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**ANALYSIS OF THE EFFECT OF ROLE CONFLICT, JOB STRESS, AND PSYCHOLOGICAL CAPITAL ON NURSE PERFORMANCE**

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**ABSTRACT**

*This study aimed to analyze the magnitude of Role Conflict, Job Stress, Psychological Capital (Psycap), and Job Performance of Nurses in the context of nurses at Regional General Hospitals in Jambi-Indonesia Province. This study adopted inferential research designs. This is a cross-sectional study as the data in this study was collect at one point in time. This study used a survey method; the approach was exposed de facto, using a saturated sample of 161 respondents. The instruments to measure all research variables adopted instruments that have been used previously. The number of themes and scales was adjusted to the data needs and characteristics of nurses in Indonesia. After adaptation, the items were translated into Indonesian. Smart PLS 3.0 and SPSS software were used in data analysis.*

*Research findings showed that directly good role Conflict and Job Stress have an effect on Psychological Capital (Psycap) and Job Performance of Nurses and have an indirect impact on*

*Job Performance through Psychological Capital. This research was conducted with a limited sample (n=161), so that it was difficult to generalize to the Job Performance of Nurses, therefore for further research, the sample needs to be enlarged, and research needs to be carried out in several hospitals. However, if the research findings are implemented productively, the outputs of this research will be synergized, namely as psychological capital to maintain the health of nurses with the ability to overcome conflict and stress in the workplace and create a healthy, comfortable and pleasant environment.*

*Keywords: Role Conflict, Job Stress, Psychological Capital, Nurse Performance*

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**1. INTRODUCTION**

Job performance is an organizational value from a series of employee behaviors that contribute directly or indirectly to organizational goals (Campbell, 1990). According to him, job performance includes three things: 1) refers to work behavior rather than results, 2) includes relevant behavior to organizational goals, and 3) is multidimensional. Moorhead and Griffin (1999) suggest that job performance is a set of work-related behavior. Motowidlo and Kell (2012) explain that job performance is an organizational value that is expected from what employees do. Performance can reflect individual involvement and the resulting consequences. The results of employee behavior can contribute positively or negatively to the organization.

Both in the past and during the current covid-19 pandemic, nurses have become fighters who are at the forefront of handling patients diagnosed with a disease, including a dangerous disease such as contracting the coronavirus. For this reason, the community hopes that nurses can increase their role to produce a good performance. But on the other hand, many people also complain about the performance of nurses, especially those who work in public hospitals. It is often assumed that they do not have job satisfaction, lack a high commitment to their main tasks, their psychological well-being is weak, which resulted in their performance being as it is. Low performance may be caused by high work stress and anxiety, or it may be due to role conflict and so on.

According to role theory, role conflict and tension often arise due to which individuals find it increasingly difficult to successfully carry out their respective roles due to limited resources (e.g., time, energy) or incompatibility between different roles (e.g., employee vs. spouse or superior-subordinate role). Therefore, it is necessary to see how nurses have psychological capital that can act as a factor that can improve their performance. Recently, in the field of organizational behavior, Psychology Capital (hereinafter referred to as PsyCap) has been studied to measure and manage human resources. PsyCap is a state of positive individual psychological development, which is characterized by: (1) the presence of self-efficacy to take the necessary actions to achieve success in challenging tasks; (2) positive attribution (optimism) about current and future success; (3) persistence in achieving goals, with the ability to redefine the path to achieving goals if needed (hope) to achieve success; and (4) when facing problems and difficulties, being able to survive and move forward (resiliency) to achieve success (Luthans, Youssef & Avolio, 2007). PsyCap is a positive resource for improving employee performance and coping with challenges, stress, or conflict. The research is conducted to (a) Identify a model that represents the relationship between role conflict, job stress, and psychological capital on individual performance at work; (b) create and validate research instruments that can be used for large-scale

surveys; and (c) statistically estimate the effect of role conflict, job stress and psychological capital on nurse performance.

## **2. LITERATURE REVIEW AND HYPOTHESIS**

### **Job Performance**

The performance consists of various dimensions, which are reflected by indicators that can be measured directly (Viswesvaran, 2011). Therefore, to conceptualize and operationalize individual performance, it is necessary to explain the construct and identify its dimensions and indicators. Another obstacle is determining which measurements can be applied to various jobs; otherwise, the indicators may differ from job to job (Koopmans et al., 2011). The definition of individual performance used in this study is a combination of behavioral and outcome dimensions (Sonnentag et al., 2008). Not all individual behaviors are constituents of the concept of performance, but only those with relevance to the implementation of activities can be evaluated. Therefore, when organizing individual performance as behavior, there is difficulty in determining which ones are effectively relevant to the organization (Sonnentag et al., 2008; Bendassolli, 2012).

All performance concepts refer to behaviors beyond formally defined work goals, such as taking on more tasks (Koopmans et al., 2011; Schneid et al., 2015). The following assumptions distinguish contextually and task performance: (1) task performance activities vary between jobs, whereas contextual performance activities are relatively similar across jobs; (2) task performance is predicted mainly by ability, while contextual performance is related to personality and motivation; (3) task performance aims to meet the expectations specified for the position, whereas contextual performance is more related to different roles, related to spontaneous behaviors that arise (Sonnentag and Frese, 2002; Schneid et al., 2015).

Several theoretical and empirical reports published over the last 20 years have found causal models of performance that explain the relationship between essential traits such as cognitive ability and personality and performance using intervening variables such as knowledge, skills, and sometimes other variables that are also thought to mediate the underlying effect of traits. -characteristic of the performance. Hunter (1983) reported the results of a meta-analysis based on a total sample of 3,264 cases examining the relationship between cognitive ability, job knowledge, performance, and performance supervisory ratings. The average correlation across studies in its meta-analysis supports that model. It has a direct causal path from the ability to both job knowledge and performance, a direct approach from job knowledge to performance, and a direct way from both job knowledge and work sample performance to rank supervisors' performance.

Schmidt, Hunter, and Outerbridge (1986) added work experience to the variables tested by Hunter (1983). Using data from the four studies included in Hunter's meta-analysis, they showed that in addition to ability, experience also had a direct influence on job knowledge and a less direct effect on the performance of the job sample. There is no direct effect of experience on supervisory ratings. Thus, both experience and ability have a substantial direct effect on knowledge and a smaller direct impact on skills as measured by work sample performance. Neither variable affects job performance as measured by supervisory ratings except through their effect on job knowledge and skills.

Campbell (1990) and colleagues (Campbell et al., 1996; Campbell, McCloy, Oppler, & Sager, 1993) presented a theory of performance that formalized the relationships that Hunter (1983) and Borman et al. (1991) between ability, job knowledge, skills, and performance. They argue for three direct determinants of job performance: declarative knowledge, procedural knowledge and skills, and motivation. Declarative knowledge is knowledge of facts, principles, and knowledge procedures that tests might measure, for example. Procedural knowledge and skills are skills in doing what should be done; it is a combination of knowing what to do and doing it. This includes cognitive skills, psychomotor skills, physical skills, self-management skills, and interpersonal skills and can be measured by simulations and job sample tests. Motivation is a combination of the choice to exert effort, the choice of how much effort to put in, and how long to try. Individual differences in personality, abilities, and interests are considered a single entity and interact with education, training, and experience to form declarative knowledge, procedural knowledge and skills, and motivation.

Spending more time than expected either at work or in the family, fulfilling roles by desire or by need, lowers performance, causes work-family conflict, and negatively affects life satisfaction (Karatepe & Bektashi, 2008). Frone et al. (1997) stated that role conflict reduces performance. Karatepe and Kılıç (2007) found that role conflict has a negative effect on performance. Bhuiana et al. (2005) stated an inverse and significant relationship between employee performance and their level of work-family conflict. Stress due to conflict between work and family can increase productivity, but it can result in loss of performance and mental disorders



(Bacharach et al., 1991; Frone et al., 1992). Jamal (1985) and Abramis (1994) underlined if there is a negative correlation between stress and performance.

### **Psychology Capital/PsyCap**

PsyCap is a scientific study of psychology in industry and organizations. Recently, in the field of organizational behavior, PsyCap has been studied to measure and manage human resources. PsyCap is one view that arises due to the need for practitioners in organizations to find new approaches in psychological practice in the realm of work where a negative psychological approach is felt to make workers only fulfill their personal needs. Through this negative psychological approach, only solves short-term problems. Luthans, et al., (2007). Along with the times, a positive psychological approach emerged that was developed by Seligman (in Luthans, Youssef, and Avolio, 2007), the researchers then found a new approach that could minimize the shortcomings of the negative psychological approach, namely, Positive Organizational Scholarships at the organizational level and Positive Organizational Scholarships at the organizational level. Organizational behavior at the individual level. Psychological capital is part of Positive Organizational Behavior.

Luthans, et al. (2007) define PsyCap "... an individual's positive psychological state of development and is characterized by: (1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resiliency) to attain success".... a state of positive psychological development of the individual and is characterized by: (1) having the confidence (self-efficacy) to take on and put forth the effort necessary to succeed at challenging tasks; (2) make positive attributions (optimism) about success now and in the future; (3) persevering toward the goal and, when necessary, directing the path to the goal (hope) to succeed; and (4) when hit by problems and difficulties, able to endure and bounce back and even surpass (resilience) to achieve success. So PsyCap is a psychological construction consisting of making positive attributions both now and in the future (optimism), trying to find alternative ways to achieve goals (expectations), believing in one's competence to achieve a specific set of goals (self-efficacy), and maintaining focus. And bounce back to achieve goals in the face of problems and setbacks (resilience) (Luthans and Youssef, 2007).

The concept of expectation (Snyder, 2000) represents a set of cognitive pathways associated with problem-solving and job performance (Peterson and Byron, 2008). Optimism is defined as a person who has a strong potential to have important organizational outcome indicators such as organizational commitment, job satisfaction, citizenship behavior, and performance (Kluemper et al., 2009). The results of the meta-analysis show that self-efficacy is generally positively and strongly associated with performance (Stajkovic and Luthans, 1998). Finally, resilience positively contributes to job satisfaction, job happiness, and organizational commitment (Youssef and Luthans, 2007). Although research to date has provided little evidence of such resilience in the workplace, Luthans et al. (2005) found a significant relationship between the resilience of Chinese workers undergoing a considerable transformation and their performance. Empirical evidence shows that levels of hope, optimism, self-efficacy, and resilience are each related to performance to the same extent.

However, the combination of these three aspects has a stronger relationship with performance than one aspect individually, which suggests a shared mechanism between them (Luthans et al., 2005). This is because, although each component has shown discriminant validity across multiple samples compared to one another (Bryant and Cvengros, 2004; Carifio and Rhodes, 2002; Magaletta and Oliver, 1999; Youssef and Luthans, 2007), there is also evidence to support this. Overall core construction (Luthans et al., 2005). A meta-analysis found that PsyCap was an important predictor of desired (satisfaction, commitment, psychological well-being, superior performance) and undesirable (cynicism, intention to leave, job stress, anxiety, and deviant) job-related attitudes and behaviors (Avey et al., 2011). Individuals who have a high PsyCap, have more resources to use when pursuing goals (Hobfoll, 2002), and therefore perform better (Luthans et al., 2007; Avey et al., 2011; Peterson et al., 2011). Newman et al. (2014) conducted a comprehensive study of PsyCap and concluded that PsyCap can be considered as a mediating factor between organizationally relevant antecedents and various individual, team, and organizational outcomes.

Over the years, numerous studies have shown that the core construct of PsyCap has a more substantial impact than one or more of its constituent components (see meta-analysis of 51 studies by Avey et al., 2011; and comprehensive review by Dawkins et al., 2013; Newman et al., 2014), and is related to attitudes, behaviors, and desired work performance (see Luthans and Youssef-Morgan, 2017; Peterson et al., 2011), over and above recognized demographic characteristics. Broad and positive traits such as personality and self-evaluation (Luthans et al., 2015) in western and non-western cultures (Sun et al., 2012). For example, Avey et al. (2011), in

their meta-analysis, found a positive correlation of PsyCap with job performance (0.26 in 24 studies), with organizational citizenship behaviors (0.45 in 8 studies), and with attitudes of satisfaction (0.54 in 10 studies) and commitment (0.48 in 9 studies). They also found a negative correlation of 0.43 (in 7 studies) between PsyCap and counterproductive measures of work behavior.

Soleha Research. N, Rosiana, and Yulianto (2014) found that PsyCap had a significant positive effect on employee performance, as indicated by the original sample estimate value of 0.541. Also, research by Tovan and Rusdianan Rauf (2020) PsyCap significantly affects employee performance by 0.485. The results of this study are consistent with research conducted by Venkatesh and Blaskhovic (2012) and Luthans et al. (2008), which states that Psychological capital influences positive employee behavior in the form of employee performance. Meanwhile, Meliana's research (2020) found a strong significant negative relationship between psychological capital and work stress (correlation magnitude of -0.731). Harms and Luthans (2012) describe the positive contribution of psychological capital in improving performance, strengthening personality, and the ability to act rationally in critical conditions. PsyCap can improve job performance and help in achieving employee goals (Sun et al., 2011). Psychological capital was a strong predictor of improving job performance (Luthans et al., 2007). For this reason, the following hypothesis is proposed:

*H1: PsyCap has an effect on job performance.*

### **Role Conflict**

When responsibilities are not adequately defined or not properly defined, role conflict will occur. Role conflict has been described by Rizzo et al., (1970) as "The conflicting roles performed by individuals in an organization. Role conflict has also been defined as "the degree to which a person experiences stress in one role that is incompatible with stress in another" (Glissmeyer et al., 1985). Roles arise when more demands have been placed on the individual by coworkers, supervisors, subordinates. This type of stress is more dominant because you lack description or unclear description, which requires conceptual thinking and decision-making (Zhao et al., 2010). Role theory states that "when the expected behavior of an individual is not appropriate, he will experience stress, depression, become dissatisfied, and his performance is less effective than if the expectations imposed on him are not contradictory. Thus, it can be seen that role conflict can negatively impact the individual state of mind". Another way to explain it may be that individual commitment decreases due to role conflict, Ahmad and Taylor (2009). Kahn et al. (1964) describe the role theory, and they suggest that the organizational environment influences employee role expectations and roles. Expectations are pressures and norms to act as directed. But the role may not be in the range of his duties. Role conflict will arise if the demands do not match the needs of employees, goals, abilities, values, and beliefs. Singh et al., (1994) suggested that role conflict can be seen in all organizations.

According to Schemerhorn, Hunt & Osborn (1991), a "conflict" role can occur when one or more group members take on an inappropriate role. The types include intrasender, intergender, person-role, and inter-role conflict. Intrasender role conflict arises when members who have the same role have conflicting expectations. Intergender role conflict arises when members who have different roles have conflicting expectations. Person-role conflict arises when the values and needs of individual conflicting roles do not match the expectations of group members' roles. Interrole conflict: arises when the expectations of two or more roles held by the same individual do not match.

Role conflict sometimes called role stress, relates to the environment work, caused when work to do, tasks to be performed, and tasks to be assigned to employees are not clearly defined, not explained, and specified. "Role conflict will lead to job dissatisfaction among employees and this dissatisfaction will be the most dangerous thing for the organization and also for employees (Behrman, Douglas, & William, 1984)". These forms of stress have been identified and discussed in the organizational behavior literature highlighting the fact that these types of stress and conflict such roles must be addressed (Fisher, Cynthia, & Richard, 1983). Role ambiguity will occur when the "task perceived by the individual", which must be completed, is very unclear, which will eventually make the mind hesitate to work and which work to do with what time and concentration to pay."

According to Safaria et al. (2011), "conflict relationship role with work stress mediated by job unrest is significant." Yousef (2000) studied that "role stressors do not affect satisfaction" work, but can affect job satisfaction separately." In the study of Lankau et al., (2006) it was concluded that if role conflict is reduced, the level of job satisfaction and commitment organization will increase." "The higher the level of role conflict, the lower the performance (Higgins et al., 1992)." Yousef (2002) studied that "role stressors have a direct and negative relationship to job satisfaction." Bennet et al., (2001) identified in their study that "there is a significant relationship between work conflict or work-at-home disturbance and job satisfaction." In Feldman's study

(1976) it was concluded that "there is a relationship between role conflict and performance". The study of Bhagat et al, (1985) also identified a "negative relationship" between job satisfaction and work conflict." For this reason, the following hypothesis is proposed:

*H2: Role conflict affects job performance*

*H3: Role conflict affects PsyCap*

*H4: Role conflict has an indirect effect on job performance through PsyCap.*

### **Job Stress**

Work-related stress or job title has been identified as one of the biggest problems in the environment work organization. Job stress has been widely associated with adverse effects on the psychological and physical well-being of employees in many occupations, including academics in Colleges. Therefore, work stress has an impact on a large increase in costs for employee welfare and place a sizeable financial burden on performance organization. Work stress is work-related stress. According to the WHO definition "occupational or work-related stress "is the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope)." Based on general stress theory or integrative stress theory which includes workers' subjective processes (i.e., personality or attributes such as locus of control and flexibility, which may have an influence on perception stress at work) and environmental sources objective or external sources of stress (e.g., extreme or noxious stimuli such as the risk of physical harm, working conditions such as extreme temperatures) are built on the premise that individuals in principle will try to deal with, update, and improve their resources, and when they can't, they experience stress. Resources are defined as goal characteristics personal, condition, energy or ability that a person has in dealing with stress. In other words, "stress occurs when a person's resources are perceived to be unstable, threatened or lost, or when the individual is unable to achieve or maintain resources in the way he or she could (Hobfoll, 2001)."

According to Pleck et al. (1980) "The source of stress, which occurs in life can have an effect on other life forms in unexpected ways." In other words, demands coming from work for both employees and their families if it exceeds individual stamina will end with an increase in tension. Work stress is defined as "an individual reaction to environmental characteristics" work that seems emotionally and physically threatening (Arshadi & Damiri, 2013)." Some studies claim that the increasing demands on employees that are not in accordance with their abilities, then the job stress increases (Yozgat et al., 2013). Apart from this imbalance, there are many sources of stress such as physical environment, workload, career advancement, management style, work relationship, endorsement organization, the work itself, the rewards, the security work, job autonomy, conflict role, ambiguity, and others (Trivellasa et al., 2013). This stress can cause "negative physical, psychological or physiological reactions (Haq, 2011)."

Stress at work generally occurs due to job attribution, hierarchical situations, relationships between colleagues and customers (Drowkin et al, 1990)." High levels of stress can lead to several negative consequences such as "absenteeism, industrial accidents and injuries (Sharpley et al, 1996)." According to Greenhaus and Beutell (1985) "stress, tension", distraction, anxiety and individual fatigue that occur because of his family or the work itself causes several obstacles to achieving optimal performance." For this reason, the following hypothesis is proposed:

*H5: Job stress affects job performance*

*H6: Job stress affects PsyCap*

*H7: Job stress has an indirect effect on job performance through PsyCap.*

### **3. METHODS**

#### **Research Design**

This study adopted inferential research designs. This is a cross-sectional study, which the data in this study was collected at one point in time. This study used a survey method, the approach uses exposed de facto to assessing the impact of role conflict, job stress, and PsyCap on the performance of nurses in the work environment of the Regional General Hospital. Using a saturated sample totaling 161 respondents. From the respondents' distribution, it was known that the top three respondents came from the ER, 21 people, Neuro and Internal Medicine 18 people, and 16 Obstetricians. Meanwhile, for the three lowest, the respondents were at least 1 person from the ENT, Radiology and Conditions Polyclinic. This indicates that there was an imbalance in the distribution of medical personnel at Regional Hospitals.

### Place and time of research

This research was conducted at the Abdul Manap Regional General Hospital (RSUD) Jambi City, which is located at Jalan Raden Syahbudin, Mayang Mangurai, Alam Barajo District, Jambi City. RSUD has type C which was established in 2009. The time of the study was conducted in April-June 2021.

### Study Measures

The instrument for measuring all research variables in this study adopted an instrument that had been used previously. The number of themes and scales was adjusted to the data needs and characteristics of nurses in Indonesia. After adaptation, the items were translated into Indonesian.

**Job Performance.** Adopting a measurement scale that has been modified and developed by Van Scotter and Motowidlo (1996), Belfort and Hattrup (2003), and Sampath Kappagoda et al. (2014) which includes two dimensions, namely; the task performance dimension was measured by five questions, while the contextual performance dimension was measured using six questions. Both dimensions used a four-point scale ranging from “never” score = 1 to “Very often” with a score of 4. Example questions: How often do you receive a special task (trust) from your boss to do?

**Psychological Capital/PsyCap.** PsyCap was adopted and modified from the PsyCap Questionnaire developed by Luthans et al. (2007) adapted to Indonesian conditions. Psychological capital includes four dimensions: hope, optimism, resilience, and self-efficacy, measured by 12 items consisting of four subscales. Examples of questions: hope (e.g., “If I have to find myself in a traffic jam at work, I can think of many ways to get out of it”), resilience (e.g., “I usually overcome adversity one way or another at work”), optimism (e.g. “I always look on the bright side of my work”), and efficacy (e.g., “I feel confident helping to set goals/goals in my work area”). Responses were given on a four-point Likert-type scale (very disagree score = 1, strongly agree score = 4). Cronbach's for the overall scale was 0.79, and ranged between 0.73 and 0.82 for the sub-dimensions, indicating that the scale was reliable.

**Job Stress.** The measurement of the work stress variable modifies the Stress in General Scale (SIG) which is designed to measure the cognitive aspects of general job stress in various workplaces developed by Stanton et al. (2001). GIS was designed to measure the cognitive aspects of stress in general in various workplaces, covering two subscales, namely the dimensions of job threat stress and the dimensions of job pressure stress. The job threat stress subscale consisted of eight items (annoying, restrained, stressful, annoying, comfortable, more stressful than I would like, running smoothly and overwhelming), and the job stress subscale consisted of seven items (demand, pressured, busy, calm, relaxing, a lot of stressful, and encouraging). The responses were using a Likert scale ranging from 1 = strongly disagree, to 4 = strongly agree.

**Role Conflicts.** Role conflict is a psychological symptom experienced by organizational members/nurses that causes discomfort at work. To measure the role conflict used a questionnaire developed by Rizzo et al. (1970) used 10 question items. Example question: “I do a job that is different from my skills”. Responses using a Likert scale ranging from 1 = strongly disagree, to 4 = strongly agree.

### Data Analysis

In this study, Smart PLS 3.0 and SPSS software were used in data analysis. SEM PLS works in stages to get a predictive model in the form of a final statistical report equipped with several statistical tests. SEM PLS worked through two stages, namely the Factor Analysis Stage and the Regression Analysis Stage. At the level of constructing the framework of the relationship between the construct and its indicators, Smart PLS uses factor analysis, because the data used were generally categorical data with a certain scale. At the level when the factor analysis process was completed, the PLS SEM work already has a regression score, which can be continued with regression analysis for hypothesis testing. In this study, the validity test used the convergent validity and discriminant validity methods with the helped of Smart PLS 3.

## 4. RESULTS

### Demographic data

After the data screening process was carried out on all respondents who filled out the questionnaire, the researchers got 161 pieces of data for analysis as research samples. The results were presented in **TABLE 1** below.

**TABLE 1. Respondent Demographic Information (n=161)**

Demographic Characteristics	Category	Frequency	Percentage %
Gender	Man	16	9.94%

<b>Age</b>	girl	145	90.06%
	<b>Total</b>	<b>161</b>	<b>100%</b>
	< 21 Years	10	6.21%
	> 21 Years	151	93.79%
<b>Education</b>	<b>Total</b>	<b>161</b>	<b>100%</b>
	D3	160	99.38%
	SPK and Ners	1	89%
	<b>Total</b>	<b>161</b>	<b>100%</b>
<b>Years of service</b>	< 10 Years	81	50.31%
	> 10 Years	80	49.69%
	<b>Total</b>	<b>161</b>	<b>100%</b>
	<b>Total</b>	<b>161</b>	<b>100%</b>
<b>Competency improvement training</b>	Ever	123	76.40%
	Never	38	23.60%
	<b>Total</b>	<b>161</b>	<b>100%</b>
	<b>Total</b>	<b>161</b>	<b>100%</b>

### Validity and Reliability Test

In the research, the validity and reliability testing used SPSS 24 software. The summary of the results is presented in **TABLE 2** below.

**TABLE 2.**Summary of Validity and Reliability Test Results

Variable	Item Items	Validity		Reliability	
		rcount	Information	Crobach's Alpha	Information
<b>Role Conflict (X1)</b>	KP1	0.644	<b>Valid</b>	0.829	<b>Reliable</b>
	KP2	0.449	<b>Valid</b>		
	KP3	0.615	<b>Valid</b>		
	KP4	0.559	<b>Valid</b>		
	KP5	0.635	<b>Valid</b>		
	KP6	0.479	<b>Valid</b>		
	KP7	0.611	<b>Valid</b>		
	KP8	0.726	<b>Valid</b>		
	KP9	0.660	<b>Valid</b>		
	KP10	0.644	<b>Valid</b>		
<b>Work Stress (X2)</b>	SK1	0.665	<b>Valid</b>	0.445	<b>Reliable</b>
	SK2	0.706	<b>Valid</b>		
	SK3	0.789	<b>Valid</b>		
	SK4	0.676	<b>Valid</b>		
	SK5	0.623	<b>Valid</b>		
<b>Capital Physicologist (Y)</b>	CP 1	0.441	<b>Valid</b>	0.703	<b>Reliable</b>
	CP 2	0.720	<b>Valid</b>		
	CP 3	0.652	<b>Valid</b>		
	CP 4	0.558	<b>Valid</b>		
	CP 5	0.660	<b>Valid</b>		
	CP 6	0.410	<b>Valid</b>		
	CP 7	0.722	<b>Valid</b>		
	CP 8	0.645	<b>Valid</b>		
	CP 9	0.631	<b>Valid</b>		
	CP 10	0.560	<b>Valid</b>		
	CP 11	0.711	<b>Valid</b>		
	CP 12	0.548	<b>Valid</b>		
<b>Nurse Performance (Z)</b>	KPE1	0.821	<b>Valid</b>	<b>0.907</b>	<b>Reliable</b>
	KPE 2	0.817	<b>Valid</b>		
	KPE 3	0.838	<b>Valid</b>		
	KPE 4	0.723	<b>Valid</b>		
	KPE 5	0.821	<b>Valid</b>		

	KPE 6	0.759	Valid		
	KPE 7	0.829	Valid		
	KPE 8	0.789	Valid		
	<b>KPE 9</b>	<b>0.444</b>	<b>Valid</b>		

### Hypothesis test

The summary of the results of hypothesis testing is presented in TABLE 3, TABLE 4, and TABLE 5 FOLLOW.

**TABLE 3. Summary of the correlation coefficient between variables**

VARIABLE	Role Conflict (X1)	Work stress (X2)	Capital Physicologist (Y)	Nurse Performance (Z)
<b>Role Conflict (X1)</b>	1	.788**	.374*	.460*
<b>Work stress (X2)</b>	.788**	1	.344*	.441*
<b>Capital Physicologist (Y)</b>	.374*	.344*	1	.840**
<b>Nurse Performance (Z)</b>	.460*	.441*	.840**	1

\*Correlation is significant at the 0.05 (1-tailed), \*\*. Correlation is significant at the 0.01 (1-tailed)

**TABLE 4. Summary of Direct Effect Path Coefficients**

No.	Independent Variable	Dependent variable	Coefficient Beta (β)	t-count	Sig.	Information
1.	X1	Y	-0.072	3,327	0.001	Significant
2.	X1	Z	-0.010	1,845	0.002	Significant
3.	X1	X2	0.269	3,780	0.000	Significant
4.	X2	Y	-0.013	3,001	0.001	Significant
5.	X2	Z	-0.028	3,447	0.000	Significant
6.	Y	Z	0.284	3,226	0.000	Significant
7.	X1,Y	Z	1,256	1.091	0.143	Not significant
8.	X2, Y	Z	1,440	3.048	0.102	Not significant
<b>Error (e1): 1-0.448=0.742</b>						

Source: Research Primary Processed Data, 2021

**TABLE 5. Summary of Effects (X); (Y) against (Z)**

VARIABLE EFFECT	CAUSAL INFLUENCE		
	Live	Indirect	
		Via Variable Y	Total
<b>X1, X2, Z AGAINST Y</b>	X1 Y = 3,327 YZ = 3.226 X2 Y = 3.001	X1 YZ = 1.091 X 0.001 = 0.033	0.033
<b>X2, Z AGAINST Y</b>	X2 X3 = 3,447 X1 X3 = 1.845	X2 YZ = 3,048 X 0.102 = 0.310	0.310
<b>Y AGAINST Z</b>	3,226	-	3,226
<b>1 X1, Z AGAINST Y</b>	1.091	-	1.091
<b>2 X2, Y AGAINST X3</b>	3.048	-	3.048

From the processing results, a path analysis model was developed in this study as shown in **Figure 1** below:

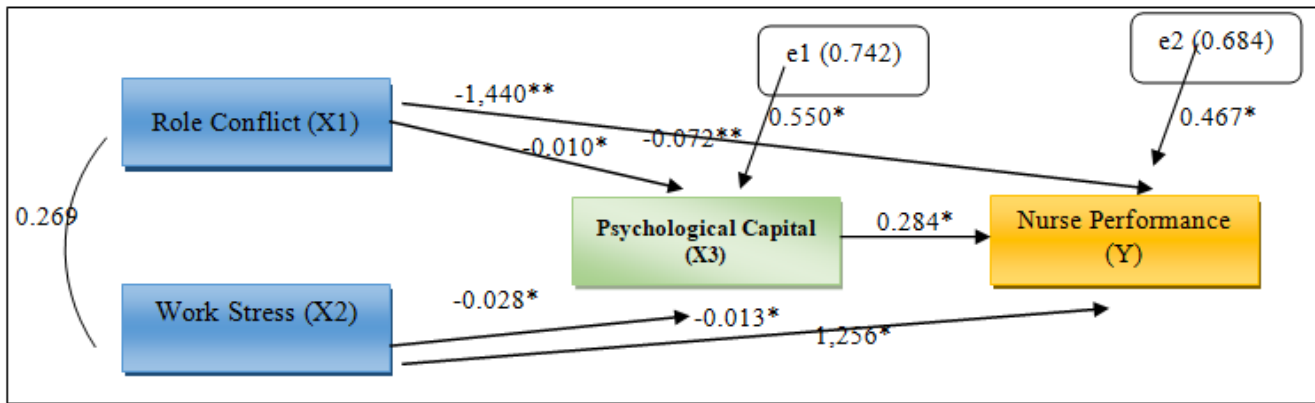


Figure 1. Research Model

**Model suitability test (goodness of fit test)**

Analysis of the data processing results at the entire stage of the SEM model was carried out by conducting a suitability test and statistical test. The results of the goodness-of-fit model test were described in **TABLE 6** below:

**TABLE 6. Goodness-of-fit Model Test Results**

No	Index	Critical Value	Result	Model Evaluation
1	Chi-Square	Close to zero	44,331	Good
2	Probability level	0.05	0.001	Good
3	CMIN/DF	< 2.00	1,428	Good
4	CFI	0.95	0.878	Marginal
5	RMSEA	0.08	0.065	Good
6	TLI	0.90	0.862	Good
7	GFI	0.90	0.712	Marginal
8	AGFI	0.90	0.843	Marginal

Source: Research Primary Processed Data, 2021

These results indicate that the model used was acceptable. The CMIN/DF value of 1.428 indicates a good structural equation model. The RSMEA measurement index was in the range of expected values, namely 0.08, which was 0.065. And the results of the chi-square, probability level, CFI, TLI assessment are marginally accepted. This research model was feasible from several model feasibility tests and meets the criteria, and several model feasibility test methods were met with Chi-Square 44,331. From the results of the model output for the model suitability test criteria, several measures were at an acceptable, marginal value. The marginal value was the condition of the suitability of the measurement model under the criteria for absolute fit and incremental fit. However, it can still be continued in further analysis because it was close to the good fit criteria.

**DISCUSSION AND CONCLUSION**

This study was conducted to measure the influence of Role Conflict, Work Stress, and Psychological Capital on Nurse Performance which was analyzed using the SEM (structural equation modeling) method. The purpose of this study was to examine and analyze the relationship between variables and examine the role of the mediating variable, namely Psychological Capital. Role conflict has a positive role in job stress. From the test, it appears that when the work stress variable was added to the model, it can be seen that role conflict has a significant effect on nurse performance. From the loss of the direct influence of role conflict on nurse performance, it can be said that work stress has a full mediation effect.

Based on the result in this study, the researchers can conclude that the role conflict construct has a direct and significant negative effect on the nurse's work stress construct. This indicated that an increase in role conflict would increase nurse work stress, or other words; the higher the role conflict, the higher the work stress. The results of this study are in line with research conducted by Tidd and Friedman (2002), which states that work stress can be influenced by the existence of conflict within the organization. One of them is role conflict. Role conflict can be interpreted as a situation where an individual has different roles at the same time. The role conflict puts pressure on individuals because of differences in interests between roles that can cause work stress.

Based on the results of structural testing or the inner model, it is known that the Role Conflict variable has a significant effect on the Nurse Performance variable. This shows that role conflict does not have a negative effect on employee performance, so the hypothesis that there is a negative effect of role conflict on employee performance is not supported. This study is not in line with Fisher (2001) in Fanani et al (2008), which states that role conflict causes discomfort at work and can reduce work motivation to reduce overall performance.

Role conflict will have a direct effect on employee performance if it passes the work stress variable. Moorhead and Griffin (2013) stated that if someone performs two or more roles simultaneously assigned by the boss, it can lead to stress. This hypothesis is not supported by several arguments. First, nurses have been able to deal with role conflicts professionally so that it does not affect the results of their performance, even though with heavy duties, obligations, and workloads nurses can minimize the possibility of collisions and pressures in their work. Second, there is an incentive that is commensurate with the workload given by the hospital to nurses, so that it can stimulate employee motivation to complete the job as best as possible.

The results in this study show that the third hypothesis is accepted because work stress has a negative and significant effect on nurse performance. This means that the duties, roles, and responsibilities that must be carried out by nurses sometimes make individuals experience work stress because the burden is too heavy. However, the work stress experienced by nurses is positive which gives rise to encouragement or motivation to improve performance. This is in line with Handoko (2012) which states that the consequences of work stress can be in the form of building or destroying work performance. Luthan (2006) job stress is not automatically bad for individual employees or their organizational performance. This is also in line with the theory of Robbins (2009) that stress with low to moderate levels stimulates the body and increases its ability to react. They then often perform tasks that are done better, more intensely, and faster.

This study states that job stress mediates role conflict on nurse performance, in line with Rusinta's (2013) research which states that job stress mediates role conflict and employee performance. According to Ivancevich and Gibson (1987), role conflict is a conflict that arises when a person gets a role that does not match with the appropriate role behavior. The inappropriate role can cause pressure in a person which in turn causes work stress. If the role conflict is tested without including the mediating variable, namely work stress in the hypothesis test, then the hypothesis testing of the role conflict affects the nurse's performance is not supported. This means that several factors affect nurses' performance, such as job satisfaction, organizational culture, and work environment.

Implementation of Psychological Capital as a way to measure and manage human resources. PsyCap is one view that arises due to the need for practitioners in organizations to find new approaches in psychological practice in the realm of work, where a negative psychological approach is feel to make workers only fulfill their personal needs. Through a negative psychological approach it only solves short-term problems. (Luthans, et al., 2007). Research shows a strong influence of Psychological Capital on job performance. This is in line with Harms and Luthans (2012) who describe the positive contribution of psychological capital in improving performance, strengthening personality, and the ability to act rationally in critical conditions. PsyCap can improve job performance and help in achieving employee goals (Sun et al. 2011). Psychological capital was a strong predictor of improving job performance (Luthans et al., 2007). Nurses who experience work stress will do Psychological Capital to reduce the pressure they experience, Psychological Capital carried out by nurses can be positive or negative. Psychological capital that tends to be negative will harm the nurse because Coping serves to change situations that cause stress or regulate emotional reactions that arise because of a problem. Empirical evidence shows that job stress, optimism, psychological capital, and resilience are each related to nursing performance to the same extent.

## **RESEARCH LIMITATIONS AND IMPLICATIONS**

The sample consisting of 161 has a clear weakness because it is limited. Replication of this study is needed with a wider sample and across different hospitals and cultures to increase the generalizability of our findings. The use of longitudinal datasets is required for future analysis. In addition, it should be noted that different measuring instruments may have led to different results, so the definition of construction and size deserves further attention. Constraints faced during implementation, role conflict, and work stress in optimizing the performance of nurses are obstacles that usually occur in every organization. Considering that, in an organization, there are various kinds of individual characters who run the organization. Therefore, the implication is that nurses are expected to be able to reduce these problems with the right solution. The obstacle in implementing coping strategies in minimizing work stress is the limited time of nurses. This time limitation is unavoidable considering that working hours start at 07.30 WIB to 16.00 WIB. However, if there are still many



patients, especially during this Covid 19 pandemic, extra services are needed, which causes every nurse to be prepared to extend the duration of working hours. Constraints to the emergence of role conflict,

### **NOVELTY RESEARCH FINDINGS**

There are several justifications and updates that the researchers found in this study, especially the concept paradigm in overcoming role conflict, Psychological Capital, work stress, and performance. The researchers combine this research into one narrative that explains that every human being must have problems, from the smallest to the biggest. It all depends on the individual who undergoes it. There are various methods of solving, dealing with, avoiding, or minimizing a problem, but not infrequently, we meet someone who is afraid to face a problem and does not look for a wise solution. Suppose an individual is wrong or inappropriate in coping with a problem. In that case, the results will be unsatisfactory and can even cause disturbances in his mind and psyche, such as depression, stress, and crazy.

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**A CRITICAL ANALYSIS ON RECRUITMENT POLICIES OF GOOGLE INC: A CASE STUDY**

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**ABSTRACT**

*Well Recruitment is one the important function of any Organization because it deals with Human Capital one of the most precious asset to any organization. it always found that recruitment strategies gives improved organizational outcomes. Keeping the same context in mind a research paper Entitled Recruitment has been prepared to illuminate the Recruitment & selection process. This research paper aims at studying the Requirement & selection process followed by Google Inc .As mentioned in the beginning of abstract the Human resource is one of the most precious asset and this what makes any organization competitive & it becomes a real life blood of the organization. The study key focus is on how the recruitment and selection process plays a vital role in affecting the organizational outcome. This paper also attempts in providing suggestions that can be helpful. Qualitative research is followed. It could be found from the research that recruitment and selection policies followed at Google Inc needs some changes but the organization follows ethical recruitment policy.*

*Keywords: Recruitment, Human Capital, Recruitment Policy, Selection Process.*

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**INTRODUCTION**

Identification of a successful Human resource is a an upmost need of an any organization. The success or failure of any organization depends upon the human capital that is been employed in an organization. The right candidate at a right job increases the probability of success and growth of business and in all together an organization . recruitment may possibly what it can be defined as discovering of potential candidates for actual or anticipated organizational vacancies or the other way round to define Recruitment is an linking activity which brings together all those who needs to fill job and those seeking job. now to attract the ideal candidate we must put all things at right place that means our recruitment process will attract right candidate for right job .Recruitment is the finding of potential candidate for real or foreseen authoritative opening. Or on the other hand, from another point of view, it is a connecting action uniting those with employments to fill and those looking for work. The perfect Recruitment exertion will draw in countless qualified candidates who will accept the position in the event that it is advertised. It ought to likewise give data with the goal that inadequate candidates can self-select themselves out of occupation appointment, this is, an acceptable enlisting system ought to pull in the certified and not draw in the unfit. This double target will limit the expense of handling unfit candidates. Recruitment is the positive viewpoint though determination is the negative part of HR rehearses. A significant number of the analysts state that enrollment and choice arrangements ought to be moral for the associations so as to continue in the serious condition. As indicated by Edwin B Flipppo: Recruitment as "the way toward scanning for forthcoming workers and invigorating them to go after the positions in the association."

**LITERATURE REVIEW**

Better Recruitment methodologies bring about improved hierarchical results. Concerning this specific circumstance, the exploration paper entitled Recruitment has been set up to put a light on Enrollment and Determination process. An outline of certain examinations is given beneath:

**Burack (1985):** says that recruitment sources are closely linked to the organizational activities as performance of employees, employee turnover, employee satisfaction, employee wishes and the commitment of the organization.

**Gorter, (1996):** In his research paper titled Recruitment and Selection of public workers: An international compendium of modern trends and practices opined that technology plays an significant role in recruitment & selection process for updating the Organizational resources. they also concluded that there is a nearby linkage between the recruitment, selection of employee, satisfaction, organization performance and HR Practices.

**Michael D. White and Glipsy Escobar (2008):** The researcher did a research on Recruitment & selection process and came up with the conclusion in their research a paper tilted "Making good cops in the 21st century: Emerging issues for the effective recruitment, selection and training of police in the United States and abroad" that in Police department also recruitment and selection process are predominant factor . this paper also highlights the seven issues relating to recruitment , selection & training practices followed in any organization

**Ongori Henry and Temtime Z (2009):** The researcher in their article "Recruitment and Selection Practices of SME's: Empirical Evidence from A Developing Country Perspective" have proposed suitable systems on the most proficient method to improve human asset management practices to elevate the organizational performance. In their research they concluded that these practices do exist in SME's nevertheless a large portion of these practices are not very much reported. In this time of globalization, SMEs need to hold qualified employees so as to have upper hand and be ahead of their competitor .

**Ukinkar Vasant G (2011)** Assessed in his article "HR Practices in Paper Industry in Vidarbha", that in Vidarbha, there are near about 20 newspaper Papers. Researcher has chosen four newspapers and learned about HR Practices in Vidarbha. Some great HR Practices they embraced, for example, HR Planning, Recruitment and selection, Placement, Replacement, Effective Communication, Compensation Plan, Actuating and HRM, A cordial Industrial Relations system, Evaluation and Appraisal System, Executive Counseling, Employee welfare, Occupational Health and Safety etc He concluded that a proper HRM process need be followed by all the newspapers with the development of newspaper as an Industry in the present period.

**Mohammed Nurul Absar (2012):** In his work "Recruitment & selection practices in manufacturing firms in Bangladesh" pointed out the differences and similarities between the public and private sector manufacturing firms of Bangladesh with respect to recruitment and selection practices, sources of recruitment, and selection devices. The survey conducted on twenty six public and thirty four private manufacturing firms shows that general status of recruitment and selection practices of the private sector firms is essentially better than that of the public sector firms in Bangladesh. A few ramifications are additionally offered for the upgrade of the recruitment and selection acts of people in public and private manufacturing firms of Bangladesh.

## **RESEARCH METHODOLOGY**

### **OBJECTIVE:**

- To understand the Recruitment policy followed at Google Inc.
- To study recruitment and selection process at Google and to critically analyze the same.
- To study whether Google is choosing the best possible process for recruitment for effective hiring of resource.

### **SCOPE:**

The present research is confined to study the recruitment and selection process followed at Google Inc process followed at Google Inc. The research paper uncovers the recruitment & selection process followed in the organization. To comprehend Recruitment approach for various categories of employees .does an organization following a ethical and fair process of recruiting the employees . Regardless of whether the organization is picking the best appropriate procedure of recruitment for hiring one of the most important resource of any organization . The organizational study of Google was done with the study of recruitment and selection.

### **LIMITATIONS:**

- Due to the time constraint data collection was difficult
- Since the data collected is qualitative and not quantitative and therefore cannot be represented in statistical form.
- The outcome and result of the study were not able to assess accurately

### **DATA COLLECTION TOOL**

- Qualitative method of data collection was used. The data was obtained from company website, reports and other promotional materials.

### **DATA ANALYSIS**

One of the most outstanding proclamations of the CEO of Google Inc. is that "Google invests in people." The principle motivation behind why individuals from various societies, have been longing for being selected and recruited by Google is that the organization extends perhaps the most remarkable employment opportunity remuneration bundles any ordinary worker would ever appreciate.

So as to pool in and attract the best employees , Google draws them by the guarantee of riches , wealth ,extravagance and luxury , furnishing their workers with nearly everything a employee might require, from ludicrously high remunerations to unrestrained and sumptuous advantages like gourmet food, carwash, recreational center, snacks, practice classes, cleaning administrations, vehicle administrations, hair styles, oil changes, back rubs, tests and many more without paying a penny for it .

In any case, the recruitment procedure is likewise a long ways past common. A few people who have had undergone the recruitment process with the Google portrays that the experience was absolutely nerve-racking. A few candidates who experienced interview for Google has had five to seven meetings in a single day for a few straight days. The candidates who applied for a job at goggle guarantee that the interviews were extremely intense with the absolute most splendid individuals on the planet, leading the meetings loaded up with brain teasers, algorithmic problems, and IQ tests. A few job aspirants who additionally have had encounters in the recruitment procedure of Google claims that his Google experience was one of the most nerve-racking undertakings of their life. The interviewers looks for extremely bright individuals thus the recruitment technique was loaded up IQ tests, brain teasers, algorithms, data structures, a great deal of arithmetic engaged with it.

There were numerous cases when the candidates were approached to compose codes, brain storm, role play or solve mathematical equations on the spot just to demonstrate that they are exceptionally gifted and capable. In different cases, the candidates are even tried of their advertising abilities despite the fact that the position a candidate is applying for is exceptionally specialized and technical. The interviewers appear to have control and power over the candidates letting them do everything just to demonstrate that they are commendable for the position. Basic questions computer network problems, Java programming and algorithms by which Google is known for. Moreover, different candidates can rate and offer remarks on another candidate which Google can track and use as another reason for employing or not recruiting a candidate. Generally speaking, the procedure is a long, tedious and nerve-racking experience which can traumatize anybody whose dream is to work for one of the most renowned and prestigious organizations on this globe.

### **SWOT Analysis Of Recruitment And Selection Process Google Inc**

#### **STRENGTHS:**

- The right recruits are made.
- Control over the recruitment and selection process.
- The HR division generally has great visibility into the recruiting needs of the organization.

#### **WEAKNESSES:**

- Stressful & nerve racking recruiting process.
- The process of recruitment & selection is quite lengthy
- Number of Rounds of Interview are many that increases the stress & Anxiety of Candidate

#### **OPPORTUNITIES:**

- Large number of applicants due to attractive policies.
- The overall reputation and good will of the organization is an asset in the marketplace.
- The recruiting process appropriately & suitably addresses the realities of the current economic scenario.

#### **THREATS:**

- Sometimes Applicants loose interest due to delay in application process.
- Ensuring the Candidates Confidentiality is difficult.
- Chances of making errors in the system are more during the recruitment & selection process.

#### **FINDINGS**

- The recruitment and selection process are exceptionally distressing for the Applicants Applying for job at Google Inc.
- Some Modifications needs to be done in the recruitment policy which is been Currently followed.
- Well all those candidates appear for Interview at Google Inc has to go under rigorous process of interview with 5 -7 interviews in a day nearly about 2 to 3 days in a row .
- The Google sometimes uses pear interview process to hire new employees.
- The recruitment & selection process is quite lengthy.
- Ethics & transparency is followed during the recruitment process.

## RECOMMENDATIONS

- HR department can always involve the Heads of other department while recruiting a candidate so that they can securitize the knowledge of candidate related to a particular job
- The recruitment process should be done in a careful manner with appropriate methods and techniques to ensure that the hired employees are the right ones in terms of qualification and experience.
- Recruitment and selection process should be precise and less time consuming so in turn that reduces stress of the candidate.
- All the policies related to appraisal and promotion should be conveyed to candidate at the time of interview during the recruitment process itself so it reduces and avoid the future grievances.
- It should not be a single Hiring manager or Single HR personnel who should convey the candidate or applicant about the selection of particular candidate.
- Well there are always various medium or platform to increase the scope of recruitment and one such source is advertisement so that aspiring candidates get to know well in advance about the opening .
- The growth of any organization depends on value addition done by its employee to the organization hence HR department must select those employees who have vision and will definitely add value

## CONCLUSION

Even though world is heading towards modernization and it has done extreme growth in terms of technology, we must never forget that human resource is always an indispensable asset to any organization. The growth and expansion of a organization is definitely function of many variables and parameters one such variable is the employees working for that organization. It has been proved on several occasion that no matter technologically how much the world progress it will be always of no value without the contribution of Humans. So from this research we can conclude that recruitment process plays a critical and vital role for any organization . hence these process must followed very meticulously and the HR department must select the suitable candidate for a suitable Job. As it is aptly said that a right Candidate for a right Job at a t a right place can create wonders for the organization. at the Google Inc it was found that some modifications needs to be done according to the changing scenario. Its always better to move with the pace of the world when it comes to recruitment & selection process so that we are not left behind our competitor and we choose the best candidate.

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## PUPIL CONTROL IDEOLOGY AMONG SECONDARY SCHOOL TEACHERS: A LITERATURE REVIEW

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### ABSTRACT

*The present paper contains a systematic review of literature related to pupil control ideology among secondary school teachers. There are various factors which influence the Pupil Control Ideology among Secondary School teachers. From this systematic literature review the purpose of this paper is to get an idea of the background of the Pupil Control Ideologies of the Secondary School teachers. Also, this may aid in avoiding any shortfalls faced by the previous studies and risk of repetitions if any studies in this context is considered. This study aims to determine pupil control ideology of teachers working at secondary stage. The primary aim of the study is to identify pupil control ideology of teachers. The study will lead to important understanding on the teacher working at the secondary level. This study may aid in finding out the research gaps in this particular context so that focused studies may be conducted in future to contribute significantly to the pool of knowledge.*

*Keywords: Secondary School students, Pupil Control Ideology.*

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### 1. INTRODUCTION

The review of literature is a step in the research process that positions the research problem within the context of the literature as a whole (Wiersma and Jurs, 2009).

The term “Ideology” is one of the primary terms having different meanings in every era. It has great importance for various social groups. The term “Ideology” is also used in education under many fields. Pupil control ideologies have emerged as a result of management provided by teachers and school administrations over students. Pupil control ideology is divided into two; custodial control ideology and humanistic pupil control ideology, and the basic characteristics of these control ideologies are as follows (Turan and Altuğ, 2008). Hoy (2001) summarizes the historical and theoretical underpinnings of PCI investigations. He indicates that pupil control usually a problem in service organizations like schools, hospitals, and prisons which require mandatory from clients who did not volunteer to join the organization. Thus PCI constitutes a critical intermediary between the teacher and the strategies they adopt to maintain an orderly classroom environment (Wiseman & Hunt, 2008).

The first studies related to pupil control ideologies were conducted by Willower, Eidell and Hoy. They recognized the saliency of pupil control in Junior High School. The study conducted by Willower, Eidell and Hoy was adapted by schools following the studies of Gilbert and Levinson (Yılmaz, 2007). The Pupil Control Ideology (PCI) has become one of the major instruments used by researchers to examine school climate and pupil control orientation (Anderson, 1982). PCI is a measure of ideology concerning pupil control rather than controlling behaviour. Pupil control orientation can be conceptualized as a point on a continuum ranging from authoritarian to humanistic (Willower, 1975).

#### **Custodial pupil control ideology**

Custodial approach primarily describes a classroom atmosphere in an environment including strict and high level of control. On the other hand, humanistic pupil control ideology helps students discipline themselves, and teachers are lenient in this approach (Willower et al. 1973; Yılmaz, 2007).

In supervisory pupil control ideology, an understanding prevails in which students are under extreme pressure and they are not given opportunities for self-control (Bayram and Aypay, 2012). Students are asked to obey orders and do nothing else. Students are never trusted. Supervisory pupil control ideology is generally employed in schools with traditional approach and military schools. The view of the students in such schools is that students are irresponsible, undisciplined, and they should be externally controlled (Bas and Beyhan, 2013; Hoy, 2001).

#### **Characteristics of Custodial pupil control ideology**

- Student behaviour is controlled.
- The priority is to maintain the order stability.

- Pupils are the living beings which need to be controlled.
- Misbehaviour is evaluated by normative moral principles.
- Teachers perceive misbehaviour as a personal insult.
- Communication is unilateral and from upward to downward.
- Not trusting pupils is essential.

**Humanistic Pupil Control Ideology**

Humanistic pupil control ideology allows students to control themselves (Hoy, Miskel, 2010). Teachers with humanistic pupil control ideology have relationships with their students based on mutual respect; and they try to create a friendly behaviour. Teachers are not the authority over students, they are rather viewed as friends trying to show the students how to control themselves (Bayram, Aypay, 2012).

**Characteristics of Humanistic Pupil Control Ideology**

- Disciplining and controlling oneself is essential.
- Learning and behaviour are considered within the psychological context.
- Interpersonal relationships are sincere and friendly.
- Pupils' decision made by their own free will is important.
- A teacher does not regard misbehaviour as a personal insult.
- Communication is bilateral and upward.
- Trust, respect and tolerance are at the forefront.

**2. REVIEWS**

Barfield and Burlingame (1974) conducted a study on 275 teachers distributed among different socio-economic status of clientele and reported that teachers working in less SES schools are more custodial in their pupil control ideology than compared to middle and high SES schools. Moreover, teachers with low self-efficacy are more custodial in their control ideology than their counterparts.

In his research thesis on school climate, Gandhi (1977) concluded that teachers teaching in schools with relatively open climate are significantly more humanistic in their pupil control ideology than those teaching in relatively closed schools.

Mehta (1977) concluded in her doctoral thesis that the locale (city-town) of the college did not bear any significant relationship between the custodial and humanistic ideology of teachers.

Gor (1998) concluded that the area of the school does not have any relation to student control ideology of teachers.

Jones and Garner (1978) compared pupil control ideology of middle school teachers at the various grade levels and concluded that teachers become more custodial at the higher grade levels.

Jones and Harty (1980) found out that there was a significant positive correlation between student teachers' pupil control ideology and the number of hours of participation in instructional activities. They concluded that the more time student teachers spent on class the more custodial they became.

S. Munir (2009) found out that teachers teaching different subjects do not differ significantly in their pupil control ideology.

Rideout and Windle (2010) found out beginning teachers' belief about education to be a significant predictor of their pupil control ideology.

Adwere-Boamah (2010) concluded, after a study on 200 urban school teachers, that majority of teachers (76%) have humanistic orientation in their pupil control ideology and only 24% of teachers have the custodial orientation.

Gilbert (2012) found out that Elementary level teaching was correlated with humanistic pupil control ideology, whereas, secondary level of teaching was correlated with more custodial orientation.

Bas (2012) found out that elementary school teachers have humanistic pupil control ideology in general.

Wentze (2012) on the role of perceived pedagogical caring on Student motivation in middle school. This study examined adolescents' perceptions of pedagogical caring in relation to their motivation to achieve positive social and academic outcomes in middle school. It was found that Perceived caring from teachers predicted motivational outcomes, achievement and social competence. Clearly, from the preceding discourse, one can infer without doubt that, a child that learns under custodial teacher could differ from those under humanistic teacher in both self concept and school adjustment.

Kilin (2014) examined the relationships between teachers' pupil control ideologies and teacher professionalism on a sample of 234 high school teachers. The results revealed that teacher professionalism was significantly and negatively related to teachers' pupil control ideologies. The results also demonstrated that pupil control ideology negatively and significantly predicted teacher professionalism.

Gürşimşek (2014) investigated prospective teacher candidates' educational beliefs and pupil control ideologies on a sample of 218 teacher candidate from the early childhood education departments. Data reveal significant differences on participants' educational beliefs and pupil control ideology due to gender and grade level. Women are seen to have lower scores on traditionalism dimension and less custodial beliefs for pupil control.

Conriquez (2020) found the extent to which teachers' pupil control ideology relates to teachers' management beliefs and their perceived relationships with their students consisted of a sample of 34 middle schools that served low income students of color. Significant correlations were identified between teachers' years in the profession and control ideologies, with qualitative results providing additional descriptive analysis regarding teachers' perceptions of their relationships with students. The findings indicate that teacher years in the profession and control ideologies need to be taken into consideration by school site administrators when looking at teacher-student relationships.

Bakanlığı (2021) studied the relationship between teachers' epistemological beliefs and pupil control ideology on a sample of 228 teachers. Study revealed that there is a moderate, positive relationship between the dimensions of epistemological beliefs termed the belief that learning is tied to talent and the belief that there is one right way to learn and pupil control ideology. Findings also indicated that the BLTT and BRWL dimensions significantly predict pupil control ideology.

Gor (1998) did not find any relationship between teachers' sex and their student control ideology. Also, Patel (1999) and Bas (2012) concluded that male and female teachers did not differ significantly in their pupil control ideology; whereas, other studies have found out female teachers are more humanistic than male teachers (Gandhi, 1977; Altaf, 1982; Harris, Haepin and Haepin, 1985).

Munir (2009) concluded that male teachers are more custodial in their pupil control ideology than their female counterparts. Qualification of teachers did not have any bearing on the pupil control ideology of teachers. (Gandhi, 1977; Altaf, 1982; Gor, 1998; Patel 1999). Teaching experience has significant bearing on pupil control ideology of teachers. Hoy (1967) concluded that student teachers become significantly more custodial in their pupil control ideology after their student teaching experience. Studies have shown that less experienced teachers are more humanistic in their pupil control ideology than their more experienced counterparts (Gandhi, 1977; Altaf, 1982; Munir, 2009) However, in some studies, it was concluded that experience of teachers did not have an impact on their pupil control ideology (Gor, 1998; Patel 1999).

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## A NEW SPOROPHYTE FROM THE DECCAN INTERTRAPPEAN BEDS OF CENTRAL INDIA

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## ABSTRACT

A well preserved fossil is collected from Mohagaonkalan, MP, India a well known Deccan Intertrappean fossiliferous locality belonging to upper most Cretaceous period. The present fossil Bryophytic sporophyte showing foot, intercalary zone and capsule. Seta is absent Capsule wall 2 – 3 layered. In the center of the capsule slender core of sterile tissue i.e. columella present. In capsule, inside spore sac, spores are present. Elaters not seen.

**Keywords:** Bryophyte, Sporophyte, Deccan, Intertrappean, Notothylaceae

## INTRODUCTION

In Deccan Intertrappean Beds, Bryophytic remains are of rare occurrence because of their delicate nature. *Notothylites levi* (Pande, 1934); Gupta (1956) recorded a sporogonium “*Notothylus*” type and Singhai (1964, 1973) reported another sporogonium under the name *Shuklanites deccanii* showing affinities with Anthocerotales and Marchantiales. Two more bryophytic remains *Notothylites nirulai* (Chitaley and Yawale, 1974) and *Andreaites remanujamii* (Kapgate 1986) have been reported from Mahagaonkalan. Sheikh and Kapgate (1982) recorded fossil *Ricca* L. thallus from the same bed. Fossil *Nagpurites jungermannii* (Sheikh and Kapgate, 1998); *Krempogonium mohgaonsis* (Nambudiri et al., 2004) *Pterostachys mahabalei* (Deshmukh, 2019); *Fillicophyllites deccanensis* (Thorat, 2021); *Bryoites harrisii* (Dighe, 2021) are also reported from the Deccan Intertrappean beds.

## METHOD AND MATERIAL

After breaking chert, the present fossil specimen was exposed in longitudinal plane and trasverse plane. The specimens are well preserved in chert, after etching with hydrofluoric acid, serial peel sections taken by cellulose acetate method (Darrah, 1936).

## DESCRIPTION

The present fossil is bryophytic material. It is exposed in longitudinal plane and transverse plane.

All specimens are well preserved. The first specimen is 1.99 mm long and breadth 23.1  $\mu$  in size. Second specimen is measuring about 1.22 mm in length and 1.65 mm in breadth. While, third specimen measuring about is 1.15 mm in length and 1.32 mm in breadth. The specimen in transverse plane is 16.5 $\mu$  in size. In longitudinal plane sporophyte is seen elongated and elliptical in shape. While, in transvers plane it is circular in outline. (Text Fig. 1 to 4, Plate Fig. 1 to 4)

## Foot

It is more or less rounded bulbous in shape. The cells of foot are parenchymatous. The tissue of thallus is not seen. The foot measure s 75.9  $\mu$  in length and 39.6  $\mu$  in breadth in size. This part of sporophyte helps to anchor it in gametophytic thallus. But, in the present specimen thallus is not seen clearly. (Text Fig. 8, Plate Fig. 5)

## Meristimatic zone

In present fossil specimen seta is absent. Instead meristimatic zone or intercalary zone is present. This is narrow zone consisting of meristematic cells. It is located at the base of capsule and just above the foot. This intercalary zone measures 34.3 $\mu$  in size. The function of this zone is to increase the size of sporophyte. (Text Fig. 8, Plate Fig. 5)

## Capsule

The well preserved capsule is long, slender, smooth, upright and cylindrical in shape measuring 1.65 mm in length. It is nearly of uniform in thickness throughout its length. At the apex it slightly tapers. The capsule further divided into capsule wall, spore cavity or sac and central columella.

## Capsule wall

The wall of capsule is 2 – 3 layered made up of thin walled parenchymatous cells. The outermost layer of wall is the epidermis, it consist of narrow, vertically elongated cells. These cells measuring 13  $\mu$  in size. (Text Fig. 1 and Plate Fig. 1)

**Spore cavity or sac**

Spore cavity is in the form of cylindrical sac present in between columella and the capsule wall. The cavity measure  $0.82\mu$  in size. The spore sac contains spores and also some debris is seen. The elaters are not in present fossil specimen. Mostly spores are round in shape. It is thick walled. It is black or dark brown in colour. (Text Fig. 1, 9, Plate Fig. 7)

**Columella**

In the center of the capsule, slender, solid core of tissue, columella is present. It is sterile tissue of capsule and may help to provide support to the erect, long and slender sporophyte. The cells of columella consist of narrow, elongated, thick walled measuring  $148.5\mu$  in size. Each cell of columella is  $22\mu$  in size.

In transverse section of fossil specimen the outline is circular. The outer most layer of capsule wall is single layered and thin. In the center sterile, parenchymatous columella is present. In between capsule wall and columella the spore cavity is present, which consist of spores. (Text Fig. 1 and 7, Plate Fig. 6)

**DISCUSSIONS AND COMPARISON**

Followings important characters were used to identify the capsule is -

- 1) Presence of an long, slender, erect capsule.
- 2) Presence of rounded, bulbous foot.
- 3) Above foot intercalary zone of meristematic cells is present.
- 4) Presence of long, slender, smooth capsule is present.
- 5) Presence of spores.
- 6) Presence of centrally placed columella.

Presence of columella suggest that the present fossil specimen belong to Class Anthocerotopsida. So, it is compared with only Anthocerotopsida.

Anthocerotopsida is divided into single Order Anthocerotales and Order Anthocerotales divide into two Families Anthocerotaceae and Notothylaceae (Muller, 1940; Proskauer, 1948, 1960 and Smith, 1988). At the turn of century Campbell (1928), originated and vigorously supported the idea that primitive vascular plants had evolved from bryophytic ancestors of *Anthoceros* type.

The present fossil specimen when compared with the sporophyte of Family Anthocerotaceae, most of the characters shows resemblance, i.e. sporogonium divided into three region Foot, intercalary or meristematic zone and capsule. Foot is rounded, bulbous in structure, seta absent while just above the foot meristematic cells are present. Capsule is long and smooth. In the centre of the capsule is a slender solid core of sterile tissue i.e. columella is present. Spores are present in spore sac.

In family Notothylaceae only the genus is *Notothylus*. Which are divided into two categories columellate species and non columellate species. Present fossil specimen is compared with columellate species only. In this entire endothecium form to columella. The cells of capsule wall is dome-shaped and arches are present over the columella which is not seen in present fossil specimen.

**Comparison with fossil specimen**

When present fossil specimen is compared with *Notothylites levieri* (Pande, 1934), *N. choudhari* (Nirula, 1945) *N. orbicularis* (Amones, 1940) *N. nirulai* (Chaitale and Yawale, 1974) shows different characters in having non – columellate sporogonium while in present fossil specimen columella is seen.

*Nagpurites jungernanni* (Sheikh and Kapgate, 1998) sporogonium having foot, seta and capsule compared with present fossils shows dissimilarity in not having seta.

Thallus of *Riccia chitaleyii* (Sheikh and Kapgate, 1982); *Krempogonium mohgaonsis* (Namebudiri *et al.*, 2004) are recorded from Mohgokalan. The present fossil specimen does not resembles with any reported sporophyte. It shows similarities with family Anthocerotaceae of class Anthocerotopsida therefore it is placed under the same class and named after its sporophytic structure and specific name after renowned Palaeobotanist Harris *Sporollites harrisii* gen. et. sp. nov.

When *Rodeites polycarpa* (Chitaley and Paradkar, 1971) is compared with present fossil specimen it shows similarities in having multilayered outer cortex but differ in shallower groove in petiole and aerenchymatous middle cortex.



*Psilotoxylon trapii* (Dighe, 2017); *Pterostachys mahabalei* (Deshmukh, 2019); *Fillicophyllites deccanensis* (Thorat, 2021) are fossil pteridophytes but present fossil is Bryophytis specimen.

*Bryoites harrisii* (Dighe, 2021) is bryophytic axis and present fossil specimen is bryophytic sporophyte.

## DIAGNOSIS

### *Sporollites* gen. nov

Bryophytic sporophyte showing foot, intercalary zone and capsule. Seta is absent Capsule wall 2 – 3 layered. In the center of the capsule slender core of sterile tissue i.e. columella present. In capsule, inside spore sac, spores are present. Elaters not seen.

### *Sporollites harisii* gen. et. sp. nov.

The present fossil specimen well preserved in longitudinal plane, 1.22 mm length and 1.65 mm breadth. Specimen in T.S. 16.5  $\mu$  in girth. Foot of sporophyte rounded, bulbous, measuring 75.9  $\mu$  in length and 39.6  $\mu$  in breadth with parenchymathous cells. Seta absent, instead of meristematic zone measures 34.3  $\mu$  in size. Above meristematic zone long, slender, upright cylindrical, capsule measuring 1.65 mm in length. Capsule wall 2-3 layered, thick made up of parenchymatous cells, outer epidermis measuring 13.0  $\mu$  consisting narrow, vertically elongated cells. In centre of capsule narrow, elongated solid core of sterile tissue i.e. columella is present measuring 148.5  $\mu$ , Spore cavity present in between capsule and columella, measuring 0.82  $\mu$ , Spore cavity containing spores. Mostly spores are rounded, thick walled black or brown in colour.

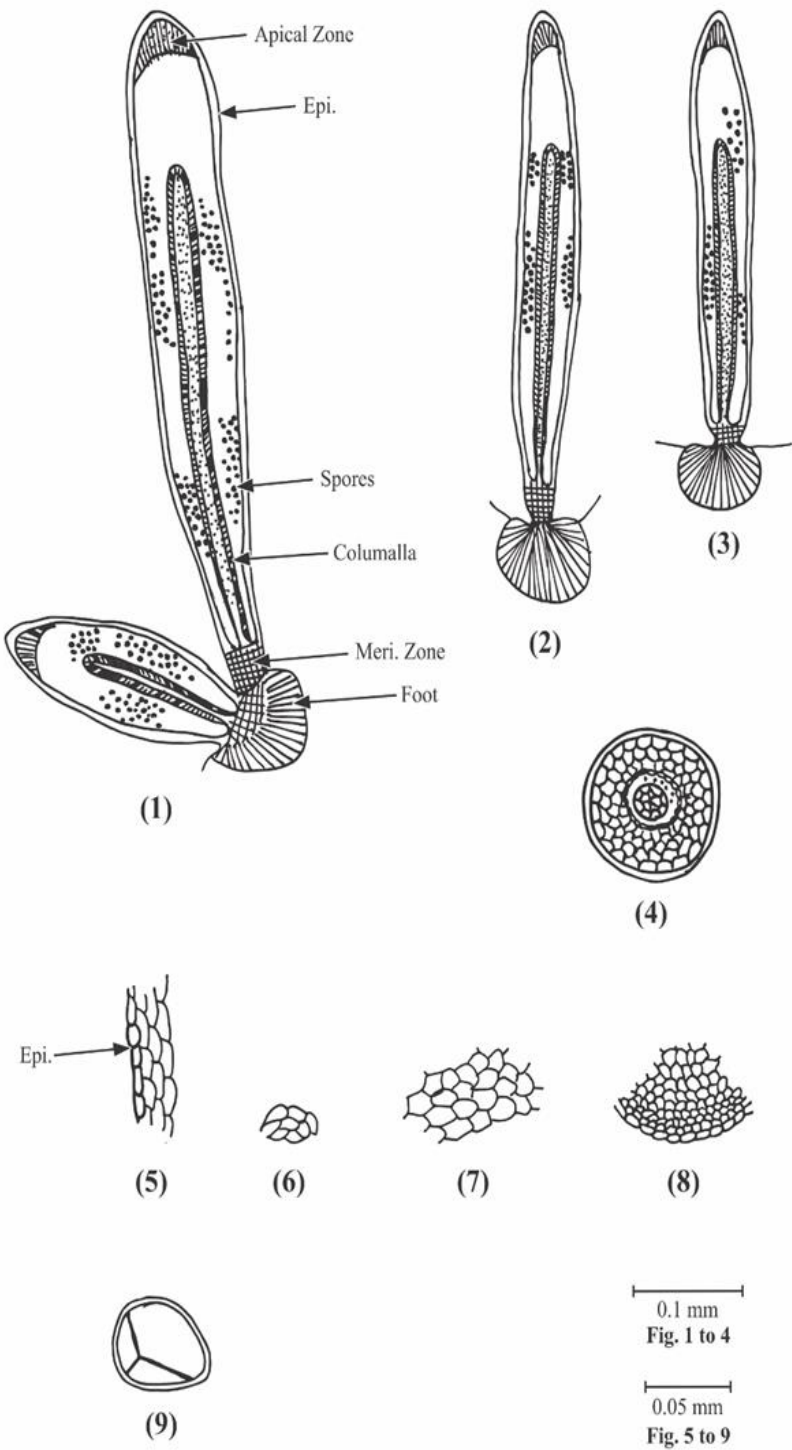
Holotype	-	MOH/SVP/ BRY - SPO
		Department of Botany, Shri. Shivaji College, Akola
Locality	-	Mohgaonkalan, Dist. Chhindwara, M.P., India
Horizon	-	Deccan Intertrappean Series of India
Age	-	Lower Cretaceous

## Explanation of Text Figures 1 to 9

1 to 3.	Mature sporogonium showing foot, meristematic region, columella and spores in spore sac (Diagramatic)
4.	T.S. of Sporogonium
5.	Epidermal cells of Sporogonium wall
6.	Cells of apical region or zone
7.	Cells of columella
8.	Cellular details showing foot and meristematic zone
9.	Single spore in detail

## Explanation of Plate Figures 1 to 7

1.	Group of L.S. of mature sporogonium specimen 1x100
2.	L.S. of mature sporogonium specimen No. 2 x100
3.	L.S. of mature sporogonium specimen No. 3 x100
4.	T.S. of sporogonium x100
5.	L.S. of sporogonium showing foot x150
6.	L.S. of sporogonium showing columella x150
7.	Detail structure of spores x400



Text Fig. *Sporollites harisii*

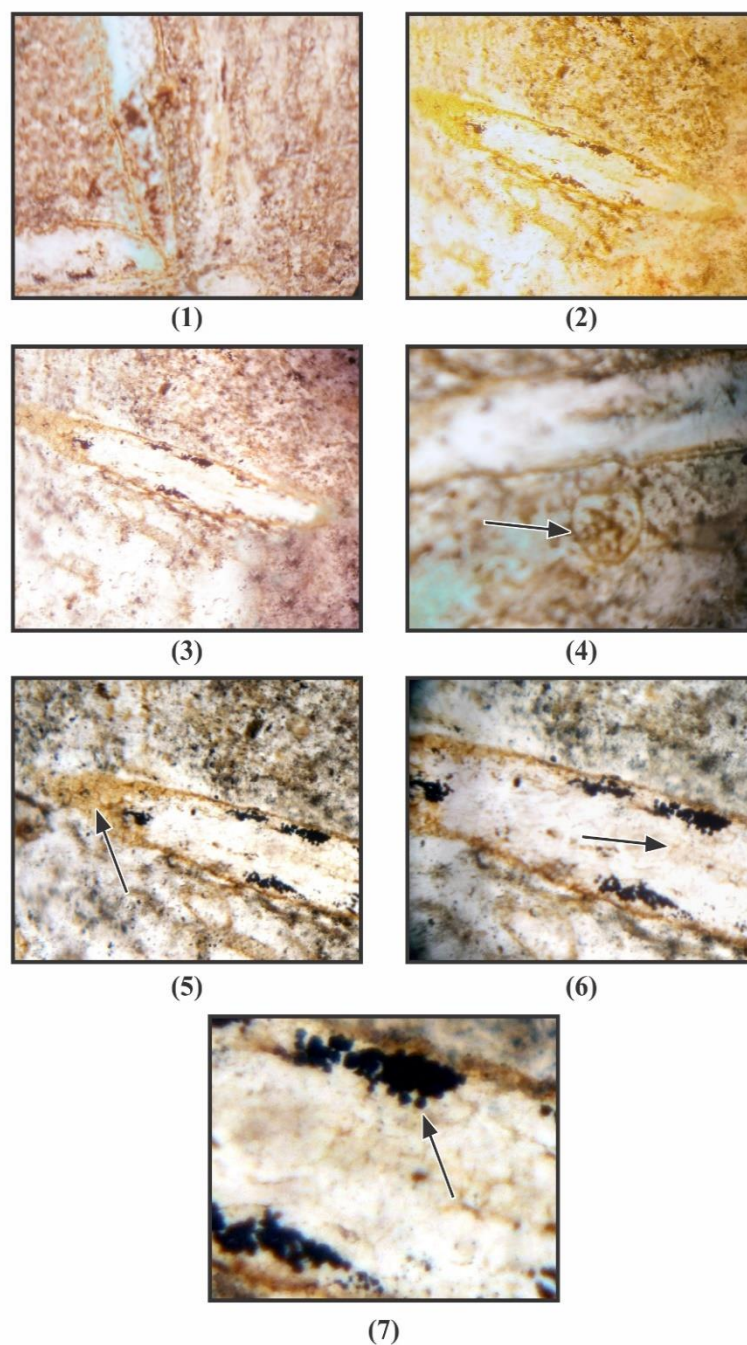


Plate Fig. *Sporollites harisii*

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**A STUDY OF UNDERSTANDING THE REASON BEHIND THE FEAR OF MATHEMATICS  
SUBJECT AMONG SCHOOL CHILDREN**

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**1. INTRODUCTION**

Mathematics comes in to existence with the existence of human being. Mathematics is as old as humanity. As we all know human being are unique creations as compare to other living organisms. Human beings have a developed nervous system which helped them to develop sounds and symbols like letters and numbers to help in communication. It also helped them to preserves their ideas, experiences and observations. The curiosities of human lead them to think systematically about the universe and logical thinking began. Mathematics is the root of human civilization. It helped in development of civilization and progress of human.

Mathematics is widely studied discipline as it is a very useful subject. All new development in the field of industry and sciences requires the fair knowledge of mathematics nowadays. There are very few modern sciences that can be learn without the knowledge of mathematics like zoology, botanical sciences, biological sciences etc. Hence, mathematics is also highly studied as a language of industry and sciences.

**IMPORTANCE OF MATHEMATICS IN EVERYDAY LIFE**

Everyone use mathematics in day to day life. In today's world, nobody can live without mathematics for a single day. From the very beginning of existence of man on earth, he invented arithmetic to answer the question like how many? How long? Etc. Similarly, geometry was invented to find measurement, trigonometry was invented to find positions of mountains and stars and sun in the sky and many more branches of mathematics are invented for different purposes. The subject developed according to the developing day by day needs of human.

**IMPORTANCE OF MATHEMATICS IN SCHOOL CURRICULUM**

Apart from the daily life, Mathematics is also important in school curriculum. It helps in building mental discipline and logical reasoning.

It has been said in NPE 1986 that "Mathematics should be visualized as the vehicle to train a child to think, reason, analyze and to articulate logically. Apart from being a specific subject, it should be treated as a concomitant to any subject involving analysis and reasoning" (p.29). Hence, in NPE mathematics is considered as an important subject. The above statement shows that mathematics is considered as an important subject in school curriculum that develops child's thinking. In school curriculum mathematics, should be taught in such a way that it relates to other subject that include analysis and reasoning as well.

According to NCF 2005 mathematics is about thinking and reasoning in a certain way (NCERT, 2005, p.43). I agree with this view as mathematics enable child to think about problems they encounter in mathematics and also enable them to give reason of the solution. It is a subject that helps in every step/ phase of life. Mathematics is a very useful subject for many vocations and higher specialized courses of learning. According to Romberg and Kaput (1999), "school mathematics should be viewed as a human activity that reflects the work of mathematicians- finding out why techniques work, inventing new techniques, justifying assertions, and so forth" (p.5). Hence, this show that school mathematics should be treat in a manner that also tells students its application.

**AIMS OF TEACHING MATHEMATICS**

We can think of many aims of teaching mathematics that cover the entire school education. Teaching of mathematics can help students in many ways as discussed earlier. Thus, teaching and learning of mathematics deals with the following aims that can also be seen in 'the vision for school mathematics' section in NCF 2005 (NCERT, 2005, p.43)

- To enable students to recognize that mathematics deals with the world around us.
  - To develop the ability of thinking and reasoning among students.
  - To understand and use language, symbols and notations of mathematics.
  - To enable students to understand and solve mathematical problem of daily life.
  - To prepare the child for further learning in mathematics and its field.
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- To encourage students to enjoy mathematics and develop mathematical curiosity among them.
  - To enable the child to think logically and critically and to reflect on their and others work.
  - To develop knowledge, skills and attitude towards mathematics for future development.
  - To develop rational and scientific attitude among students.
  - To make students confident in using mathematics.

These are the few aims of teaching mathematics and can be many more such aims of teaching mathematics.

### **RESEARCH PROBLEM**

The knowledge of mathematics is very important in human's day to day life. Future choice of profession also depends on the presence of knowledge of mathematics in one's life. So, it has an important role in school curriculum, but not everybody likes mathematics as a subject. In present world, intelligence is decided on the basis of achievement or failure in mathematics. Achievement and intelligence are considered as correlated words. Those who score low are considered as weak and those students later develop fear from mathematics. Because feel that they are incapable for doing mathematics. So, this study will try to understand the reasons of fear from mathematics in school students.

### **SIGNIFICANCE OF THE PROBLEM**

It has been said in the position paper of national focus group on Teaching of Mathematics 2006, that there are few problems in teaching and learning of mathematics that develop fear of mathematics among students. It has been said there that the nature of mathematics, the way it is taught in schools, the language used in mathematics books and the use of symbols in mathematics are some reasons of fear of mathematics among students. There was a feeling of math anxiety among school students. There was a feeling of tension among students when they come across a mathematical problem. Such feeling made the person to lose self-confidence which also affects their future attitudes. Due to this, students who have fear of mathematics often try to avoid coming across any mathematical situations to avoid public embarrassment. Students find the subject difficult which leads them to take subject for granted. In some cases, students also drop out from schools to avoid mathematics. Mathematics is a subject that develops great amount of fear among students. Maximum numbers of students fail in mathematics as compared to any other subject due to the fear they developed in their mind for mathematics.

Students in class sixth to eighth are in the age of adolescences which is known as the stage of stress. Inability to do mathematics at this stage gives rise to fear from mathematics and students start hating the subject. Also, due to the spiral nature of curriculum of mathematics, if student is unable to understand any concept at lower level gives rise to the fear and problem at higher classes which leads to bad performance in the subject. Due to this stress students often commit suicides. Hence it is important to find out the reasons behind the fear of mathematics among school students.

This study will help us to know how children feel about mathematics. Also, it will tell us about the role of teachers, their teaching, and student's environment in generating fear for the subject. So, this study will help us to know the various reasons behind fear of mathematics and will help the teachers to overcome the fear of mathematics among students.

### **OBJECTIVES OF THE STUDY**

- To understand the reason behind the fear of mathematics among children.
- To understand the role of the subject that arouses fear among children.
- To understand the role of teacher and teaching learning process of the subject in arousing the fear among children.

### **RESEARCH QUESTIONS**

- What are the various reasons that cause fear for mathematics among students?
- What is the role of different factors (like parental pressure, past experiences, subject) in arousal of fear of mathematics among students?
- Does the role of teacher and teaching learning process affect the student's behavior towards the subject mathematics?

**DELIMITATION OF THE STUDY**

- The sample study is drawn only from the students and teachers of two schools in Delhi, one is govt. aided boys school and other is govt. girls school of level 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup>.
- The study is limited to sample of only 6 students and 3 teachers of grade 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup>.
- The presence study explored a limited number of children's perception in the area of mathematics as a subject and limited no. of teacher's perception in the area of fear of mathematics among students.

**2. REVIEW OF RELATED LITERATURE****Major area of study in mathematics**

Mathematics is a part of school curriculum since Vedic age (1500 to 200 B.C.). During the period 200 A.D. to 400 A.D. several works on astronomy and mathematics were composed based on indigenous knowledge. During 400 A.D. to 1200 A.D. a new branch of mathematics called as 'Ganita' came which has 3 different components like arithmetic, algebra and geometry. But mathematics received importance as a separate subject in 1200 A.D. The situation remained same till 18<sup>th</sup> century. (History of Mathematics, Wikipedia)

In 19<sup>th</sup> century, with the development of various learning theories, mathematics learning caught attention of the researcher and various area of research were opened. But the attention is mainly on the achievement in mathematics. Various studies related to arithmetic and algebra were done. But major area of research in 19<sup>th</sup> and 20<sup>th</sup> century were:

- Teacher and teaching strategies
- Curriculum and text books
- Factors affecting achievement
- Diagnostic test

For the literature review the researcher made sections i.e. studies conduct in abroad and studies conducted in India to understand the idea of mathematics fear in students of abroad and india separately that help the researcher to know about the regional differences in factors of fear of mathematics.

**STUDIES CONDUCTED IN ABROAD****Math anxiety, math phobia and fear of mathematics**

In this section the researcher will try to understand some terms that will help her in her research. These terms are math anxiety, math phobia, fear of mathematics. Before stating the research, researcher tries to understand that whether these terms are same or differ in any sense.

**Math anxiety:** Before knowing the term math anxiety the researcher would like to know about the term anxiety that will help her understand the term math anxiety better. So, in Merriam Webster it has been said that anxiety means "an abnormal and overwhelming sense of apprehension and fear often marked by physiological signs (as sweating, tension, and increased pulse), by doubt concerning the reality and nature of the threat, and by self-doubt about one's capacity to cope with it". So, the term anxiety refers to a sense of fear that can come through threat and by doubting one's capability. Hence math anxiety can be the feeling of fear and tension for the subject math. Children suffering from math anxiety may doubt their capability of learning it.

Also, in the article 'Addressing math anxiety in the classroom' by Maureen Finlayson quoted the statement by Tobias (1993) "math anxiety is a feeling of tension and anxiety that interferes with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations". Also, according to Sheila Tobias (2013), "math anxiety is a response, over time, to stress in math classroom where tests are frequently given under time pressure, in the home where there is competition with siblings, or at work place" Maureen (2014).

**Math phobia:** The term phobia refers to a persistent, irrational fear of a specific object, activity, or situation that leads to a compelling desire to avoid it. So, math phobia refers to the fear of subject mathematics that leads to the avoidance of it.

Also, it has been said in a guide from Skills Team by University of Hull named Math phobia and how to beat it that math phobia is a deep-seated fear of mathematics that affects learner's life by making them lose confidence in themselves, avoid courses of math, etc.

From the above review, the researcher got the understanding of the terms math phobia and math anxiety. Also, she came to know that all the three terms i.e. math phobia, math anxiety and fear of mathematics have similar

meaning. The difference is in their name but they all refers to the fear of mathematics.

### **Self-efficacy/self confidence**

Sarah Rossnan (2006) in her article 'Overcoming Math Anxiety' talked about what is math anxiety, how it hampered child's performance, how teachers and parents help their child to overcome this anxiety. In this article, she used the quote by Tobias (1993), "Mathematics anxiety has been defined as feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations. Math anxiety can cause one to forget and loose one's self-confidence". Hence fear of mathematics also leads to low self-confidence or vise-versa.

Similarly, Marilena Pantziara and George Philippou (2016) in their articles 'Fear of Failure in Mathematics. What Are the Sources?' talked about two motivational construct, from which one is self-efficacy. Here they used the idea of Zimmerman (2000), that students who have high self-efficacy show more interest and devotion in any subject and work harder when they find any difficulty as compare to the students with low self-confidence and self-efficacy.

Also, Maureen Finlayson (2014) in her article 'Addressing math anxiety in the classroom', said that students who have math anxiety tries to avoid learning mathematics and they have very low self-confidence.

### **Cause of fear of mathematics**

Sarah Rossnan (2006) also talked about the causes of fear of mathematics. According to her student's prior negative experiences of learning mathematics is one of the reasons of math phobia among them.

Teachers and parents generally increase the anxiety in child by putting their own views for math on child. Such imposition put pressure on child's mind and increases the anxiety. If students have some negative past experience then it affects the child's mind/ thinking and stop him/her from doing math in future finally causes a lack of understanding and fear of mathematics. She also suggested the ways for teacher and parents to help child to overcome this fear.

Also, Marilena Pantziara and George Philippou (2016) in the findings of their studies conclude that fear is a result of social inequalities due to the educational background of parents. According to then the lower educational background of parents make parents incapable to help their child during home that leads the fear towards that subject.

The researcher felt that this kind of social inequality can be the reason of fear for some learners, but it may not be necessary in all the cases.

Maureen Finlayson (2014), in her study of addressing math anxiety talked about some causes of math anxiety. According to her the problem is not in the subject but in the way, it is perceived and taught in classroom. She said mathematics is taught in a traditional method in school i.e. it emphasizes on basic skills, instructors show authoritative role, assessments are done via tests, textbook used as medium of knowledge etc. She also said that the often teachers are themselves anxious about mathematics that transfer the fear to students also.

The researcher agrees with the causes that she talked about in her study, this helped her to better understand the reason behind fear of mathematics.

### **STUDIES CONDUCTED IN INDIA**

Dr. Ranjan Das and Gunendra Chandra Das conducted a study on math anxiety and its impact on problem solving in school mathematics. In mathematics learning problem solving is considered as important in school curriculum. Problem solving helps student to think logically and help them to construct their own ideas. It is found that math anxiety create hurdle for student in thinking logically and lead students to perform poorly in problem solving. And it is suggested that it is the role of the educator to inbuilt a right attitude towards the subject mathematics by applying appropriate teaching strategies that help students to overcome from the fear of mathematics and think logically and perform well in problem solving.

### **Conclusion**

The researcher studies and reviewed various previous studies done on the Fear f mathematics, and it helped the researcher to form an understanding of the tentative causes of fear of mathematics and the impact of fear of mathematics on students. The fear of mathematics make the students feel inferior and develop low self-efficacy and low self-esteem.

## **3. RESERCH DESIGN AND METHODS**

### **Design of the study**



In this chapter the design of the study used by the researcher i.e., the methods and procedure of the research, population, samples, sampling techniques and data analysis techniques are discussed.

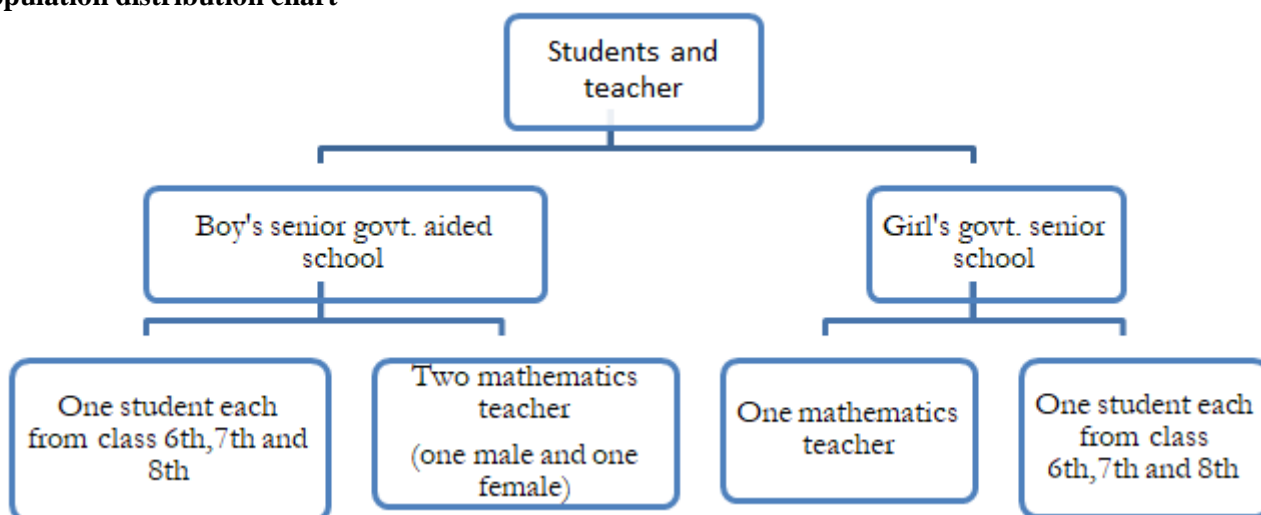
**Table of the research design**

Source of data	Population	Sample	Tools used and Process of data collection	Analysis and interpretation
Students, teachers and classroom situations/ observations.	Mathematics teachers teaching to selected students and students of government schools of Delhi.	3 teachers, 6(2 from each class i.e., 6 <sup>th</sup> , 7 <sup>th</sup> and 8 <sup>th</sup> ) students and 6 class room situations.	Observation of the classroom situations and individual semi structured interview with the sample.	Qualitative and descriptive.

### Sample selection

- **Population:** The populations of present study are government schools of Delhi. The researcher selected one boy's government school and one girl's government school of Delhi.

### Population distribution chart



- **Sample:** For the present study samples are students and teachers of secondary level of government school (6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup>). As the researcher wants to identify the reasons behind fear for mathematics among school children, and by taking the samples from these schools will help her getting a better understanding of fear of mathematics among school children.
- **Sampling Technique:** For collecting the data for any research problem, the researcher required to sample the population he selected for data collection, as including the whole population in the study is impossible, and it will also make the work of researcher even tougher. So it is necessary to use a sampling technique to limit and select samples. For the present study the researcher wants to find out the reasons behind fear from mathematics among school children, so the researcher observed mathematics period in 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> class and identified 6 students who have fear from mathematics and three teachers teaching mathematics to the selected students are selected for the study.

### Tools selection

- **Observation:** The researcher silently observes and takes notes of the situations. In the present study the researcher closely observed mathematics period as a non participant observer in class 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> to know the role of teachers and teaching learning process in arousing the fear from mathematics among schools children and also to indentify students who have fear from mathematics.
- **Interview:** For data collection, the researcher will conduct interviews. In interview the researcher will ask a series of open ended questions based on the topic areas i.e. fear of mathematics that to be cover in this study. Also, the researcher is using semi-structured interview method as Semi structured interviews are helpful in probing the interviewee in order to get the detailed responses. For the interviews the researcher will prepare two interview schedules (one for students and one for the teachers).

**Administration of the tool**

The researcher conducted interviews with both teachers and students, to know what are the student's views towards mathematics are and what reasons they give for the fear they have for mathematics.

**Method for data analysis**

The data collected by the researcher in this research will be in textual form as the researcher is doing a qualitative research. So, the data that will be gathered by the researcher will be the responses of teachers and students and observations done by researcher. So, for analyzing the data the researcher will write the descriptive account of the data i.e. what was said by the interviewee with interpretive analysis of it. For analysis, the researcher will infer the responses.

**4. ANALYSIS AND INTERPRETATION OF THE DATA****Analysis of observations**

The observation of three math classes of each school been done by the researcher. In the government girls school there was the same teacher teaching all the three classes i.e. 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> that researcher observed whereas in the government boys school there was one teacher who taught class 6<sup>th</sup> and 8<sup>th</sup> and another teacher taught class 7<sup>th</sup>. Now researcher will analyze the observation for each school one by one.

**Separate analysis of observation**

In the government boys school there are four sections for each class. The class 6<sup>th</sup> D chosen by the researcher for observation has 44 students. There was a male mathematics teacher in that class. In the few minutes' conversation with the teacher before the beginning of the class, he told that most of the students in this class are low performers in mathematics. Also, it was a government school, so the teacher was having other workload as well. This teacher was also the timetable and arrangement in charge. He always have first period in the class 6<sup>th</sup> D but he came late to the class as he have to prepare the arrangement timetable everyday to assign teacher in the classes of those teachers who were on leave. So, a lot of time was spent in that work and he get less time to teach. So, he was also having the pressure to complete the chapters/syllabus on time.

He was using the traditional teaching strategy in his class. He simply opened the book and solved the first question of the exercise and asked the students to solve the rest of the questions on their own. He was just providing the formula and doing one question as a sample on blackboard and gave the whole exercise to students to do it themselves. This was his method of teaching. Then he started checking the notebooks of students by calling them one by one to his seat. During this time some students are solving the questions and some are copying them from their partner's notebook.

The next class that I observed in the same school is class 7<sup>th</sup> C, there was a female mathematics teacher in this class. She was teaching integers in the class that I observed. She first revised what she taught a day before, for that she asked some question from students and only few students were responding to her questions. She was also, discussing and revising the content with those students only and ignored the students who were not responding. Then she started the new exercise, for that she simply showed the solution on one question of the exercise on board and asked the students to solve the rest of the questions on their own and she also told students to ask her if they face any difficulty. While solving the questions, some students are showing off their intelligence, by solving the questions very quickly as they have already completed this chapter in their tuition. Some students are coming to teacher when they are facing difficulty, but instead of helping them teacher was sending them to those students who solved that particular question. So, teacher was not giving attention to the difficulties faced by students.

She was comparing high scorers of the class to the low achievers of the class. She was scolding the low achievers for not able to solve simple question and asking them to learn from high achievers.

Now, I will analyze the observation of class 8<sup>th</sup> B, the same teacher who teaches class 6<sup>th</sup> D also teaches this class. I observed his teaching methods in class 6<sup>th</sup> D, but still I observed this class because the teacher was same but students are different. In this class he was teaching linear equations. As I observed his previous class i.e. 6<sup>th</sup> D, so he told me that most of students of this class are better than the previous class. Majority of the students of this class take tuitions as next year they are going to be in 9<sup>th</sup> standard. In this class also he just solved one question and told students to do rest of the similar question on their own. He was just showing how to solve linear equations by just solving one question of each type and asking students to do rest of the questions by themselves. He continuously solved 4 different types of questions on board one after another asking students to copy it in their notebook. When he was solving the question students were copying the solution from board without even understanding it. He was not giving time to students to understand the question and its solution. Then he gave all the other similar questions in homework for students to solve all by themselves.

Now, I will analyze the observation of government girls' school. The class that I observed in this school was 8<sup>th</sup> A. Here in this class there were 48 students. The mathematics teacher teaching in this class was in teaching profession from past 32 years and she was teaching in this school from last 15 years. The classroom of class 8<sup>th</sup> A was very small for 48 students. So, for math period students had to go to the math lab/ mathematics teachers' room for the mathematics period. Hence, some time was spent on going to the room and settling down. The teacher was teaching rational numbers, she first explained rational number to students with the help of simple equation, and then explained the closure property of rational number. After that she begin with the exercise, she solved one question from the exercise on board and explained the solution to students. The she asked a student to come and solve the next question on board. She used to motivate students by saying good, excellent to the students who are attempting to solve the questions. So, the students who were good in mathematics and who has tuitions at home do the sum quickly and the rest of the class doing the sums at their own pace and according to the teacher she complete the exercise. Teacher was also calling those students to come and solve on the board who has already done it in their tuition.

I also observed 7<sup>th</sup> B class of the same school. There was the same teacher who was teaching class 8<sup>th</sup> A. Her teaching approach/ methodology were almost similar as I observed in the previous class. Here in this class she was teaching integers.

### **Glimpse of a mathematics classroom in a government school**

Teacher enters the classroom around 10 to 15 minutes late. Then he/she ask students to take out their notebooks and textbook and tell them to open the page on which they were in previous class. Then he/she ask students about the homework that he/she gave in the last class and ask students if they faced any difficulty. If any student asks his/her doubt, then he/she ask other students about who has solved that question. If someone raises their hand then he/she ask them to come and solve that question on board otherwise he himself solve the question on board. After taking one or two doubt, he/she begin with the new exercise. For teaching new exercise, he explain concept used in that exercise with the help of questions, then he write the formula on board and put that values of the sum in that formula, explain students how to solve the sum by demonstrating a sum on blackboard. After showing and explain the new concept, he/she ask students to do rest of the question of similar type on their own and then he begins with another type of question or another concept. When the teacher was doing the sum on board, other students were busy in copying the solution from board. The students sitting on the front benches were able to match the pace of the teacher, but students sitting at the back were facing difficulty in matching the speed of the teacher and they were leaving incomplete solutions in their notebooks and trying to peep in their other classmates' notebook to complete their solutions. Some students were not writing anything in their notebook and constantly looking at the blackboard to try to understand the solution/concept. When the bell rings the teacher told students to complete the exercise in homework and the bring difficulties in next class.

### **Interpretation of observation**

It can be interpreted from the observation of two different schools and 5 different classes that the work load and work pressure on the teacher affect the teaching of mathematics. Teachers were unable to teach with full concentration and teach in haste due to the work pressure. Which leads to jumping the concepts and students face difficulty in matching the pace of teacher and unable to understand the concepts. That creates fear for the subject among students.

Also, teaching methodology used by the teacher also affect the learning and students attitude towards the subject. If teacher teach the subject in traditional manner i.e. just explain how to solve the problem will not generate the interest of the students. Then the subject becomes merely the compulsion. Also, the teachers' attitude towards students affects the achievement and interest in the subject. The students who get reinforcement from the teacher verbal or non-verbal, appreciation for the efforts done by the students i.e. good, nice, excellent, and motivation to do the task i.e. you can do it etc from the teacher will try to improve their performance in the subject and would start showing interest in the subject.

It was also interpreted from the observation that the socio-economic background of the students also affects the achievement of the students in class. As the students who belong to higher or middle economic group can afford the tuitions that compensate the lack of learning in school. But students who belong to lower economic group either can't afford the tuitions or get the tuitions that are not much helpful. Hence, such students lag behind in their academics and achieve low in the subject.

Also, not just math in fact for teaching any subject it is important that teacher should have professional training. So, that they understands students capacity and thinking. Also, from such training teacher able to know the

methods of teaching which is very important in teaching as if the teacher will not have such knowledge, then she won't be able to teach the subject effectively which leads to the fear in students.

### **Analysis and interpretation of student's interview**

Since the data collected in this study to know the perspective of students for subject mathematics is through semi-structured interviews. Students were asked some questions and their responses were noted down. So, the data is in descriptive form and quantitative data analysis cannot be done in this case. Qualitative data analysis techniques were used by the researcher to analyze the data. The researcher had done the content analysis of data collected through interviews.

The researcher coded the data and categorized it in to some broad themes that tells about the reason of fear for mathematics in students from student's perspective and analyzed the data and also mentioned some responses by the students in the analysis. The themes are as follows:

#### **• Examination and tests**

Students often have fear from mathematics because of their achievement in mathematics. They feels that mathematics is such a subject where there is no midway to perform. Either your solution can be right or wrong. If your solution is wrong then you cannot score well in mathematics. Having such thinking for mathematics leads students to develop fear for mathematics. Examinations put pressure on students to achieve highest score and fell frightened and perform low in their exams and tests.

Students face difficulty in remembering the formulae and equation they get troubled in examination in recalling them. Because of this they were unable to attempt questions in examination and spend a lot of their time in recalling the formulas.

Instead of understanding the concept/ formulae students tries to rote memorize it that create difficulty for them during examination. Also, just for the sake of getting good marks in exams students cram the content instead of understanding it. They cram the content before exam to pour that in answer sheets during exams.

According to students getting the right answer in the end is the main purpose in mathematics and students fails to get the answer and get annoyed.

These are some factors because of which examinations and tests generate fear for mathematics among students.

#### **• Parents role**

Parents put efforts in their child education, and some of the students whom researcher interview are first generation learners. So, their parents have high expectations from them. Parents want their child to get educated and want them to achieve what they haven't achieved in their life. So, in the fulfillment of their expectations parents knowingly or unknowingly put pressure on their on their child.

Parents don't see the individuality of the child and do not consider their ability to do mathematics and often compare them with other and expect high marks from them. Parents compare the marks scored by their child with other and scold them if they achieve low marks.

Due to such pressure from parents side students learn mathematics just for the sake of getting good marks not because they love and enjoy doing mathematics. Students see mathematics as a hard subject that needs time for perfection.

#### **• Teachers role**

Teacher's role is important in students learning process. Students can perform well if/she will get a good teacher who praises him/her and students performance can also falls down due to the behavior of teachers. In schools some teachers do not motivate low performers and often avoid their efforts and only focuses on the intelligent students in the class.

Favoritism done by teacher for some students in classroom affects the confidence of other students and they feel inferior and incapable for doing mathematics. This also, generates the pressure among students to score good marks and perform according to the teacher's expectation. Teachers also scold students for not getting good marks and for giving incorrect responses in class.

On the other hand if teachers have good attitude and equal behaviors towards all the students can even motivate students to try to understand the subject and perform well in subject.

Teachers also have impact on students for liking or disliking the subject. Teachers' behavior can also motivate student and build fear and pressure on students.

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- **Subject mathematics**

Students saw some concepts in mathematics as easy and some as hard to understand and if they found something hard then they don't like the subject.

Students feel that mathematics is a subject that requires time to solve questions. They find it challenging and consider it as a huge task to solve a question correctly.

They find some concepts in mathematics as abstract and vague. And see them as difficult to understand.

Students feel that mathematics requires a lot of hard work and practice, and it is not everyone's cup of tea to do mathematics. A lot and lot of practice can only give success in mathematics.

Sometimes, the language used in mathematics also creates problem for the students. Students find the language of mathematics as abstract and confusing. They find it difficult to comprehend.

Students also feel that due to lack of some knowledge they are not good in math and without that knowledge they are unable to do it properly.

So, misconceptions for the subject math also generate fear in child's mind for it.

The researcher analyzed above factor of fear for mathematics from the interview conducted with students.

**Analysis and interpretation of teachers' interview**

Since the data collected in this study is through semi-structured interviews. So, the data is in descriptive form. Hence, quantitative data analysis cannot be done in this case. Qualitative data techniques were used by the researcher to analyze the data. The researcher had done the content analysis of data collected through interviews.

The researcher divided the data into some themes that tells about the reason of fear for mathematics in students from teacher's perspective and analyzed the data and also mentions some responses by the teacher in the analysis.

- **Teacher's work load**

The work load that teacher have in school affect his or her teaching. In government schools teachers have a lot of other responsibilities apart from teaching because of that teacher don't get enough time to teach

Such work pressure make the teachers job a hectic task. They get less time to teach, so they teach concepts with a fast pace, that create difficulty for students to understand the concepts properly. Also, in government schools 4 to 5 classes are allotted to each teacher. This also, increase the workload of teacher

Hence, other clerical works create hindrance in teaching and stop the teacher to teach effectively.

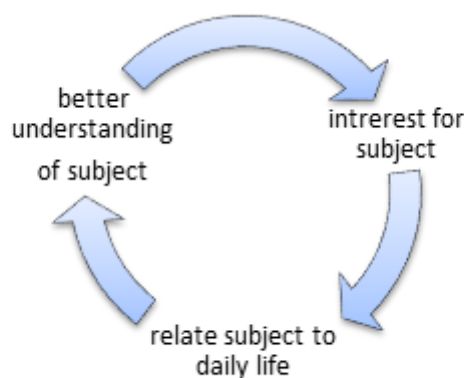
- **Teaching methodology**

The methodology used by teacher to teach mathematics plays a very important role in effective learning of students. If the teacher teach subject in boring way i.e. writing the formula and putting the values in the formula doesn't help the student much in understanding the concept.

A teaching methodology can create the interest of student in subject or it can even make students feel disinterested in subject. An appropriate teaching methodology is very important for teaching any subject. For teaching any subject it is important to create students interest in that subject as only then the learning can become fruitful.

Creating students interest is also an important part of teaching methodology. And student's interest can only be created if they were able to relate the concept with their life.

It is important for students to relate what they are learning to their life to build a better understanding of concept. Better understanding will further create child's interest in the subject.



**Figure showing: The process of teaching and learning of a subject**

Hence it is a cyclic process in which interest leads to relation with life that leads to better understanding which further leads to interest. So, teaching methodology plays a key role in learning process of any subject and can remove and build fear for the subject.

- **Parents' role**

Parents also play an important role in child academic progress and achievement in mathematics. Parents should also take care of their child learning, they should help their child at home in his/her education. Even if the parents are not educated enough, they should provide moral support to their child.

But, instead of that parents often pressurize their ward to score well and scold them for their poor performance. Parents put their high expectations on the shoulders of their child. In today's competitive world everyone wants their child to achieve higher and for that parents are willing to spend money for their child's education and send them to tuitions classes. Hence, parents shift their responsibility to school and tuitions.

- **Lack of basic/ previous knowledge**

Mathematics has a spiral nature, where previous knowledge is very important for further knowledge and understanding. Without basic previous knowledge one cannot get mastery in this subject.

In government schools students come to 6<sup>th</sup> standard from govt. primary school which generally have different branches. Hence there was no connection between child's primary school teacher and elementary school teacher. When student comes to class 6<sup>th</sup> he/she doesn't have mastery in basic knowledge.

Such lack of previous knowledge creates hindrance for the child to cope up with the syllabus of high standard and child builds fear for mathematics in their mind because of their incapability to math.

- **Shortage of time**

Mathematics is a subject that needs proper time. In school timetable mathematics doesn't get enough time. According to the teachers the syllabus of mathematics is very vast that needs much time to be covered.

Students also need time to understand any concept of mathematics.

But due to shortage of time teachers just throw one concept after another in order to complete the syllabus which further generates lack of understanding of concept among students.

- **Teachers role**

Teacher also plays an important role in generating the fear among students. If the teacher shows positive attitude towards students, shows respect to child's dignity and individuality then student will like the teacher that in a way leads him towards liking the subject.

It is natural that if students have fear from the teacher, then they will also have the fear from the subject taught by that teacher as well. So, teacher's attitude also matters in developing fear for mathematics.

### **Conclusion**

The analysis and interpretation of the data collected through observations and interview of students and teachers done by the researcher given the conclusion of the study. The researcher found some factors/reasons responsible for the fear for mathematics among school children. The researcher discussed the conclusion, the major findings, the limitations and educational implication of the study in the next chapter.

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## **5. MAJOR FINDINGS AND CONCLUSION**

### **Major findings**

A research that was conducted in a well planned and orderly form helps the researcher to get an appropriate conclusion that the research intended to get that obeys and achieve the objectives of the study. The present study was a small scale study that used the tools like observations and semi-structure interviews to get the in depth information about the reasons of fear of mathematics among school children. After doing the in-depth and interpretative content analysis of the data collected through observations of mathematics classes, interview with students and interview with mathematics teachers the researcher find some major findings of the study. Those major findings are as given below under the subsections misconception about mathematics and reasons for fear of mathematics.

### **Misconceptions about Mathematics**

Below are some of the misconception about mathematics from the perspective of teachers and students that the researcher found through interviews.

- Mathematics requires more and more memorization of formulae, equations, and methods involved in solving the problems. Without the memorization of the mentioned components one cannot do mathematics.
- Learning mathematics is all about learning and knowing the procedures. Students often ignore the fact that mathematics about understanding the idea behind the concept and not the procedures involved in the concept.
- In mathematics, one should strictly follow the steps and procedure told by the teacher and given in the textbooks in order to achieve high scores in mathematics. Without following the procedures one cannot perform well in mathematics.
- Mathematics is all about doing fast, one must solve problems as quickly as possible. If you don't do it fast then you will lag behind from others.
- Mathematics cannot be understood without doing it on papers. It requires a lot of practice, only then one can get mastery in this subject. It cannot be done without practice.
- Mathematics is a very difficult subject and it is hard to understand for everyone. It is not everyone's cup of tea. Only an intelligent mind can understand and do mathematics.
- Mathematics requires time and special mental ability to learn it.
- Mathematics is mainly involves arithmetic, i.e. dealing and working with numbers. Without having the knowledge and mastery in arithmetic one cannot learn mathematics of higher level like mensuration, algebra, trigonometry etc.
- The language of mathematics is confusing, abstract and unrelated to the language used in daily life.
- Mathematics is definite, based on logics and it is unchangeable.
- Mathematics is abstract. Students find the concepts in mathematics as abstract and they feel that its concepts have no relation and use real life situation. These misconceptions also get reflected in the reasons that students and teachers have highlighted for the development of fear of mathematics, as can be seen bellow.

### **Reasons for fear of mathematics**

The researcher found the reasons for fear of mathematics among school children from the analysis of the data collected through observations and interviews of students and mathematics teachers. Hence as identified by the researcher below are the main factors responsible for the fear towards the subject mathematics:

1. Fear of mathematics teacher
2. Increased competition in today's world
3. Parent's expectation from their Childs
4. Students attitude towards mathematics
5. Work pressure on teachers
6. Class size

7. Time devoted to mathematics in school
8. Curriculum of mathematics
9. Previous experience with mathematics

## CONCLUSION

From most of the findings it has been concluded that positive attitude towards the subject can lead towards the liking of subject that leads to the positive change in the performance of the child. There are various factors like parent role, teachers role, teaching process, past experiences, etc that can create both positive and negative attitude towards the subject. Negative attitude arouses fear and positive attitude improve performance. So, it is very important to help students to create positive attitude for the subject. For creating such positive attitude teachers and parents should motivate the child and some modifications need to be done in teaching learning process and in the education system. The suggestions and some educational implications are given in the next section.

## Educational implications of the study

- Teacher should develop necessary skills among students through the subject and should not provide formulas and solution directly.
- Teacher should help students to see the concepts of mathematics useful and related to daily life by giving examples from daily life and should tell the application of the concepts in real life situations.
- School should view the education as a means of developing skills in students and treats education as a purpose for learning and not merely from exam point of view.
- The curriculum planners should modify the curriculum of mathematics so that it looks interested to students and should focus on quality content and not quantity.

## Limitations of the study

- Due to the time constraints the researcher had done her study with the samples collected from only two schools.
- Also, the researcher collected the data from limited samples i.e. 6 students and 3 teachers.
- Also, because of the availability of schools the study limited with samples of only boys and only girls schools.

## Suggestions for further researches

- This study was conducted with the students of class 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup>; the same study can be done with the students of other higher classes as well.
- The gender dimension can also be studied to see fear difference between male and female.
- The study can also be done to see gender issues regarding perception of mathematics
- As a subject at senior secondary level.

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**A STUDY ON DEPRESSION AMONG MILLENNIALS DURING A PANDEMIC**

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**ABSTRACT**

*Depression is classified as a mood disorder. Depression (depressive disorder) is a common and extreme scientific infection that negatively influences the way you feel, the manner you suspect and the way you act. Fortunately, it's also treatable. Depression results in emotions of unhappiness and/or a lack of interest in the hobbies or activities you once enjoyed. It can result in a number of emotional and bodily issues and may lower your capacity to work in the office as well as at home.*

*The COVID-19 pandemic has had a first-rate impact on our lives. Many people are dealing with demanding situations that may be stressful and depressing, overwhelming, and purposely causing negative as well as strong emotions in adults. Self-isolation and social distancing are exacerbating the problem which affects both bodies as well as the mind.*

*As countries locations introduce measures to limit motion as a part of efforts to lessen the variety of humans inflamed with COVID-19, increasingly folks are making massive adjustments to our everyday routines. The new realities of running from home, transient unemployment, home-education of children, and absence of bodily touch with different own circle of relative's members, pals and co-workers take time to get used to. Adapting to the way of life adjustments including these, and coping with the concern of contracting the virus and fear approximately humans near us who're in particular vulnerable, are difficult for all folks. They may be in particular tough for humans with intellectual fitness conditions*

*This study aims to examine the depression suffered among millennials before the pandemic as well as after the pandemic. The forecast for millennials' intellectual fitness in 2020 doesn't appearance pretty — melancholy and "deaths of despair" are each at the upward push a few of the generation, related to problems which include loneliness and cash stress. Millennials additionally experience that their jobs have an outsize position of their basic intellectual fitness. Because of longer paintings hours and stagnant wages, millennials be afflicted by better charges of burnout than different generations. Many of them have even stopped their jobs for intellectual-fitness reasons.*

**Keywords:** *Mood Disorder, Depression, Covid-19, Self-isolation, Mental health*

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**INTRODUCTION**

Depression is a temper sickness that prevents people from main everyday life, at paintings socially or inside their families. Seligman (1973) stated melancholy as the 'not unusual place cold' of psychiatry due to its frequency of diagnosis. Depending on how statistics are accrued and the way diagnoses are made, as many as 27% of a few populace corporations can be affected by melancholy at some time.

Behaviourism emphasizes the significance of the surroundings in shaping conduct. The recognition is on observable behaviour and the situations thru which people' study conduct, particularly classical conditioning, operant conditioning and social studying concepts. Therefore, melancholy is the end result of a person's interplay with their surroundings.

For example, classical conditioning proposes melancholy is discovered thru associating sure stimuli with terrible emotional states. The social studying concept states conduct is discovered thru observation, imitation and reinforcement.

**Operant Conditioning**

Operant Conditioning states that despair is due to the elimination of positive reinforcement from the environment (Lewinsohn, 1974). Certain events, which includes dropping your job, result in despair due to the fact they lessen wonderful reinforcement from others (e.g. being around folks who like you).

Depressed humans generally end up lots much less socially active. In addition, despair also can be precipitated thru inadvertent reinforcement of depressed conduct with the aid of using others.

For example, while a cherished one is misplaced, a critical supply of wonderful reinforcement has been misplaced as well. This results in inactivity. The foremost supply of reinforcement is now the sympathy and interest of pals and relatives.

However, this has a tendency to boost maladaptive conduct i.e. weeping, complaining, speak of suicide. This finally alienates even near pals main to even much less reinforcement, growing social isolation and unhappiness. In different phrases, despair is a vicious cycle wherein the character is pushed similarly and similarly down.

Also if the character lacks social abilities or has a totally inflexible character shape they'll discover it hard to make the modifications had to search for new and opportunity assets of reinforcement (Lewinsohn, 1974). So they get locked right into a terrible downward spiral.

### **Critical Evaluation**

Behavioural/learning theories make feel in phrases of reactive despair, wherein there may be a virtually identifiable reason for despair. However, certainly considered one among the largest issues for the principle is that of endogenous despair. This is despair that has no obvious reason (i.e. not anything terrible has befallen the person).

The extra trouble of the behaviourist method is that it fails to do not forget cognitions (thoughts) have an effect on mood.

Covid-19 guidelines risk leaving mental and socioeconomic scars on hundreds of thousands of younger humans throughout the world, with far-attaining effects for them and society, a wide-ranging Guardian venture has revealed.

Teenagers and adults expressed profound tension approximately their destiny and accused governments of failing them as 15 months of lockdowns destabilised their intellectual wellbeing, schooling and activity prospects.

As countries locations introduce measures to limit motion as a part of efforts to lessen the variety of humans inflamed with COVID-19, increasingly folks are making massive adjustments to our everyday routines. The new realities of running from home, transient unemployment, home-education of children, and absence of bodily touch with different own circle of relative's members, pals and co-workers take time to get used to. Adapting to the way of life adjustments including these, and coping with the concern of contracting the virus and fear approximately humans near us who're in particular vulnerable, are difficult for all folks.

### **REVIEW OF LITERATURE:**

Widespread outbreaks of infectious disease, including COVID-19, are related to mental misery and signs and symptoms of intellectual illness (Bao et al., 2020). Psychiatrists internationally need to be privy to those manifestations, their correlates, and techniques to manipulate them that embody each the wishes of precise populations (Yang et al., 2020) and the precautionary measures vital to comprise the unfold of COVID-19 (Liu et al., 2020a). They need to additionally be privy to lacunae with inside the current literature, which might also additionally want to be crammed in over the years thru extra vast medical revel in and research. With the above targets in mind, the present day evaluates become designed to summarize the prevailing literature addressing intellectual fitness worries associated with the COVID-19 pandemic.

In 2007 Kelly and colleagues performed a non-experimental examine that recruited from introductory psychology training college students with melancholy who have been now no longer present in remedy, presenting each economic repayment and sophistication credit score for studies involvement. Sixty university college students (66ucasian, 57male) with foremost melancholy have been observed for 9 weeks with no remedy to evaluate for surprising profits (that is, precipitous enhancements in depressive symptomatology), remission of depressive symptoms, and reversal of enhancements. The authors determined that 60% of the university college students with foremost melancholy skilled surprising profits over the 9 weeks of now no longer receiving remedy. However, earlier than the cease of the 9-week remark duration, extra than 1/2 of those surprising profits reversed. At the cease of the duration of now no longer receiving remedy, melancholy become in remission for 20% of the college students. The authors concluded that surprising profits can be a part of the herbal route of melancholy for a few university college students, no matter remedy, and that self-assessment procedure can also additionally play a vital position in recovery.

Duan and Zhu 2020 It become talked about that whilst Western nations have included mental interventions into their protocols for disorder outbreaks, this has now no longer but befall in nations consisting of China, main to the emergence and endurance of stress-associated problems in affected persons.

Of specific hobby to training, psychiatrists are the 2 reviews from China (Yao et al., 2020, Zhu et al., 2020) concerning COVID-19 and sufferers with pre-current psychiatric illness. To date, an unmarried outbreak of

COVID-19, affecting around 50 sufferers and 30 staff, has been pronounced in a psychiatric hospital, and this becomes contained via way of means of strict quarantine. Reasons for this will have blanketed overcrowding, loss of preferred clinical centres in psychiatric hospitals, lack of know-how amongst intellectual fitness professionals, and problems in acquiring the cooperation of sufferers for preventive measures, mainly the ones stricken by psychotic issues (Zhu et al., 2020). Conversely, sufferers with pre-current intellectual issues can be at better danger of relapse or new episodes in their disease because of the pressure associated with the COVID-19 outbreak (Yao et al., 2020a). During this period, it's far critical that psychiatrists familiarize themselves with screening and triage procedures, and paintings intently with physicians and public fitness professionals to limit the dangers that their sufferers face (Zhu et al., 2020).

### OBJECTIVES OF THE STUDY:

- To reveal how covid-19 has affected the lives of the people
- To understand the reasons for the depression among millennials before the pandemic
- To study the depression among millennials due to pandemic and lockdown

### METHOD:

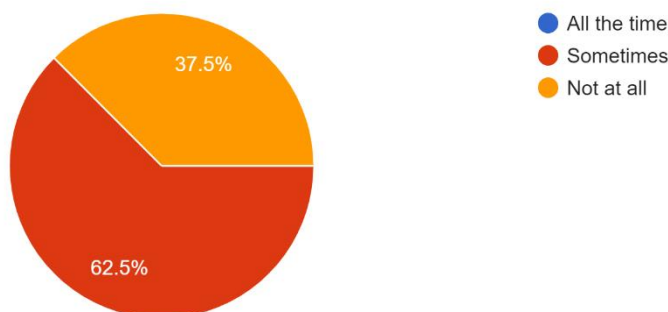
- Sampling Procedure: The Questionnaire Technique using Google forms was used for this study
- Sampling Size: Around 50 responses were received through the survey

### RESULT AND DISCUSSION:

The responses received from the survey carries out has helped us find out and understand the following points:

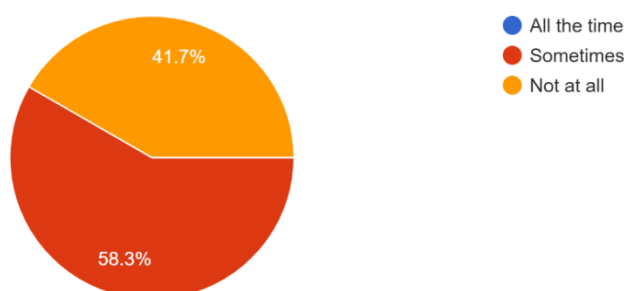
#### 1. When I'm around people, I still struggle feeling alone

It is observed that even before the pandemic people struggle with loneliness. It is observed that 37.5% people do not feel lonely but 62.5% people struggle with loneliness even when they are surrounded by the people they know.



#### 2. I feel alone

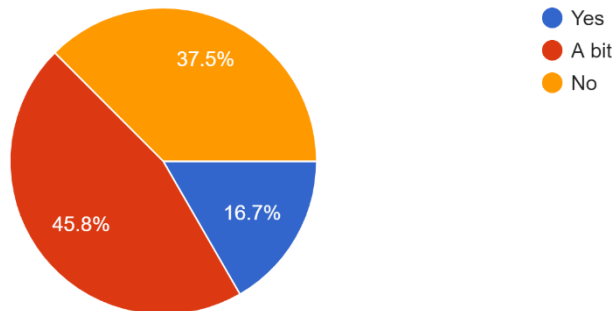
Depression is one of the major factors in feeling lonely. We are living in such a generation where factors like break-ups, unemployment, job change, family issues, etc. stress us in such a way that we start feeling lonely and hopeless with ourselves. So we can see that 58.3 % of people are likely to feel alone at some point in their life.



#### 3. I have put my friendships on the back burner

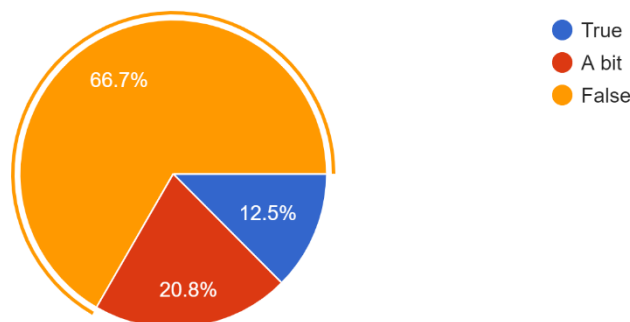
Every person is different in their own way, one's got betrayal in friendships they tend to think that it will happen in future also, so they put their future friendships on the back burner. As it is already said every person

is different, for some people friendship is their most important priority so they never put their friendships on back burner. So as we can see in the below diagram, 37.5% of people do not keep their friendship on the back burner, 16.7% people keep their friendship on back burner.



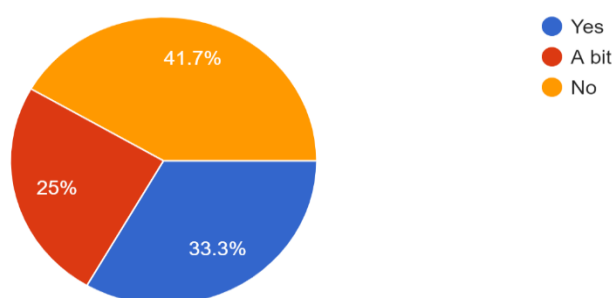
#### 4. My family just doesn't have the same priority in my life as they use to

Family is one of the most important part of every individual's life. As family makes one complete, we can see that 66.7% of people disagree to the above statement whereas 12.5% of people agree with the above statement.



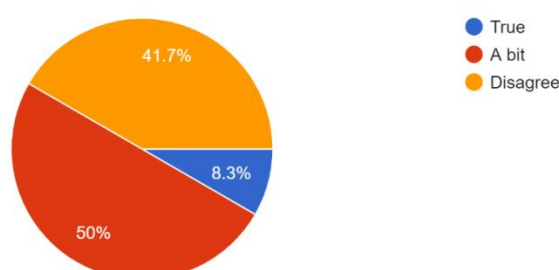
#### 5. Covid – 19 pandemic followed by the lockdown has made me feel lonely

Covid has made a tremendous impact on everyone's life, a pandemic which was followed by sudden lockdown brought a drastic change in life, some people reacted to it positively whereas some reacted negatively. We can see here that 33.3% of people said that Covid made them feel lonely at home whereas 41.7% of people disagree with the statement.



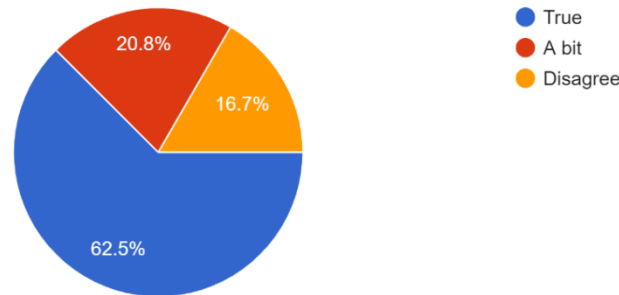
#### 6. Pandemic has made me feel that my life will never go back to normal

Most of the people disagree with the statement which is good sign, as we should always see the positive side of any situation and never lose hope.



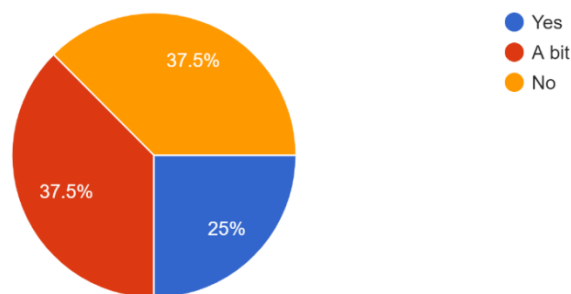
### 7. Pandemic has brought me closer to my family

Covid led to worldwide lockdown which resulted in everyone spending their time at home which in turn brought people closer to their families, as you can see that 62.5% of people agree with this statement.



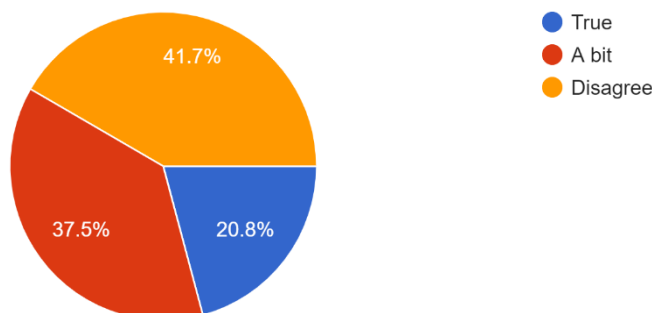
### 8. Pandemic has destroyed my social life

Since everyone was forced to stay at their home, social gatherings like birthday parties, wedding functions, get togethers etc. was not possible which led to no social life. As we can see 25% of people agree to this whereas 37.5% of people feel that virtual relations were enough to maintain a social life.



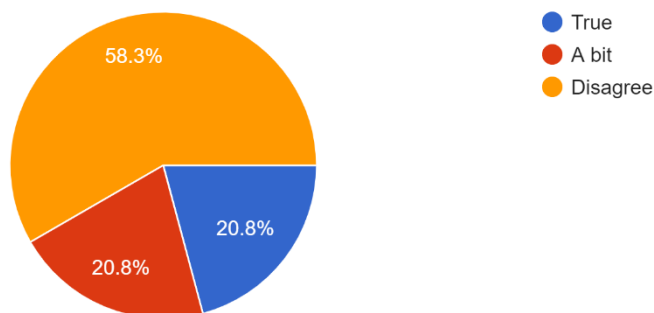
### 9. Pandemic made me doubt my career

Pandemic resulted in massive unemployment which led to people doubting their career choice. As you can see 41.7% of people disagree to this statement which is a positive sign whereas 20.8% of people agree.



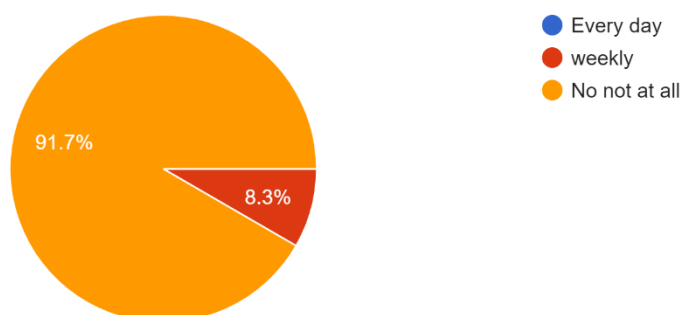
### 10. Pandemic made me think I will never get a job

Due to unemployment during pandemic as most of them lost their jobs in this time due to cost cutting and initially when only one-month lockdown was announced which extended up to 1 year, this led to people to lose their hope of finding new jobs. As you can see here 58.3% of the people disagree with the statement which shows positivity.



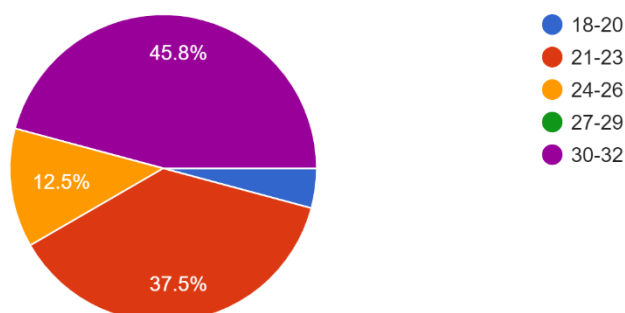
### 11. Because of this Pandemic and lockdown, I have suicidal thoughts

Due to stress which is usually caused by unemployment, health issues, relationship issues, etc. most of the time people tend to have suicidal thoughts, but as you can see in this case around 91.7% of people do not have any suicidal thoughts even when the situations are for the worse.



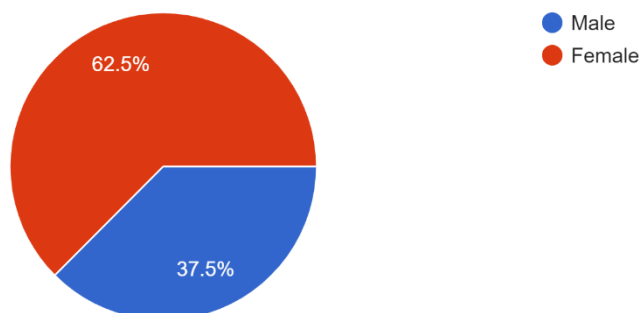
### 12. Age

The study is based on millennials which is generally from 18 years to 35 years. In this survey the majority of the respondents fall under the age group of 30- 32 followed by 21-23 years and 24-28 years.



### 13. Gender

The survey was conducted for both the genders. Most of the respondents were females followed by males.



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**CONCLUSION:**

The COVID-19 pandemic has had a first-rate impact on our lives. Many people are dealing with demanding situations that may be stressful and depressing, overwhelming, and purposely causing negative as well as strong emotions in adults. Self-isolation and social distancing are exacerbating the problem which affects both bodies as well as the mind.

As countries introduce measures to limit motion as a part of efforts to lessen the spread of COVID-19, increasingly folks are making massive adjustments to our everyday routines. The new realities of work from home, transient unemployment, home-education of children, and absence of social life with relative's members, pals and co-workers take time to get used to. Adapting to the way of life adjustments including these, and coping with the concern of contracting the virus and fear of humans near us who are particularly vulnerable, are difficult for all folks.

The study has helped us to understand how badly depression has impacted our lives before and after the pandemic. So from the above gathered data it was observed that one should never ignore their mental health and identify the early signs of depression, one should try to talk with the family members and friends and also if needed seek professional help immediately, because ignoring this is not an option.

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**A STUDY ON THE EDUCATIONAL STATUS OF LAKHIMPUR DISTRICT OF ASSAM, INDIA**

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**ABSTRACT**

*Education is the process of the acquisition of knowledge, or facilitating learning and skills values belief include narrative discussion training, teaching and directed research. It is imported for living a better life. Education is the strength to an education and person need to. This study was conducted to study the status of education level under Lakhimpur district, special references of Batamari village. Objectives: the objectives of the study were to see the education level of Batamari village and the economic condition of the family of Batamari village of Lakhimpur district. Methods: The present study on status of education level of Lakhimpur district, we have decided to use systematic sampling, more clearly we use circular systematic sampling to collection of data. Chi-square tests were used to test the education level and economic condition of the households. Results & Conclusion: A total of 100 households, it is observed that 13.9% of the household head were illiterate, 18.8% were primary level, 24.8% were HSLC, 20.8% were HS, 14.9% were graduation, 4.0% were PG and 2.0% were others degree passed. The income of the family in the selected study subjects which range "Between" 10000 to 25000 is 67% whereas 25000 and above is 33%. The family head education upto HS and above HS from the chi-square, the p value is calculated as 0.907 which is greater than 0.5, there is no significant difference in the family head education category. Also the other family member education up to HS and HS above group and from the chi-square, p value is calculated as 0.001 which is less than 0.5. So, there is significant difference in other family member education category.*

*Keywords: Educational Status, North-Eastern, Chi-square, Attributes, Lakhimpur, Batamari.*

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**1. INTRODUCTION**

Education is the process of the acquisition of knowledge, or facilitating learning, habits educational methods and skills values belief include narrative discussion training, teaching, and directed research (Uni. Education 2018; Baraza et al. 2019). Frequently Education takes place under the advice of educators, but beginner also may educate themselves. Education can take place in informal or formal settings and any occurrence that has a formative effect on the way one thinks acts or feels may be considered educational. It is commonly divided formally into such stages as kindergarten or preschool, primary school, secondary school and then college, university, or apprenticeship (Srikanth 2015; McKinney 2018).

**The Importance of Education**

Education is most important among all of us and plays a very important role in our life. For living a better life or living a luxurious life, you should be educated. It is that which transforms a person to live a better life and even in a social welfare. Education is the one that doing something helpful in our best future (Bhoje 2015; Family in Education 2019; Jakobson 1986). It helps a person to show their best by their spirit and mind and gives you a lot of knowledge in whatever detail. Education plays a vital role to success in the personal growth.

Being earning and educated a professional degree prepared to be a part in reputed institutions or companies and organizations. For determining what is good or bad, education help all. A person gets good education will become good citizen or worker. Without education person is not complete, so education makes man a correct decision-maker and a right thinker (Shields et al. 2017).

In today's world education is essential for man after clothing, shelter and food, education is the solution of any problem, it is the only education which proponents good values, awareness and habits towards anything like corruption, terrorism and much more (Hudson 1999).

Education is the strength to an education and person need to a person. Present day's technology plays an important role in continuing the communication of education persons through known and unknown. It is the only basic way by which a crave changes and up liftmen in the society can be taken into effect (NEP 2019).

**1.2 Education in Assam**

Assam is a one of state in North-Eastern India. In 2011, Assam literacy rate was estimated to be 73.18% (67.27% female and 78.81% male). The rate of literacy Assam is slightly below the national average of 74.04%.

Assam the North-east region of India, occupies a distinct place in the field of education<sup>11</sup>. Assam the overall literacy rate is 64.28%, where the literacy rate of female 56.03% and male is 71.93%. Large numbers of educational institutions are established here to communicate education to the students of entire, North-Eastern region (Saikia et al. 2019). The formal education starts in schools with elementary, secondary, higher secondary. Students move to a college and follow education in a stream he is interested in the directorate of elementary education of Assam organizes many activities to universalize elementary education (UEE). In Assam the elementary education includes classes from class 1 to 12, within the age group (6-14) years of students. Assam, Secondary and higher secondary school covering class tenth and twelfth respectively and finally prepare the child for higher education (Education in Assam 2015).

Assam has structured many educational institutions for higher studies following high standards to communicate education in the field of management and engineering. The Assam government provides free and compulsory education for children till the age of 14 (Education in Assam 2015; Education in India).

The requirement for technical education has been increasing gradually as a result the government has paid due attention in this field and framed up many esteemed institutions in Assam (Das 2017), Assam Agricultural University, Dibrugarh University, Guwahati University, Tezpur University and Assam University.

### **1.3 The Study Area**

The study is carried out at Batamari (No. 1 Batamari & No. 2 Batamari), Dhakuakhana, under Lakhimpur District in Assam. According to 2011 census of India 114095 people live in District covering a geographical area of 313.00 Sq.km. out of this 57791 are male and 56304 are female (District Census Handbook, India 2011).

Batamari is one of the Village of Dhakuakhana block, in Lakhimpur District of Assam. Male and Female literacy rate is average, but people are very active and always making efforts in knowing the works of government Officials (District Census Handbook 2011). There are so many problems that Batamari Village is water supply shortage, rationing of food grains issues unemployment etc. Health problem is rampant in this Village. People have to travel several kilometers to reach hospital for treatment of patients.

### **1.4 Objective of the study**

The objectives of the present study are:

- a) To see the education level of Batamari Village of Lakhimpur district.
- b) To see the economic condition of the family of Batamari village of Lakhimpur district.

### **Material for the study**

As my objective are given above, so I had to collect information regarding

- a) Age of the household head.
- b) Education level of the household head.
- c) Other family member education level.
- d) Economic condition of the family.

## **2. METHODS**

A sample is a part of universe. More specifically is a group of item selected from the population for the purpose of getting information about the characteristic of the items of the population.

It is known that if the sampling is not done using a standard statistical procedure, then the statistical technique cannot be used to infer about the population.

We have to use that technique is relevant to our study. After going through the literature and preliminary investigation we have decided to use systematic sampling. Clearly use circular Systematic sampling.

The topic we chosen for our present study is "A STUDY ON THE EDUCATIONAL STATUS OF LAKHIMPUR DISTRICT OF ASSAM".

### **Chi-Square Test for Independence of Attributes**

One of the most frequent uses of Chi-Square is testing the null hypothesis that two criteria of classification are independent. To conduct the test, a sample is drawn from the population of interest and the observed-Frequencies are cross-classified according to the two criteria. This cross-classification can be conveniently displayed by means of a table called contingency table. Let us designate the two attributes as A and B where attributes A is assumed to have r categories and attribute B is assumed to have c categories. Furthermore, assume the total

number of observations in the problem is  $N$ . A representation of these observations is shown below in a table where  $O_{ij}$  represents the observation in the  $i^{\text{th}}$  row and  $j^{\text{th}}$  column. Such a table in the matrix form is called a contingency table and is shown below. In the table  $R_i$  is the total of  $i^{\text{th}}$  row and  $C_j$  is the total of  $j^{\text{th}}$  column. The frequencies in these cells are termed as cell frequencies (Gupta et al. 2005).

Table 1:  $r \times s$  Contingency table (Table 1)

### **Chi-Square Test for Goodness of Fit**

A very powerful test for testing the significance of the discrepancy between theory and experiment was given by Prof. Karl Pearson in 1900 and is known as “chi-square test of goodness of fit” (Gupta et al. 2005).

If  $f_i$  ( $i=1,2,3,\dots,n$ ) is a set of observed (experimental) frequencies and  $e_i$  ( $i=1,2,3,\dots,n$ ) is the corresponding set of expected frequencies, then Karl Pearson's chi-square given by,

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^s \left[ \frac{(f-e)^2}{N} \right], \sum_{i=1}^r f = \sum_{j=1}^s e$$

$\chi^2$  = distribution with  $(n-1)$  d.f.

### **Analysis of Data**

Analysis of data is the main part of any scientific investigation. After collecting the data, the data must be scrutinized, edited and tabulated and then a very careful statistical analysis is to be made and finally a report cooperating detailed statement of the different stages of the survey should be prepared. In this chapter, I and required computations are made using the methods described in chapter; I and inferences are drawn accordingly. For computing purpose we have taken help of software like MS-Excel, SPSS describes scientific calculator (fx-82 MS).

For all inferences we fix  $\alpha = 0.05$

The present study includes a total of 100 households from Nagakhelia village of Dhemaji District. The demographic characteristics of the study are presented in the table: (Table 2 & Table 3)

From table 2 it is observed that 13.9% of the Household Head are Illiterate, 18.8% Are Primary, 24.8% are HSLC, 20.8% are HS, 14.9% are Graduation, 4.0% are PG and 2.0% are others degree passed.

It is observed that the income of the family in the selected study subjects which range “Between” 10000 to 25000 is (67%) whereas 25000 and above is (33%).

Analysis for Chi-Square tests: (See Table 4 & Table 5)

Other Family Member Education w.r.t. Caste (Table 6 & Table 7)

### **3. CONCLUSION:**

From the Table 4 it is seen that the family head education up to HS and above HS from the Chi-square table the p value is calculated as .907 which is greater than 0.5. Hence we conclude that there is no significant difference in the family head education category.

From the Table 6 it is seen that the other family member education up to HS and HS above group and from the chi-square table the p value is calculated as 0.001 which is less than 0.5. Hence we conclude that there is significant difference in other family member education category.

**Disclosure Statement:** There is no conflict of interest.

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## Tables

**Table 1: rxs Contingency table**

Attribute A	Attribute B					Total
	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub> . . . . . B <sub>j</sub> . . . . . . . . . . B <sub>p</sub>			
A <sub>1</sub>	O <sub>11</sub>	O <sub>12</sub>	O <sub>13</sub> . . . . . O <sub>1j</sub> . . . . .			R <sub>1</sub>
A <sub>2</sub>			. . O <sub>1p</sub>			R <sub>2</sub>
A <sub>3</sub>	O <sub>21</sub>	O <sub>22</sub>	O <sub>23</sub> . . . . . O <sub>2j</sub> . . . . .			R <sub>3</sub>
.			. . . O <sub>2p</sub>			.
.	O <sub>31</sub>	O <sub>32</sub>	O <sub>33</sub> . . . . . O <sub>3j</sub> . . . . .			.
.			. . O <sub>3p</sub>			.
A <sub>i</sub>	.	.	.	.	.	R <sub>i</sub>
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
A <sub>r</sub>	.	.	.	.	.	R <sub>r</sub>
			.			
	O <sub>i1</sub>	O <sub>i2</sub>	O <sub>i3</sub> . . . . . O <sub>ij</sub> . . . . .			
			. . . O <sub>ip</sub>			
	.	.	.	.	.	
	.	.	.	.	.	
	.	.	.	.	.	
	.	.	.	.	.	
			.			
	O <sub>r1</sub>	O <sub>r2</sub>	O <sub>r3</sub> . . . . . O <sub>rj</sub> . . . . .			
			. . O <sub>rp</sub>			
Total	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub> . . . . . C <sub>j</sub> . . . . . . . . . C <sub>p</sub>			N

**Table 2: Demographic profile of the subjects**

	Frequency	Percent	Valid percent	Cumulative percent
Valid	14	13.9	14.1	14.1
illiterate	19	18.8	19.2	33.3
Primary	25	24.8	25.3	58.6
HSLC	21	20.8	21.2	79.8
HS	15	14.9	15.2	94.9
Graduation	4	4.0	4.0	99.0
PG	2	2.0	2.0	100.0
Others	100	100.0	100.0	

<i>Total</i>				
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**Table 3: Income of the Family**

	<i>Frequency</i>	<i>Percent</i>
<i>Valid 10000-25000</i>	67	67.0
<i>25000 and above</i>	33	33.0
<i>Total</i>	100	100.0

**Table 4: SPSS output for Case Processing Summary**

	<i>Cases</i>					
	<i>Valid</i>		<i>Missing</i>		<i>Total</i>	
	<i>N</i>	<i>Percent</i>	<i>N</i>	<i>Percent</i>	<i>N</i>	<i>Percent</i>
<i>Caste Head of the Family Education</i>	99	98.0%	2	2.0%	101	100.0%

**Table 5: SPSS Output for Chi-Square tests**

	<i>Value</i>	<i>d.f.</i>	<i>Asymp. Sig. (2-sided)</i>	<i>Exact Sig. (2-sided)</i>	<i>Exact Sig. (1-sided)</i>	<i>Point Probability</i>
<i>Pearson Chi-Square</i>	6.177	12	.907	.810		
<i>Likelihood Ratio</i>	7.504	12	.823	.842		
<i>Fisher's Exact Test</i>	11.621			.798		
<i>Linear-by-Linear Association</i>	.002	1	.966	1.000	.519	.050
<i>N of Valid Cases</i>	99					

**Table 6: SPSS output for Case Processing Summary**

	<i>Cases</i>					
	<i>Valid</i>		<i>Missing</i>		<i>Total</i>	
	<i>N</i>	<i>Percent</i>	<i>N</i>	<i>Percent</i>	<i>N</i>	<i>Percent</i>
<i>Caste Other Family Member education</i>	98	98.0%	2	2.0%	100	100.0%

**Table 7: SPSS output for Chi-Square Tests**

	<i>Valid</i>	<i>d.f.</i>	<i>Asymp. Sig. (2-sided)</i>	<i>Exact Sig. (2-sided)</i>	<i>Exact Sig. (1-sided)</i>	<i>Point Probability</i>
<i>Pearson Chi-Square</i>	56.242	14	.0001	0		
<i>Likelihood Ratio</i>	17.029	14	.255	.043		
<i>Fisher's Exact Test</i>	25.745			.047		
<i>Linear-by-Linear Association</i>	.854	1	.355	.400	.200	.041
<i>N of Valid Cases</i>	99					

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**A STUDY ON FACTORS INFLUENCING YOUNG JOB SEEKERS PERCEPTION TOWARDS JOB PORTALS**

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**ABSTRACT:**

*This study focuses on the applicants' perception of varied modes of e-recruitment, specifically employment websites and career sections of company websites. It absolutely was noted that there was a major distinction in perception between career section of a company web site and employment websites aside from the constructs, user friendliness and fairness perception. It absolutely was conjointly established that the programme that the coed was following and therefore the previous work expertise had a major impact on the perception of on-line application systems of the candidates wherever the corporate must update their info in job portals with none delay in time and it should target enhancing the technology in job portals during which the businesses have signed.*

*Key words: Job portals, Employees perception, Online job board, Applicants Perception*

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**INTRODUCTION****Definition of job portals**

A job portal, conjointly called a career portal, could be a trendy name for a web job board that helps candidates realize jobs and aids employers in their quest to find ideal candidates. Career websites, like monster, so and easily employed, have job portals that supply a broad vary of jobs in an exceedingly immense range of fields. Some government agencies, noncommercial organizations, universities and personal businesses have their own job portals that candidates will access on the organization's web site.

**Job system**

An online job portal is associate application wherever the duty seekers will register themselves at the web site and search jobs that square measure appropriate for them wherever because the employers register with the web site and planned jobs that square measure vacant at their company.

Associate employment web site could be a web site that deals specifically with employment or careers. Several employment websites square measure designed to permit employers to post job needs for an edge to be crammed and square measure normally called job boards. Alternative employment sites supply leader reviews, career and job-search recommendation, and describe totally different job descriptions or employers. Through employment web site a prospective worker will find and fill out employment application or submit resumes over the net for the publicized position.

**Job portals**

A job portal, conjointly called a career portal, could be a trendy name for a web job board that helps candidates realize jobs and aids employers in their quest to find ideal candidates. Career websites, like monster, so and easily employed, have job portals that supply a broad vary of jobs in an exceedingly immense range of fields. Some government agencies, noncommercial organizations, universities and personal businesses have their own job portals that candidates will access on the organization's web site.

**LIST OF JOB PORTALS**

- ✓ **Naukri.com**
- ✓ **Shine.com**
- ✓ **Timesjobs.com**
- ✓ **Monsterindia.com**

**STATEMENT OF PROBLEM**

Incremental development in technology has influenced recruitment practice of human resources where electronic mode is used as a platform for job posting and attracting potential candidates to apply for the job. But effectiveness of the same can be analyzed only based on extent to which candidates find it as an ideal source for job seeking in terms of accessibility, suitability, relevance, cost etc. Therefore, study attempts to understand convenience of the E recruitment from job seekers perspective as a source for job search. It also helps to identify the advantages of online recruitment in opposition to traditional recruitment.

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**OBJECTIVE OF THE STUDY**

- To analyze factors that majorly influence choice of job portal for job search.
- To understand the effectiveness of job portal as a tool for Recruitment.
- To suggest measures based on factors preferred by the respondents that can be adopted to enhance job portal as a platform for ideal recruitment.

**SCOPE OF THE STUDY**

The Study is confined for seeking job opportunity through job portals. Study was narrowed down to six parameters such as quality of information, cost effectiveness, transparency, security and confidentiality, attractiveness and effectiveness, and to what extent candidates will prefer job portal for future job search. Outcomes of the study may be applicable to human resource consulting firms, which majorly function on the process of E recruitment, which may help them to streamline their present recruitment strategy and focus on improvising factors which have major influence on candidates, who prefer job search through online portals.

**REVIEW OF LITERATURE**

**A STUDY ON FACTORS AFFECTING THE EFFECTIVENESS OF JOB PORTALS FROM JOB SEEKERS PERSPECTIVE**, V. H. Chaitra & Dr. Rajasulochana (2018) says that Incremental development in technology has influenced recruitment practice of human resources, where electronic mode is used as a platform for job posting and attracting potential candidates to apply for the job. E recruitment has been one of the booming sources for recruitment of candidates for organizations at various levels. E recruitment is basically a technology driven method, which operates on data base updated by the candidates and matching the same with requirement of organization.

**A STUDY ON PERCEPTION OF JOB SEEKERS ON RECRUITMENT THROUGH SOCIAL MEDIA APPLICATION**, Mr. DINESH & Dr. MAHESH KUMAR.K. R (2015) says that Recruitment refers to the systematic process of searching for prospective employees and stimulating them to apply for jobs in an organization. It results in a pool of applicants from among whom the right employees can be selected. Social Media Recruitment (SMR) refers to recruitment with the help of Social Media sites. Social Media has become an integral part of recruitment; through which people stay in touch, keep themselves aware of new developments and connect with the world around them. Human Resource professionals observed this pattern of behavior in regards to the usage of social media tools among employees and crafted innovativeness in HR practices and processes.

**E-RECRUITMENT AND ITS IMPACT UPON ON JOB SEEKERS: A CONTEMPORARY APPROACH. ROZY RANI**, 2016 says that the rapid growth and use of the Internet over the last several years has changed the way companies' conduct of business activities, including the activities of human resource management. To attract and recruit good employees is one of the great challenges for Human Resource Department. Today online recruiting has become a significant tool for Human Resource Department. Online recruitment is effective in terms of saving the cost of recruitment and selection. Multinational companies also can recruit with their websites, job boards or resume banks, newspaper classified ads, and job boards. It also discusses the concept of e-recruitment from the perspective of job seekers.

**RESEARCH METHODOLOGY**

In this study, a Descriptive analysis style is adopted. The supply of knowledge is primary and secondary. This analysis took an amount of 1 month throughout that information was collected from the sphere, organized, analyzed and conferred in analytic kind. The study utilized the utilization of self-structured form to gather the specified primary information. Descriptive analysis technique was utilized to get helpful outline of responses. Simple random sampling was used as solely few complexities were concerned whereas information assortment. The 21 version of SPSS has been used to analyze the data collected.

**SAMPLING:**

**Sampling Type:** Probability Sampling

**Sampling technique:** Simple Random sampling

**Sample size:** 130

**LIMITATIONS OF THE STUDY:**

- The Study is confined only to limited population who have been seeking job through E Recruitment which do not present a holistic approach on alternative sources.

- Time period for conducting the study is limited, which confines the scope for a detailed research.

### STATISTICAL TOOLS

- Percentage analysis
- Chi square test
- One-way anova
- T-test

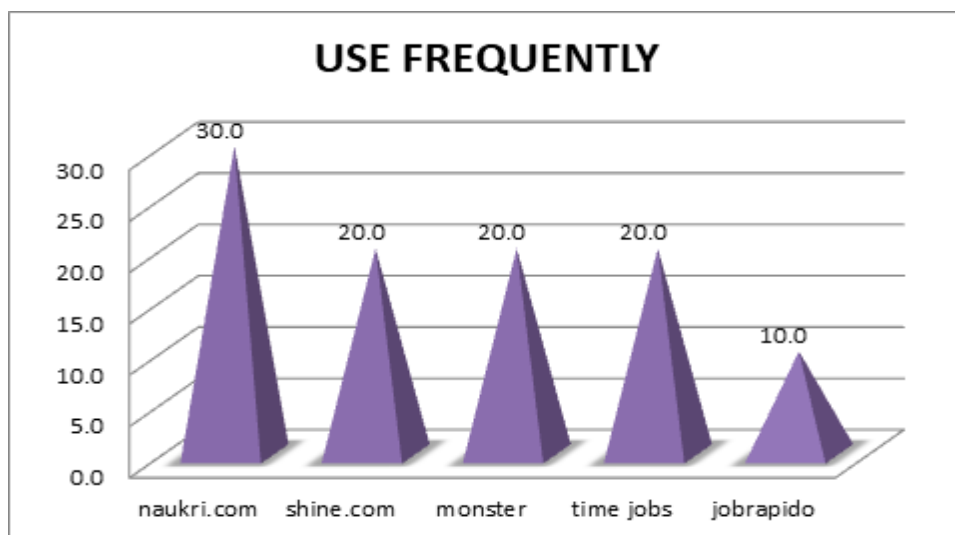
### DATA ANALYSIS & INTERPRETATION

#### PERCENTAGE ANALYSIS

TABLE SHOWING FREQUENTLY USED JOB PORTALS BY RESPONDENTS

USE FREQUENTLY	FREQUENCY	PERCENTAGE
naukri.com	39	30.0
shine.com	26	20.0
Monster	26	20.0
time jobs	26	20.0
Job rapido	13	10.0
Total	130	100.0

CHART SHOWING FREQUENTLY USED JOB PORTALS BY RESPONDENTS



### INTERPRETATION

From table, it is observed that 30% of the respondents use Naukri. 20% shine, 20% monster, 20%time jobs and 10% job rapido.

### STATISTICAL ANALYSIS

#### CHI-SQUARE TEST

##### Null hypothesis ( $H_0$ )

There is no association between age and success in job hunting.

##### Alternate hypothesis ( $H_1$ )

There is significant association between age and success in job hunting.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	140.940 <sup>a</sup>	15	.000
Likelihood Ratio	151.063	15	.000
Linear-by-Linear Association	25.190	1	.000
N of Valid Cases	130		

a. 18 cells (75.0%) have expected count less than 5. The minimum expected count is 1.30.

P value =0.00 (less than 0.05)



Reject null hypothesis

Accept Alternate hypothesis

### INTERPRETATION:

There is association between age and success in job hunting.

### ONE WAY ANOVA

#### Null hypothesis ( $H_0$ )

There is no significance difference between the experience and benefits of job portals.

#### Alternate hypothesis ( $H_1$ )

There is a associated difference between the experience and benefits of job portals.

ANOVA  
total experience

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	12.300	3	4.100	6.144	.001
Within Groups	84.077	126	.667		
Total	96.377	129			

P value =0.00

Reject null hypothesis

Accept Alternate hypothesis

**INTERPRETATION:** There is a associated difference between the experience and benefits of job portals.

### T-TEST

**Null hypothesis ( $H_0$ ):** There is no significant difference between Gender and relevant openings of job in portals.

**Alternate hypothesis( $H_1$ ) :** There is a significant difference between Gender and relevant openings of job in portals.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
relevant openings	Equal variances assumed	17.441	.000	-2.515	128	.013	-.596	.237	-1.065	-.127
	Equal variances not assumed			-2.423	99.403	.017	-.596	.246	-1.084	-.108

P value =0.00

Reject null hypothesis

Accept Alternate hypothesis

### INTERPRETATION

There is a significant different between Gender and openings of job in portals.

### FINDINGS OF THE STUDY

- 57% of respondents are male.

- 30% of respondents belong to the age group below 25, age between 26- 35 and between 36 - 45.
- 40% of respondents belong to the master graduates.
- 38.5% of respondents belong to the experiences between 6-10 years.
- 60% of the respondents are applicants of sundaram business.
- 50% of respondents preferred online job portals for their job search.
- 30% of respondents use naukri.com for their frequent use of job search.
- 40% of respondents agree that the information provided in job portals is credible.
- 30 % of respondents strongly agree and agrees that the job openings shown in online job portals are relevant to their search.
- 30% of respondents strongly agree that the information uploaded is secured in job portals.
- 60% of respondents say that the information which is provided by the job portals is not misleading.

### **SUGGESTIONS**

- The company needs to update their information in job portals without any delay in time.
- The company must focus on enhancing the technology in job portals in which the companies have subscribed.
- The company's job portal must be more users friendly and down the class they should have a proper survey in the job portals itself.
- The company need to focus on the specification of information provided in the job portals.
- The company needs to focus on the information provided in the job portals should not mislead.
- The company must focus on the job portals to avoid updating the irrelevant information.
- The company must design their job portals in the way to support the jobseekers.
- The company should wisely choose its job portals for convinces of jobseekers.

### **CONCLUSION**

The expertise and knowledge that was gained throughout the whole research paper was a whole new and extremely attention-grabbing expertise. The analysis managed to determine the connection between the work portals, the staff and also the applicant's goals/mission/objectives, age/experiences with the personnel from the analysis administered check relationships.

All three attributes had a major relationship with the staff and candidates perceptions. Finally, to conclude it all, future analysis continues to be required to justify and strengthen the outcomes of this analysis. There could be analysis almost like this subject, however matters all told the researches is also totally different, together with this analysis.

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**ONLINE PORTALS**

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- [www.google.com](http://www.google.com)
- [www.googlebooks.vom](http://www.googlebooks.vom)
- [www.scribd.com](http://www.scribd.com)

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## A STUDY ON THE AWARENESS ABOUT SHARE MARKET INVESTMENT AMONG COLLEGE STUDENT IN RURAL AREA

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### ABSTRACT

*This study examines share market investment. The share market is one of the root cause to raise fund and it regulates flow of capital from those who have it or wants to enhances it and hand it to the one who needs it. The share market helps to enhance the real saving and tend to increase capital formation from any given level of National Income and raise productivity of investment by improving allocation of investible fund. In India, approximately 1.5% population were invested in share market but 10% in China and 18% in USA were invested which is stated by BLOOMBERG in 2015. Many people were not aware of share market in India especially in rural region. Student are the pillars of the nation, who should be aware about the growing sector of the Share market and many were interested to enter the share market but many don't have sound knowledge about it. Every student should be aware of investing in share market, only a few were well-versed in investing and many were failed to sustain in it. By investing in shares we can build our wealth in the long run. While some people view shares to be a risky investment, many studies have proved that putting your money in the right shares for a long period of time (5 to 10 years) can provide inflation-beating returns and be a better investment option than real estate and gold. People also have short-term strategies while investing in share markets. While shares can be volatile over a short period of time, investing in the right shares can help traders make quick profits. This study examines the awareness among college student in rural area about share market investment and also pays a way to know the interest level of the students in investing. The perception of students varies widely but with this study, we can come through with the college student's level of awareness in share market, the student's mentality on share market and creates an opportunity to enhance the investors in share market.*

*Keywords: Share market, Investment, Student's awareness, Shares*

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### INTRODUCTION:

**SHARE MARKET:** Share market is the practices of buying and selling of shares. The stock market is a share market, however besides shares of companies, and other categories like bonds, derivatives and mutual funds are also traded in share market. Share market consists of two markets which is primary and secondary market in which the Initial Public Offering (IPO) is done under primary market and the stock/Share is traded under secondary market.

**Investment:** One need to invest to earn return on idle resources and to generate a specified sum of money for a specific goal in life and to make a provision for an uncertain future. So investment is needed for every individual to promote their standard of living.

Share market investing is one of the smartest ways to grow our secondary sources of income. Apart from secondary sources it may serves as a primary source of income for many peoples who invest it in an unerring manner. It is required with continuous learning skill in the field of movement of demand for the company's stock, the market and its relationship with the economy such as market relationship with inflation, GDP, fiscal deficit, crude prices, rupees values against dollar and investment market cycle. Investing in share market is quite easy to get back maximum return when compared with other form of investing such as bank's fixed deposits and saving account, government saving scheme and senior citizen pension/ saving scheme.

### REVIEW OF LITERATURE:

- i. Sangeeta Arora and Kanika Marwaha studied "the Financial Literacy Level and Awareness Regarding Stock Market – An Empirical study of Individual Stock Investors of Punjab". They studied and reported about the awareness of investment option in share market among the individuals in Punjab and examined the financial literacy level among investors.

### SCOPE OF THE STUDY:

With this study, one can understand the student's perception on share market investment and the level of awareness in share market among the college student in rural areas. This study portrait the willingness level of the students in acquiring knowledge in investing field and shows the other saving option preferred by students.

With the help of the study, we can motivate the rural area college students in the field of investing in share market and paves an opportunity to increase the flow of fund for the economy and generates liquidity, increases the chances of good return in a particular period of time. Investors in the stock market can directly benefit from a thriving economy, and the value of their investments rises in lockstep with economic expansion. When an economy and corporate earnings grows, results in the rise of the ordinary individual's income.

### Objectives of the study:

- To study the awareness of share market among college student in rural area.
- To study the oblivious view on share market.
- To study the acceptances state on share market.
- To examine the interest of the student in learning Share market investment and their perception on share market.

### METHODOLOGY OF THE STUDY:

The present study is Exploratory research study and questionnaire survey. This study is based on primary data collection in which it has been collected through a structured Close ended five point Likert Scale, Multiple choice questions, and checklist type multiple choice question through Google form. The primary data required for the study has been collected from the college students who are all in the rural area with the sample size of 100 student respondents. The data are analyzed using the Statistical Package For The Social Sciences (SPSS) version: 28.0.0.0(190)

### DATA ANALYSIS:

The response of the college students in rural area has been collected by sending the questionnaire through Google form. The responses of the student were sought for identifying the awareness level of the student in the field of share market investing and options on the scale ranging from Fully not Aware to Fully Aware. Further the oblivious view point and acceptances level of students on share market investing were given with the options on the scale ranging from Strongly Disagree to Strongly Agree. To analyze the response the Descriptive Statistics has been carried out to describe the feature of the large number of collected samples in a simplified summary. With the help of this, we can provide an end-note of the awareness level and the viewpoint of share market among students.

### 1. AWARENESS LEVEL OF COLLEGE STUDENT IN RURAL AREA:

The first and the foremost objective of the study are identifying the awareness level. Here, the questionnaire has been given with a set of basic share market related which implies the awareness of the student. The scale option ranges from fully not aware to fully aware.

Table 1 reveals the awareness level in which the mean and the standard deviation are taken into consideration for providing the final result.

Table-1: Descriptive Statistics			
	N	Mean	Std. Deviation
1. Do you aware about Stock/Share Market?	100	2.7900	1.25766
2. The Bombay Stock Exchange (BSE) is the first and largest securities market in India.	100	3.2300	1.18794
3. Whether you have heard about Share market indices?	100	2.8300	1.21485
4. "Demat account"- have you aware about it?	100	2.9100	1.21518
5. How to invest in share market?	100	2.6700	1.22314
Valid N (list wise)	100		

Inference:

- The mean score of the awareness about share market is 2.7900 with a standard deviation of 1.25766. The standard deviation is greater than  $1/3^{\text{rd}}$  of the mean. So the awareness level of the share market is not fully aware.
- The mean score of the awareness of Bombay Stock Exchange is 3.2300 with a standard deviation of 1.18794. The standard deviation is greater than  $1/3^{\text{rd}}$  of the mean. So the awareness level of the Bombay Stock Exchange is not fully aware.

- iii. The mean score of the awareness about share market indices is 2.8300 with a standard deviation of 1.21485. The standard deviation is greater than  $1/3^{\text{rd}}$  of the mean. So the awareness level of the share market indices is not fully aware.
- iv. The mean score of the awareness about Demat account is 2.9100 with a standard deviation of 1.21518. The standard deviation is greater than  $1/3^{\text{rd}}$  of the mean. So the awareness level of the Demat account is not fully aware.
- v. The mean score of the awareness about investing in share market is 2.6700 with a standard deviation of 1.22314. The standard deviation is greater than  $1/3^{\text{rd}}$  of the mean. So the awareness level of investing in share market is not fully aware. From the above inferences, we can conclude that the awareness level among the college student is not fully aware. Some students were partially aware and some were not aware partially too. The awareness of share market investing among college student in rural area is not aware fully has been analyzed with the mean and standard deviation using descriptive statistics.

## 2. STUDENT'S OBLIVIOUS VIEW ON SHARE MARKET INVESTING:

The following Table 2 analyzes the oblivious view on share market among college student particularly in rural area. The scale option ranges from strongly disagree to strongly agree.

Table-2: Descriptive Statistics			
	N	Mean	Std. Deviation
1. Does share market is risky?	100	3.3300	1.06415
2. Do you think share market is scam and gambling?	100	2.9400	1.08078
3. Do Mutual Fund guarantee Return?	100	3.0600	1.00323
Valid N (list wise)	100		

Inference:

- i. The mean value of the risky share market is 3.3300 and the standard deviation value is 1.06415 in which the standard deviation value is less than the  $1/3^{\text{rd}}$  of the mean value, states that many students agree that share market is risk.
- ii. The mean value of the 2<sup>nd</sup> and 3<sup>rd</sup> question is 2.9400 and 3.0600 and the standard deviation value is greater than the  $1/3^{\text{rd}}$  of the mean value. It concludes that, some students have the oblivious view on investing in share market. From this we can say that the oblivious view on share market investing among student is partially occupied and the risk factor is strongly agreed among the student.

## 3. ACCEPTANCES LEVEL ON SHARE MARKET INVESTMENT

The Table 3 analyzes the acceptances level on share market among college student with the help of questionnaire related to the supporting nature of the share market investment. The scale option ranges from strongly disagree to strongly agree.

Table-3: Descriptive Statistics			
	N	Mean	Std. Deviation
1. Can you become a millionaire by investing in stocks?	100	3.3100	1.07021
2. The world without share market would leads to difficulty in growth of business and flow of cash.	100	3.3600	1.16792
3. Do you think that share market is needed for economic growth?	100	3.5600	1.12205
4. Share Market helps in capital formation?	100	3.4500	1.00880
5. Safety of transaction and ensuring norms is one the role of Stock Exchange?	100	3.2400	.98596
Valid N (list wise)	100		

Inference:

- i. From the above table, the mean value for the question 1 to 4 is 3.3100, 3.3600, 3.5600 and 3.4500, which has standard deviation of 1.07021, 1.16792, 1.12205 and 1.00880. The standard deviation is greater than the  $1/3^{\text{rd}}$  of the mean value which states that the acceptances level on share market investment among is not fully agree but agreed partially.

- ii. But the question 5 has a mean value of 3.2400 and the standard deviation value is 0.98596, which is less than the  $1/3^{\text{rd}}$  of the mean value and implies the acceptances level on share market is strongly agree. From this we can conclude that many students agree the acceptances of share market investment in a positive approach.

#### 4. INTERET IN SHARE MARKET INVESTMENT:

The upcoming Table 4 shows the interest of the student in share market investment and their willingness to learn and earn. The scale option ranges from strongly disagree to strongly agree.

Table-4: Descriptive Statistics			
	N	Mean	Std. Deviation
1. Is there availability of opportunity to learn about Share market?	100	3.4200	1.10261
2. If you were given with a set of course material on Share market, would you ready to learn it and invest in it?	100	3.4500	1.03840
Valid N (list wise)	100		

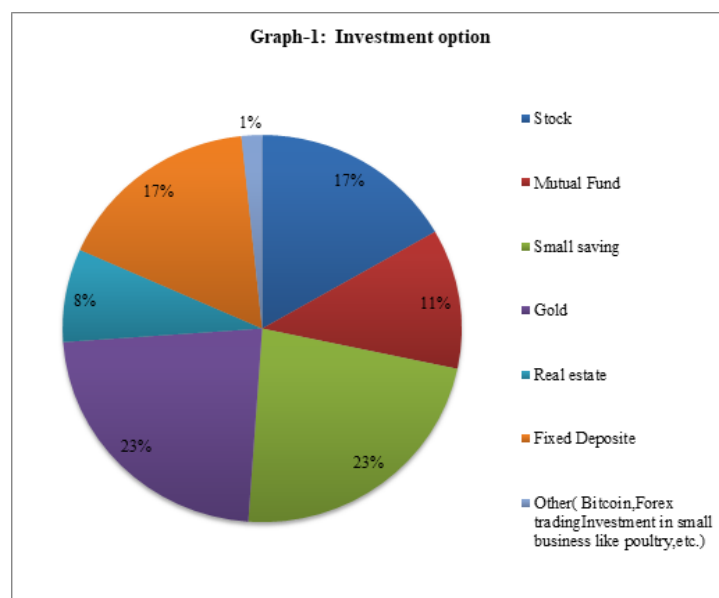
Inference:

- i. The mean value in the table for the two questions related to the opportunity to learn and investment in share market, the values are 3.4200 and 3.4500. The standard deviation is 1.10261 and 1.03840 which is less than the  $1/3^{\text{rd}}$  of the mean which shows that strongly agree on the given variables.

From the above table, we can finalize that the college students in the rural area are willing to learn and invest in share market if there was an opportunity.

#### 5. INVESTMENT OPTION IN STUDENT'S VIEW

The chart below portrait the investment option of the college student has been collected through questionnaire with check list type multiple choices.

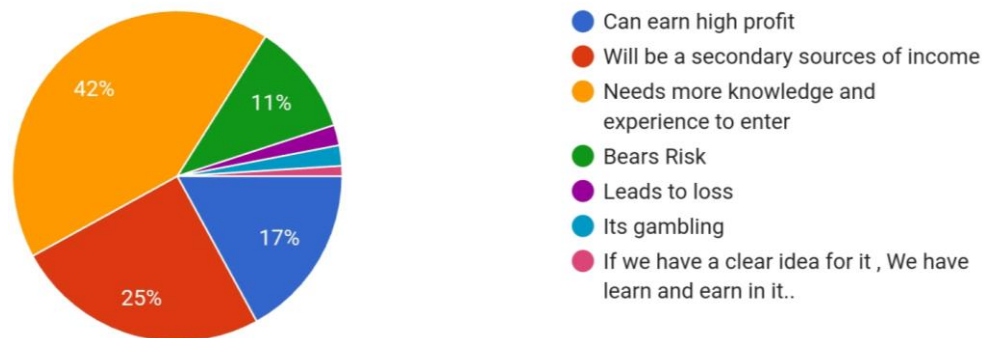


From the chart, it is clear that the students are not aware in the shocks and their investment option is in the area of small saving and gold, followed fixed deposit and stocks.

#### 6. PERCEPTION ON SHARE MARKET INVESTMENT:

The students perception on share market is vary from one person to another.

From the Graph 2, we can say that the student's perception on share market investment is highly on the way of need more knowledge and experiences to enter. Followed by the factor the share market investment will be a secondary source of income. From this analysis, the students are interest about the share market investment but unaware to enter into it. Some students were thinking it as a gambling due to their unsound knowledge in it and some says it as a risky one, but generally in share market investment when we except high return we should bear risk, if we need risk free market then the return would be a moderate one. Risk can yield good return with sound knowledge in share market.

**Graph-2: Perception of student on Share market investment****IMPLICATION:**

The Study focuses on the awareness of college student on rural area which has been founded that the awareness level is not fully aware. The students are all so active in learning about the share market investment if they were provided an opportunity to learn it and some students has an unaware depict of share market investment. But the appreciating character is that the students are partially aware about the working condition of share market to the economy of the nation. They realized that the share market can regulate liquidity, helps in capital formation and can increases the net worth of an individual. Without the correct set of tools and learning the student's preferable investment option is small saving and gold investment. The way share market projection can be understood with this study that to enter a share market; one should have a sound knowledge and experiences. When in real life, it seems to be true but the myth is that the learning the share market is modest when comparing with the myth on share market.

**CONCLUSION:**

From this exploratory research study with the help of primary sources of collection of data, it is understood that the college student in rural area has to be equipped with the knowledge of share market investment because of their interest in this area. With the help of this study the reader can able to understand the mentality of the future leaders-(student) in the share market sector. The student oblivious view on the share market can be removed when they were filled with the sound knowledge about investment. The level of acceptances of the share market benefit to the economy has been an emerging feature among the student. The student's interest on share market is pretty enough that it will lead the student toward investment. The investment and perception option has been analyzed in this study which can help the institution to well-verse their services based on the students preferences. The result achieved in this research paper would make the students to be aware on their financial knowledge.

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**A REVIEW REPORT ON INSIGHT OF HUMAN BEHAVIORAL ISSUES DURING-COVID-19**

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**ABSTRACT**

*COVID-19 is a severe acute respiratory syndrome which is caused by coronavirus 2 (SARS-CoV-2). This disease WAS first emerged in Wuhan, China at the end of 2019. The novel coronavirus disease (COVID-19) has created tremendous chaos around the world, affecting people's lives and causing a large number of deaths. COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recovered without hospitalization. Serious symptoms are difficulty during breathing or shortness of breath, chest pain or pressure, loss of speech or movement. This study focuses on the behavioral and physiological changes of COVID-19 survivors due to their health issues after taking severe medicine. This will also useful to develop an APP which may record all the details of the Covid-19 survivors and now and then give information about their behaviors to the medical physician now and then.*

*Keywords: Behavioral issues-Covid 19 survivor- Social distancing-Health condition. I.*

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**INTRODUCTION**

The novel coronavirus disease or COVID-19 that emerged at the end of December 2019 has affected people of many countries around the world. It has placed an overwhelming burden on health care systems and authorities.<sup>1</sup> Since there is no vaccine or definitive treatment yet, widespread social and behavioral changes are critical in reducing the transmission of the virus and mitigating the impact of COVID-19.<sup>1,2</sup> The combined knowledge of social and behavioral sciences with the recommendations of epidemiologists and public health experts can help align human behavior in a conducive manner.<sup>3</sup> The knowledge about what drives behavior and awareness of changes in these drivers is necessary.<sup>4,5</sup> People's behavior is influenced by societal norms, what they perceive that others are doing or what they think that others approve or disapprove of. These perceptions can often be inaccurate. People can underestimate health promoting behaviors (hand washing) and overestimate unhealthy behaviours. Public messages reinforcing positive (health promoting) norms can correct such misconceptions. Here we have highlighted some of the commonly seen human behaviours during a pandemic crisis.

**II. PROTECTIVE BEHAVIOUR**

The coronavirus is new and there's no vaccine or definitive treatment for it yet. The prevalence and case fatality rates vary across countries and mainlands. This causes high query regarding the liability of contracting the complaint. Therefore, the knowledge of threat comprehensions is critical for defensive behavior. Preventive and defensive geste during this epidemic includes regular hand washing/ sanitizing, avoid touching the face, disinfecting mobile phone defenses, staying at home when sick, covering up while coughing, balanced diet, physical distancing, wearing of face mask, avoiding crowded places, homeopathic remedies, tone- counter blockade, fraternizing digitally, and numerous further. It's assumed that these conduct are espoused by the people after estimating the threat, assessing the costs and benefits of action, and also opting an action that will give them with asked results.<sup>6</sup> It has been seen during the influenza epidemic (2009-2010) that query and perceived magnification led to a reduced liability of enforcing the recommended behaviors[1]. The stakeholders should identify and understand which of the defensive measures are known by the people and which area there's a lack of information. Applicable public dispatches can also be targeted at similar behaviours.

**III. SOCIAL DISTANCING**

It's one of the non-pharmaceutical public health interventions taken to help the spread of the contagion and reduce transmission. It's seen that people respond further explosively to losses than earnings, thus telling people they could beget detriment to others by going out can be more effective than telling them they 're saving lives by stayinghome. However, more are likely to follow but, social distancing is a largely unseen geste, If numerous people are visibly social distancing.

**IV. HEALTH SEEKING BEHAVIOUR**

As people perceive themselves as being at threat of infection or being infected, they will form an impression that they should get tested indeed if they have the fewest symptoms. Some may want to get tested indeed without symptoms[2]. Similar geste can overwhelm any health system and in a limited resource, the setting will affect the destitute. It's thus important that simple instructions are given to the community regarding this. For illustration, if you develop fever, cough, and/ or difficulty breathing, and have been in close contact with a

person known to have COVID-19 or have lately traveled from an area with the ongoing spread of COVID-19, stay home, and call your healthcare provider. Simple instructions when communicated constantly help the community in relating their trouble.

#### V. DISCRIMINATORY BEHAVIOUR

During afflictions, lower fear and perceived trouble are associated with increased sectarianism, discrimination, and violence against stigmatized groups. Various print media have reported that racial Asian people are passing physical attacks in generally white countries due to mischaracterizations of SARS-CoV-2 as the “Wuhan” or “Chinese contagion”. There have been frequency of stigmatization of certain religious groups for the spread of COVID-19 too. Therefore, this necessitates the creation of openings for reducing religious and racial conflicts[3]. Harmonized efforts among individuals, public, and government pressing the public and international cooperation can show signals of orchestration. The current epidemic has formerly employed this to its benefit. India has supplied Hydroxychloroquine tablets to the USA. China is also helping other countries by furnishing test- paraphernalia and other medical supplies. During an epidemic, effective communication plays an important part. The onus is on public health departments to convey accurate and necessary information to the public since news channels and social media are swamped with constantly amplified information. Misinformation is quickly circulated and contributes to heightened concern and outrage among the final public. It will weaken any public health action and may be refuted. Easily accessible information should be circulated by the public health authorities through accessible channels that the public trust and use.

#### VI. PSYCHOLOGICAL BEHAVIOUR

Wrathfulness, solicitude, and fear are the most common cerebral responses. Numerous people are changing themselves in unforeseen forced proximity with their immediate family. People subordinated to counter blockade self isolation are at threat for confusion, wrathfulness, and emotional tendencies due to constant enduring by family members for weeks or months. Studies have reported that forced propinquity is a threat factor for aggression and domestic violence. People are also bothered about getting infected in crowded places similar to public transport, shops, or cafes. Numerous people are fussing about their jobs indeed in middle and high- income countries. It has also been reported that strong fear prayers produce the topmost change only when people feel a sense of efficacy. Strong fear prayers with low- efficacy dispatches produce the topmost situations of protective responses. The media reporting on COVID-19 is substantially negative, for illustration, the number of people infected/ failed as opposed to number recovered/ mildly characteristic[5,6]. This may increase negative feelings and similar as fear and can also lead to people committing self-murder. Still, fear of contracting the complaint has made people stay outdoors and limited the spread of the contagion.

#### VII. HERD BEHAVIOUR

The most common herd gesture endured during the epidemic is “fear buying.” It's a belief that, when in a pitfall, people fear, especially in crowds[3]. They start acting blindly and exorbitantly out of tone- preservation, potentially venturing the survival of all. This explains the notion of “fear buying.” People stock up on inventories to prepare themselves for implicit tone- insulation. When people feel they don't have control over a threat, their emotional response is heightened.

#### VIII. CONCLUSION

This paper deals with various behavioral aspects from various research papers. The current epidemic of COVID-19 is unknown but, the important assignments of public health measures and preventative conduct are conventional. These are largely told by threat perception by the public, defensive and preparedness behaviours, and effective communication. Acceptable knowledge about what drives gesture and ways to address misconceptions can more equip the authorities to deal with the epidemic extremity. The information collected from various research papers will be useful for developing the APP through which the behavioral and psychological activities may be recorded and analyzed.

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**MAJULI : THE WORLD HERITAGE TOURISM WITH SPECIAL REFERENCE TO MISHING PEOPLE, ASSAM**

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**ABSTRACT**

*Development of tourism is one of the fastest growing sectors of the global economy. Tourism plays an increasingly important role in international relations and the degree of International Corporation existing between the two countries. Tourism's industry involves a vast network of business activities relating to attracting, receiving, accommodating, managing and servicing of tourists. Government and multilateral policies directly impact tourist activities. Government can encourage tourism through regulations, official statements, collaborations and incentives across multiple government bodies. Many of world's poorest countries rely on the tourist trade for the major part of their income. Tourism is one sector where the region has comparative advantage. Our study area Majuli Island assumes special significance so for the character of nature-culture interaction in a highly delicate ecosystem is concerned. Majuli is the largest fresh water River Island in the world. The Island is a bio-diversity hotspot and has rich ecology with rare breeds of flora and fauna. Development of tourism is one of the fastest growing sectors of the global economy. The study reveals that Majuli receives more than 1,000,000 domestic tourists and more than 500 overseas tourists every year and a token tax would be collected from them. The main occupation is agriculture with paddy being the chief crop. The all indigenous vocations like silk particularly the golden silk, textiles, mask making, pottery industry, boat making, pisciculture, cattle farming, handicrafts, handloom are other occupation. This region no doubt suffers from many problems but if use utilized these resources properly, in the river Island Majuli we can find tremendous economic potentiality and possibility for ecological and economic development. Therefore an attempt has been made in this paper to highlight the possibilities of alternative occupation and utilization in river Island Majuli and to examine the sustainability issues to finally outline a sustainable development strategy for the region.*

*Key Words: alternative, development, economy, possibilities, sustainability, tourism, etc.*

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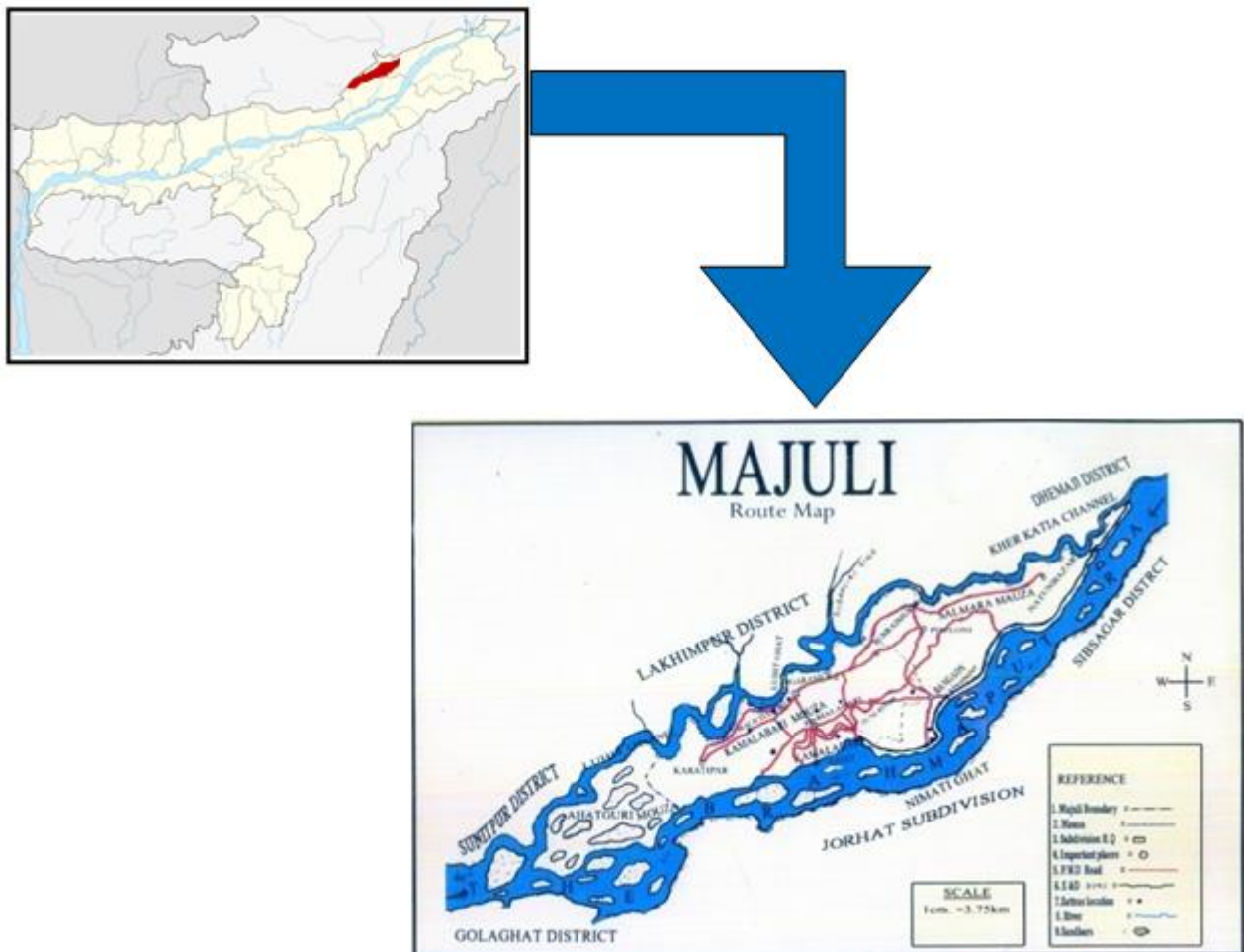
**INTRODUCTION:**

Majuli with a population of 1.6 Lakhs majority being tribal has a very rich heritage and has been the abode of Assamese Vashnavite cultural with tremendous option for spiritual and eco-tourism. The island is formed by the Brahmaputra river in the south and the Kherkutia Xuti, an anabranch of the Brahmaputra, joined by the Subansiri River in the north. Majuli Island is accessible by ferries from the City of Jorhat. The island is about 200 kilometres east from the state's largest city Guwahati. The island was formed due to course changes by the river Brahmaputra and its tributaries, mainly the Lohit. Majuli is also the abode of the Assamese neo-Vaisnavite culture. Majuli, the greatest river island of the world is famous for cultural heritage, ethnic diversity and natural beauty. Domestic as well as foreign tourist visit Majuli every year. They have been demanding a small pamphlet about the Satras of Majuli. Majuli the name contains two meaningful words where 'Ma' stands for 'Laxmi' (the goddess of prosperity) and 'Juli' denotes 'Granary'. Legends says that ancient king Arimatta, who unfortunately killed his own father had offered various glittering goods like gold, diamonds etc to the river Brahmaputra for expiating from the committed sin. Denying these rivers Brahmaputra broke into 2 parts. Living isolate bent which is later called 'Majuli'.

**Study Area:**

Majuli is a largest river island in the Brahmaputra River, Assam, India. The island had a total area of 1,250 square kilometres (483 sq mi) but having lost significantly to erosion it has an area of only 421.65 square kilometres (163 sq mi) in 2001. Majuli has shrunk as the river surrounding it has grown. Majuli is the largest river island in the Indian subcontinent. It is situated in the upper reaches of the river Brahmaputra in Assam within the latitude of 26°45' N – 27°12' N and longitude of 93°39' E – 94°35' E with mean height of 84.5 Mt. above MSL.

## LOCATIONAL MAP OF MAJULI



### Objectives:-

- To know the culture and tradition of Majuli like sattras, sattriya culture, Mukha culture.
- To analysis of various perspectives of globalization,
- Intends to depict the picture of socio-cultural transitions of the Mishings of Majuli (Assam) under the impact of globalization.

### METHODOLOGY:-

In preparing the paper, both primary and secondary data have been used. While the secondary data collected from books, journals and the internet have been used for discussion and analysis of the present socio-cultural changing scenario of the tribes of North-East India in general, the primary data, collected from Mishing villages of Majuli, are used for portraying the socio-cultural changes and analysis of the identity issues of the said tribe.

### History of Majuli :

Originally, the island was a narrow and long piece of land called Majoli (land in the middle of two parallel rivers) that had Brahmaputra flowing in the north and the Burhidihing flowing in the south, till they met at Lakhu. Frequent earthquakes in the period 1661–1696 set the stage for a catastrophic flood in 1750 that continued for 15 days, which is mentioned in historical texts and reflected in folklore. As a result of this flood, the Brahmaputra split into two and a branches-one flowing along the original channel and the other flowing along the Burhidihing channel and the Mājuli island was formed. The Burhidihing's point of confluence moved 190 km east and the southern channel which was the Burhidihing became the Burhi Xuti. The northern channel, which was previously the Brahmaputra, became the Luit Xuti. In due course, the flow in the Luit Xuti decreased, and it came to be known as the Kherkutia Xuti; and the Burhi Xuti expanded via erosion to become the main Brahmaputra River. The locals speak in the Mising and Assamese language. However, what is certain is Mājuli has been the cultural capital of Assamese civilization since the 16th century; based on written records describing the visit of Srimanta Sankardeva - a 16th-century social reformer. Sankardeva, a pioneer of the

medieval-age neo-vaishnavite movement, preached a monotheist form of Hinduism called as Vaishnavism and established monasteries and hermitages known as satras on the islet.

The island soon became the leading center of Vaishnavism with the establishment of these satras. After the arrival of the British, the island was under the rule of the British until India gained independence in 1947.

### **Climate and Temperature :**

The island of Majuli enjoys a sub-tropical monsoon climate, as is found in the other parts of Assam. The climatic conditions prevalent here are similar to that in the northeastern zones of India, Nepal. Summers are usually hot and have extreme humidity. The average annual rainfall in the area is around 215 cm. All the major festivals in the island are held in the winter season, when it is cool and pleasant. In fact, the best time to visit Majuli is from October to March. Let us get some more information on the weather & climate of Majuli.

The summer season in Majuli is from March to July and is quite hot and humid. During these times, the temperature may even peak to 34°C. Tourists prefer to stay away from the season around this time. The monsoon season in Majuli starts around July and lasts till August, after which the post-monsoon season follows. During this time, the entire island gets covered in the beautiful green cloak.

The winter season, on the other hand, starts from November and lasts till February. The average temperature during the season is around 7°C to Majuli is situated at a distance of 20 km from Jorhat. One can take the bus or a hired taxi to the Nimati Steamer Ghats from where ferry services play. The distance takes over three hours to cover, with three bus rides and two ferry rides.

### **Soil :**

As a river Island the land of the Majuli is sandy, clayey and loamy. Most of the people are farmers and they depend on agriculture.

### **Flora and Fauna :**

Rice, potato, Mustard seed, sugar cane, water melon, tomato cabbage and other seasonal vegetables are produced here in a large amount. Giant pumpkin, bananas, bamboos and other trees are planted by inhabitant for their usual use. Wild cane and Bombax Cebia (silk cotton tree, a unique tree of North-east region) grow naturally with good growth. Predominant some grasses available to these areas are-

Saccharum (Assamese name, Kohua)

Phragmites Karka (Assamese name- Khagari)

Arundo Donax (Assamese Name-Nal)

Rinthus Ravennae (Ekara)

Tamarix dioica (Zhawbon) etc.

Some important aquatic vegetation in the wetlands of majuli are-

Water hyacinth (Paani Meteka)

Trapa bipinosa (Pani Singaree)

Nymphaea carpendis, Nnauchali (Vet)

Scirpus Kysoor (Sesur)

Euryle Feeax (Nikori)

Khar Bon

Alpinia allughas (Tora)

Clinogyne dichotoma (Paatidoi)

Gogol

Kuhila

Both residential and migratory birds are available in this river island. Some of the residential birds are listed below:

Little Grebe	Eurasian Collared Dove	Magpie Robin
Little Cormorant	Oriental turtle Dove	White Rumped Shama

Little Egret	Barn Wol	Great Tit
Great Egret	Jungle Wolet	Paddy Field Pipit
Intermediate Egret	Brown Fish Owlet	Purple Rumped Sunbird
Cattle Egret	Great Eared Nightjar	Litle Spiderhunter
Indian Porn Heron	House Swift	White Eye
Black crowned Heron	Pied Kingfisher	House Sparrow
Cinnamom Bittern	Blue Eared Kingfisher	Black Breasted Weaver
Asian Openbill Stork	Green Bee Eater	White Rumped Munia
Lesser Neckecd Stork	Indian Roller	Scaly Breasted Munia
Spot- Billed Duck	Himalayan Flameback	Oriental Skylark
Red Necked Falcon	Black Drongo	Abbots Babbler
Common Moorhen	Grey Headed Myna	Marsh Babbler
Phesant Tailed Jacana	Jungle Myna	Jordens Babbler
Red Wattled Jacana	Jungle Crow	Ashy Prinia
Sall Pranticle	Common Lora	Rudy Brasted Crake

**Relief Features:**

The relief of the Majuli Island is almost a plain one but as it is an island it is slight sloppy and inclined towards the river from all sides. As far as relief is concerned no hills and mountains are there in Majuli except a network of tributaries and distributaries.

**Economy of Majuli :**

The main industry is agriculture, paddy being the chief crop. Majuli has a rich and diverse agricultural tradition, with as many as a hundred different varieties of rice grown, all grown without pesticides or artificial fertilizers. Among the fascinating arrays of rice produced are the Komal Saul, a unique type of rice that can be eaten just after immersing the grains in warm water for fifteen minutes, and usually eaten as a breakfast cereal; the bao dhan, that grows under water, and is harvested after ten months and the Bora saul, a sticky brown rice used to make the traditional cake known as pitha, Fishing, dairying, pottery, handloom and boat- making are other important economic activities.

Hand-loom is a major occupation among the population of the villages. Although largely a non-commercial occupation, it keeps many of the inhabitants occupied. Weaving is exquisite and intricate with the use of a variety of colours and textures of cotton and silk, especially Muga silk.

**Tourist Interest of Majuli:**

On the north-bank is the river Subansiri and on the South bank, the mighty Brahmaputra has excided the island from the main land. Lakhimpur town is to the North and Golaghat is to its southwest. The town of Sibsagar is on the southeast and Jorhat is to the south. On the extreme east is Dibrugarh District.

- The Satras ( Garmur Satra, Kamalabari Satra, Samaguri Satra, Dakhinpat Satra, Auniati Satra, Bengenaati Satra )
- Tengapania
- Chetiagaon
- Bangalpukhari
- Bongaori
- Amreteswar Temple
- Auniati Satra Museum
- Indira Gandhi Rashtriya Manav Sangrahalay
- The colorful culture of the tribes
- Migratory birds
- The Ali-ai-ligang festival in Feb-March
- Pottery making
- Mask making

- Paal Namm festival in the end of winter
- The sunset in winter
- Exotic homespun masks crafts
- Raas Mahotsav in November

**Socio-cultural status of the mishing people :**

The Mishing belong to greater group of Tani peoples, who speak languages of the Sino-Tibetan family, which comprise many tribes of Arunachal Pradesh in India and Tibet in China. All Tani tribes share linguistic, cultural and ritual similarities. Mishing derives from the two word Mi and Yasing. 'Mi' means 'men,' while 'yasing' means fair or worthy, so 'mishing' means a 'worthy man'

Mishing tribes is the largest human habitat in the river island Majuli. Through modern education, these people are becoming eligible for non-traditional works. Hence changes are noticed in regard to their occupation. Though most of the people are still engaged in their traditional occupation of agriculture and fishing, most of people are now engaged in business, salaried jobs like teaching, engineering, clerks of Banks and Government office etc. Some women are also engaged as nurse and in tailoring and other business. Almost 90 percent of the villagers showed interest in salaried occupation.

**Housing Pattern:**

Most of the villagers like to have modern houses in places of their traditional housing pattern. They consider the traditional houses unhygienic. The villagers who are having Mattighars (land house) like the surrounding non-tribal Assamese are of opinion that Mattighars of bamboo are much more comfortable than the Changghar. According, to them Changghar is essential only in such places where flood is a constant phenomenon .People generally construct small Mattighars for their grown up children studying and colleges as they Changghar is not at all convenient for the purpose of study. Though some economically sound people have constructed pucca buildings, in each building there is a traditional Changghar for the aged person for pujas and festivals. Some of the villagers have guest room or drawing room and separate room for each other in their houses. This is one of the direct influences of the non-tribal Assamese people.

**Dress:**

As regard dress, in spite of so much of excellent weaving products, the machine made cloth is very popular among the villagers. Almost all the villagers, irrespective of male and female, wear machine made cloths. No doubt weaving is still popular among them but its place is being gradually taken over by the machine made cloths. The dresses of the man are similar to those of the neighboring non-tribal Assamese people, but the dresses of the women are still dissimilar with those of the non-tribal women. But the educated Mishing women are using the same dresses as the Assamese women. Except in the puja and festivals, the Mishings do not use traditional dresses. Traditional dresses are preserved like their property. Few of the weaving production Tapum gasor, gadu, dumar, mibugaluk etc are sold by the women to meet their daily needs. Young generations Mishings are influenced by T.V serials, movies, as regard their dresses. The mishings are found to use the same kind s of ornaments made of gold & silver like non-tribal Assamese people

**Food Habit:**

Impact of Hinduism and regional culture is found in the changing pattern of food habit of Mishings. The Hinduisation has taught them the notion of purity and pollution. It is noticed that the villagers nowadays offer betel nut to the guests in place of Apong. The betel nut is the part of the regional assamese culture which is accepted by the mishings. Again, eggs, milk, oil are included in the food items , which did not form part of the food habits of the past. Most villagers have acquaintance with tea which as a drink is next to their rise bear. Most of the traditional food items(pork, beef) have been abundant by the villagers after their conversion to Vaishnavism.

**Religion:**

The Mishings had earlier tribal practices; later on many of them embraced various Hindu sects. Mishing has its own religion named Mising faith. The recent move is towards Christianity. In some cases treatment of high castes Hindu and in others, the economic support and motivation of the Christian missionaries compel the Mishings for this conversion. Majuli Island district have a large number of Mishings who are Christians by faith. Christianity is the fastest growing religion amongst Mishings especially among the younger section of the society. In coming few decades Christianity might be the major religion of the Mishings. The traditional religious beliefs and practices amongst the Mishings are animistic.



**Dance and Music:**

There are many types of Mishing dances, and each has their particular rules. Drums and symbols are the usual musical instruments for the dances. Global mainstream national and regional impacts are seen making way to the Mishing dance and music etc. e.g. Performance of Bihu in their own way. It is noticed that the Mishing society is undergoing various socio-cultural changes. Globalization is influencing them directly through communication media and indirectly sieved through surrounding non-Mishing Assamese people.

**Marriage and family:**

The Mishings are a patrilineal and patriarchal society and so, as per customary law, only the male children are entitled to inherit the property of a family. However, daughters can inherit the clothes and jewellery of their mothers. Now we have seen in Majuli that educated persons prefer late marriage and small family norm. They want to get established prior to their marriage. Again, they consider that small family offers better opportunity for education and future of the children. This is a great attitudinal change in the Mishings as they are usually used to live in joint family and prefer early marriage.

**SUGGESTIONS AND RECOMMENDATIONS**

Following suggestions may be considered to safeguard the socio-cultural identities of the tribes;

- (a) Govt. should provide the basic resource to the tribes so that they can cultivate their specific culture.
- (b) Awareness camp should be organized to aware the people about the global changing scenario and demand for community specific products
- (c) Opening of India's door to the East. Ethnic communities of north-east including Assam can profit a lot by trading the handicrafts and industrial & agricultural products
- (d) Setting up of marketing centers for ethnic items.
- (e) Globalization is inexorable. Our attempt should be maintain balance between the global and local. We must not be local for its mere sake. Instead of just accepting and purchasing what other countries have to offer, we should take measure to benefit by selling our ethnic products and thus achieve recognition in world market and transform the threats to opportunities.

**CONCLUSION:**

We had gathered enormous experiences in Majuli not only as tourist attraction but also enhancing the personnel granary of knowledge. globalization is said to adversely affect the ethnic identity of the smaller communities/tribes in the underdeveloped and developing countries. Tribes of India present a significant degree of cultural and ethnic diversity. Globalization appears threat to the very specificity or identity of their socio-cultural life. North-East India the hotspot of tribal culture attracts special attention in this regard. Hence the need is to study their cultures under impact of globalization. As our study was confined to all the aspects of Mishing tribes in Majuli. All the traditional practices are changed from time to time due to the influence of modernization of the societies but in a very slow pace in case of Majuli. The chang ghars are changing to pucca houses as a result of economical upgradation. Through the increase of modern education people are slowly diverted towards non-traditional works. The overall socio-cultural changes have been identified in the Mishing communities in the present time.

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**STUDY ON PRICE DISCOVERY OF SELECTED INDIAN AGRICULTURE COMMODITY WITH SPECIAL REFERENCE TO NCDEX**

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**ABSTRACT**

*An efficient commodity futures market provides producers and consumer not only with correct price signals but also with tools for managing price risk. The futures market is developing in India. Now days, it attracts number of investors in the futures market. The futures market has to decide the prices of a commodity on the basis of demand and supply. At this juncture, there are many complications related to price signals, volatility spillovers, and relationship between spot and futures markets of Indian commodity market. It is important to know about the bi directional and unidirectional relationship between future and Spot markets in India, price discovery process and price forecasting in Indian agricultural commodities. The study analyses the efficiency of commodity future in price discovery of Chana and Castor Seeds traded in NCDEX for 2016- 2018*

*Keywords: Commodity, market, price, trading, risk, etc.*

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**INTRODUCTION**

Commodities are products which are outputs of primary sector of the economy. Commodities have commercial Value and can be transacted. They are considered to be separate asset class. India being an agricultural economy for a long time, commodity market has a significant role to play. India is the second largest producer of agricultural outputs. With the changes in the economic policies, our country has witnessed a sea change in the consumption pattern too. Many products which were not that popular in indian markets have now captured the markets. At present india is the leading producer of many commodities as well as the leading consumer of many commodities too.

A commodity market is a place where commodities are bought and sold. With the advent of derivative trading in commodities, commodity derivative markets are now being considered as commodity markets. This is because commodity derivative markets involve trading, delivery and settlement of commodity transactions. Commodities have attracted quite a considerable interest as an investment avenue in recent years. Indian commodity derivative market has a very long history. However, the first organized commodity future trading was started in cotton in 1875 by Bombay Cotton Trade Association. The policies with regard to commodity future trading have taken several turns over the years where there were several years that witnessed a ban on trading. However with the adoption of liberalisation and globalization, commodity future trading has regained momentum. Today commodity derivatives constitute 5.5% of the trade (based on value) of the secondary market.

**Chana**

Chana or chickpea is one of the oldest legume or pulse known to humankind. It is popular in Europe, Northern Africa and Mediterranean countries, India, Pakistan and Afghanistan. It is high in protein content. There are two types of Chana. One is desi, which are also called Bengal Gram and is produced majorly in India, Iran, Ethiopia and Mexico. The second one is Kabuli, which is also known as safe Chana in India. It is mainly cultivated in Mediterranean, Afghanistan, Pakistan, Northern Africa and Chile. It is used as an edible seed and can be boiled, fried or grounded into flour for making other dishes. The prices of this commodity fluctuate frequently and are affected by the high substitutability with other pulses, crop situation and existence of fragmented markets

**Castor Seed**

India is known as the world leader in castor seed and oil production and leads the international castor oil trade. Castor oil production in this country usually fluctuates between 250,000 and 350,000 tons per year. Approximately 86% of castor seed production in India is concentrated in Gujarat, followed by Andhra Pradesh and Rajasthan. Specifically, the regions of Mehsana, Banaskantha, and Saurashtra/Kutch in Gujarat and the districts of Nalgonda and Mahbubnagar. There are various challenges that make castor crop cultivation difficult to pursue. Climate adaptability is one of the challenges restricting castor plantation in the U.S. The plant also contains a toxic protein known as ricin, providing a challenge from being produced in the U.S. It also requires a labor-intensive harvesting process, which makes it almost impossible for the U.S. and other developed countries to pursue castor plantation.

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**REVIEW OF LITERATURE**

The review of existing literature is an important part of any research. The review of study has been grouped under the following heads:

- a) The studies on the commodities market in India
- b) The studies on relation between spot market and future markets in the commodities market

**The studies on the commodities market in India**

**Narender L Ahuja (2006)** he concluded that since 2003, Commodity Derivatives market has made enormous progress by extending more number of commodity exchanges, trading activity and transparency. The volume and value of commodities in commodity market has shown unpredictable progress due to demand and supply in market forces and changing policy of the government concerning to commodity derivative. He suggested that the promotion of barrier free trading in the future market and freedom of market forces will play important role in determining price.

**Harvinder Pal Kaur and Dr.BimalAnjum (2013)**, Examined that Commodity Future market has gained momentum in Indian economy. There are 21 regional commodity exchanges and 5 national commodity exchanges governed by Forward Market Commission. The two vital functions of the commodity future market for the economy is discovery of prices and risk management. Futures markets provide liquidity and facilities to hedge against future price risk. Financial leverage to hedgers, speculators and other traders in commodity trading in future market.

**Madhavi & G. V. Chalam (2017)** studied that in India, agriculture is the backbone of India, the functioning of markets of agricultural produce is important for policy makers and other stockholders. The markets are expected to provide a reasonable price for farmers and traders. But it is difficult to provide reasonable prices due to lack of storage facilities, seasonality, yield differences across different geographical regions in our country. With recommendations of different Committees and after a prolonged debate, commodity derivatives trading was restarted from the year 2003. The prices of agriculture commodities in "Spot" and "Futures" markets with a revolution in information technology moved toward fairness and resulted in remunerative to farmers. Further, the profiles of selected commodities and their price trends are analyzed.

**Kevin Jimmy**, University of Tampere, Tampere, Finland, in his study, he explained that Commodities have various underlying financial values in terms of their derivatives globally. This study analyses the importance of derivative in Indian organized commodity markets. And also study about trading values, underlying parameters and their derivative faces

**The studies on relation between spot market and future markets in the commodities market**

**GouriPravaSamal (2017)** The paper evaluates the efficiency of Indian cotton futures prices in predicting future spot prices during the period January, 2013 to December, 2015 using Vector Auto Regression model and Granger causality tests. To check stationarity in futures and spot prices ADF test is applied. The results shown that both the variables are stationary at level. The VAR model suggests that lag value of futures has more influence on spot price of cotton. The causality test has further indicated that futures markets have negligible ability to predict subsequent spot prices for cotton.

**Dr. K.Nirmala, Swarna.C (2017)**, this study finds the univariate relationship or bivariate relationship between spot and futures prices of crude oil. ADF and Granger Causality and Co integration test is used to analyse the causal relationship. The results indicate that there is a univariate relationship where spot prices are discovered in futures markets.

**VishweswarSastry & Dr.PundareekaVitala (2017)**, In the present era commodity market can be said as physical and virtual market place for buying, selling and trading of primary products. These commodities are Soft agricultural commodities and hard commodities. The main objective is to study the relationship between future and spot commodity price and to find the intensity of future trading on spot volatility of the selected commodities and to study the trading and settlement pattern of agriculture commodity needs and to facilitate yield to agricultural commodity.. It is been found that all commodities have positive correlation and also found that Spot market volatility tends to affect futures market trading activity, measured by trading volumes liquidity

**Raghavendra, Velmurugan and Saravanan (2016)**, The study empirically examines the price discovery of spot and future market of agricultural commodities such as Soya bean, Chana, Maize, Jeera and Turmeric for a period from January 2010 to March 2015 traded in NCDEX. The findings shows that the existence of long-run equilibrium relationships between futures and spot prices for all the 5 agricultural commodities that were taken

for this study. The commodities like Maize, Jeera and Turmeric have bivariate relationship where both spot and future markets influence each other in the price discovery process.

**K. Nirmala, Munilakshmi R, Sandhya V. (2015).** This study analyses which market influence to discover the price in Cardamom futures market using econometric tools like Augmented Dickey Fuller test, Granger Causality test and Co-integration technique. These study findings suggest that, cardamom futures price movement can be used as price discovery vehicle for spot market transactions by taking daily closing data from 1st Jan 2012 to 31st Dec 2013. This study has been further validated by comparing the results of international futures cardamom prices.

**QiuMengyuan, Ocean University of China (2015),** the futures prices of Chinese agricultural products are generally followed by the Chicago commodity exchange futures prices. The objective of this study is to find the relationship between corn futures prices in China and corn future price in United States. The Johansen Co-integration test is used to test the long run co integration and found that there is a long run co integration between two variables and VECM is used to know the causal relationship and indicated that corn futures prices in America had a significant effect on prices of China. By comparison, the information in the corn market of America transfers faster and the U.S. corn futures market plays a leading role. This research also suggested about how to promote the development of China's corn futures market.

**Vasantha and Mallikarjunappaa, (2015)** examines the lead-lag relationship of pepper in India by employing Johansen's cointegration test, ECM-EGARCH models. Augmented Dickey-Fuller (ADF) are used to check the stationarity of the price series. It was found that there is a long run co integration between the two markets in terms of price discovery. This result is further supported by the results of volatility spillover obtained from EGARCH model. Therefore, spot market influences in price discovery process. This paper will be immensely useful to the investors to hedge their market risk. Since the spot market is informationally more efficient than the futures market, hedgers can take spot market prices as base.

**Anuragagnihotri and Anandsharma (2011),** The study explains the relationship of spot and future price of commodities. Zeera, Channa, Zink, and Natural Gas and their inter-relationship and consider the data from NCDEX and MCX. The standard deviations and correlation is used as the techniques of data analysis for this paper. It has collected the data of the total turnover of the derivative contracts in order to find out that the correlation between the two. The results indicate that the regression tests is more powerful detecting any convergence between two markets for Zeera, Zink, Channa, and not capable for detecting for natural gas.

### Research Gap

(i) The review of existing literature on studies on commodity market in India indicates that Indian Commodities Market is still an emerging forum in the arena of research. The numbers of quality research in the field are limited.

(ii) The review of literature on studies of spot market and future market shows that

a) There is a need to study the causal relationship between spot markets and future markets on various sectors of agricultural commodities

b) There is a need to study Price Forecasting

c) Arbitrage opportunities and challenges in commodity futures markets on different exchanges platforms.

### OBJECTIVES OF THE STUDY

1. To check Stationary of Commodity Prices and Returns.
2. To Estimate Long-run and short-run equilibrium (causality) relationship between two markets
3. To check the Uni-directional or Bi-directional relationship between two markets

### METHODOLOGY

**Data Collection**– Data is collected from National Commodity and Derivative Exchange (NCDEX) of daily closing prices from 2016 to 2018.

**Period of Study** – The study uses daily closing prices of future and spot contract. The sample period is for 2 years from 2016 to 2018.

**Scope of the study** – This study examines the relationship between spot and future prices of agricultural commodities such as Turmeric and Chilly from 2016 to 2018 traded in NCDEX,

### Hypotheses–

H<sub>0</sub>: Time series data is non Stationery

H<sub>a</sub>: Time series data is Stationery

H<sub>0</sub>: There is no significant long-run and short run association between commodity futures and spot prices

H<sub>a</sub>: There is significant long-run and short run association between commodity futures and spot prices

H<sub>0</sub>: Spot price does not granger cause future

H<sub>a</sub>: Spot price does granger cause future

H<sub>0</sub>: Future does not granger cause spot

H<sub>a</sub>: Future does not granger cause spot

### Statistical Tools for Analysis

a) Augmented Dickey Fuller Test.

b) Johansen's co-integration model and VECM Model.

c) Ganger Casaulity Test

### Stationary of Commodity Spot and Futures Prices

H<sub>0</sub>: there is no stationarity of spot and futures Prices

H<sub>a</sub>: there is a stationarity spot and futures Prices

### TESTING OF STATIONARITY OF COMMODITY SPOT AND FUTURES PRICES RETURNS

				Level –Trend		Level-Trend and Intercept		Level None	
				t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*
Chana Spot	Augmented Dickey-Fuller test statistic			0.499435	0.9864	-0.889334	0.9544	1.359399	0.9564
	Test critical values:	1% level	-3.457515		-3.996754		-2.574633		
		5% level	-2.873390		-3.428660		-1.942153		
		10% level	-2.573160		-3.137757		-1.615818		
	Augmented Dickey-Fuller test statistic			-1.808582	0.3758	-2.200914	0.4865	-0.299631	0.7717
Chana Future	Test critical values:	1% level	-3.457515		-3.996754		-2.574633		
		5% level	-2.873390		-3.428660		-1.942153		
		10% level	-2.573160		-3.137757		-1.615818		
	Augmented Dickey-Fuller test statistic			-1.877313	0.3427	-1.918973	0.6415	-0.094257	0.6502
	Test critical values:	1% level	-3.457630		-3.996918		-2.574674		
Castor Seeds Spot		5% level	-2.873440		-3.428739		-1.942159		
		10% level	-2.573187		-3.137804		-1.615814		
	Augmented Dickey-Fuller test statistic			-1.715507	0.4222	-1.647683	0.7711	-0.226372	0.7512
	Test critical values:	1% level	-3.457515		-3.996754		-2.574633		
Castor Seeds Future	Augmented Dickey-Fuller test statistic			-1.715507	0.4222	-1.647683	0.7711	-0.226372	0.7512
	Test critical values:	1% level	-3.457515		-3.996754		-2.574633		

	5% level	-2.873390	-	3.428660	-	1.942153
	10% level	-2.573160	-	3.137757	-	1.615818

Since the probability value is greater than 0.05, the null hypothesis is accepted.

The table shows the results of stationarity test on the  $\ln$  values of prices of series of spot and futures of Chana and castor seeds respectively. The result of the ADF test confirms that the data series of spot and futures prices is non-stationary at level form ( $p > 0.05$ ) and the data series of spot and futures is stationary at level form ( $p < 0.05$ ). Hence, Johansen Test of cointegration is used to check long run equilibrium relationship between spot and future prices of sample commodities. As a result of cointegration is sensitive to lag length.

### Long run Association between Commodities Futures and Spot Prices

$H_0$ : There is no significant long-run association between commodity futures and spot prices

$H_a$ : There is a significant long-run association between commodity futures and spot prices

### ESTIMATION OF LONG RUN ASSOCIATION BETWEEN COMMODITIES FUTURES AND SPOT PRICES

### ESTIMATION OF LONG RUN ASSOCIATION BETWEEN COMMODITY FUTURE AND SPOT RETURNS.

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.043261	10.84271	15.49471	0.2213	10.43707	14.26460	0.1848
At most 1	0.001717	0.405632	3.841466	0.5242	0.405632	3.841466	0.5242

Trace test indicates no cointegration at the 0.05 level

\*Denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Max-eigenvalue test indicates no cointegration at the 0.05 level

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.064672	19.33639	15.49471	0.0125	15.77859	14.26460	0.0286
most 1	0.014962	3.557806	3.841466	0.0593	3.557806	3.841466	0.0593

At

Trace test indicates no cointegration at the 0.05 level

\*Denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level

The table shows the results of Johansen test of cointegration. The result reveals that there is a presence of one cointegration equation between spot and future prices of Chana and Castor Seeds and this signifies the long run association. The trace results point out the number of cointegrating equations; equation are less than or equal to one; whereas Maximum Eigen Value test results confirm the presence of one integration equation. To examine the lead lag relationship or the long run and short run speed adjustment or convergence towards equilibrium between spot and future prices.

### Long-run and short-run adjustments (causality) between spot and futures prices

$H_0$ : There is no long-run and short-run adjustment (causality) between spot and futures prices

$H_a$ : There is a long-run and short-run adjustment (causality) between spot and futures prices

# . ESTIMATION OF LONG-RUN AND SHORT-RUN ADJUSTMENTS (CAUSALITY) BETWEEN SPOT AND FUTURES PRICES

## ESTIMATION OF LONG RUN AND SHORT RUN ADJUSTMENTS BETWEEN SPOT AND FUTURES

Panel A : Normalized Co- integration Co-efficient		
CHANNA(-1)	CHANNA1(-1)	CONSTANT
1.000000	-1.438321	1920.791
	(0.19532)	
	[-7.36378]	
Panel B : Coefficient of Error Correction Term		
Error Correction:	D(CHANNA)	D(CHANNA1)
CointEq1	0.015214	0.096657
	(0.01668)	(0.02511)
	[ 0.91192]	[ 3.84893]
F-statistic	2.354423	3.919548

Standard errors in ( ) & t-statistics in [ ]

Panel A : Normalized Co- integration Co-efficient		
CASTOR(-1)	CASTOR1(-1)	CONSTANT
1.000000	-0.895942	-376.5728
	(0.04209)	
	[-21.2865]	
Panel B : Coefficient of Error Correction Term		
Error Correction:	D(CASTOR)	D(CASTOR1)
CointEq1	0.041934	0.221188
	(0.05708)	(0.06194)
	[ 0.73464]	[ 3.57107]
F-statistic	5.474049	12.55270

The t-statistics are given in [ ] brackets while the error term are given in ( ) brackets .The coefficients of Chana future returns and castor seeds future returns are positive and statistically insignificant respectively, the results reveal that the relationship between Chana future returns and spot returns and castor seeds future returns and spot returns are positive. The sign of the error correction coefficient in determination of Chana spot returns is positive ( 0.01521),the t value is [ 0.91192]and f statistics is 2.354423 and castor seeds returns is positive 0.041934 ,the t value is [ 0.73464].And f statistics is 5.474049 This indicates that Chana and castor seeds spot returns do not respond significantly to re-establish the equilibrium relationship once deviation occurs

### Presence of Short runs Causality between futures and spot prices

Ho: There is no presence of short run causality between futures and spot prices.

Ha: There is presence of short run causality between futures and spot prices.

## ESTIMATION OF PRESENCE OF SHORT RUN CAUSALITY BETWEEN SPOT AND FUTURE PRICES

Wald Test:			
Equation: Untitled			
Test Statistic	Value	Df	Probability
F-statistic	1.723210	(2, 234)	0.1807
Chi-square	3.446421	2	0.1785
Null Hypothesis: C(3)=C(4)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(3)		-0.082809	0.045552
C(4)		0.079584	0.045157
Restrictions are linear in coefficients.			

Wald Test:			
Equation: Untitled			
Test Statistic	Value	Df	Probability
F-statistic	0.058046	(2, 234)	0.9436
Chi-square	0.116093	2	0.9436
Null Hypothesis: C(3)=C(4)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value		Std. Err.
C(3)	0.022544		0.076318
C(4)	-0.009034		0.071519
Restrictions are linear in coefficients.			

Note: p values denote significance level at the 5% level of significance.

Since the probability value is more than 0.05, null hypothesis is accepted hence alternative hypothesis is rejected.

The table reveals that results of Wald chi-square test that the joint value of all the coefficient of future prices of Chana and castor seeds at select lag length are not equal to zero ,which indicates the presence of the short run causality between the spot and future market of commodities under study.

#### Direction of Causality-Granger Causality

$H_0$ : There is no significant impact of commodity futures prices to spot prices

$H_a$ : There is a significant impact of commodity futures prices to spot prices

#### ESTIMATION OF DIRECTION OF CAUSALITY-GRANGER CAUSALITY

#### ESTIMATION OF DIRECTION OF CAUSALITY –GRANGER CAUSALITY

Null Hypothesis:	Obs	F-Statistic	Prob.	DECISION
D(CHANNA1) does not Granger Cause D(CHANNA)	238	2.72990	0.0673	Accept
D(CHANNA) does not Granger Cause D(CHANNA1)		1.24487	0.2899	Accept

Null Hypothesis:	Obs	F-Statistic	Prob.	DECISION
D(CASTOR1) does not Granger Cause D(CASTOR)	238	1.84703	0.1600	Accept
D(CASTOR) does not Granger Cause D(CASTOR1)		22.3142	1.E-09	Reject

Sources: NCDEX website

The co integration result indicates that causality exists between the co integrated variables but it fails to show us the direction of the causal relationship .The pair wise Granger causality test is performed between all possible pairs of variables to determine the direction of causality .The results show that there are bidirectional causality exists only between castor future returns and castor spot returns.

#### FINDINGS

1. The Johansen's co integration test reveals that there is a long run association that is equilibrium between spot and future prices of Chana and castor seeds.
2. The VECM results reveal that the co efficient of error correction term (coefficient of cointEq1) is positive in sign and is not significant. This implies that there is a long run causality running from future prices to dependent spot prices which enable the spot market to adjust to the short run deviation from long run equilibrium path nearly 2.01% and 3.30% speed of adjustments in sample commodities ,that is ,Chana and castor seeds respectively .The speed of correction in the future market of Chana is 3.43%against spot market ,which indicates a highly informative future market .At the same time ,insignificant ECT of in future prices of castor seeds indicates futures market efficiency towards maintaining stable long run equilibrium.
3. Wald chi-square reveals that the joint value of all the coefficient of future prices of Chana and castor seeds at select lag lengths are not equal to zero ,which indicates the presence of short run causality between the spot and future market of commodities under study ( $p < 0.05$ ).



4. Granger Causality tests disclosure that there is only a unidirectional causality from future returns to spot returns of commodities Chana and castor seeds ( $p < 0.05$ ).

### CONCLUSION

It is concluded that there is a long-term association, that is, equilibrium between commodity future and spot prices of sample commodities. This indicates there is long-run arbitrage opportunity. The result of co-integration and VECM highlight that Future market plays very important role in the price discovery, suggesting that Prices are first discovered in future market and then transferred to the spot market.

### FUTURE IMPLICATIONS

It is found that the commodity future market has a greater potential among the Indian investors and the future market is going to decide the price signals and managing the price risk. The future market has to decide the prices of commodity on the basis of demand and supply and its also indicating the relationship between spot and future markets of Indian commodity market. It also gives an overview of price forecasting in Indian agriculture commodities.

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**CONTEMPLATION OF CSR PRACTICES IN THE INDIAN BANKING SECTOR: A COMPARATIVE DELIBERATION**

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**ABSTRACT**

*Corporate social responsibility (CSR) becomes an indispensable part for the success of any organization. Banking sector plays a crucial role in the development of nation, not only as the big contributor of financial system of the nation but also supports for the upliftment of the society. In order to sustain in the competitive market, each and every organization has to perform its responsibility towards society as it integrates economic, social, environmental and ethical objective of business while fulfilling the expectations and demands of stakeholders. This objectives of this paper are to study the CSR activities undertaken by private and public sector banks and compare the CSR spending by the selected banks from the year 20016-17 to 2020-2021. It has been observed that after mandatory implication of CSR by companies' ACT 2013, the banks are spending more and reported the CSR activity in an ethical and organized manner.*

*Keywords: corporate social responsibility, banking sector, SBI and ICICI*

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**INTRODUCTION**

Corporate Social Responsibility of business refers to what a business does over the statutory requirement for the benefit of the society. The word "responsibility" means that the business has some moral duty towards the society.

In the 21<sup>st</sup> century, companies are passing through a lot of challenges and competitions on the path of their survival and the expansion and diversification process. Due to globalization and rapid information penetration in the market, the corporate seek new and innovative strategies for their sustainable business operations. Corporate Social Responsibility has become a buzz word in the contemporary business world now-a-days. It means the organization's moral responsibilities to perform some social welfare activities towards its stakeholders and society as well. In short it is what a business does over and above the statutory requirements of the business for the societal benefit. Corporate Social Responsibility also referred as Sustainable Responsible Business which is a form of business model integrates with the corporate self-regulation. Though the nation has been developed by the industrialization and commercialization of service sector but at the opposite side, it uses the non- renewable energy, causing global warming and greenhouse effect and harming the upcoming generation by raising the levels of waste. CSR concept is acknowledged by budding apprehension for ecological and environmental protection, sustainability, and efficient use of natural resources. The mandatory implication of performing CSR has gained its momentum than previous era where it is done voluntarily.

**Objective of Study**

- To study the CSR initiatives taken by leading public sector and private sector banks.
- To compare the CSR spending of SBI and ICICI from 2016-17 to 2020-21.

**CSR practices in Indian Banking sector:**

Indian banking sector plays a pivotal role in uplifting the society by integrating financial as well as social contributions. The performance of the banking sector should not be evaluated not only the financial measures but also through the CSR performance of the bank. The CSR concept has been regulated by the regulating authorities SEBI, RBI, ICAI, MCA etc. the Government of India has initiated several reforms for CSR activities performed by different companies, Companies Act 2013 was one of the significant reform which leads India as the first nation to legalize and made CSR spending mandatory through company law. RBI has issued a circular on 20<sup>th</sup> December, 2007 to highlight the CSR performance of the banking sector which emphasized on the roles of banks in CSR, sustainable development and non-financial Reporting. With the implementation of companies Act 2013, there is a mandatory obligation of at least 2% spending on CSR activities by corporate. It has been witnessed that the role of Government is not satisfactory to solve the issues of the under privileged and deprived people of the society. So that, the Government of India made CSR compulsory to some specific category of corporate. The Indian Banking sector put emphasis on the CSR activities like poverty eradication, rural development, development of health and sanitization, financial literacy and training, education and infrastructure development etc.

**CSR Practices: SBI**

State Bank of India has been a leader in corporate social responsibility in the Indian banking system. SBI developed the concept of Corporate Social Responsibility in 1973 under the name "Innovative Banking," which aided the poorer and oppressed parts of society by giving options for improving their economic conditions. It participates in initiatives such as blood drives, health fairs, adult literacy programmes, and tree planting, among others. The COMPANIES ACT of 2013 requires businesses to set aside at least 2% of profits for social activities as CSR spending.

SBI has a comprehensive CSR policy that has been approved by its Board of Directors. SBI's key target areas for CSR initiatives are educational help, entrepreneurial growth through skill development programmes, health and sanitation, assistance to the underprivileged and deprived in society, environmental protection, clean energy support, and disaster relief. SBI gave a school bus to Ramakrishna Math Saradha Vidyalaya in Madurai as part of its CSR programme. It has also provided an ambulance van to Tuticorin's Sacred Heart Hospital. For the fiscal year 2016-17, SBI set aside Rs. 115 crore, or 1% of its previous year's profit, for corporate social responsibility efforts.

This year SBI spent 144.88 crore on CSR efforts in the current fiscal year, accounting for 2.03 percent of earnings. 16,000 children in Haryana's Ambala district. It has reached 7,138 children studying in 479 schools, and is a part of India's first ever impact bond – the Haryana Early Literacy Outcomes Development Impact Bond. More than 50,000 schools have received financial help from the Bank, which has donated 300 ambulance vans, 42000 water purifiers, and 1,40000 ceiling fans. SBI supplies 14 crores in medical equipment to hospitals as part of its health-care efforts. It contributes to the Chief Ministers Relief Fund, which helps states such as Assam, Sikkim, Uttarakhand, Maharashtra, and Kerala recover from natural disasters.

During the fiscal year 2018-19, SBI made a donation of 5 crore to the Kerala flood relief effort. In addition, the bank made a CSR donation of Rs. 1.24 crore to the Health and Sanitation sector. SBI's Children's Welfare Scheme has been established as a trust in which SBI employees and the Bank contribute equally to the welfare of underprivileged youngsters such as orphans, destitutes, challenged, and deprived children.

For environmental sustainability also s SBI Green Fund initiative is to plant 12,000 bamboo saplings in six nurseries created on wastelands of tribal farmers in the Nashik and Palghar districts of Maharashtra.

**CSR Practices :ICICI**

ICICI Bank has long been committed to corporate social responsibility and considers it to be an important element of its business. Through the involvement of bank and societal stakeholders, it contributes to the growth of the social sector. The ICICI Foundation was created to promote inclusive growth and provide financial support to specific projects. The Bank's goal is to identify areas where there is a need for investments and intervention that can lead to India's prosperity and growth. The bank's CSR Policy establishes the basis for guiding CSR initiatives. The following are the bank's key emphasis areas:

**Education:** ICICI Academy for Skills operates 27 centres across 19 states and one union territory. The ICICI Foundation and the Bank work together to improve the quality of education in government and municipal schools. ICICI Bank is concentrating on a capacity-building programme in finance and management. ICICI Bank spent 159.1 million for education promotion in the fiscal year 2020-21.

**Healthcare:** The bank and the ICICI Foundation work together to enhance healthcare and explore new concepts. 105.23 million was spent this year to promote preventative health care, sanitation, and the availability of safe drinking water.

**Skill Development & Sustainable Livelihoods:** Till March 31, 2020, ICICI Foundation for Inclusive Growth has positively impacted over 5.2 lakh lives through its skill development initiatives.

**Financial Inclusion:** As part of our financial inclusion efforts, we have opened over 2.1 crore Basic Savings Bank Deposit Accounts (BSBDA) till March 31, 2020, the largest number of accounts opened by a private sector bank in India. Of these, around 47 lakh accounts were opened under the Pradhan Mantri Jan Dhan Yojana. We actively encourage and enable these account holders to transact digitally.

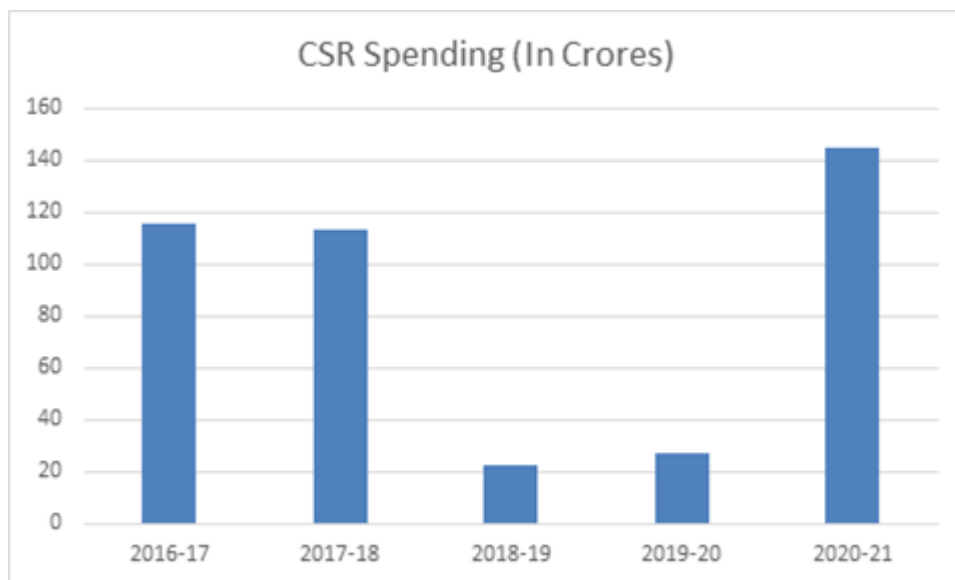
**Rural Development:** ICICI Foundation Rural Livelihood Programme reaches out to over 2,100 villages across 29 states and one union territory. The bank has invested 4796 million in the development of rural areas and related activities through direct investment.

**DATA ANALYSIS & INTERPRETATION****TABLE NO: 1 -SHOWING CSR EXPENDITURE OF SBI FROM 2016-17 to 2020-21**

## SOURCE: ANNUAL REPORT OF SBI

SBI	2016-17	2017-18	2018-19	2019-20	2020-21
CSR Spending (In Crores)	115.8	112.96	22.7	27	144.88

CHART NO: 1- SHOWING CSR TREND FROM THE 2016-17 to 2020-21

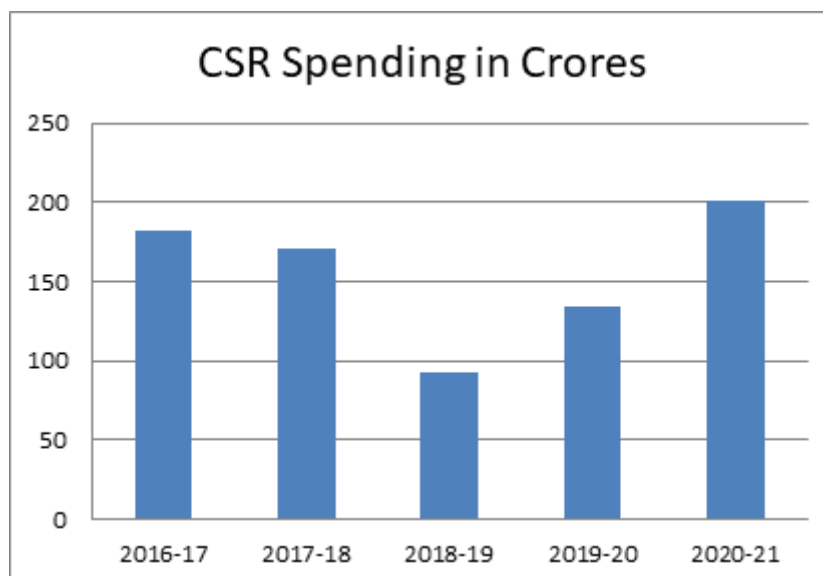


The table no 1 and chart 1 depicts that CSR expenditure gradually increased from the year 2016-17 to 2017-18 but it decreased in the year 2018-19 and 2019-20 because of the corona pandemic. Again it has increased in 2020-21 as 144.88 crore.

TABLE NO: 2-SHOWING CSR EXPENDITURE OF ICICI BANK FROM 2016-17 to 2020-21

ICICI	2016-17	2017-18	2018-19	2019-20	2020-21
CSR Spending (In Crores)	182	170.38	92.2	134.35	200.5

CHART : 2 SHOWING CSR EXPENDITURE TREND OF ICICI



Source: Annual report of ICICI Bank

**SOURCE: TABLE 2**

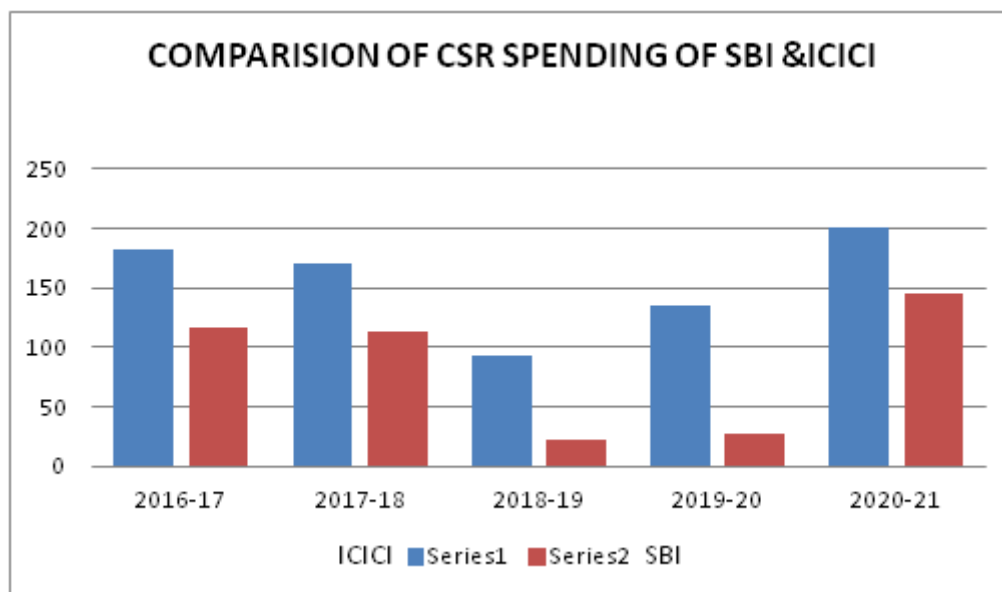
The table no 2 and chart no 2 shows there is an increase trend in the CSR expenditure over the years from 2016-17 to 2017-18. It has reduced in the year 2018-19 and again it has increased in 2019-20 and 2020-21 to 200.5 crore.

**Table 3- SHOWING COMPARISION OF CSR EXPENDITURE BETWEEN SBI BANK&ICICI BANK**

Comparison Statement	2016-17	2017-18	2018-19	2019-20	2020-21
CSR of ICICI	182	170.38	92.2	134.35	200.5
CSR of SBI	115.8	112.96	22.7	27	144.88

**SOURCE: ANNUAL REPORT OF RESPECTIVE BANK**

**CHART:3- SHOWING COMPARISON OF CSR EXPENDITURE OF SBI& ICICI**

**SOURCE: TABLE 3**

The amount spent on CSR is showing increase trend in ICICI bank where as in case of SBI it is increased from the year 2016-17 to 2017-18 then it is decreased in 2018-19 then it has again increased in the year 2019-20 AND 2020-21.

**CONCLUSION**

In major part of India, the banking sector is mainly focusing on the sustainability with their business model. In major leading banks the corporate social responsibility (CSR) is not focused and also not been widely adopted. In the banking system the triple bottom line principle is not been engulfed and practiced. The financial institution like banks and NBFC's are not paying attention to the CSR philosophy rather they use it to publicize or to promote their brand name. The priority to be given by the bank to the socio environmental feasibility and viability of the project approached by some companies before offering any financial assistance to some projects. The Indian banking system to amalgamate the CSR Activities with its business model in their core operation and marketing part. If the banking system wants to achieve the sociability there should be the practices of adopting and integrating triple bottom line principle into their system.

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**EDUCATION “COMPARISON OF EFFECT OF CONVENTIONAL TEACHING AND MULTIMEDIA TEACHING ON ACHIEVEMENT OF IX STUDENTS IN SCIENCE SUBJECT”**

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**ABSTRACT**

*The main objective of the study is to compare the effect of conventional teaching and multimedia teaching on achievement of IX students in Science subject. The study used pre-test post-test control and experimental group design. In which control group taught through conventional teaching and experimental group through Multimedia teaching. The effect of intervention was assessed seeing achievement of students in pre and post achievement test. And delayed post-test was administered only to experimental group. Collected data was analysed using t-test and one Way ANOVA. The study found that in pre-test the students of Conventional Teaching and Multimedia Teaching showed equal performance. Whereas in post-test the students of Multimedia Teaching group performed superior compared to Conventional Teaching.*

*Key Words: Multimedia, Multimedia Teaching, Achievement*

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**INTRODUCTION**

Teaching is systematic approach to initiate learning in the students. Due to impact of technology, teaching taking in very dynamic position. Moreover technology made space to use of various sources for teaching. They are usually called as multimedia. Multimedia combines five basic types of media into the learning environment: text, video, sound, graphics and animation, thus providing a powerful new tool for education (Asthana, 2008). A quick multimedia definition is any electronic application used to teach lessons or to further educate students on a particular topic (Mcgee, 2021). Today multimedia form platform to present content and information as well as evaluation components in dynamic way. It also bring many benefits in teaching and learning environment namely Deeper understanding ; Improved problem solving; Increased positive emotions; Access to a vast variety of information (Nuiteda, 2016). Many research studies also reported the benefit of using multimedia. Ilhan and Oruc (2016) found that multimedia technique increased the academic success of students in social studies lesson compared to the traditional classroom. Xu, (2016) realized that maximum students in physical education were satisfied with the multimedia teaching. Beydogan and Zeynel(2015) Use of multimedia teaching changes attitude of students towards social science subject by helping them in identifying and classifying the concepts and making inference through generalizations. Thus, multimedia teaching is shaping education system. In this background the present study also investigated impact of Multimedia on academic achievement of students in school education.

**STATEMENT OF PROBLEM:**

The main objective the study is comparison the effect of Conventional Teaching and Multimedia Teaching on Achievement of IX students in Science subject.

**OBJECTIVES:**

1. To develop multimedia teaching for selected units of science subject of IX standard.
2. To find out effect of Conventional teaching and Multimedia teaching on achievement of students.
3. To find out difference in achievement of students taught through conventional teaching and multimedia teaching.

**HYPOTHESES:**

1. There is no significant difference between pre-test and post test scores of control group.
2. There is no significant difference between pre-test, post-test and delayed post test scores of experimental group.
3. There is no significant difference between pre-test scores of control group and experimental group.
4. There is no significant difference between post-test scores of control group and experimental group.

**METHODOLOGY:**

The study used pre-test post-test control and experimental group design. The study was conducted on IX standard students of one of the school of Bellary city. Initially, groups identified based on the previous



academic achievement scores and listed higher to lower and allotted for two groups and calculated t test scores. Found that both the groups are equal. Later groups are randomly assigned and named as control group and experimental group. In which control group through conventional teaching and experimental group through Multimedia teaching. For intervention of Experimental Group, researcher developed Multimedia Package for selected unit of IX standard science subject with the help of PPT and other components using computer. The effect of intervention was assessed seeing achievement of students in pre and post achievement test. And delayed post-test was given only to experimental group.

### Statistical Technique

In this study collected data was analysis using t-test and one Way ANOVA.

### Analysis and Interpretation of Data

**Hypothesis-1:** There is no significant difference between pre-test and post test scores of control group

**Table 1: comparison of pre-test and post-test scores of control group**

Test	N	Mean	SD	t-value	p-value	S/NS
Pre Test	40	18.5250	1.30064	14.363	.000 ( $p < .05$ )	S
Post Test	40	21.4250	1.33757			

The above table reports  $t$  value of 14.363 and  $p = .000$ . Here,  $p$ -value is ( $p < .05$ ) less than the .05 level of significance. Hence hypothesis is rejected at .05 level of significance. It means, there is a significant difference between pre-test and post-test achievement of students of control group. The mean difference favors the post-test scores, which indicate that the students of control group scored higher in post-test compared to pre-test due to intervention of conventional teaching.

**Hypothesis-2:** There is no significant difference between pre-test, post-test and delayed post test scores of experimental group.

**Table 2: One Way ANOVA results of Experimental Group**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	494.867	2	247.433	155.874	.000 ( $p < .05$ )
Within Groups	185.725	117	1.587		
Total	680.592	119			

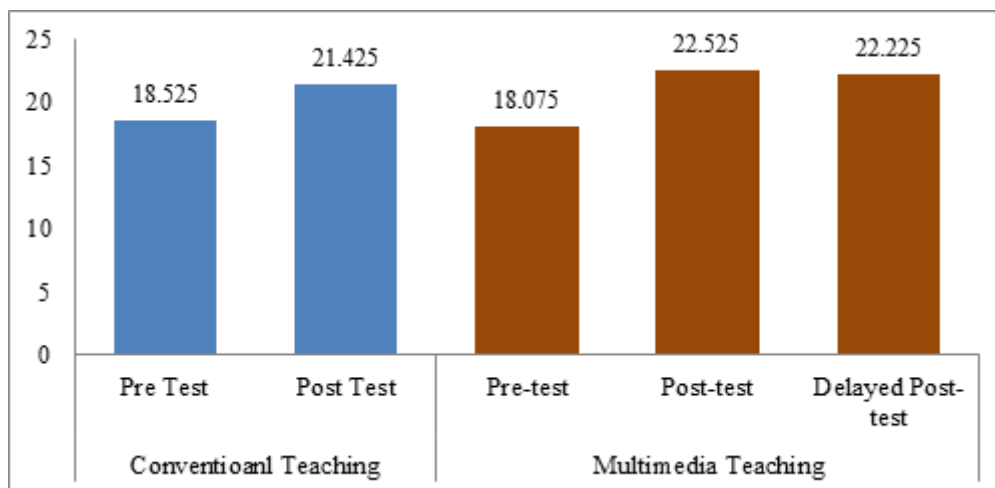
The above table  $F$  value of 155.874 and  $p = .000$ . Here,  $p$ -value is ( $p < .05$ ) less than the .05 level of significance. Hence hypothesis is rejected at .05 level of significance. It means there is a significant difference between Pre-test, Post-test and Delayed Post-test mean scores of Achievement of students of Experimental group. Further multiple comparisons are performed using Tukey post hoc test procedure to find out the mean difference and reported in the table.

**Table-3: Results of Pre-test, Post-test and Delayed Post-test mean scores of Achievement of Experimental Group**

Achievement	N	Mean	Achievement	
			Post-test	Delayed Post-test
Pre-test	40	18.0750	.000 ( $p < .05$ )	.000 ( $p < .05$ )
Post-test	40	22.5250		.538 ( $p > .05$ )
Delayed Post-test	40	22.2250		

From the above table, it is evident that, The obtained  $p$  value for difference in Pre-test and Post-test Achievement scores of Experimental Group is less than ( $p = .000$ ) .05 level of Significance. The obtained  $p$  value for difference in Pre-test and Delayed Post-test Achievement mean scores of Experimental Group is less than ( $p = .000$ ) .05 level of Significance. The obtained  $p$  value for difference in Post-test and Delayed Post-test Achievement mean scores of Experimental Group is higher than ( $p = .538$ ) .05 level of Significance.

Hence, it can be concluded that due to intervention of Multimedia Teaching, the students scored higher in Post-test and Delayed Post-test achievement. The Post-test and Delayed Post-test Achievement scores are equal. It means, in long period Multimedia effected on the achievement of students and equal amount of achievement was observed in the Delayed Post-test as equal to Post-test.



**Hypothesis-3:** There is no significant difference between pre-test scores of control group and experimental group.

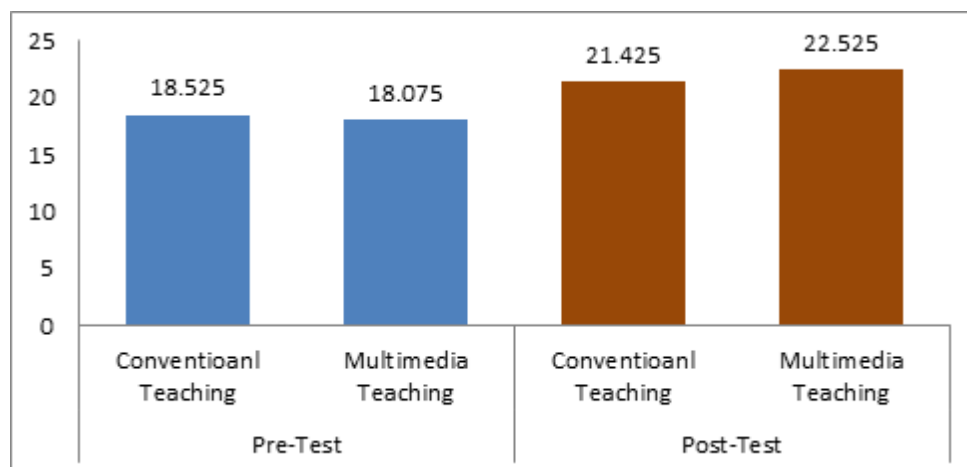
Group	N	Mean	SD	t-value	p-value	S/NS
Control Group	40	18.5250	1.30064	1.704	.092 ( $p > .05$ )	NS
Experimental Group	40	18.0750	1.04728			

The above table reports  $t$  value of 1.704 and  $p = .092$ . Here,  $p$ -value is ( $p > .05$ ) higher than the .05 level of significance. Hence hypothesis is accepted at .05 level of significance. It means, there is no significant difference between pre-test achievement of students of control group and experimental group. It indicates that the students of control and experimental group perform equally before intervention.

**Hypothesis-4:** There is no significant difference between post-test scores of control group and experimental group.

Group	N	Mean	SD	t-value	p-value	S/NS
Control Group	40	21.4250	1.33757	3.504	.001 ( $p < .05$ )	NS
Experimental Group	40	22.5250	1.46738			

The above table reports  $t$  value of 3.504 and  $p = .001$ . Here,  $p$ -value is ( $p < .05$ ) less than the .05 level of significance. Hence hypothesis is rejected at .05 level of significance. It means, there is a significant difference between post-test achievement of students of control group and experimental group. The mean difference favors the experimental group, which indicates that the students of experimental group performed higher compare to control group due to the intervention of Multimedia Teaching.



## FINDINGS AND CONCLUSIONS

The main objective the study was to found out the effect of Conventional Teaching and Multimedia Teaching on academic achievement of IX standard science subject. The study found that difference in pre-test and post-test scores in control group as well as experimental group. When mean difference compared it was found that the students of experimental group performed higher compare to control group. It indicates that multimedia found to be more effective than the conventional teaching. The Study also found that there is no difference

between pre-test scores of control and experimental group. Which shows that both the group equal in their performance before intervention. While the study found that there is significant difference between post-test scores of Control and Experimental group. It indicates that the intervention of multimedia teaching for superior to conventional teaching.

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**MONITORING DOCKER CONTAINER TOWARDS SMOOTH INTERACTION BETWEEN DEVELOPMENT AND OPERATIONS AND MEASURE THE PERFORMANCE**

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**ABSTRACT**

*Docker is the most popular and easy-to-use platform for running and managing Linux containers. Containers seem to be the most appropriate way to be used in agile software development, packaging, shipping, and multi-computing environments. Software portability through container movement is valued by companies and experts in the computer industry. Docker develops, deploys, and implements applications in isolated containers. Containers allow developers to build an application with all the necessary components, such as Libraries and other dependencies, compile and pass as a package. Docker is a daemon (a process that runs in the background) and a sales order. First, a Docker application is a process that runs on the system. The hypervisor does not need to be running, so there is no guest operating system for the traffic. Second, use virtual machines to isolate individual applications and the entire system. Docker makes it easy to run multiple versions or instances of the same program without configuration problems or port conflicts. This paper explains how to integrate Docker containers into the "CAAdvisor" monitoring tool. This integration simplifies and streamlines the monitoring, measurement, and management of containers.*

*Keyword - Dcoker Container, Virtual Machine, Monitoring, Performance.*

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**INTRODUCTION**

Docker is a tool that lets you create, deploy, and manage compact, stand-alone packages that contain all the information needed to run an application (code, libraries, runtime, system settings, and dependencies). These packages are called containers. Each container is used with its own processor, memory, block I/O and dedicated network resources, without depending on a separate kernel and operating system. While Docker compares easily with virtual machines, the way they share or allocate their resources varies. In simple terms, Docker is a software-based container platform that lets you build your application and package it in a container with its dependencies. These containers can be easily sent to other computers.

Virtualization is the technique of mporting a system to run guest operating system at the top of the host operating system. It allocates separate memory, RAM, other resources etc. The technology is an unrestricted innovation of the earlier. It eliminated the need for additional hardware resources. Some of drawbacks of using virtualization are: running multiple virtual machines results in unstable performance, hypervisors are not as efficient as the host operating system; the startup process takes longer time. These shortcomings led to the emergence of a new technique called containerization.

Container is a technique that brings virtualization to the operating system state. While virtualization brings a shrink to the hardware, the containerization brings an abstraction to the operating system. Note that the container is a type of virtualization. Container virtualization, however, is more efficient because it does not have a guest operating system and, unlike virtual machines, uses a host's operating system, sharing libraries and associated resources. Application-specific binaries and application-specific container libraries run on the host kernel, which accelerates processing and operation. Even launching a container takes only a fraction of a second. When all containers are shared, the operating system is hosted and contains only application-related binaries and libraries. It also ensures that the workflow is consistent for everyone involved, from development to deployment. The number of settings can be easily measured and the code easily used. Container images can be stored centrally for each application. There are publicly available container image repositories and locally created repositories.

Container is a technology working at the operating system level. This is more in line with the future needs of data centers for light resource management and secondary start-up capabilities. As a bridge between containers, the container network plays a very important role in the container life cycle system.

Lightweight technologies have changes the world of software development by introducing flexibility and creativity in this area. The IoT and mobile computing system uses container virtualization to take advantage of these technologies. In other words, IoT is a computer concept in which everyday objects with embedded hardware / devices are connected to a network or online. The concept of Lightweight virtualization is used to address the challenges of IoT performance in terms of performance and scalability to enable the concept of device virtualization. Virtualization technologies are used in different environments.

The remainder of this paper is organized as follows: Section II covers the related work; In Section III, focus on the implementations. Finally, Section V contains the description of conclusions and future research work.

## RELATED WORK

Wes Felter et al. [1] compared the performance of virtual Machine and LXC. Their results help identify responsible performance factors. They used many evaluation sites and applications to get effective results. Their results show that Linux containers perform better than virtual machines, while Linux containers tend to be faster.

Jyoti Shetty et al. [2] display performance evaluation for native containers, virtual machines and Docker. Performance metrics are based on the processor, memory, disk, and computer. Their evaluation shows that docker containers are better than virtual machines in terms of performance, but they are not isolated.

Ashish Lingayat et al. [3] proposed a comparative study of performance evaluation based on different scenarios. The environments were based on Permetal, a virtual machine, Linux containers and OpenStack cloud to evaluate the processor, network, disks, memory, and speed of the Apache web server. The analysis shows the variation in performance between Linux containers and the virtual machine mainly due to the architecture of the systems. Search implies that Linux containers are more favorable than virtual machine and OpenStack cloud.

R.Madhumathi [4], Proposed the suitability of container monitoring with SYSDIG. Containers running on the host operating system and share the kernel. This makes sharing containers lightweight. As a result, containers start immediately and use less RAM. Container images are built of brick by brick by adding software to the base layer. Each layer is an extra layer. Only the top layer is enabled for writing and reading. Docker containers are based on dozens of open standards. This benchmarking allows containers to run on all major Linux distributions (Redhat, Ubuntu, etc.) and other operating systems such as Microsoft Windows and Apple Macintosh. The standard menu is integrated with the SYSDIG monitoring tool to analyze the performance of the container using various parameters.

Ashish Lingayat et. al [5], It provided a clear overview of the need to deploy Docker containers in a parametric environment. Calculate the startup time of a docker container and a virtual machine (KVM) running the Apache web server in parametal. The results show that the virtual machine is slower than Permetal, which affects performance when launching standard menu containers. Docker containers are about 50% more efficient than the virtual bar on a virtual machine. This performance degradation of the virtual machine is due to its architecture. The virtual machine runs on prototype hardware, thus introducing additional layers to the barometer. When working with a limited number of docker containers, the lack of performance on a virtual machine is not felt, whereas when the number increases, performance decreases. To make full use of docker containers, they must be used in parametrical systems.

Gupta et al.[6], Container-based Hadoop configuration is mainly used to perform big data analytics based on the cloud in a cloud environment. The Docker operating system is very convenient for automated piglet analysis and effective fault-tolerance card prototype.

## RUNNING THE APPLICATION ON DOCKER CONTAINER

A docker file is a text document containing list of steps to create an image. With help of Docker framework, users can create an framework that executes multiple command line statements in a sequential manner. Docker Image is a text file that can be run the event of an image by container. Docker image is a template for creating the environment.

#execute the command

# docker stats --all --format "table {{

.container}} \t {{.cpuperc}} \t {{.memusage}}}" Docker Swarm load balancing of requests to a Build Run simple service

If CPU<Threshold and RAM<Threshold: Run the container

**Fig: Creation of container**



Containers running on a single system partition the same core of the host operating system machine. This makes sharing containers lightweight. As a result, containers start immediately and use less RAM. Container images are made of step by step adding software to the base layer. One for each layer extra layer. Only the top layer is written and done read enabled. Docker containers are based on scores open standards. This allows benchmarking containers run on all major Linux distributions (RedHat, Ubuntu, etc.) and other operating systems Microsoft Windows and Apple Macintosh.

The Docker container is similar to a directory. It has everything the application must be running. A container can be started, started, stopped, moved and deleted. Docker registry is an environment used to create an image in this place and uploaded the images either public or privately in the docker repository. This docker images are pulled during the build steps.

To execute more number of applications, create multiple containers on the same machine and execute at the same time. It is used to avoid the overloading of the CPU. When the load is increased, check the CPU threshold value and automatically create new container to avoid the CPU overloading.

The algorithm can be as follows:

Docker-machine start

Set Master container (wrkr1, wrkr2..., wrkrn)

Conn establish each service for each in service:

Build and run an image

Allocate the job and execute at each container Repeat; (to service 'n') then

Calculate container performance data

elif CPU>Threshold and RAM>Threshold: Create a new container by calling RMI Service; else: Docker-machine stop

## IMPLEMENTATION

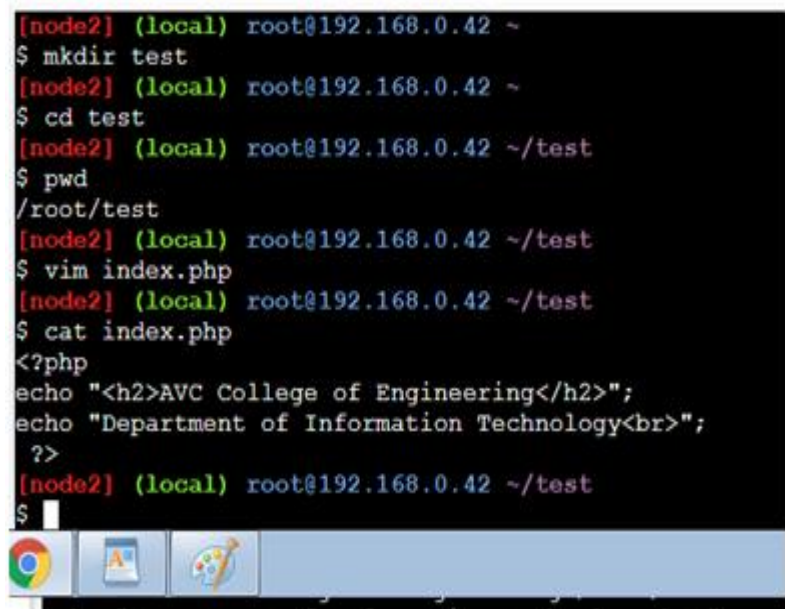
To monitor the performance of the container cAdvisor (or) Container Advisor tool is installed. The docker has been integrated with the monitoring tool to analysis the performance characteristics of the container.

Steps to run the application on docker container,

Step 1: To create an image, it's a template for creating the environment. Images are best created and maintained using Docker files. These files consist of the operating instructions on how to create a container image.

By using the mkdir command to create a new directory named "test". Within a directory, create a new file named index.php.

\$vim index.php



```
[node2] (local) root@192.168.0.42 ~
$ mkdir test
[node2] (local) root@192.168.0.42 ~
$ cd test
[node2] (local) root@192.168.0.42 ~/test
$ pwd
/root/test
[node2] (local) root@192.168.0.42 ~/test
$ vim index.php
[node2] (local) root@192.168.0.42 ~/test
$ cat index.php
<?php
echo "<h2>AVC College of Engineering</h2>";
echo "Department of Information Technology<br>";
?>
[node2] (local) root@192.168.0.42 ~/test
$
```

```

$ docker build -t my-first-php-image .
Sending build context to Docker daemon 3.072kB
Step 1/3 : FROM php:7-apache
7-apache: Pulling from library/php
f5d23c7fed46: Pull complete
4f36b8588ea0: Pull complete
6f4f95ddefa8: Pull complete
187af28c9b1d: Pull complete
3c4135e0a3e9: Pull complete
764143bdfc93: Pull complete
3a141d427998: Pull complete
273ba44de0c6: Pull complete
a508367b4ba3: Pull complete
0196a98ca6a5: Pull complete
0accc27cff60: Pull complete
d9745b3647e0: Pull complete
92b4636120c9: Pull complete
73aa9840a7e0: Pull complete
Digest: sha256:521aecc3524b66710370106cfccd784e85cb012b044739
Status: Downloaded newer image for php:7-apache
--> 4d395268fde2
Step 2/3 : COPY index.php /var/www/html
--> ff731a2e0ba5
Step 3/3 : EXPOSE 80
--> Running in a42760930a40
Removing intermediate container a42760930a40
--> a814568014a4
Successfully built a814568014a4
Successfully tagged my-first-php-image:latest
[node2] (local) root@192.168.0.42 ~/test
$
[node2] (local) root@192.168.0.42 ~/test

```

Step 2: Next, create a file named `Dockerfile` and use the following commands:

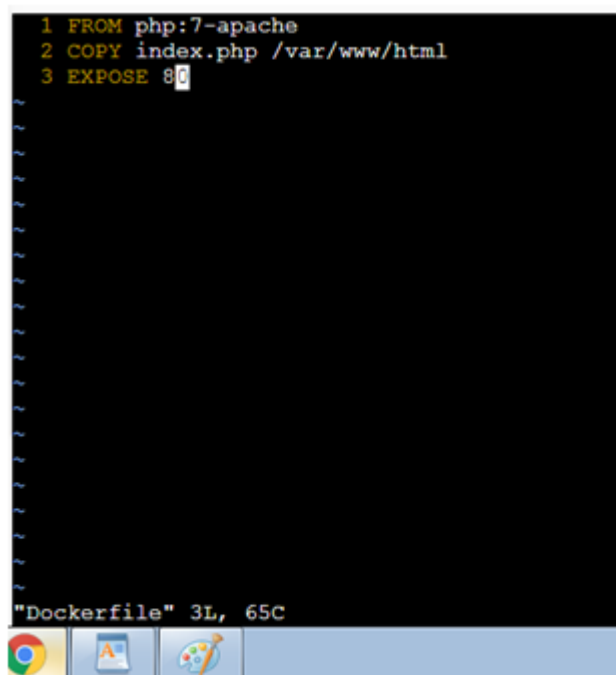
\$ vim Dockerfile

FROM php:7.2-apache

COPY index.php /var/www/html EXPOSE 80

The `FROM` command represents the container image will base from the `php:7.2-apache` image.

The `COPY` command copy the source file to be destination.



```

1 FROM php:7-apache
2 COPY index.php /var/www/html
3 EXPOSE 80

```

"Dockerfile" 3L, 65C

Step 3: Before to build the image run the `ls` command to verify any existing image is there in container.

\$ docker image -ls

Step 4: To build an image file use the following command:



```
$docker build -t my-first-php-image .
```

The `-t` flag represents a 'tag'.

Step 5: After build the image run the `'ls'` command to verify the new image is created or not in container. It will list all the images and containers.

```
[node1] (local) root@192.168.0.38 ~/test
$ docker container run -p 80:80 -d my-first-php-image
0942fb1445fb12cea870d1ee28990c5e29e63c6da3adf0b8c7563d4480
[node1] (local) root@192.168.0.38 ~/test
$ docker image ls
REPOSITORY          TAG                IMAGE ID
my-first-php-image   latest            2acdcfb6e13d
php                  7-apache         4d395268fde2
[node1] (local) root@192.168.0.38 ~/test
$
```

```
$ docker image -ls
```

The `'.'` represents the current location. The docker file running in the same directory. If it's in other location specifies the path.

Step 6: To run the container image, use the following command. It executes a command and use the port 80 as default.

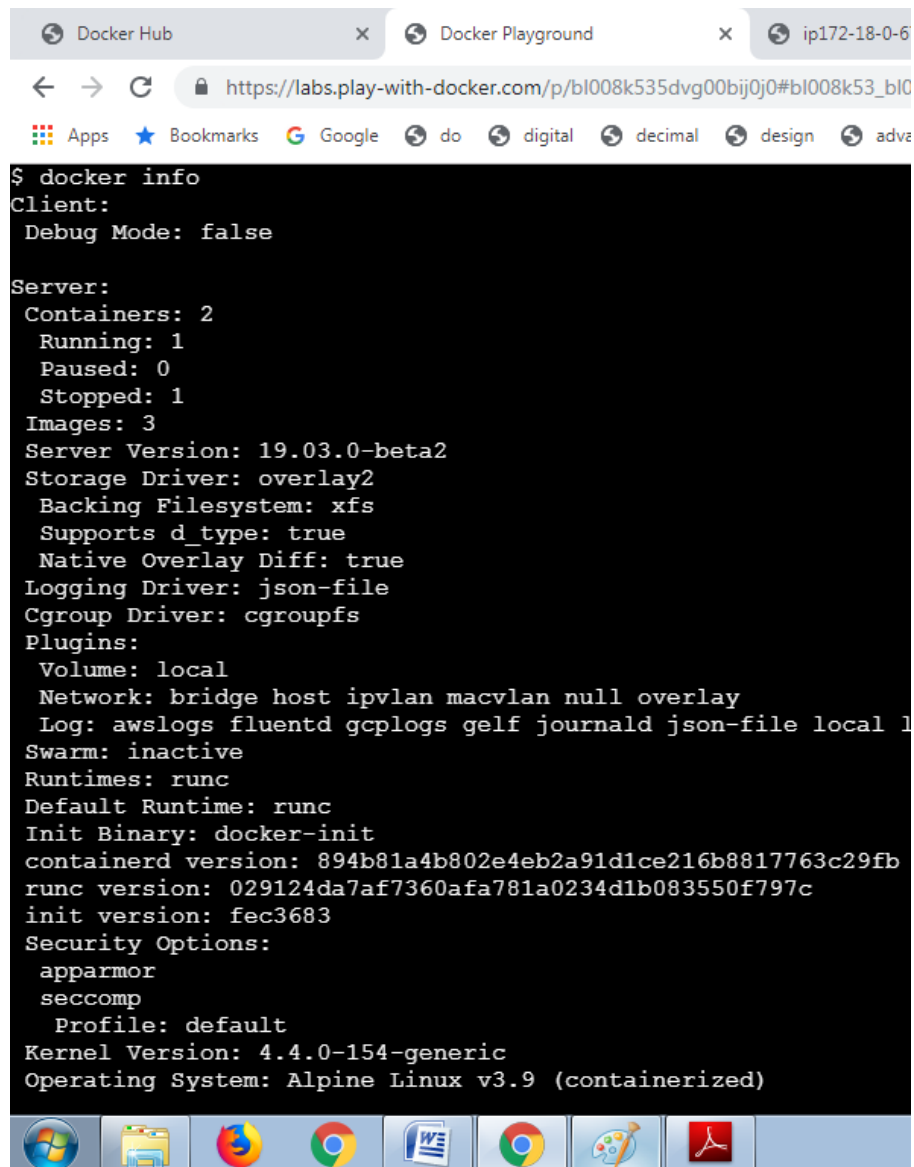
```
$ docker container run -p 80:80 -d my-first-php- image
```

```
[node1] (local) root@192.168.0.38 ~
$ mkdir
[node1] (local) root@192.168.0.38 ~/test
$ docker build -t my-first-php-image .
Sending build context to Docker daemon  3.072kB
Step 1/3 : FROM php:7-apache
7-apache: Pulling from library/php
f5d23c7fed46: Pull complete
4f36b8588ea0: Pull complete
6f4f95ddefa8: Pull complete
187af28c9b1d: Pull complete
[node1] (local) root@192.168.0.38 ~/test
$ docker container run -p 80:80 -d my-first-php-
0942fb1445fb12cea870d1ee28990c5e29e63c6da3adf0b8c
[node1] (local) root@192.168.0.38 ~/test
$
```

Step 7: The information about the Docker is known using the command

```
$ docker info
```





```
$ docker info
Client:
 Debug Mode: false

Server:
 Containers: 2
  Running: 1
  Paused: 0
  Stopped: 1
 Images: 3
 Server Version: 19.03.0-beta2
 Storage Driver: overlay2
  Backing Filesystem: xfs
  Supports d_type: true
  Native Overlay Diff: true
 Logging Driver: json-file
 Cgroup Driver: cgroupfs
 Plugins:
  Volume: local
  Network: bridge host ipvlan macvlan null overlay
  Log: awslogs fluentd gcplogs gelf journald json-file local
 Swarm: inactive
 Runtimes: runc
 Default Runtime: runc
 Init Binary: docker-init
 containerd version: 894b81a4b802e4eb2a91d1ce216b8817763c29fb
 runc version: 029124da7af7360afa781a0234d1b083550f797c
 init version: fec3683
 Security Options:
  apparmor
  seccomp
   Profile: default
 Kernel Version: 4.4.0-154-generic
 Operating System: Alpine Linux v3.9 (containerized)
```

STEP 8: The user account has been created in CAdvisor monitoring tool where the containers performance is been monitored through the desired parameters.

STEP 9: The below commands are used to integrate the docker with the cAdvisor monitoring tool.

The cAdvisor tool displays metrics for the host and container. This tool extracts the container running information's and display on screen.

To install and run cAdvisor as a container on docker host, please use the below command,

```
# docker run \
-volume=/:/rootfs:ro \
-volume=/var/run:/var/run:rw \
-volume=/sys:/sys:ro \
-volume=/var/lib/docker:/var/lib/docker:ro \
-volume=/dev/disk:/dev/disk:ro \
-volume=/cgroup:/cgroup:ro \
-publish=8080:8080 \
-detach=true \
-name=cadvisor \
```

```

Digest: sha256:815386ebbe9a3490f38785ab11bda34ec8dacf4634af77b8912832d4
Status: Downloaded newer image for google/cadvisor:latest
6a90f37c5a2cc636f413cfd6d02afa9d9330ad1a4d440f6ced5c2908605dfae9
[node1] (local) root@192.168.0.33 ~/src
$ sudo cadvisor
/usr/local/bin/sudo: line 5: exec: cadvisor: not found
[node1] (local) root@192.168.0.33 ~/src
$ vim Dockerfile
[node1] (local) root@192.168.0.33 ~/src
$ docker run
> --volume=/:/rootfs:ro
> --volume=/var/run:/var/run:rw
> --volume=/sys:/sys:ro
> --volume=/var/lib/docker:/var/lib/docker:ro
> --publish=8080:8080
> --detach=true
> --name=cadvisor
> google/cadvisor:latest
docker: Error response from daemon: Conflict. The container name "/cadvisor"
is already in use by container "6a90f37c5a2cc636f413cfd6d02afa9d9330ad1a4d440f6ced5c2908605dfae9"
that container is able to reuse that name.
See 'docker run --help'.
[node1] (local) root@192.168.0.33 ~/src
$

```

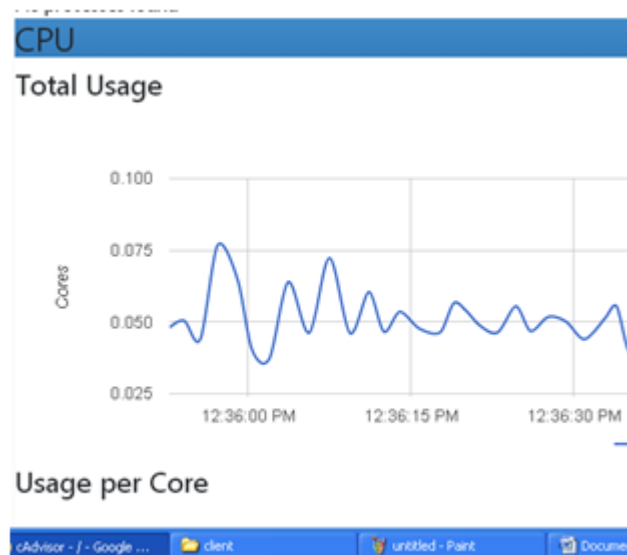
–privileged=true \ google/cadvisor:latest

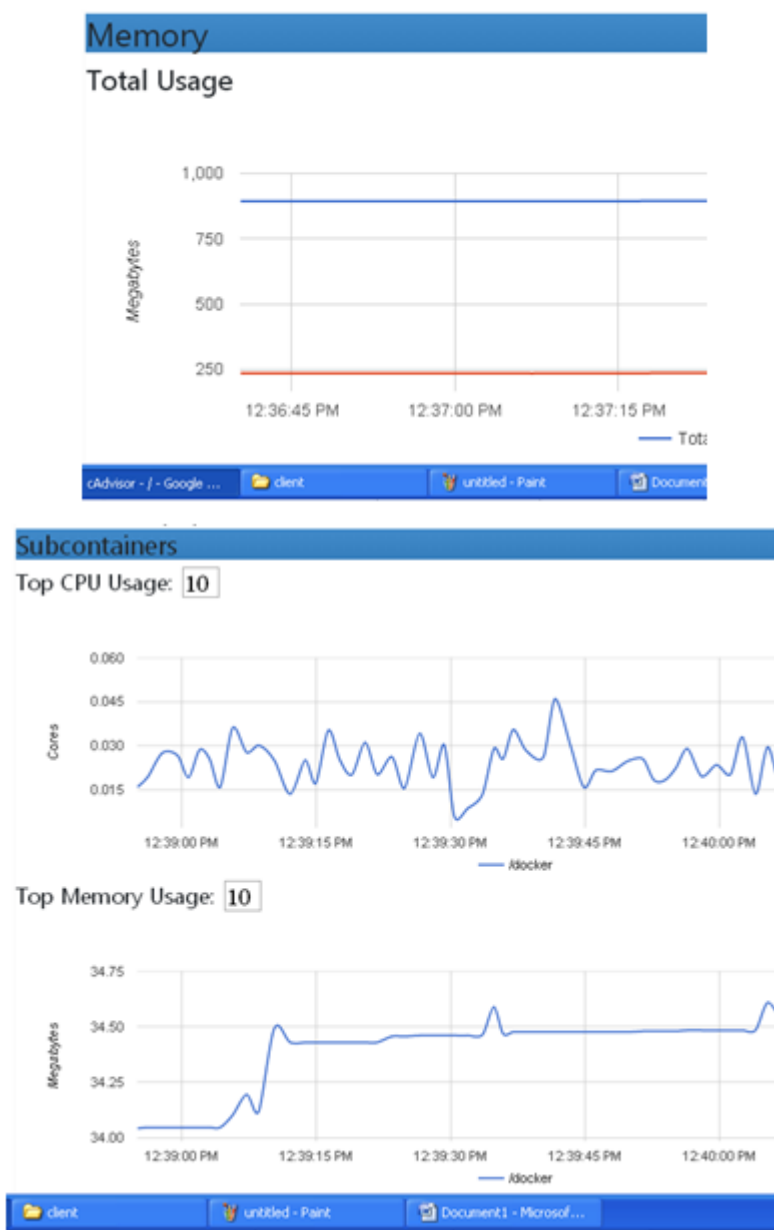
## RESULTS

The use of the container is illustrated in figures. This represents the average and maximum demand times for all requests.



cAdvisor is an open source container resource utility collector. Native support for Docker containers and support for other types of containers. cAdvisor operates through the node. It automatically detects all containers in a given node and collects CPU usage, memory, file system and network usage statistics.





## BENEFITS OF USING CONTAINERS

Increase in the number of devices connected to different networks.

Processing huge volume of data.

Managing the heterogeneous environment.

Docker can help to reduce the usage of infrastructure resources. The nature of Docker is that it requires less resource to run the same application.

This reduces the time lost in defects and increases the time available for feature development.

Docker guarantees sustainable environments, from development to production. Docker containers are configured to handle all configurations and dependencies locally.

## CONCLUSIONS

Docker performance is faster than Virtual Machines because it does not have a guest operating system and less overhead of resources. In addition, the docker container can do that cAdvisor tracking tool to shows the performance metrics of the container. Using this method to save as much energy as possible using the docker container, because it builds the container based on the load. It automatically closes the container when there are no tasks to process.

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**ASSESSMENT OF SOIL MACRONUTRIENTS THROUGH GEOSTATISTICAL INVESTIGATION OF SPECTRAL SIGNATURES EXTRACTED FROM INSITU MEASUREMENTS AND SENTINEL-2A**

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**ABSTRACT**

*Spatial information consisting soil nutrient information reverberate precise decision making in agricultural practices. Remote sensing is the foremost technology in acquiring the spatial information. Soil sensing techniques through remote sensing technology greatly helps in converting the soil nutrient information to digital platform and it is found to be cost effective and less time consumption compared to manual soil testing procedure. Spectral signature of the soil provides copious information about the soil compositions. Based on the spectral values with ground truth analysis references, the soil nutrients assessment can be made. This study promotes the utility of sentinel data in extracting the spectral values for precise assessment of soil nutrients. The inherent characteristics of sentinel data in assessing the soil information at regional scale in Tamilnadu, India have not been fully explored. Current study focused on the soil nutrient assessment by extracting the soil spectra from multispectral satellite data (Sentinel 2A). For ground based reference thirty Soil samples were collected on different soil and agricultural practicing field which were subjected to spectral analysis in spectroradiometer laboratory as per standard protocol. Insitu spectral ranges were correlated with the values extracted from the sentinel data. The precision in correlation were found to be contended and this technology finds the best alternatives to the manual soil testing were revealed in this study. Statistical correlations were implemented to attain  $R^2$  value. Validation of  $R^2$  values of Insitu spectra and the spectra extracted from the sentinel data gives justification for utilizing the remote sensing technology in soil science. Based on the correlation among the spectral values and the field soil nutrient status the assessment for large scale was attempted. The study outcomes elucidate the extensive usage of satellite data in exploring the soil health information in large scale. Satellite data acquired during various stages were found to be the most important spectral predictors while elevation, temperature and precipitation came up as prominent terrain/climatic variables in predicting soil properties. Considering the increased availability of freely available remote sensing data soil information at local and regional scales can be predicted with relatively little financial and human requirements.*

*Keywords: Remote sensing, soil nutrient, multispectral satellite data,  $R^2$  value, spectra.*

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**1 INTRODUCTION**

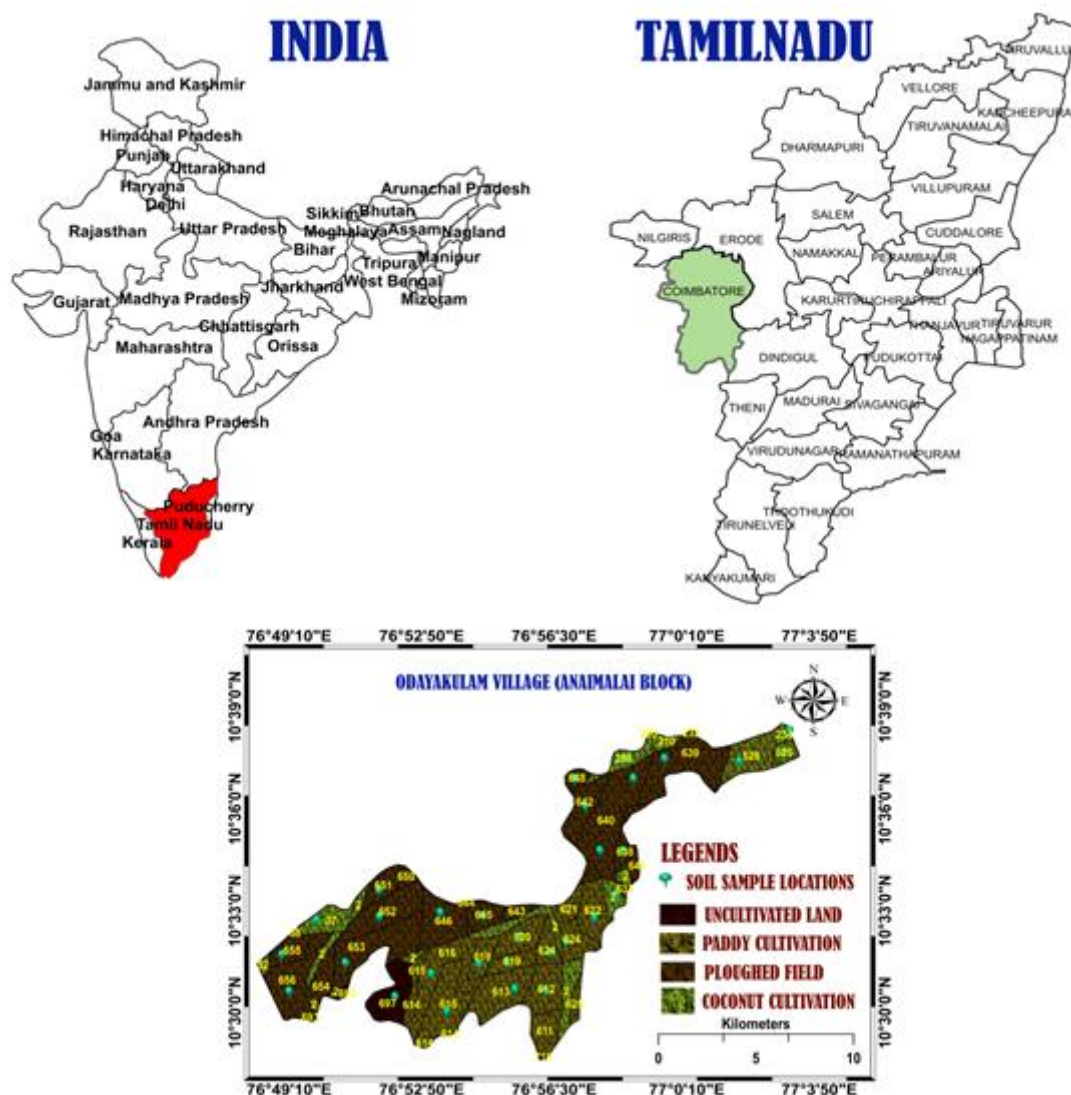
Soil is the predominant constituent in the telluric ecosystem which dispenses required humidity and nutrients to the plants. Chief constitute of plants nutrition are preferably primary macronutrients such as Nitrogen, Phosphorous and Potassium (NPK) [14]. Macronutrients rich soil highly influences the sustainable agricultural activities thus providing real time solution to the global challenges such as food insecurity, nutritious food availability, and sustainable food productivity and so on [3]. Hence it is imperative to have adequate knowledge on soil fertility and soil nutrient status for whole field. Existing traditional methods of sampling and physiochemical testing of soil grasp lot of time, cost and man power [6]. Traditional methods estimate the nutrient status only at the sampling point not for the whole field. Knowledge on the nutrient status of entire field gives rise to decision making in the regards of multiple cropping and fertilizer dosage [4]. For the vast agricultural field the traditional methodology ruins the time and cost. Hence the traditional methods of soil nutrients estimation do not meet the modern soil management needs. The modern soil management requires inch by inch soil nutrient status since the soil fertility gets diminished over the year due to over utilization of agrochemicals. Contrarily the remote sensing technology spatially assesses the soil nutrient status at larger scale relatively at low cost and man power [5]. The inherent nature of remote sensing technology in extracting the pixel-by-pixel soil spectral reflectance at large scale brings the world into new vision on modern soil management. Developing correlation among the soil properties and the soil spectra from the satellite image as well as Insitu measurements gives a statistical relationship [11]. Applying that relationship in assessment of soil nutrients at unsample locations reveals the techniques behind the application of remote sensing in soil nutrient assessments. Mathematical relationships and the satellite extracted spectral values can be revealed spatially for large scale so as to reach the farmers. This can be achieved through incorporating Geographical information system (GIS) in remote sensing results. One of the most predominant geostatistical techniques namely kriging which is a linear regression method of assessing the point values at any location [15]. Based on the kriging

model the entire field can be subjected to soil nutrient assessments. The assessed soil nutrient status can be mapped for further investigation. This large scale information about soil nutrient status remains unexplored in the southern part of Tamilnadu, India. This study elucidates the aforementioned modern soil assessment techniques by implementing to the Odayakulam village which covers 1461 hectares of Anaimalai block in Coimbatore district of Tamilnadu at India. Although different research groups have developed qualitative and quantitative evaluation of soil characteristics using spectral measurements this current study brings the incorporation of geostatistical technique in the spectral outcomes as a novelty. Odayakulam village being covered with almost 82% of fertile diversified soil nutrient status pushed to make a study in that area in order to fulfill the novelty. Spectral information reveals the diversity nature of the soil. Thus this current study explores the application of satellite data and GIS in soil science at different dimension of modern agriculture so as to reduce the cost and time and to improve precise decision making on various aspects of crop productivity.

## 2 MATERIALS AND METHODS

### 2.1 Study area description

Odayakulam village having the geographical extend of  $10^{\circ}39'$  N and  $76^{\circ}49'$  E situated 40 km to the south of Coimbatore district of Tamilnadu, India. Soil in that area is characterized by red loam, black soil and calcareous soil and receives an average rainfall of about 158cm annually. Diverged soil nature of this village is supported by Aliyar river basin for agricultural practices. Assorted crops such as Coconut, Paddy, Ground Nut, Sugarcane, Coco, Nutmeg, Arecanut, and Vennila are cultivated in major concern. Soil sampling was performed during the period of 8 to 9 February 2021 covering 1461 hectares. Total of 30 samples were collected at different locations based on the varied soil texture, colour and crop cultivated. Sampling was made as per the standard protocols of Tamilnadu Agricultural University (TNAU), India. Sampling location was recorded using Differential Global Positioning System (DGPS) along with a sub meter (Trimble Navigation Ltd., Sunnyvale, California, USA). Soil collected were sieved and packed with labels holding sample site information.



**Fig.1.** Study area with sampling locations**2.2 Nutrient analysis of soil samples**

Labeled samples were transported to soil testing laboratory (TNAU soil testing laboratory, India). Available Nitrogen, Phosphorous and potassium were measured using kjeldhal nitrogen analysis method, Bray-1 method, Flame Photometer respectively [2]. The available nitrogen ranges from 59 to 109 kg/ha where phosphorous ranges from 5.5 to 7.5 kg/ha and available potassium ranges from 50 to 375 kg/ha. The field soil nutrient statuses are tabulated along with the respective standards.

**Table 1.** Sample site locations and nutrient status

S.No.	S.F_no	Longitude	Latitude	N	P	K
1	37	E76°52'46.34482764"	N10°35'18.87022104"	81	7.0	75
2	208	E76°53'46.68415188"	N10°35'47.34380292"	90	5.5	105
3	234	E76°54'18.94746024"	N10°35'52.4358294"	81	5.5	100
4	525	E76°54'17.8303446"	N10°35'48.47452296"	101	6.0	120
5	526	E76°54'9.09296388"	N10°35'46.93263216"	81	5.0	165
6	612	E76°53'31.16245164"	N10°35'6.4323024"	90	5.5	100
7	613	E76°53'25.0976814"	N10°35'6.6378876"	76	5.0	105
8	615	E76°53'11.83742124"	N10°35'2.62897188"	76	5.0	105
9	615	E76°53'18.82732596"	N10°35'19.58976996"	76	5.0	105
10	616	E76°53'8.75363964"	N10°35'9.31049844"	70	5.0	140
11	618	E76°53'18.10777704"	N10°35'11.05797444"	84	7.5	165
12	619	E76°53'23.55579096"	N10°35'11.3663526"	98	7.0	195
13	620	E76°53'26.22840144"	N10°35'15.992025"	73	5.0	315
14	622	E76°53'40.72217424"	N10°35'19.2813918"	81	7.0	120
15	624	E76°53'31.98479352"	N10°35'13.11382896"	70	7.0	55
16	624	E76°53'35.17136772"	N10°35'15.06689052"	81	6.5	70
17	633	E76°53'44.93667552"	N10°35'23.39310048"	90	6.0	150
18	639	E76°53'54.39360552"	N10°35'47.44659588"	109	6.5	375
19	640	E76°53'41.75010132"	N10°35'31.20534672"	78	5.5	105
20	640	E76°53'48.32883528"	N10°35'43.95164352"	87	5.5	55
21	642	E76°53'38.87190528"	N10°35'39.01759296"	87	6.5	155
22	646	E76°53'10.501116"	N10°35'20.20652628"	95	5.0	50
23	648	E76°53'36.91884372"	N10°35'43.95164352"	90	7.5	110
24	651	E76°52'58.47436812"	N10°35'24.1126494"	90	7.0	110
25	652	E76°52'58.57716108"	N10°35'19.48697736"	70	5.5	150
26	653	E76°52'51.89563452"	N10°35'11.26356"	70	6.0	75
27	655	E76°52'39.45771588"	N10°35'12.70265784"	59	6.0	130
28	656	E76°52'40.89681372"	N10°35'6.22671684"	84	5.0	100
29	688	E76°53'46.37577372"	N10°35'31.10255412"	90	6.0	95
30	697	E76°53'1.66094232"	N10°35'5.30158236"	76	5.0	105

\*S.F.No. Survey Field Number, N- Available Nitrogen in Kg/Hectare, P- Available Phosphorous in Kg/Hectare, K- Available Potassium in Kg/Hectare.

**2.3 Laboratory soil spectra extraction**

ASD FieldSpec® HandHeld™ 2 spectroradiometer capable of measuring the soil spectra ranges from 325 to 1075 nm [8]. Thirty samples were subjected to spectral measurements. To avoid signal-to-noise errors the entire set up has been done under closed environment. The instrument is mounted on the tripod stand and artificial light source is made with the help of tungsten quartz halogen lamp. The soil sample placed at the distance of 30cm from the instrument. Initial calibration of the instrument was made and white reflectance spectra were taken between each successive soil samples [6]. Then the soil sample was exposed to the sensor and the signals were recorded at particular wavelength by the instrument. All the extracted soil spectra are transferred from the



instrument to the computer system through data cable provided. Using the ViewSpec Pro software the spectra were processed to convert the recorded radiance soil spectra to reflectance soil spectra [10].The reflectance soil spectra are visualized in the ENVI 4.7 software [13] and the parameters are plotted from 400nm to 1075nm since the initial wavelength spectra were subjected to noise errors. The spectra are saved as ASCII files and analyzed in OriginPro 8.5 software.

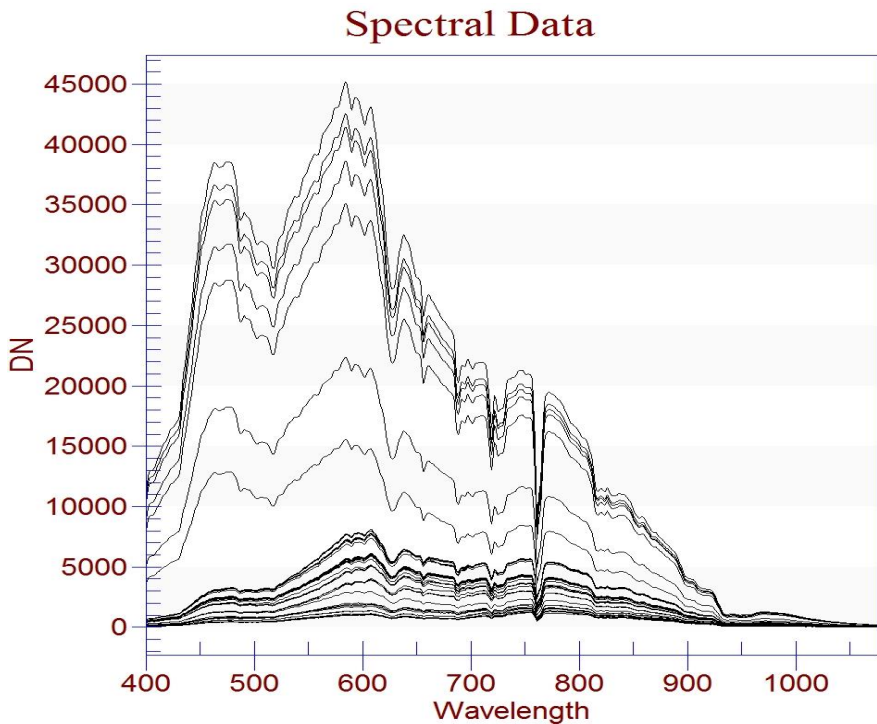


Fig.2. Insitu extracted Soil spectra

2.4 Remote sensing data

Sentinel-2A a multispectral remote sensing data used in this study for the analysis of soil nutrients [16]. Extensive literatures reveal the application of sentinel data in soil nutrient assessments. The sentinel-2A data holding the study area were collected from Copernicus Open Access Hub (previously known as Sentinels Scientific Data Hub) website (<https://sentinels.copernicus.eu/web/sentinel/home>). The acquisition of the data falls in the month of February matching the sampling periods. The Meta data about the data were furnished in table-2. The soil spectra indices were extracted from this multispectral satellite image.

Table 2. Remote sensing data used

Satellite Data	Sentinel 2A
Acquisition Date	09-02-2021
Spatial Resolution	VNIR 10m; NIR 20m

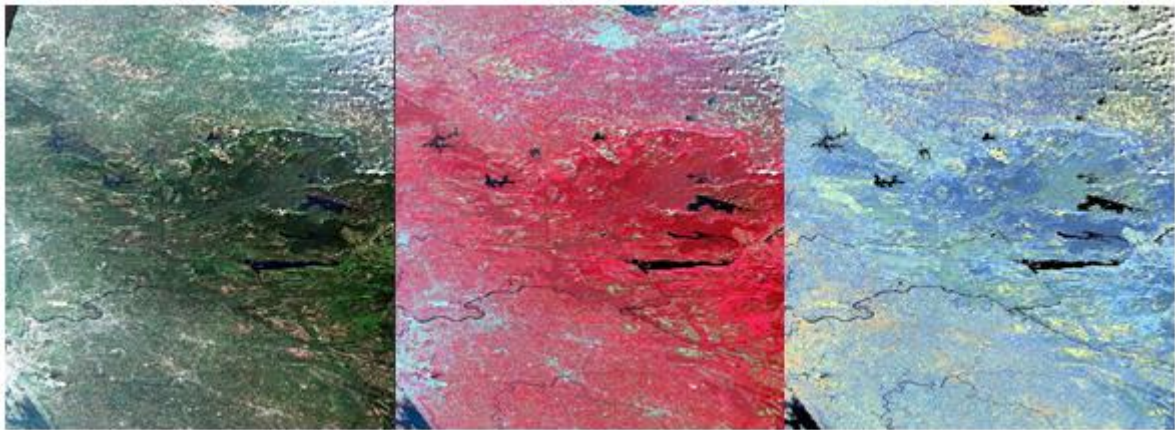


Fig.3. Natural, false colour and atmospheric penetration band combination

Sentinel Application Platform (SNAP) software developed by ESA are used to carry out specific atmospheric and radiometric corrections with the specific sen2Cor tool [9]. Sen2Cor corrects the data from the effects of atmosphere in order to receive desired Bottom-Of-Atmosphere (BOA) reflectance product. Supervised classification is carried out for classifying the land cover information and to identify the accuracy of the sentinel data [1]. Supervised classification utilizes the region of interest classes as an algorithm to classify the entire area. Maximum likelihood classification is made by classifying the five region of interest. Initially the pixel selection is made in ArcGIS software band composition and classes were given as input. Running the maximum likelihood supervised classification based on the pixel selection it is found that 2% of the study area covers by water bodies, 3% by bare soil land, 6% by alluvial soil deposit, 7% by buildup lands and 82% by agricultural land. Since higher percentile land is utilized for agricultural purpose the purpose of the study is fulfilled by utilizing the sentinel dataset. Kappa's coefficient followed by the supervised classification helps to find the accuracy level of the sentinel data [17] for carrying further process. It is revealed from the kappa's coefficient that the accuracy level of the data is 99.8%. Having precise accuracy level sentinel dataset enters next level of processing of soil spectra. After image processing the data are subjected to extract the spectra with the help of latitude, longitude of sample locations.

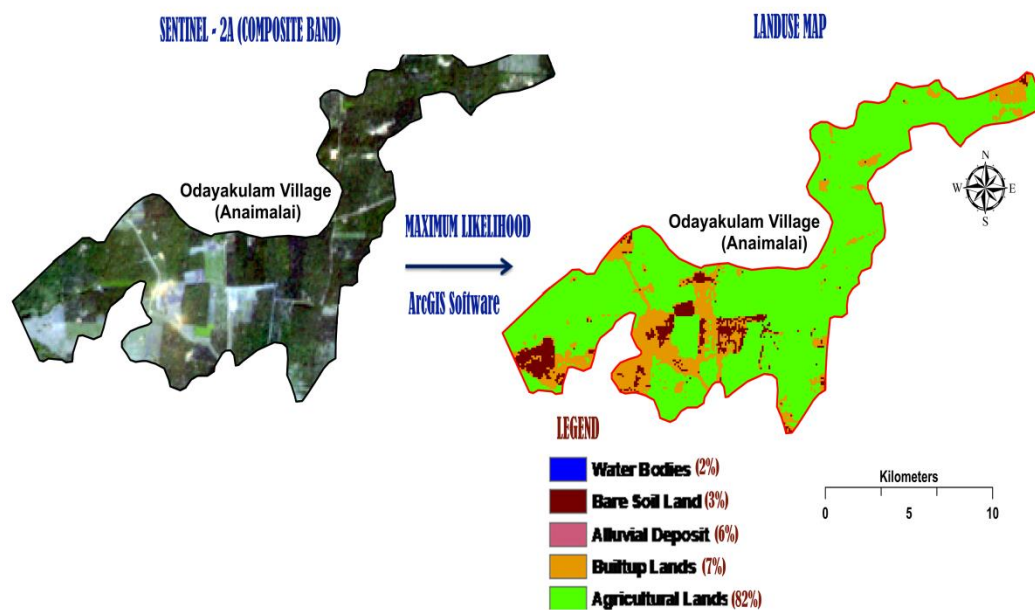


Fig.4. Land use map by supervised classification

Table 3. Kappa's coefficient (Accuracy level of sentinel-2A data)

CLASS Overall Accuracy = (1206/1208) 99.8344%	Commission	Omission		Produced accuracy			User Accuracy	
	%	Pixel	%	Pixel	%	Pixel	%	Pixel
Water Bodies	0	0/459	0	0/459	100	459/459	100	459/459
Vegetation	0	0/29	0	0/29	100	29/29	100	29/29
Dense Vegetation	0	0/93	0	0/93	100	93/93	100	93/93
Bare soil	0	0/44	0	0/44	100	44/44	100	44/44
Buildings	1.75	2/114	0	0/112	100	112/112	98.2	112/114

### Spectral extraction

Importing the sentinel data in SNAP software visualize the true composite bands where the study area location is identified by importing the .kml file. By using the pin manager tool the latitude and longitude information of the sample sites were imported. Spectral reflectance value at different wavelength [9] were extracted in the clipboard and finally imported in statistical software for analysis.

**Table 4.** Soil spectral reflectance value from sentinel 2A data

S.Nos	S.F.NO.	Reflectance @ wavelength											
		443	1610	2190	490	560	665	705	740	783	842	865	945
SAMPLE-01	37	0.0546	0.1631	0.0757	0.0442	0.0689	0.0434	0.0951	0.2866	0.3681	0.4476	0.3881	0.3033
SAMPLE-02	208	0.0451	0.1579	0.0734	0.0414	0.0594	0.0419	0.0924	0.2876	0.3539	0.298	0.3786	0.2938
SAMPLE-03	234	0.0477	0.173	0.089	0.0459	0.0711	0.0558	0.0954	0.217	0.2567	0.2736	0.2873	0.2594
SAMPLE-04	525	0.0747	0.2146	0.1413	0.0717	0.0972	0.0924	0.1444	0.261	0.3034	0.2912	0.3258	0.3047
SAMPLE-05	526	0.0762	0.2135	0.152	0.0497	0.0743	0.0691	0.126	0.2163	0.2427	0.2362	0.2601	0.274
SAMPLE-06	612	0.0762	0.1968	0.1461	0.0663	0.0893	0.106	0.1234	0.1961	0.2233	0.2346	0.2392	0.274
SAMPLE-07	613	0.0544	0.2	0.1433	0.0647	0.0935	0.1074	0.1267	0.2032	0.236	0.2486	0.2515	0.2483
SAMPLE-08	615	0.0478	0.1293	0.0621	0.0403	0.0561	0.0439	0.0819	0.1961	0.2442	0.2548	0.2689	0.2628
SAMPLE-09	615	0.0449	0.1334	0.0683	0.0383	0.0544	0.0429	0.0775	0.1745	0.222	0.2234	0.2392	0.2472
SAMPLE-10	616	0.056	0.1304	0.0637	0.0415	0.0593	0.0458	0.0779	0.171	0.21	0.2258	0.2291	0.2425
SAMPLE-11	618	0.0546	0.1631	0.0757	0.0442	0.0689	0.0434	0.0951	0.2866	0.3681	0.4476	0.3881	0.3033
SAMPLE-12	619	0.0451	0.1579	0.0734	0.0414	0.0594	0.0419	0.0924	0.2876	0.3539	0.298	0.3786	0.2938
SAMPLE-13	620	0.0477	0.173	0.089	0.0459	0.0711	0.0558	0.0954	0.217	0.2567	0.2736	0.2873	0.2594
SAMPLE-14	622	0.0747	0.2146	0.1413	0.0717	0.0972	0.0924	0.1444	0.261	0.3034	0.2912	0.3258	0.3047
SAMPLE-15	624	0.0762	0.2135	0.152	0.0497	0.0743	0.0691	0.126	0.2163	0.2427	0.2362	0.2601	0.274
SAMPLE-16	624	0.0762	0.1968	0.1461	0.0663	0.0893	0.106	0.1234	0.1961	0.2233	0.2346	0.2392	0.274
SAMPLE-17	633	0.0544	0.2	0.1433	0.0647	0.0935	0.1074	0.1267	0.2032	0.236	0.2486	0.2515	0.2483
SAMPLE-18	639	0.0478	0.1293	0.0621	0.0403	0.0561	0.0439	0.0819	0.1961	0.2442	0.2548	0.2689	0.2628
SAMPLE-19	640	0.0449	0.1334	0.0683	0.0383	0.0544	0.0429	0.0775	0.1745	0.222	0.2234	0.2392	0.2472
SAMPLE-20	640	0.056	0.1304	0.0637	0.0415	0.0593	0.0458	0.0779	0.171	0.21	0.2258	0.2291	0.2425
SAMPLE-21	642	0.0477	0.173	0.089	0.0459	0.0711	0.0558	0.0954	0.217	0.2567	0.2736	0.2873	0.2594
SAMPLE-22	646	0.0747	0.2146	0.1413	0.0717	0.0972	0.0924	0.1444	0.261	0.3034	0.2912	0.3258	0.3047
SAMPLE-23	648	0.0762	0.2135	0.152	0.0497	0.0743	0.0691	0.126	0.2163	0.2427	0.2362	0.2601	0.274
SAMPLE-24	651	0.0762	0.1968	0.1461	0.0663	0.0893	0.106	0.1234	0.1961	0.2233	0.2346	0.2392	0.274
SAMPLE-25	652	0.0544	0.2	0.1433	0.0647	0.0935	0.1074	0.1267	0.2032	0.236	0.2486	0.2515	0.2483
SAMPLE-26	653	0.0478	0.1293	0.0621	0.0403	0.0561	0.0439	0.0819	0.1961	0.2442	0.2548	0.2689	0.2628
SAMPLE-27	655	0.0449	0.1334	0.0683	0.0383	0.0544	0.0429	0.0775	0.1745	0.222	0.2234	0.2392	0.2472
SAMPLE-28	656	0.0544	0.2	0.1433	0.0647	0.0935	0.1074	0.1267	0.2032	0.236	0.2486	0.2515	0.2483
SAMPLE-29	688	0.0449	0.1334	0.0683	0.0383	0.0544	0.0429	0.0775	0.1745	0.222	0.2234	0.2392	0.2472
SAMPLE-30	697	0.0477	0.173	0.089	0.0459	0.0711	0.0558	0.0954	0.217	0.2567	0.2736	0.2873	0.2594

## 2.5 Statistical interpretation

Insitu laboratory spectral values and the sentinel extracted spectral value were imported in OrginPro 8.5 software. Imported data were plotted in the graph in order to develop soil spectral reflectance curve. The reflectance curve shows close correlation among the Insitu measurements and satellite data. In order to justify the correlations the  $R^2$  value is obtained for both soil spectral curves extracted from Insitu measurements and satellite data. Comparing the  $R^2$  value the final outcomes were derived showing correlations in Insitu measurements and sentinel data that are very useful in measuring the soil associated NPK.

## 3 RESULTS AND DISCUSSION

### 3.1 Insitu laboratory soil spectra curve

The extracted spectral reflectance from the Insitu soil testing was developed as spectral reflectance curve statistically. The soil samples taken from the various location of Anaimalai block, Coimbatore, India implies

very peak response in VNIR (visible near infrared region) the curve continuous at the peak in the range of 1000-1075nm. From the extensive literature the nitrogen ranges from 100 to 250 kg/ha, phosphorous ranges from 20 to 40 kg/ha and potassium ranges from 200 to 400 kg/ha shows in the aforementioned wavelength regions. It is clear from the table.1 where the soil was tested manually and reported correlates with the outcomes of the soil spectral curve from the Insitu measurements.

### 3.2 Sentinel 2A soil spectra curve

Spectral curve reveals the values of soil spectra extracted from the sentinel data using pin manager tool in SNAP software. The spectral values at different wavelength were plotted as graph in order to compare with the Insitu spectral curve and the manual tested soil nutrient status.  $R^2$  value was delineated from the curve.

### 3.3 $R^2$ Value

The linear equation of the curve gives the  $R^2$  value for both the curves of spectral reflectance extracted from Insitu measurement and the satellite data. Correlation between the Insitu measurement and satellite data enables to investigate NPK associated with the soil. Moreover the mathematical analyses of manual soil testing report support the findings of the spectral indices.

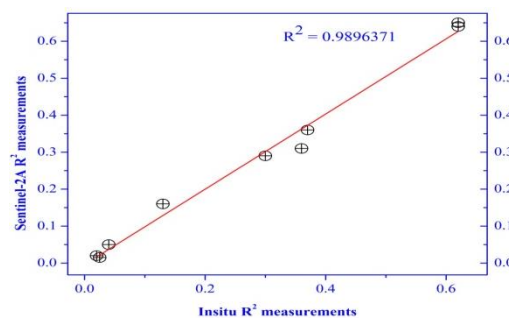


Fig.5. Linear fit curve

### 3.4 Kriging

It is found that the soil nutrients give high ranges from 600nm to 900nm in both Insitu and sentinel spectral. Thus the ranges were imported along with the latitude and longitudinal values in the ArcGIS software. By utilizing the kriging geostatistical technology the nutrients were mapped and the ranges of soil fertility can be assed at all unsample location and also in unassessable areas.R

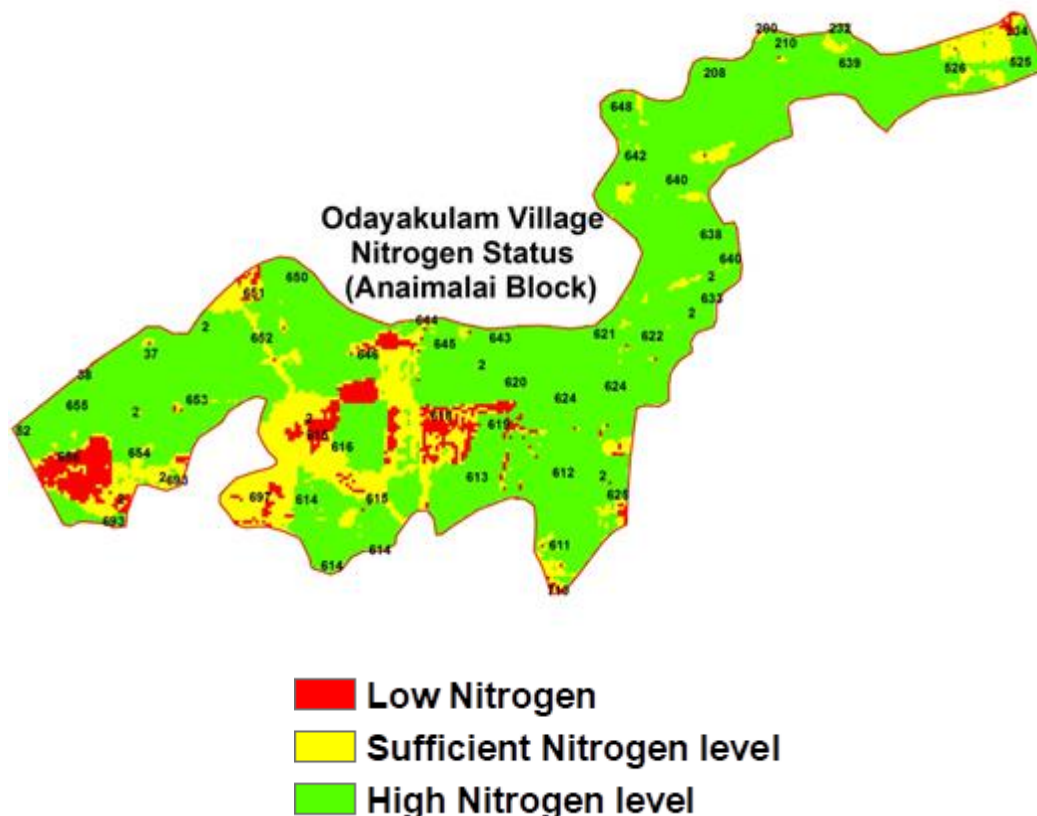




Fig.6. Available Nitrogen map

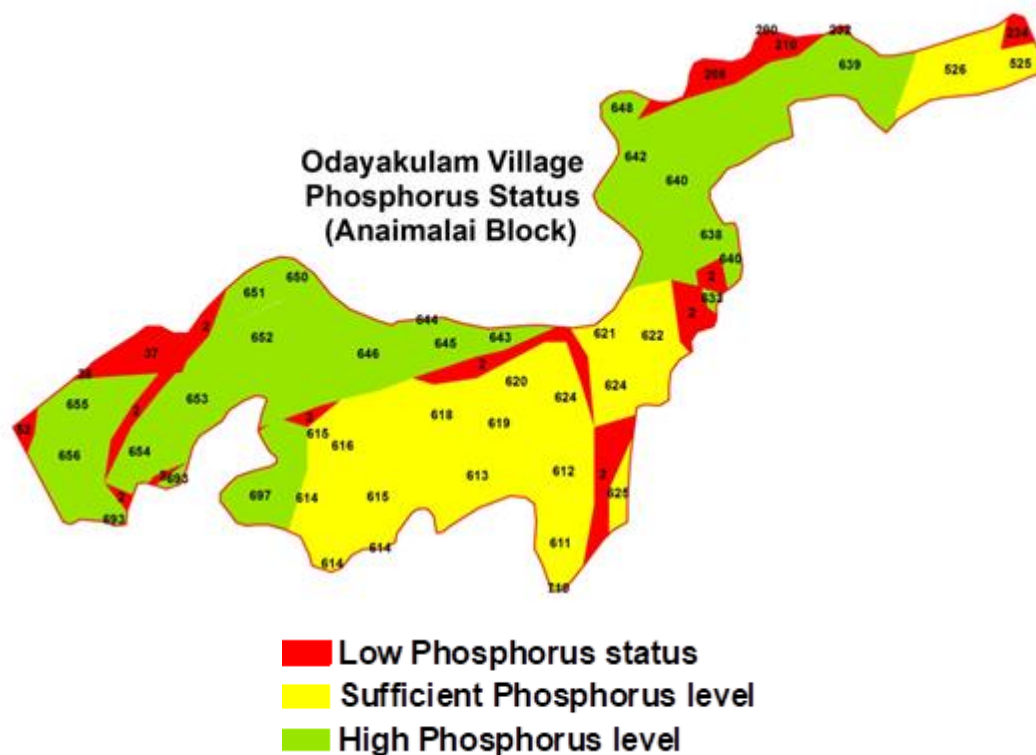


Fig.7. Available Phosphorus map

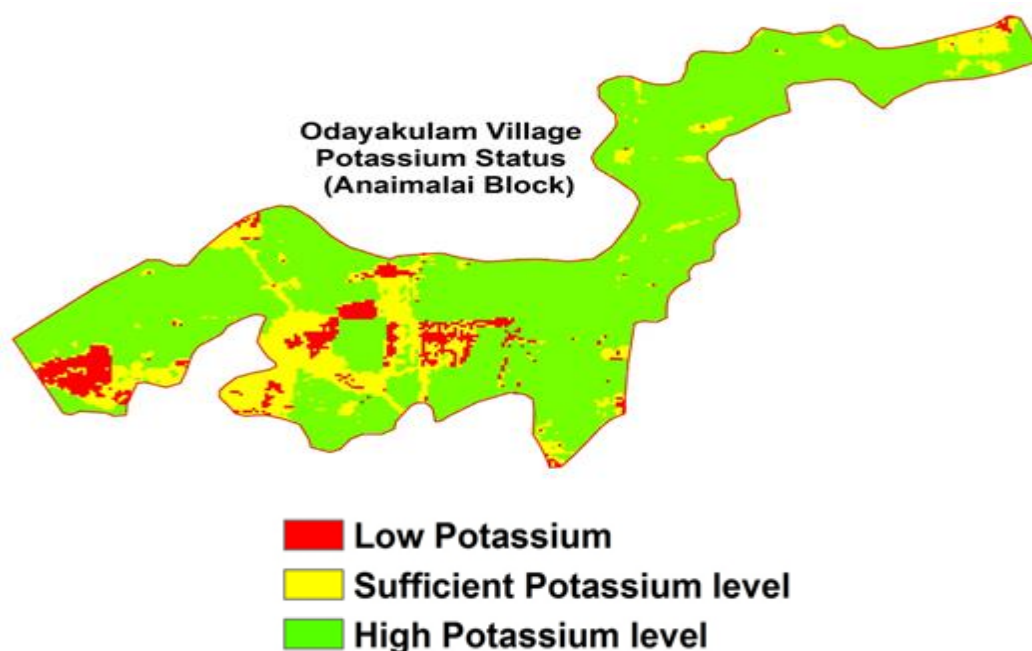


Fig.8. Available Potassium map

#### 4 CONCLUSION

In this study soil nutrient status in unexplored and unsample areas was found. In spite of all modern technology in monitoring the soil health, there is an undiscovered ideology in the theme of periodical and large scale soil nutrient status. Periodical (Time series) soil nutrient database plays a vital role to attain the sustainable agriculture through suitable crop rotation at appropriate time with respect to soil nutrient and ecosystem. In order to achieve the 21st century challenges of food safety and security, there is a great need for measuring the

nutrient status inch by inch of the farm lands so as to follow multiple cropping protocols. Multiple cropping is the only solution to resolve the food security problems, which is a major challenge in future as forecasted by the experts. Inch by inch farm nutrient status for a large scale is feasible only through remote sensing technique. Thus this study fulfills the void research gaps, in respect to time series nutrient measurements and large scale compilation of soil nutrient status. The present study reveals the importance of satellite technology alternates to the manual soil testing in analyzing the soil properties especially NPK. This study gives clear picture about the NPK status of the Anaimalai area from remote sensing technology.

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## AUTO SCALING OF WEB APPLICATION

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### ABSTRACT

*Scalability is the potential for an application to cope with the number of users interacting with it. Eventually, we want it to grow and handle more and more requests. Many cloud computing services innately scale up or down to be more efficient. To function on several servers, an application needs to do two things; direct requests to an appropriate server, and enable that server to process them and provide an appropriate response. This paper presents a food recipe web app that helps users find and view different food recipes based on different sections. The app pursues to run efficiently while having an intuitive simple design that provides the user with all the necessary functionalities. In this paper, we are creating a web application that is flexible and scalable, two essential goals of many modern architecture exercises.*

*Index Terms—Cloud computing, Scalability, Web application, Server, Auto scaling*

### I. INTRODUCTION

Cloud computing is a very effective approach to developing efficient software applications with less cost. Cloud services are provided by service providers and are managed by them. Most of the time service providers fail to offer the best services such as availability, performance, and scalability which are highly in demand by clients these days. Cloud computing mostly refers to on-demand services over the internet. Nowa- days, most web applications are hosted in the multi-tenant- based virtualized cloud environment, scalability becomes a serious and challenging task in this environment. The scalability issues are classified into two types as Horizontal scalability and Vertical Scalability. Horizontal scalability is the process of adding or replicating the virtual instances to handle the traffic or load of a web application. Vertical scalability is the process of increasing the capacity of RAM, memory etc. to handle the load as well as to maintain the performance levels of the application.

#### 1.1. Auto Scaling

Auto-scaling is a way to scale up or down the number of resources that are being allocated to our application based on its needs at any time. Before cloud computing, it was very difficult to scale a website, let alone figure out a way to scale a server setup. In a traditional, committed hosting environment, we are limited by your hardware resources. Once those server resources are maxed out, our website can inevitably suffer from a performance perspective and presumably crash, thereby causing you to lose information and/or potential business. RightScale permits you to line up and assemble the required trigger points, known as alerts and alert escalations, in order that you produce an automatic setup that mechanically reacts to numerous monitored conditions once thresholds are exceeded.

### AUTO-SCALING TECHNIQUES:

#### (i) Application Profiling (AP)

Application profiling is a process of finding the peak point of resource utilization while running an application workload. The workload used for profiling can be existent or synthetic. The test can be both online and offline for application profiling. It is one of the simplest ways to find the desired resources at a different point of time. Profiling of the job through an offline process gives resource requirements at different levels of workload. The produced resources requirements help auto-scaler to monitor the resource provisioning task in a precise manner. We have applied integer linear programming (ILP). They have used the workload profiling technique. The profiling advantage is to reproduce requirements manually after every update in applications. It is further classified into two categories:

- (i) Off-line Application Profiling: This method of profiling is performed in a detailed manner in resource provisioning of tasks at different stages of workload. The advantage of offline profiling is to perform profiling manually after the applications are updated. The different methods of offline application profiling are: (1) Integer Linear Programming (ILP): It is a mathematical optimization problem. all variables are integers. The constraints and objective function is linear. (2) Workload

Profiling Technique (WPT): This technique gathers workload information. The workload modeling performed to estimate the performance under the stressed conditions. The workload profiling is done with various types of testing techniques such as limit finding, soak testing.

(ii) Online Application Profiling: This method of profiling is dynamic in nature and fulfill the needs of the fine grained tasks that immediately require working virtual machines with different workloads. The different techniques of online application profiling are: –Application Signatures (AS): This technique identifies a small set of classes of workload and classifies them according to workloads. The resource allocation of workload is cached at runtime. –Elastic distributed resource scaling (AGILE): In this technique, wavelets are used for fulfilling the resource demand prediction with much longer time for the applications servers to start up before falling short of performance. –Rapid Profiling (RP): In this technique, the individual performance of the virtual machine instance is profiled after it is obtained from the cloud. This technique helps to judge the best tier for the profiled instance of a virtual machine.

#### (ii) Reinforcement learning (RL)

Reinforcement learning is one of three basic machine learning paradigms, alongside supervised learning and unsupervised learning. RL is concerned with how a software agent ought to take actions in an environment to maximize some notion of cumulative reward. In other words, the computational approach where an agent, acting in an environment with uncertainty, learns to associate situations with actions while maximizing a numerical reward signal is considered reinforcement learning. At the beginning, the agent does not know what actions to take, and as time passes, it must discover which actions produce the greatest long-term benefit, trying again and again, different options. Making the most appropriate decision requires taking into account the indirect consequences of the actions, therefore, some kind of foresight or planning is necessary. These two characteristics, trial-and-error search, and delayed reward, are the two most important distinguishing features of RL. Markov decision processes (MDP) provide a formal framework widely used in the context of RL to define the interaction between a learning agent and its environment in terms of states, actions, and rewards. MDPs have become the de facto standard formalism for learning sequential decision making and it has been applied to auto scaling problems in Cloud.

#### (iii) Q-learning

It is the most used algorithm in auto-scaling by extending it with various techniques. The author used the SARSA approach. Some articles did not specify which machine learning approach was used in their research, but problem definition and update function resemble the SARSA. There are many problems in Q-learning and SARSA addressed in various ways as follows: –Initial performance is bad and requires a

large training period. On-line performance is poor before the best solution is found. It requires the exploration of different states and actions. –The curse of dimensionality problems in Q-learning. The number of state variables grows the state exponentially. States are stored in lookup tables. As the table grows, it takes time to search for the possible state from the lookup table. –The environmental condition has a great impact on the performance of the RIL algorithms. As the conditions change and the best optimal solution degrades the performance. RIL needs to design to work with application behavior or environmental conditions.

### 1.2. Overview On Cloud Computing

Cloud computing is a model for sanctionative, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that may be chop-chop provisioned and free with least management effort or service supplier interaction. It's become a major technology trend, and lots of specialists expect that cloud computing can reshape data technology (IT) processes and therefore the IT marketplace. With the cloud computing technology, users use a range of devices, together with PCs, laptops, good phones, and PDAs to access programs, storage, and application-development platforms over the web, via services offered by cloud computing suppliers. Cloud Computing is the term given to the employment of multiple server laptops via a digital network as if they were one computer. The Cloud itself may be a virtualization of resources – networks, servers, applications, information storage, and services – that the top user has on-demand access to. These resources are given the least management or service supplier interaction. Cloud computing offers the top user resources while not the necessity of getting information from the systems that deliver it. To boot, the cloud will give the user a much bigger variety of applications and services. So the cloud permits users and businesses ascendable and tailored services. Cloud Computing brings with it several advantages to the top user. These include:

1. Access to an enormous variety of applications while not having to transfer or install something.



2. Applications are accessed from any laptop, anyplace within the world.
3. Users will avoid expenditure on hardware and software; solely exploiting what they have. Corporations will share re- sources in one place.
4. Consumption is billed as a utility with the least direct prices.
5. Scalability via on-demand resources.

With the assistance of cloud computing, a corporation will save several prices on native knowledge storage, maintenance of data, etc. the knowledge over the cloud may be accessed by anyone, anywhere, and anytime, with the assistance of the in- ternet. Using cloud computing rather than ancient storage helps users with several advantages like speed, cost-effectiveness, security, world access, etc.

## II. LITERATURE SURVEY

Al-Dulaimy.A et al[1] proposed the MULTISCALER ap- proach employs a combination of multi-level scaling systems for SLA provisioning in cloud-based applications. It comprises three levels to allocate resources efficiently for VMs. The sys- tem is designed with three closed-loop controllers as an elastic solution for performing the following tasks independently: reg- ulate resources' shares, scale resources, and migrate VMs from one host to another. The results of the paper show that the three scaling levels included in this approach, which are represented by the three control loops, actually complement each other. Even though each level has its scope and performs specific tasks, reaching the desired metric requires the activation of all levels.

Catillo.M et al[2] proposed methodology which is based on the use of custom benchmarks for the target web application. These benchmarks can be executed offline once and for all and will provide information used to identify the conditions when the application should scale. The method introduced consists of three main phases:

- (i) Application Behavior Profiling
- (ii) Profile Bench-marking
- (iii) Cost Analysis

The main advantage of the proposed approach is that we can focus on simple performance indexes, easy to measurable with minimal overhead, making the technique particularly attractive for simple and cheap systems.

Aslanpour.M.S et al[3] proposed auto-scaling technique: tail latency evaluation. The term tail latency originates from statistics and refers to the distribution and frequency of outliers in distribution (i.e., the values that are far from the mean). Note that in statistics, a tail refers to outliers on both sides of the mean. The efficiency of an auto-scaling mechanism from the viewpoint of mitigating such outliers can be evaluated using tail latency metrics. MAPE-K concept introduced by IBM, which refers to the mechanism acting based on Monitoring, Analyzing, Planning, Executing, and putting the data into a Knowledge-based repository. The tail analysis of seven distinct features of auto-scaling is performed here. Having empirically evaluated, we found that sources of tail latency in auto-scaling web applications include:

- (1) large requests;
- (2) long-term scaling intervals;
- (3) instant analysis of scaling parameters;
- (4) conservative, i.e. tight, threshold tuning;
- (5) load-unaware surplus VM selection policies;
- (6) cooldown time feature;
- (7) VM start-up delay.

These evaluations demonstrated that the cooldown feature, poor threshold tuning, poor scaling interval, and poor surplus VM selection produce more outliers. Overall, poor analysis methods and cooldown features are the most critical sources of tail latency.

Ocone.L et al[4] proposed the methodology which is based on the use of custom benchmarks for the target web applica- tion. These benchmarks can be executed offline once and for all and will provide information used to identify the conditions when the application should scale. The method we propose consists of three main phases sketched in figure

- (i) Application Behavior Profiling
- (ii) Profile Benchmarking
- (iii) Cost Analysis.

As a future development, they have planned to extend the methodology to consider more complex types of workloads, composing different application user profiles.

Aslanpour.M.S et al[5] proposed the “AutoScaleSim” technique, to study auto-scaling mechanisms for web applications in cloud environments. AutoScaleSim answers the scalability and load management issues that are considered lacking in existing simulators. AutoScaleSim also formulates and measures more than twenty low-level and high-level performance metrics (e.g., response time, CPU utilization, and cost) which makes it further easy to evaluate the performance of implemented solutions. The original CloudSim core logic is used to simulate the basic compute elements that compose the cloud infrastructure.

Key findings of this paper include

- Simulations for Web applications in clouds, AutoScaleSim thoroughly models the performance of auto-scaling mechanisms under the test by formulating and measuring a wide range of performance metrics,
- AutoScaleSim provides a customizable, extendible, and scalable simulation environment suitable for future research, and
- AutoScaleSim’s performance is validated through a real-world implementation in an OpenStack cloud environment

Singh.P et.al[6] proposed a methodology involving the auto-scaling challenge for the web applications to dynamically grow or shrink the resources to meet fluctuated workload requirements. Autonomous scaling techniques work without human intervention. Autonomic systems are self-(configuring- optimizing-protecting-healing). The auto-scaling follows the MAPE loop: Monitoring (M), Analysis (A), Planning (P), and Execution (E).

The auto-scaling techniques are classified and taxonomy

is presented based on various characteristics. Furthermore, future research directions have been proposed based on the key challenges.

S.P.T.Devaka et.al[7] proposed a scalable, highly available architecture for e-Governance applications on cloud environments using a server load balancer and failover clustering.

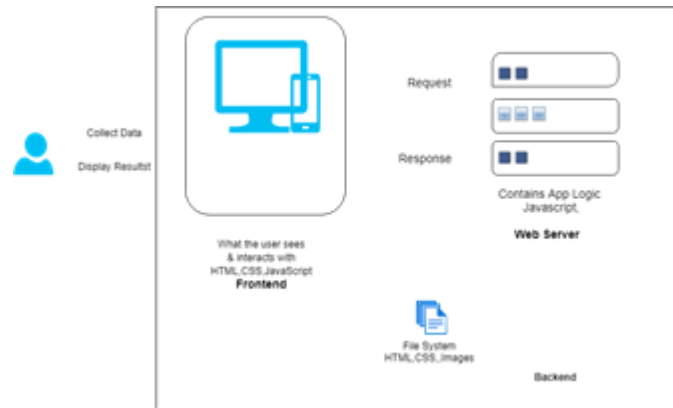
The major key finding in this paper is that the architecture ensures high application service delivery uptime and scalability in case of high application service demand. The architecture uses most of the advantageous features of cloud computing technology.

### III. PROPOSED METHOD

Most Web apps are written in Javascript, HTML, or Cascading Style Sheets (CSS). Client-side programming typically utilizes these languages, which help build an application’s front-end. Server-side programming is done to create the scripts a Web app will use. For a web app to operate, it needs a Web server, application server, and a database. Web servers manage the requests that come from a client, while the application server completes the requested task. A database can be used to store any needed information. The web application provides the users with a variety of recipes to view and add some to their favorite. The web application is made by using HTML, CSS, js, react.

In this paper we have analyzed two different platforms for auto scaling of a web application they are:

- (i) Google App Engine
- (ii) AWS Cloud



**Fig. 1. Architecture diagram of Web Application**

### 3.1 AUTO SCALING USING GOOGLE APP ENGINE

An App Engine app is created from one application resource that consists of 1 or additional services. every service is organized to use completely different—completely different runtimes and to control with different performance settings. among every service, you deploy versions of that service. Every version then runs among one or additional instances, betting on what proportion traffic you organized it to handle.

#### A. Components Of An Application

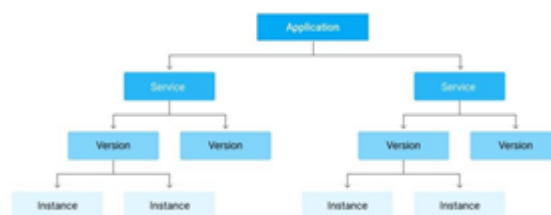
Your App Engine produced is formed beneath your Google Cloud project after you create associate application resource. The App Engine application could be a commanding in- strumentation that features the service, version, and instance resources that conjure your app. after you produce your App Engine app, all of your resources area unit created within the region that you simply select, as well as your app code together with a group of settings, credentials, and your app's data.

Each App Engine application includes a minimum of one service, the default service, which might hold several versions, betting on your app's asking standing. For additional data, see Limits below.

The following diagram illustrates the hierarchy of associate App Engine app running with multiple services. during this diagram, the app has 2 services that contain multiple versions, and 2 of these versions area unit actively running on multiple instances:

Hierarchy graph of associate app's services, versions, and instances

Other Google Cloud services, as an example Datastore, area unit shared across your App Engine app. For additional data, see Structuring internet services.



**Fig. 2. Components of an application**

#### B. Services

Use services in App Engine to issue your massive apps into logical elements which will firmly share App Engine options and communicate with each other. Generally, your App Engine services behave like microservices. Therefore, will be able to run your whole app in a very single service otherwise you can style and deploy multiple services to run as a collection of microservices. For example, associate app that handles your client requests may embody separate services that every handle totally different tasks, such as:

1. API requests from mobile devices
2. Internal, administration-type requests
3. Backend process like asking pipelines and information analysis

Each service in App Engine consists of the ASCII text file from your app and also the corresponding App Engine configuration files. The set of files that you simply deploy to a service represent one version of that

service and every time that you simply deploy thereto service, you're making extra versions among that very same service.

### C. Versions

Having multiple versions of your app among every service permits you to quickly switch between totally different ver- sions of that app for rollbacks, testing, or different temporary events. you'll route traffic to 1 or additional specific versions of your app by migrating or rending traffic.

### D. Instances

The versions among your services run on one or additional instances. By default, App Engine scales your app to match the load. Your apps can rescale the amount of instances that area unit running to produce consistent performance, or scale right down to minimize idle instances and reduces prices. For additional data regarding instances, see however Instances area unit Managed.

### E. Application requests

Each of your app's services and every of the versions among those services should have a singular name. you'll then use those distinctive names to focus on and route traffic to specific resources exploitation URLs.Incoming user requests area unit routed to the services or versions that area unit organized to handle traffic.You'll conjointly target and route requests to specific services and versions. For additional data, see Handling Requests.

### F. Logging application requests

When your application handles an invitation, it also can write its own work messages to stdout and stderr. For details regarding your app's logs, see Writing Application Logs.

### G. Limits

a) T: he maximum number of services and versions that you can deploy on your app's pricing:

Limits	Free App	Paid App
Maximum Services Per App	5	105
Maximum Versions Per App	15	210

There is also a limit to the number of instances for each service with basic or manual scaling:

Maximum instances per manual/basic version of scaling		
Free app	Paid app US	Paid app EU
20	25(200 for US-central)	25

There is also a limit to the number of characters in the URL of your application.

## 3.2 AUTO SCALING USING AWS CLOUD

Designing your API in microservices and adding horizontal scaling might sound just like the best option, unless your net application is already running in Associate in Nursing on- premises atmosphere and you'll got to quickly scale it thanks to surprising massive spikes in net traffic.

### H. Step 1

Ease server load. We'd like to quickly handle spikes in traffic, generated by activity on the diary post, thus let's scale back server load by moving image and video to some third - party content delivery network (CDN). AWS provides Amazon CloudFront as a CDN answer, which is extremely scalable with inherent security to verify origin access identity and handle any DDoS attacks. CloudFront will direct traffic to your on-premises or cloud-hosted server with its eleven3 Points of Presence (102 Edge Locations and 11 Regional Edge Caches) in fifty six cities across twenty four countries, that provides economical caching.

### I. Step 2

Scale back scan load by adding a lot of scan replicas. MySQL provides a pleasant mirror replication for databases. Oracle has its own Oracle plug for replication and AWS RDS give up to 5 scan replicas, which will—which might span across the region and even the Amazon information Amazon Aurora can have fifteen scan replicas with Amazon Aurora auto scaling support. If employment is extremely variable, you must think about Amazon Aurora Serverless information to attain high potency and reduced price. whereas most mirror technologies do asynchronous replication, AWS RDS will give synchronous multi-AZ replication, that is sweet for disaster recovery however not for measurability. Asyn- chronous replication to mirror instance suggests that replica- tion knowledge will typically be stale if network information measure is low, thus you would like to set up and style your application consequently.

It is recommended that you just continually use a scan reproduction for any reportage desires and take a look at to maneuver non-critical GET services to scan reproduction and scale back the load on the master information. During this case, loading comments related to a diary are often fetched from a scan replica—as it will handle some delay—in case there's any issue with asynchronous reflection.

### J. Step 3

Scale back write requests. This could be achieved by introducing a queue to method the asynchronous message. Amazon straightforward Queue Service (Amazon SQS) could be a highly-scalable queue, which may handle any quiet work- message load. you'll method knowledge, like rating associated review; or calculate Deal Quality Score (DQS) mistreatment instruction execution via an SQS queue. If your employment is in AWS, I like to recommend employing a job-observer pattern by fixing motorcar Scaling to mechanically increase or decrease the quantity of batch servers, and mistreat the quantity of SQS messages, with Amazon CloudWatch, because the trigger. For on-premises workloads, you'll use SQS SDK to make an Amazon SQS queue that holds messages till they're processed by your stack. otherwise you will use Amazon SNS to spread out your message process in parallel for various functions like adding a watermark in a picture, generating a fingernail, etc.

### K. Step 4

Introduce a lot of sturdy caching engines. You'll use Amazon ElastiCache for Memcached or Redis to cut back write requests. Memcached and Redis have completely different use cases, so if you'll afford to lose and recover your cache from your information, use Memcached. If you're searching for a lot of sturdy knowledge, persistence and sophisticated systems, use Redis. In AWS, these square measure managed services, which suggests AWS takes care of the employment for you and you'll additionally deploy them in your on-premises instances or use a hybrid approach.

### L. Step 5

Scale your server. If their square measure still has problems, it's time to scale your server. For the best cost-effectiveness and unlimited measurability, It is recommended continually mistreatment horizontal scaling. However, use cases like information vertical scaling could also be an improved alternative till you're sensible with sharding; or use Amazon Aurora Serverless for variable workloads. It'll be knowing to use motorcar Scaling to manage your employment effectively for horizontal scaling. Also, to attain that, you would like to persist in the session. Amazon DynamoDB will handle session persistence across instances.

If your server is on premises, think about making a multisite design, which is able to assist you reach fast measurability PRN and supply a decent disaster recovery answer. you'll choose and select individual services like Amazon Route fifty three, AWS CloudFormation, Amazon SQS, Amazon SNS, Amazon RDS, etc. counting on your desires.

In this design, you'll run your regular employment on premises, and use your AWS employment PRN for measurability and disaster recovery. mistreatment Route fifty three, you'll direct an explicit proportion of users to associate AWS employment.

Your multisite design can seem like the subsequent diagram:

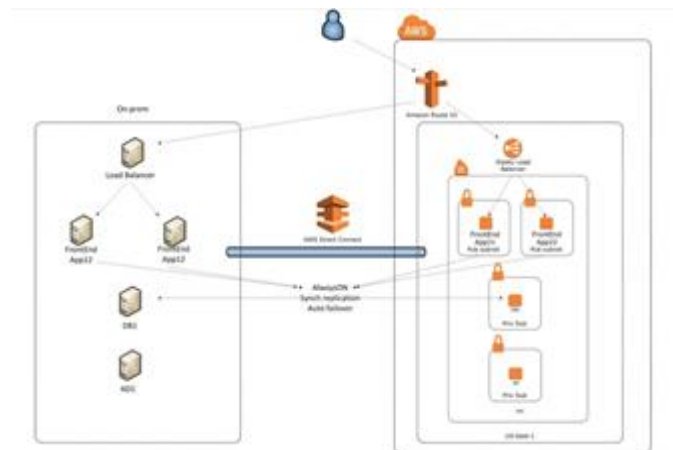
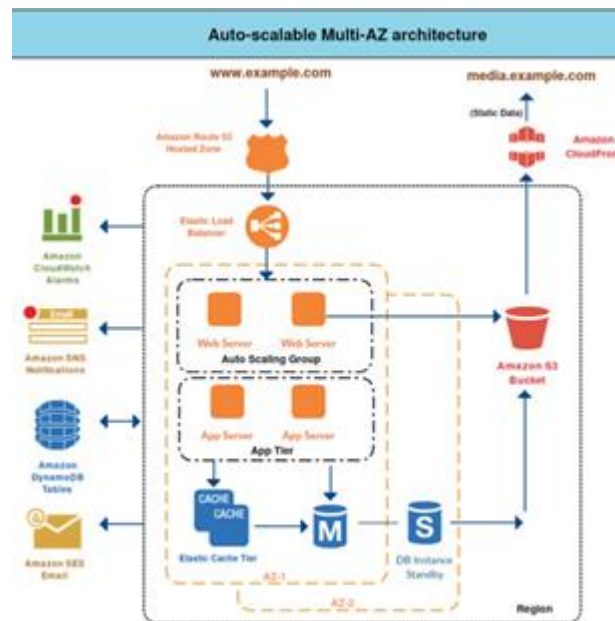


Fig. 3. AWS Architecture

If you opt to maneuver all of your workloads to AWS, the counseled multi-AZ design would seem like the following:



**Fig. 4. Auto-scalable Multi-AZ Architecture**

#### IV. CONCLUSION

Autoscaling is a vital side of contemporary cloud computing deployments. The core plan behind cloud computing is to enable users to solely procure what they need, that is achieved partly with elastic resources – applications and infrastructure which are known as to satisfy demand.

In this paper we explored about auto scaling and analyzed about how to auto scale web applications on two different platforms. We found that in auto scaling there are additional ways to try and do research on several levels. A deeper study on auto scaling approaches to affect totally different scalability problems associated with the cloud ought to be the target of future work.

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**COMPARATIVE ANALYSIS OF OPENSTACK WITH OTHER CLOUD SERVICE PROVIDERS**

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**Abhishek Kumar, Keshav Chatterjee, Anjali Sharma, Basavachetan**

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**ABSTRACT**

*Cloud computing is the on-demand availability of system resources, particularly knowledge storage and computing power, while not direct active management by the user. To meet the services from the cloud there are several cloud service providers like AWS, Open Shift, Microsoft Azure, OpenStack etc. Out of these OpenStack comes free of cost and has a massive community. It is installed and deployed free of cost. OpenStack is taken into account as a far better choice for small and medium businesses. The main purpose of using OpenStack in business is it permits fast innovation and cuts down time-to-market. And OpenStack is the leading open-source solution provider.*

*Keywords: Business, Cloud computing, Innovation, OpenStack.*

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**1. INTRODUCTION**

“Cloud computing” is the on-demand delivery of IT resources over the internet with pay-as-you-go pricing. Rather than owning and maintaining physical centres and servers, you'll access technology services, like computing power, storage, and databases, we can take these services from service providers.

“Cloud computing” is perhaps one of the most emerging technological innovations of the 21st century. This adoption is mainly increasing because the number of smartphones and mobile devices that has access to the internet is increasing rapidly. Cloud computing is used in businesses and organizations also it is also useful for the average person as well. With the use of cloud computing we can run software programs without installing them on our computers and it also enables us to store and access our multimedia content. We can also develop and test programs and so on.

There are four main types of cloud computing: “private cloud, public cloud, hybrid cloud and community cloud”.

A Public cloud is an IT model where on-demand computing services and infrastructure are managed by a third party provider on a pay as you go billing model. Resources are shared between multiple tenants therefore it is economical.

Private cloud provides computing services to a private internal network only selected users can access it instead of the general public. Private cloud gets dedicated infrastructure and is not shared by other tenants. The security and control level is highest in private clouds and the payment model can be different.

In the hybrid model, the main aim to combine these cloud (Public and Private) is to create a unified, automated, and well-managed computing environment. The hybrid model includes the characteristics of public cloud and private cloud and public cloud and it allows sharing of applications and data between them.

A community cloud is a cloud infrastructure that allows the systems and services to be accessed by a group of several organizations to share information. It is owned and managed by one or more organizations in the community, a third party, or a combination of them. The members of the community generally share similar security, privacy, performance and compliance requirements.

**1.1. Cloud Infrastructure:**

The cloud infrastructure can be divided into four main layers: hardware layer, infrastructure layer, platform layer, application layer.

- **Hardware layer:** The hardware layer manages the physical resources of the cloud. These resources include a cooling system, physical servers and physical network equipment.
- **Platform layer:** It provides resources to build applications. The platforms consist of applications frameworks and operating systems.
- **Infrastructure layer:** It is also called the virtualization layer it includes resources of computing and storage.
- **Application layer:** It provides services for an application program to ensure that effective communication with another application program on a network is possible.



- Generally, cloud services can be provided in three ways: Infrastructure as a service (IAAS), Platform as a service (PAAS) and Software as a service (SAAS).
- IAAS: “Infrastructure as a service (IaaS)” is “cloud computing” offering access to computing resources like storage, networking, and servers. Organizations use their own platforms and applications inside a service provider’s infrastructure. These instances are completely controlled by developers who are fully responsible for its operation and manually handle the Scalability process.
- PAAS: “Platform as a service” (PaaS) is a “cloud computing” platform offering a runtime environment. PAAS makes it easy for programmers to create, test, run, and deploy web applications. The tools provided by PAAS are needed for application development. The hardware and software are hosted by the PAAS provider.
- SAAS: “Software as a service” (or SaaS) is a way of delivering applications over the Internet—“as a service SaaS”. Users subscribe to an application rather than purchasing it once and installing it. Users can log into and use a SaaS application from any compatible device over the Internet. The actual application runs in cloud servers rather than user's servers.

**1.2. Cloud service providers:** Some of the most common and leading cloud providers are Google, RackSpace, Amazon, Microsoft Azure, VMware, Apache CloudStack.

- Amazon web service: AWS (Amazon web services) is a comprehensive, evolving cloud computing platform provided by Amazon that features a combination of “infrastructure as a service (IaaS), platform as a service (PaaS), and prepacked code as a service (SaaS) offerings”.
- Microsoft Azure: Microsoft Azure is “Microsoft's public cloud computing platform”. The Azure cloud platform has than 200 products and cloud services. Azure provides a range of cloud services, including compute, analytics, storage and networking. Users can choose the services to develop applications and scale new applications or run existing applications in the public cloud.
- VMware: VMware Cloud let us run, manage, connect and protect all of your apps on any cloud, letting you choose the cloud or clouds that best meet your app and business needs for computing flexibility. It also gives us flexibility to migrate to any cloud, run apps on every major hyperscale cloud, and access hundreds of innovative cloud-native services to drive app modernization.
- Cloud stack: CloudStack is open source cloud computing software system for making, managing, and deploying infrastructure cloud services. It uses existing hypervisor platforms for virtualization, like KVM, VMware vSphere, together with ESXi and vCenter, and XenServer/XCP.
- OpenStack: OpenStack is a free and open cloud computing platform. It is mostly deployed on IaaS in both private as well as public clouds. The software platform consists of different components that control various, multi-vendor hardware arenas of processing, storage, and networking throughout the data centre.
- Main Components of OpenStack:
  - Compute (Nova): Nova is the OpenStack project that provides a way to provision compute instances as virtual machines, real hardware servers (through the use of ironic), and has limited support for system containers.
  - Networking (Neutron): Neutron is an associate OpenStack project to supply “network property as a service” between interface devices managed by different OpenStack services (e.g., nova). It implements the OpenStack Networking API. It manages all networking aspects for the Virtual Networking Infrastructure and also the access layer aspects of the Physical Networking Infrastructure within the OpenStack surroundings.
  - Dashboard (Horizon): Glance is the first component that the user sees in the OpenStack and it provides web-based user interface for some user operations.
  - Object Storage (Swift): Swift is used for retrieving and storing data in the cloud, object storage is used. Swift is used to store images, videos, files, virtual machine backups also unstructured data.

Benefits of open stack:

- Open stack is open source software so it likely charges very little cost and is very useful for the small and medium business.



- It enables rapid innovation
- Cut down time to market: Faster deployment of it resources means end users and business units no longer have to wait for a long time .We can finish the product in a short interval of time or before.
- Compatibility and portability : It supports both private as well as public clouds and it is easy to deploy .
- Security: It supports multiple forms of identification and provides a good level of security.
- Cloud storage : open stack offers unlimited storage pools.It has a unique features that recovers failed resources and nodes.
- Quality control:Its code is always maintained in 6 months of time and regular innovation is going on open stack.

## 2. Comparative analysis of Openstack with others:

### 2.1. OpenStack V/S AWS:

	OpenStack	AWS
Cost model	Public cloud-based pricing models are generally optimized for development workloads that have a lifespan of months  It is suitable for workloads that have choppy demand where IT may need the flexibility to scale up and down resources  The network bandwidth costs for Openstack can add up quickly for high-traffic workloads.	High cost compared to other pricing models  List pricing unless you make a multiyear, prepaid financial commitment (i.e., EDP)  EDP discounting is significantly lower than the discounting on other pricing models.
As a service model	Vendors like Rackspace Hosting have come to market with solutions by deploying private cloud as-a-service, they can deploy their workloads on their premises or at a co-location which will give all of the benefits of a private cloud like data sovereignty, security, control with a public cloud like model. Service offerings include planning, cost monitoring, solution optimization and resource management for the entire product lifecycle.  You can use as many resources you want to, there's no restriction.	One more drawback of using AWS is its limiting of resources by region. So, your region can determine how many resources you can have access to.  Also, as a new user, AWS prevents you from using too many resources and spending a lot of money. which is designed to prevent people with malicious intent from using its resources to launch hack attacks.  The amount of resources used information is limited.
Storage Offered	In Openstack we can buy storage from an vendor or we can use our own storage.  In Openstack it is not necessary to buy the storage provided by Openstack itself. And it also provides complete control over your data.	For using AWS services we should buy storage provided by AWS. You have complete access over data but if there is any outage then the company then there is SLA(Service level agreement).

### 2.2. OpenStack V/S VMware:

	VMware	OpenStack
Licencing	The adoption process starts with a software purchase. Licensing costs apply because vRealize is proprietary-source software. And they are pretty significant. For example, the PLU for vRealize Advanced costs \$6,445. It also uses a per-CPU pricing model. The licencing costs can inflate very quickly if your physical servers have four, eight or more CPUs.	OpenStack is open-source software and is available under the Apache License which means that it can be used free of charge. Vendors must not add any additional licensing costs even if deployed within one of the available distributions. This applies to Charmed OpenStack too.

Hardware and architecture	<p>VMware vRealize is designed to run on special-purpose hardware, such as blade servers and storage arrays. These types of hardware are usually more expensive than regular hardware. All these factors increase the initial costs.</p> <p>The architecture of vRealize is centralized, dedicated hardware has to be purchased to host control, compute/network and storage services, even if those machines would not be fully utilised.</p>	<p>OpenStack, however, is designed to run regular hardware. Also, OpenStack supports a hyper-converged architecture that control, compute, network and storage services are distributed across all nodes in the cluster. As a result, all physical machines in the cluster can be based on the same hardware specification which helps to reduce the cost associated with hardware purchase and ensures optimal utilisation of resources.</p>
Consulting and operations	<p>VMware vCloud Suite is a complete offering – non-modular, get all components or none. ESXi is the only hypervisor. Also, there is no support for customization of components or services as per need.</p> <p>Service layers are tightly integrated which points to a relatively lesser complex. However, this means control of the platform is less.</p>	<p>OpenStack is modular and extensible. It is also possible for mixing and matching components and services, And also allows you to run with a bare minimum composition or choose as many services you need. OpenStack also allows extending the source code.</p>

### 2.3. OpenStack V/S Azure

	Azure	OpenStack
Hardware compatibility	Users should purchase hardware that is certified for the platform if they want to use it to host Azure Stack services on-premises.	<p>OpenStack can be deployed on virtually any type of modern hardware.</p> <p>OpenStack makes it much easier to build a private cloud with the infrastructure you already have.</p>
Cost	Azure Stack charge fees based on the cloud services consumed. Generally, these fees are lower. But they are coupled with all the usual fees that come with the public cloud: Data egress, software licensing costs and so on.	OpenStack is open source so to is free to download and use in its core form. You may pay money if you choose to deploy OpenStack using a commercial distribution.
Architectural models	Azure Stack take public cloud computing services and extend them into on-premises data centers. Thus, using these frameworks, you can run the same services as you would in the public cloud. You can also use the same monitoring and management tools that you would in the public cloud.	OpenStack is not tied to any particular public cloud platform. Instead, it allows users to deploy their own cloud services using OpenStack components and modules.

### 2.4. OpenStack V/S CloudStack

	OpenStack	CloudStack
Industrial Use	OpenStack can be used by small and medium companies as well as big companies. OpenStack is leading in on-demand self-service and network access since it is available to more businesses.	CloudStack is recommended for small cloud service providers or small and medium businesses not for big businesses. CloudStack is not recommended for large businesses.
Community	OpenStack has huge and active community of developers. The community works for releasing new features to OpenStack.	CloudStack has a much smaller community than OpenStack. The number of contributors are less so waiting time increases for the new features before they are ready for production.

Utilization	<p>OpenStack is a more reliable product because there are more than a hundred and fifty firms are all subscribe to OpenStack. Firms like Yahoo, Dell and IBM. OpenStack is still developing and is currently the head in cloud platform control.</p> <p>This gives a competitive edge over CloudStack.</p>	<p>Cloudstack is, in comparison, much simpler. Its distribution is much simpler as compared to OpenStack. It has a single virtual machine (VM) operating the control server and the other VM's acts as the cloud substructure.</p>
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### 3. CONCLUSION

As per the comparison, it is evident that OpenStack is leading in many aspects like Cost, Licencing, Community and many more. There are many providers already providing cloud services and many new cloud service providers are emerging. However, there are many aspects for selecting a cloud service provider. Openstack is the leading provider of open source solutions.

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- [8] <https://www.datacenters.com/news/openstack-vs-cloudstack>

## GREEN COMPUTING SOLUTION FOR ENERGY MINIMIZATION IN DATA CENTERS

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**ABSTRACT**

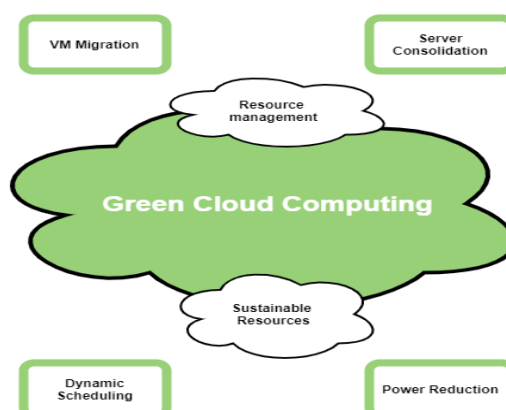
Cloud computing has been a one-stop solution to problems related to storage, data processing, networking, etc. for a recommendable amount of time, now. It has features like pay-as-you-go, on-demand-services and scalability which makes it popular among its users. However, increasing popularity of cloud computing has led to an exponential growth in the number of data centers all around the world, which consumes a huge amount of power which in turn, releases a massive amount of CO<sub>2</sub> in the environment. To overcome these cons, service providers are opting for methods (physical, such as infrastructure) and algorithms that help promote green cloud computing. In this paper, we discuss a few such techniques; namely, VM Migration and Power Reduction. As suggested by the names, these algorithms focus on virtual machine migration techniques to help in reduction of the power being used by data centers. Further, we will also brief about dynamic scheduling of servers and server consolidation techniques which help in allocating servers in a way that is convenient and also utilizes the resources fruitfully, all while keeping the power consumption at low. These approaches to save energy have been said to save 30% more energy as compared to the pre-existing methods.

**Keywords:** Cloud Computing, Dynamic Scheduling, Energy Consumption, Green Cloud Computing, Power Reduction, Server Consolidation, VM Migration.

**I. INTRODUCTION**

Cloud computing is a form of computing where the users can get virtual access to computer resources as per their requirements, without actually purchasing any physical devices for those resources. These resources mainly consist of storage, computing power, servers, etc. Cloud computing is exponentially increasing in popularity and with that, even the number of data centres around the globe are going up to support the cloud infrastructure. This leads to the release of greenhouse gases into the environment through the data centers. Energy consumption has also spiked up due to this rapid expansion of data servers and other infrastructure. Reducing this amount of consumed energy will also reduce the emission of CO<sub>2</sub> and other gases. To support this notion, the concept of green cloud computing is introduced.

As suggested by the name, green cloud computing is an approach towards an eco-friendly cloud computing. The theoretical idea of green cloud computing is to decrease the amount of power used up by the data centers and hence the amount of negative impact that cloud computing has on our environment. The need for green cloud computing is to search for and implement digital ways to save energy and bring down the level of emission of greenhouse gases in the atmosphere. One of many ways in which service providers can cut down power consumption is through thoroughly utilizing the resources present in a data center at their maximum capacity. The researchers<sup>[1]</sup> have provided quite a few software and hardware solutions to overcome the problem of energy efficiency in cloud operation. Some of those solutions are: Virtualization, Server Consolidation, VM Migration and Power Reduction. Virtualization is used to achieve resource isolation and to reduce power consumption by implementing VM Migration and Server Consolidation. This paper suggests the mentioned four types of solutions for making cloud computing green cloud computing that is environment friendly. Fig. 1 represents a few sustainable ways to achieve green cloud computing.

**Fig 1.** Green Cloud Computing and its methods

## II. LITERATURE REVIEW

<sup>[16]</sup> Physical approaches to promote green computing were discussed by the authors of this paper. The methods discussed by them were about NaDa (Nano Data Centers), virtualization, thermal aware management techniques, minimizing the power dissipated by CPU, solar photovoltaic systems, multi-tenancy. The NaDa are managed by an ISP (Internet Service Provider). The computing platforms that are newly developed use ISP which are controlled home gateways to offer computing and storage devices. Virtualization is used to reduce the power consumption in data centers. They also suggested simpler ways to promote Green Cloud Computing which are buying “Energy star” labelled devices, usage of flash drives should be encouraged and Laptops/PCs put in sleep mode when not in use.

<sup>[18]</sup> The rise of cloud computing has raised concerns about energy consumption and hence an energy efficient approach has been developed to save energy and processing time by considering energy as a parameter and altering the size in the montage scientific workflow model. In terms of infrastructure such as storage, local area network (LAN), and virtual machine controller (VMC), the suggested model acquires optimal resource consumption. When a new job is assigned, we must consider its arrival time as well as its total size, which is expressed in bits. Tasks are separated into a number of subtasks depending on the job's complexity, and each subtask is calculated parallelly by the VMs. Tasks are scheduled based on the nature, size, and complexity of workflow jobs to achieve a minimal processing rate based on a temporary reduction in the number of jobs. The suggested approach outperforms existing models in terms of utilization and power consumption. The technique could be utilized for a variety of work sizes and fault-tolerant activities in the future.

<sup>[15]</sup> In this paper, the authors suggest implementing two layers of computing: Cloud Manager Layer (CML) and Green Manager Layer (GML) to achieve an energy-efficient resource allocation without compromising on the quality of service. They have mentioned formulas for achieving this task. The role of CML is to manage a table which has details of all the available cloud data centres, cloud servers and virtual machines. It chooses the resources that are suitable to access a request/execute a task out of all the resources that are available for the same. The GML then chooses the best among the short-listed resources by the CML. This decreases the response-time for a process and therefore the power consumed by each process goes down significantly.

<sup>[17]</sup> Green data center, green cloud energy metrics, thin client for green cloud computing, and e-Waste management in green cloud computing were discussed in this paper. While cloud computing provides users with on-demand resources as services through a pay-as-you model, it also results in alarming Greenhouse gas (GHG) emissions. In this article, several strategies, tactics, and measures for reducing heat and CO2 emissions, as well as recycling systems, were reviewed in order to achieve a sustainable environment. It is not enough to simply use these technologies in order to achieve Green Cloud Computing; users must also use the technologies and resources wisely and with better power management options.

<sup>[4]</sup> Archana Patil and Rekha Patil investigated the concept of cloud computing and the need for developing green clouds in this study. It detailed the green cloud computing architecture and its various parts. With prior research talks, current trends, and future research problems, this study primarily focuses on exploring the significant properties of green cloud computing. The authors of this work have created a concise guide for green cloud research academics to learn about the characteristics of green cloud computing, present trends, and future research difficulties.

## III. VM MIGRATION

VM Migration is when a virtual machine is relocated from one host to another based on a set of criteria. Virtual machine monitors, often known as hypervisors, are the low-level programmes that sit between the hardware and the operating system in virtualization.

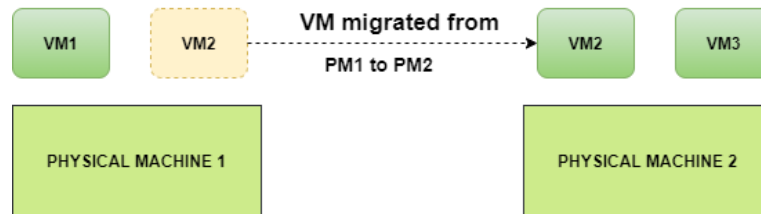
The hypervisor allows users to run several operating systems on a single (PM) Physical Machine at the same time. Because of its structure, where all hardware resources are shared through a network to improve resource usage, virtualization has just become a fresh new trend in computing. In layman words, VM Migration is a method for migrating a VM across hypervisors or physical hosts with the goal of improving system performance.

Live and non-live migration are the two types of communication mechanisms. Live migration allows you to move a running VM from one physical host to another without interrupting service. It means that users will not notice the movement of their VMs between physical hosts while exploiting the system. This approach contributes to the service's continuity and usability. Non-live migration, on the other hand, does not support this feature. To migrate, the VM should be powered down and then restarted once the migration processes are completed. <sup>[3]</sup>

The task of moving a virtual machine from one physical hardware environment to another is known as virtual machine migration. It is part of managing hardware virtualization systems and is one of the few things that suppliers check when providing virtualization services.

Transferal is another term for VM migration.<sup>[5]</sup>

The schematic diagram of VM Migration is as shown below in Fig. 2:



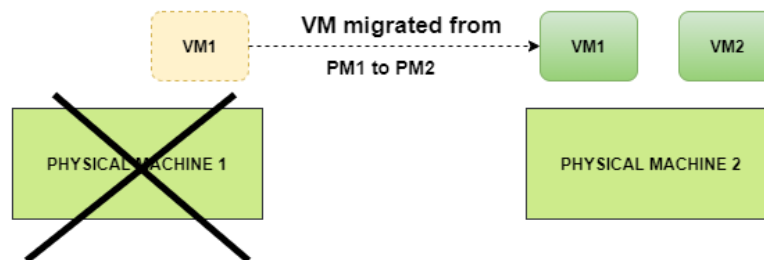
**Figure 2.** Schematic Diagram for VM Migration

Techniques for VM Migration<sup>[2]</sup>

- Based on Energy-efficiency.
- Based on load.
- Based on Faults

Energy-based VM migration: Those Physical machines (PM) are underloaded in this migration technique. VMs from those machines are moved to a different PM.<sup>[2]</sup>

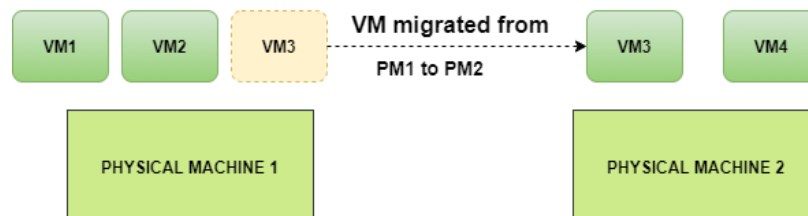
The Schematic diagram of VM migration based on Energy Efficiency is as shown below in Fig.3:



**Figure 3.** Schematic diagram of VM migration based on Energy Efficiency

Load-based VM migration- The workload is distributed among physical machines (PMs) using this method. VMs are migrated from an overloaded PM to an underloaded PM or a PM in the normal category after VM migration.<sup>[2]</sup>

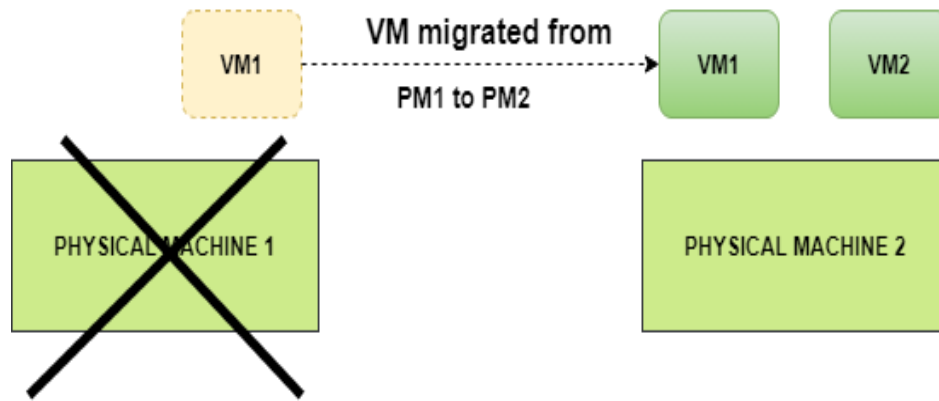
The Schematic diagram of VM migration based on Energy Efficiency is shown below in fig.4:



**Figure 4.** Schematic diagram of VM migration based on Load

Fault-based VM Migration: In this technique whenever any physical machine fails all its VM are migrated to another PM.<sup>[2]</sup>

The Schematic diagram of VM migration based on Energy Efficiency is shown below in fig.5:



**Figure 5.** Schematic diagram of VM migration based on Fault

Virtualization's key benefits include increased resource performance, fewer infrastructure investments, and more efficient resource utilization. Few other accomplishments of virtualisation include high-speed processing, low power consumption, high-end resource utilisation, and cost savings, all of which aid in the construction of green clouds. Dynamic workload balancing with VMs, resource sharing among VMs, safe VM design, and energy optimization approaches for virtualization are the trending activities of green cloud. <sup>[4]</sup>

#### IV. SERVER CONSOLIDATION

In this section, we will talk about what is server consolidation, what are its benefits and how it helps promote green cloud computing. As we already know, data centres are one of the fundamental blocks of cloud computing which consists of hardwares such as servers, storage, networks, etc. Among these, servers are the one to consume the maximum amount of energy, which in turn releases a non-negligible amount of carbon dioxide and other greenhouse gases in the environment. This happens because servers are huge in numbers in a data center, and they keep growing rapidly with demand. <sup>[1]</sup> Hence, to try and reduce the energy consumption by servers, service providers are suggested to opt for server consolidation methods. Server consolidation, as suggested by its name, is a way to efficiently use server resources while combining them to reduce their count. Usually only about 30% of a server's resources are used but through server consolidation, the utilisation can go upto 80% <sup>[6]</sup>.

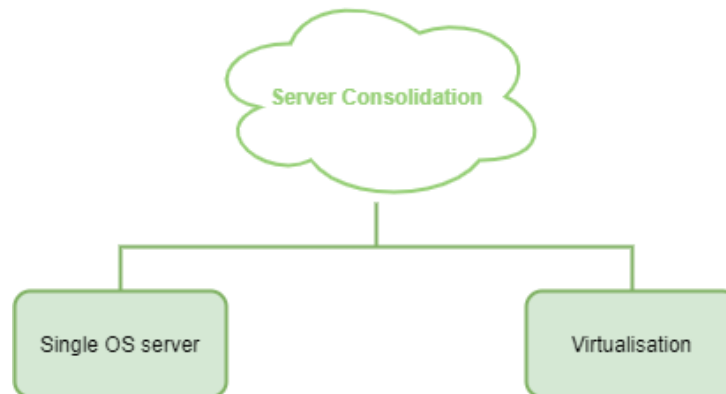
As stated by Archana Patil, Rekha Patil in their paper<sup>[4]</sup>, consolidation is derived from virtualisation and it helps in process-level load balancing along with reducing power consumption. Apart from these, consolidation also had the following benefits <sup>[7]</sup>:

- Expenses on cooling infrastructure are reduced because of reduction in the number of physical servers.
- Since the number of physical servers are less, providers can save a hefty amount of time and money in maintenance of the servers and their warranties and licences.
- Business agility with ability to leverage cloud and shared infrastructure.

In a study done by Posey (2020)<sup>[8]</sup>, he mentions that server consolidation can be achieved by two methods. The first one uses a single OS. In this, the provider can use a single server's operating system to execute more than one workload. Even though this method is said to be easier of the two methods, it has quite a few drawbacks, One is, since all the workload is being executed on a single server, if, say one task is not secure then it can act as an entry point for viruses and can be a opening for malicious activities on the other tasks that are being executed on the same server. The second drawback is that if there is any kind of outage on the main server, it will affect all the concurrent applications on that server which can result in a huge loss for big companies.

Virtualisation is the second method of consolidating servers. Although it is more expensive when compared to the single OS method, it is given more preference among the two methods. Here, a physical server can act as a virtual host and in this case, all the applications run with their own OS in the VM. This overcomes the drawback of security and server failure. Few factors that providers must keep in mind are the capacity of the data centers, architecture of virtualization (VMWare or Hyper-V), backup servers, set-up cost, etc.

A flowchart showing the ways to consolidate servers is depicted in Fig.6:



**Figure 6.** Ways to Consolidate Servers

## V. DYNAMIC SCHEDULING OF SERVERS

The suggested approach is unique since the virtual machines are dynamically selected. As a result, we have employed a hierarchical selection method to select the servers, which then, will select the VMs in a sequential, random, or maximal fairness manner.

### i) Sequential Search algorithm:

In this, the list or array is traversed consecutively and each component is checked. For example: Linear Search.<sup>[12]</sup>

### ii) Random Search algorithm:

A random search formula is a degree formula that employs some degree of randomness or likelihood.<sup>[13]</sup>

### iii) Maximum Fairness algorithm:

The Maximum Fairness algorithm prioritises jobs with the longest execution time first, then those with the shortest execution time.<sup>[19]</sup>

All tiny tasks are allotted to quicker resources and huge tasks are allotted to slower resources.

The dynamic server scheduling can also be implemented by utilising each server to its full potential and by showing how it hierarchically distributes the incoming load to other servers. As a result, servers will not be left on needlessly, resulting in energy savings.

The following is a description of the scheduling algorithm:

Let's imagine a datacenter has five clusters of servers. Servers are categorised and clusters are established based on configurations, speed, processing time, and other parameters.

When a user requests something, the work is assigned to the first cluster's servers. For more efficient resource allocation and utilisation, tasks can also be distributed across the servers of any cluster using a sequential, random, or maximum fairness algorithm.<sup>[10]</sup>

## VI. POWER REDUCTION

Green Cloud Computing primarily aims to scale back the ability usage of the data center, hence options like live virtual machine migration, on-line observance, and optimization of virtual machine placement area unit offered. Going by this design of the cloud, the energy utilization will return down by a whopping 27%.<sup>[9]</sup>

Any machine's power consumption can be classified as static or dynamic, where static power (here on referred as SP) refers to the power consumed when the machine is idle and turned on but not performing any tasks, and dynamic power (here on referred to as DP) refers to the power consumed when the machine is active and the machine is turned on but not performing any tasks, and this power consumption always varies according to the workloads assigned to the machine. As a result, the following equation may be used to calculate the system's net or total energy consumption:

$$\text{Net energy} = \text{SP} + \text{DP} \quad [10]$$

Due to a variety of factors, such as the amount of workload, job scheduling, and the number of instructions required to complete every activity, DP consumption of any given machine cannot be correctly predicted.



According to the authors<sup>[10]</sup>, if the net power exceeds a certain level, the source VM will be live migrated towards the target VM so as to turn off the DP consumption of the targeted VM, resulting in noticeable energy savings.

Their paper<sup>[10]</sup> mentions an algorithm to reduce power, it takes power reading from three watt-meters, first the static power and then net power whilst both the VM and host are idle and active respectively, and then if the net power exceeds the breakdown, live migration from VM to host is performed; then,

$$SP_{(VM)} = SP_{(host)}$$

$$DP_{(VM)} = DP_{(host)} + SP_{(host)}$$

And then the 3rd watt meter reads net power again with the source VM now in sleep mode which leads to the host being in active state; the net power accounts for the sum of the machine's SP and DP usage. If the net power is not greater than the threshold value, then no migration is performed.

Some pre-executed data is needed to predict the state of the servers, since servers with lower workloads than a certain breakdown value must be put into sleep mode or must be shut down to save some energy. The dist function is also mentioned in the paper<sup>[10]</sup>, which is used for calculating the distance between the customer and server. When a customer wants a service, it is handled by the server nearest to them. Some established characteristics, such as transit amount and distance between client and server, would be used to locate the nearest server.<sup>[10]</sup>

After the process is completed, the VM can be relocated from server on source host to target host. This will give us a greater server utilization factor and lesser transfer amount.

## CONCLUSION AND FUTURE WORKS

In general, the growth of cloud computing has resulted in excessive energy consumption in communication, storage and data processing. Because of the large amount of carbon footprints contributed by information centres, the massive energy consumption is unhealthy for the environment. As a result, methods, softwares and algorithms supporting green cloud computing are required for the betterment of the environment. In this paper we have discussed how virtual machine migration can help reduce power consumption. We've also discussed the practise of server consolidation in order to increase computing capability while lowering power and cooling costs. With a view to effectively utilising the information centre resources, we have specified dynamic scheduling of resources that supports 3 searching algos: sequential search, random search, and maximum fairness search. Only techniques for lowering power usage have been considered in this paper. Additionally, there are a number of other hardware-based ways for reducing power consumption. In the future, we'll endeavour to combine cost-effective hardware procedures with planned cooling operations in order to achieve greener cloud data centres.

Future research areas include the design of energy-efficient hardware, programming methods, cluster setup, and energy-aware network protocols. The long-term goal is to reduce cloud provider costs by optimising energy consumption, ensuring supply intervals by evaluating performance parameters and by increasing data volume.

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**GREEN CLOUD COMPUTING: ECO-FRIENDLY TECHNOLOGY**

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**ABSTRACT**

*The investigation of productive and eco-accommodating processing assets otherwise called green registering is in the consideration of numerous natural associations, enterprises, and different organizations. Coordinators have understood that becoming environmentally viable aids them for both great public interest and furthermore diminished expenses. In this paper, we attempt to introduce a few green drives continuous in the PC business and furthermore issues in regards to these drives and comprehension of things to come of green figuring. The total carbon footprint caused by technology is 17% which is due to data centers. Nearly 30 Billion watts of electricity are needed to run these data centers.*

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**I. INTRODUCTION**

The field of "green technology" comprises a vast range of subjects starting from new energy generation techniques and lasting to the study of advanced materials that are used in our daily life. The main focus of green technology is to reduce the environmental impact of industrial processes and innovative technologies which is caused due to the earth's increasing population. The main goal has been set up by it to provide society's needs in ways that do not damage the natural resources, this means to create fully recyclable products, reduce pollution, propose alternative technologies in various fields, and create a center of economic activity around technologies that benefit the environment. The colossal amount of computing that is being manufactured worldwide is having a direct impact on environmental issues. Due to which scientists are conducting various types of studies to reduce the negative impact that computing technology has on our natural resources.

**History of GREEN COMPUTING**

In 1992, a deliberate naming system named Energy Star was dispatched by the U.S National Security which was intended to advance and perceive energy productivity, environment control gear, and different innovations. The program brought about the far and wide reception of rest mode among buyer gadgets. The expression "green registering" likely came to be known solely after the Energy Star Program started. The principal part of green processing came to be thought of somewhere around a couple of years back when the news was that the climate was not a sustainable asset and individuals understood that they needed to do their part to secure the climate. The fundamental thought of green registering is a social obligation, monetary reasonability, and the effect on the climate. The primary thought of green processing is to make PCs from start to finish a green item.

**Chibli Joumaa, Seifedine Kadry****II. LITERATURE REVIEW**

The above-mentioned authors have suggested the use of Thin Client PCs instead of ordinary desktop computers so as to cut down power usage and maximize their efficiency.

They found that a thin client will consume way less energy than a normal desktop computer by a factor of 0.52. So if we assume an organization has 500 computers then the power usage is cut down by 390000 watts.

But there is not much talk about the servers of the organization and their data center as they consume the majority of the power for their maintenance and operation.

**APPASAMI, G; SURESH JOSEPH, K**

The above-mentioned authors have suggested The efficiency of algorithms has an impact on the number of computer resources required for any given computing function and there are many efficiency trade-offs in writing programs. Hence by improving algorithms to be energy efficient we can have our way toward green computing.

Algorithms may be wont to route information to information centers wherever electricity is a smaller amount pricy. Researchers from MIT, Carnegie Philanthropist University, Associate in Nursing. Akamai have tested an energy allocation rule that with success routes traffic to the placement with the most affordable energy prices.. They found that Green Computing not only helps in reducing costs but also helps in saving energy and optimizing resource utilization. And Reducing energy consumption is the key goal of Green Computing.

There is no mention of using green power resources like Solar power/Hydropower. As we know 50% of the US's power comes from non-renewable sources which cause pollution. There is no mention of reducing CO<sub>2</sub> pollution.

### III. BACKGROUND



#### 1. Governments Go Green

Governments around the world have initiated energy management programs such as Energy Star, an international standard for energy-efficient electronic equipment that was created by the United States Environmental Protection Agency in 1992 and has now been adopted by several other countries. Energy Star reduces the amount of energy consumed by a product by automatically switching it into —sleep mode when not in use or reducing the amount of power used by a product when in —standby mode. Surprisingly, standby —leaking, the electricity consumed by appliances when they are switched off, can represent as much as 12 percent of a typical household's electricity consumption. In Australia, standby power is a primary factor for the country's increased greenhouse gas emissions — more than 5 megatons (CO<sub>2</sub> equivalent) annually.

#### 2. An example of a Taiwanese Organization supporting Green Computing

Using Advancements, a Taiwanese organization that makes motherboard chipsets, central processors, and other PC equipment, presented its drive for "green registering" in 2001. With this green vision, the organization has been zeroing in on power proficiency all through the plan and assembling interaction of its items. It is harmless to the ecosystem items are fabricated utilizing a scope of

clean computing techniques, and the organization is endeavoring to instruct markets on the advantages of green figuring for the climate, just as efficiency and generally speaking client experience.

# CARBON FREE COMPUTING

#### 2.1. Carbon-free computing

One of the Employing Innovations' thoughts is to diminish the "carbon impression" of clients — the measure of ozone harming substances created, estimated in units of carbon dioxide (CO<sub>2</sub>). Ozone harming substances normally cover the Earth and are answerable for its pretty much stable temperature. An increment in the grouping of the real ozone-depleting substances — carbon dioxide, methane, nitrous oxide, and fluorocarbons — is accepted to be liable for Earth's expanding temperature, which could prompt serious floods and dry seasons, rising ocean levels, and other natural impacts, influencing both life and the world's economy. After the 1997 Kyoto Convention for the Unified Countries Structure Show on Environmental Change, the world has at last ventured out in diminishing discharges. The emanations are basically an aftereffect of petroleum product consuming force plants. (In the US, such power age is liable for 38% of the country's carbon dioxide emanations.) Through intends to offer the world's first PC items affirmed carbon-free, assuming liability for the measures of CO<sub>2</sub> they produce. The organization works with ecological specialists to compute the power utilized by the gadget over its lifetime, by and large, three years. From this information, one can finish up how much carbondioxide the gadget will discharge into the environment during its activity. This gauge will fill in as a marker, and the organization will pay provincial associations for the sequestering, or counterbalancing, of the emanations. Balancing carbon dioxide can be accomplished in various ways. One way is to establish trees that ingest CO<sub>2</sub> as they develop, in the area where the processors were bought. The vital measure of trees per

processor is addressed Using the tree Mark rating framework. Through advances in the utilization of such elective energy sources as sunlight-based force, so power plants wouldn't have to consume as much petroleum products, decreasing the measure of energy utilized. Wetlands additionally offer extraordinary assistance in sequestering a portion of the carbon dioxide transmitted into the climate. In spite of the fact that they make up simply 4 to 6 percent of the World's landmass, wetlands are equipped for retaining 20 to 25 percent of the climatic carbon dioxide. Utilizing is working intimately with associations liable for protecting wetlands and other normal environments, and other people who support broad reusing programs for ICT gear. The sum paid to these associations will be addressed by the extent of the carbon-free item's cost. Fossil fuel byproducts control has been a central point of contention for some organizations that have communicated a solid obligation to supportability. Dell is a genuine illustration of an organization with a green picture, known for its free overall item reusing program. Dell's Plant a Tree for Me project permits clients to balance their fossil fuel byproducts by paying an additional \$2 to \$4, contingent upon the item bought. AMD, a worldwide microchip producer, is likewise pursuing diminishing energy utilization in its items, scaling back risky waste, and lessening its eco swap. The organization's utilization of silicon-on-encasing (SOI) innovation in its assembling, and stressed silicon covering films on semiconductors (known as dual stress liner innovation), have added to decreased force utilization in its items.

## 2.2. Solar Computing

During the global race toward elective energy sources, Using is focusing on the sun, and the organization's Sun-oriented Registering drive is a critical piece of its green-processing projects. For that reason, Through banded together with Motech Businesses, perhaps the biggest maker of sun-based cells around the world. Sun-oriented cells fit Through's force effective silicon, stage, and framework innovations and empower the organization to foster completely sun-based controlled gadgets that are non contaminating, quiet, and exceptionally dependable. Sun-based cells require almost no support all through their lifetime, and when introductory establishment costs are covered, they give energy at for all intents and purposes no expense. Overall creation of sun-based cells has expanded quickly in the course of the most recent couple of years; and as more legislatures perceive the advantages of sun-oriented force, and the advancement of photovoltaic innovations continues, costs are relied upon to keep on declining. As a feature of Through's —pc-11 drive, the organization set up the very first sun-oriented fueled digital public venue in the South Pacific, controlled totally by sunlight-based innovation.

## 2.3. Quiet Computing

A central target of Utilizing a green-handling drive is the improvement of energy-useful stages for low-power, little design factor (SFF) figuring contraptions. In 2005, the association introduced the Through C7-M and Utilizing C7 processors that have the best force use of 20W at 2.0GHz and ordinary force use of 1W. These energy-successful processors produce less carbon during their movement and can be beneficially introduced in daylight-based controlled devices. However it isn't the primary association to address normal concerns: Intel, the world's greatest semiconductor maker, uncovered eco-obliging things at another get-together in London. The association uses virtualization programming, a strategy that enables Intel to merge a couple of genuine structures into a virtual machine that abrupt spikes sought after for a singular, astounding base system, along these lines basically diminishing force usage.

Recently, Intel joined Google, Microsoft, and different organizations in the dispatch of the Environment Savers Processing Drive that submits organizations to meet the Ecological Insurance Office's Energy Star rules for energy-effective gadgets. Kevin Fisher, Intel's EU principles chief, says that while the organization is committed to its green-processing plans, it's not the fault of the IT business alone for fossil fuel byproducts around the world. He contends that the business likewise helps in saving colossal measures of power because of the Web, empowering, for instance, internet shopping and charging. Around the world, reserve power is assessed to represent as much as 1% of worldwide nursery outflows. The vast majority of the energy utilized side effects on reserve don't result in any valuable capacity. A limited quantity can be required for keeping up with memory or an inner clock, controller initiation, or different components; however, most reserve power is squandered energy. Energy Star-empowered items limit this waste.

For a Cleaner World

## IV. STEPS TO GREEN COMPUTING

### 1. Obtain a sustainable green computing plan:-

The components that ought to be pointed into such an arrangement, including hierarchical strategies and agendas by the business chiefs. The arrangement ought to incorporate reusing strategies, proposals for the removal of utilized hardware, government rules, and suggestions for buying green PC gear. The best arrangements and practices of green figuring ought to incorporate force utilization, a decrease of paper utilization just as suggestions for new hardware, and reusing old machines. The arrangements of the association ought to incorporate correspondence and execution.

## 2. Recycle:-

The unwanted and used electronic equipment need to be discarded in a convenient and environment-friendly manner as electronic equipment have toxin metals and pollutants that can emit harmful emissions into the environment. The computers first need to be sent to recycling centers to store the still-working parts of it. The computers shouldn't be discarded in a landfill. Recycling of electronic equipment is very essential to control pollution.

## 3. Make environmentally sound purchased decisions:-

The Green Electronics Council is procured by Electronic Product Environmental Assessment Tool to:-

- 1) Assist institutional purchasers to solve, collate, and select desktop computers, notebooks, and monitors based on environmental attributes.
- 2) Furnish a clear, compatible set of performance standards for the pattern of products.
- 3) Acknowledge manufacturer efforts to endeavor the environmental influence of products by reducing or eliminating environmentally delicate materials, conspiring for longevity, and reducing packaging materials.

## 4. Reduce Paper Consumption:-

The consumption of paper can be reduced by email, electronic archiving, and many more. Printing up documents needs to be wisely carried out to reduce the consumption of paper. A few things to be considered during printing include using both sides of the paper, recycling regularly, using smaller fonts and margins, and selectively printing required pages.

## 5. Conserve Energy:-

The basic ways to consume energy include turning off the computer when it's not in use.

- **Sustaining the Future** “The greatest challenges for businesses trying to be eco-responsible are really understanding what that really means, then making changes that are sustainable over time, while adding business value.” “Another challenge is balancing the needs of various stakeholders who each have different ideas of what changes should be made.”
- A few ecological non-legislative associations might want specific fire retardants eliminated from electronic items, while the local area fire security is worried about discarding or changing fire retardants in gadgets. One solution is to simply substitute material that has a lower ecological impact than the first material but the first materials are not always evaluated.

## V. CONCLUSION

According to the research done, we can conclude that Green Cloud Computing is still encountering challenges of security and the requisite for connectivity. Green Cloud Computing is a capable method of resolving the issue of a dangerous atmospheric deviation. By embracing such practices numerous organizations can contribute towards ecological administration, securing it, and furthermore diminishing energy costs. By the above-mentioned steps of Green Cloud Computing, we can obtain an optimized environmental impact, opposing the changes and cultural behavior.

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**CHALLENGES, ATTACKS AND SECURITY ISSUES IN MANET (MOBILE AD HOC NETWORKS)**

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**ABSTRACT**

*In present scenario, there is no need to have an optional security solution in any kind of organizations and for individuals. There are a number of generic security tools for an organization as well as for an individual user which provides security in different aspects. Some of the security tools are Anti-Spam, Anti-Virus, etc. This leads to the network security as an essential issue in MANET with respect to size and complexity of the network. In this research work, different aspects of security in MANET are studied such as the problems related to security between multi-hop networks and mobile nodes in MANET, multi-layer intrusion detection technique in multi-hop networks in MANET. A comparative study between different routing protocols is also carried out in the research work.*

*Keywords MANET, Security, tapping, intruder*

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**INTRODUCTION**

Mobile ad hoc network is widely used and implemented due to its self- maintenance and self-configuring nature. This was the reason that at the early stage, different problems came into existence as people took it as a very friendly and cooperative environment. For establishing and communication between different nodes in mobile ad hoc networks, security plays an important role and it needs to be addressed. Due to this reason, security in mobile ad hoc networks in an active research topic nowadays. Some of the challenges in MANET are as follows:

- Open network architecture
- Shared wireless medium
- Stringent resource constraints
- Highly dynamic network topology

In the wired networks, security is an active research topic form past few years, but due to the self-organizing behavior of the mobile ad hoc networks, there are a number of challenges faced with respect to security. Some of which are highly dynamic network topology, shared wireless medium, open network architecture and stringent resource constraints. It is also known to us that the solutions to the security related problems in wired networks can't directly be applied in case of wireless, mobile ad hoc networks.

MANET comprises of different challenges apart from the wired networks in regards of security issues. Some the challenges are stated below:

1. Due to the active eavesdropping and passive interfering, the wireless networks are prone to the attacks.
2. Deployment of security mechanisms and implementation of the security protocols are very difficult due to lack of trusted third party adds.
3. The mobile device in MANET has limited power consumption and computation capability which is not vulnerable to DoS attacks. This makes it incapable to run the security algorithms which is very heavy and needs high computations.
4. In case of MANET, there are chances for nodes to be compromised and get attacked on networks. So to have more secure system, we need to secure the system from both insider and outside attacks in MANET. In this insider attacks are more difficult to deal with.
5. In the case of node mobility mechanism, the nodes are free and reconfigure itself very frequently. This results in more chances for attacks. This also results in stale routing and faked routing information.

**AIMS AND OBJECTIVES**

The key features of MANET states that it is a multi-hop, infrastructure less network having the property of self-organizing of the nodes. Due to these features and nature of MANET, there is a great challenge in security designing of the system. In the last few years, most of the research area focuses on the security problems in MANET and their solutions. Some of the security areas include routing protocols security, establishing trusted infrastructure, intrusion detection, etc.

One of the main characteristics of Mobile ad hoc networks related to security is the lack of clear line defense as in MANET there is no any dedicated network protocol and routers, each nodes in MANET acts as a receiver and sender. Each node gets the packets and forwards it to other nodes. This is the reason which states that the wireless channel is easily accessible to both the users as well as attackers. There is no well-defined rule or node where monitoring and enforcing of network traffic and access control can be done. This results in lack of any defense line between inside network and outside network. Due to this, any attacker can become a router and disrupts and distorts the network operations.

There are three security services for MANETs:

1. Authentication: In this the correct identity must be known to the communicating authority.
2. Confidentiality: In this the message information is kept secure from any unauthorized access.
3. Integrity: In this the message is unaltered during the communication between two parties.

Among these three security services, authentication is the most important and complex issue to be addressed. This is because authentication acts as a bootstrap of the entire security system. After the authentication is done, confidentiality is maintained by the use of encrypting algorithm on the sessions with the help of keys.

In this paper, I will focus on the fundamental security problems of the MANET connectivity between different nodes existing in different networks. Also the working of client server architecture with respect to information security will be discussed. In the paper, I will also discuss about the different security aspects in MANET such as multi-layer intrusion detection techniques and security problems on multi-hop networks.

## BACKGROUND

There are a certain goals in terms of security services which need to be fulfilled to enforce security like confidentiality, integrity, authentication (CIA). To achieve security goal, it should provide complete protection to the entire protocol stack. Below is the table which shows security issues in each layer:

Sl. No.	Layer	Security Issues
1	Application Layer	In this layer we should prevent viruses, application abuses, worms, as well as malicious nodes.
2	Transport Layer	It provide authentication and provide secure end-to-end communications through data encryption between two nodes.
3	Network Layer	This layer deals with the protection of routing as well as forwarding protocols.
4	Link Layer	In this layer we mainly concern with the protection of wireless MAC protocol and also provide link-layer security.
5	Physical Layer	In this layer we should prevent signal jamming as well as denial-of-service attacks.

**Table: The security solution for MANET's with respect to different protocol.**

The one of the basic step to support network security services is to protect the network connectivity between the mobile nodes and then provide potentially multi-hop wireless channels. In MANET, connection between two nodes is established in multi-hop fashion by the following two steps:

1. It ensures one-hop connection through link-layer protocols like wireless medium access control (MAC).
2. Through network layer it will extend connection between multiple hops and provide routing and data forwarding protocols.

## CHALLENGES

The open peer-to-peer architecture of MANET is most difficult to handle as there is no dedicated routers, each node acts as a router and forwards packets/data from one node to another. Also there is no boundary of wireless channel in mobile ad hoc networks; the messages can be accessed to both the network users and the attackers. This results in blurring of boundary which separates inside network and outside networks. This states that to deploy any security solutions over a mobile ad hoc network, there is no well-defined infrastructure.



In MANET, networks are vulnerable and can be physically captured w.r.t. security aspects, especially at the end of low-end devices due to weak protection. Attackers and intruders get attracted towards the network and attacks weakest link by incurring a domino effect of security in the network. The computation capability of a node is also a concerning reason because it has a very limited energy resource due to this, most of the mobile nodes/ devices are powered with batteries.

In wireless medium, as compared to wired line networks, the node mobility is more dynamic due to the easy and free movement in the network. In this, the nodes can join or leave the network very frequently by their own. There exist multiple interferences in the mobile ad hoc networks and wireless networks which exhibits volatile characteristics in terms of bandwidth and delay. This is the reason due to which security services are requested by the mobile users at anytime and anywhere during their movement in the network.

Some of the characteristics of security solutions of MANETs are given below which will provide multi-fence security solutions to the networks and provide desirable performance.

1. Security solutions should be implemented across the individual components to provide collective protection in securing the entire network. Some of the capabilities (energy supply, memory, communication capacity, etc.) should be considered in the case of computation.
2. Security solution should provide security in different layers of protocol in MANET. Also each layer has to provide line of defense. It is not accepted that solution in one single layer will handle all the potential attacks.
3. Security solutions should also avoid threats and attacks from both the outsider and insiders. In case of outside attacks, the security solutions should avoid the attacks on the wireless channel and the network topology. And in case of inside attacks, it should avoid the intruders who enter into the networks through any compromised devices and gain access to different networks and nodes.
4. Security solutions should take care of all the three components of security (prevention, detection and reaction).
5. Security solutions should be affordable and practical with respect to resource constrained in highly dynamic networking scenario.

## **MANET ATTACKS & SECURITY**

### **Security**

In recent years, the ad hoc networks especially MANETs not only showed widespread use in commercial and domestic application areas but also become a major topic to be focused in the field of research. Its application is both in simple wireless home and office networking, sensor networks and in some complex tactical networking environments. Here comes the main aspect of security which plays an important role in wireless networking in radio communication which takes place in man-in-the-middle and data injection attacks.

### **Protecting Mobile ad-hoc network**

The ad hoc routing protocol is a convention and standard that controls and states how the nodes decide which way to route the packets between computing devices. In ad hoc networks, nodes do not follow any topology; instead, they have to discover it. The process is that a new node can announce its presence and should wait for any announcements broadcasted by its neighbors. Each node looks for the neighboring nodes and finds out how to reach them.

#### **A. Reactive Approach**

Reactive approach seeks for any security threats; it detects the threats and reacts accordingly. In this type of protocols, fresh list of destinations and their routes are maintained by distributing the routing tables throughout the networks at a certain interval of time. Following are the major disadvantages of such types of algorithms:

1. Respective amount of data for maintenance is needed.
2. Slow reaction on restructuring and failures is seen.

The two main disadvantages of reactive routing protocol are that the nodes do not take initiative in order to take the best route in the network. And the second is that whenever it creates any route, it will develop on demand by the flooding mechanism. There are some advantages and disadvantages in these routing protocols:

- In case of route detection and finding, it uses bandwidth.
- Due to the flooding process there is a lot of overhead.

➤ There is a delay in the network during the starting of the communication.

Below are the given steps which will explain the procedure of the reactive routing protocols:

1. In case of two nodes having at position A and position B, which node wants to communicate?
2. For communicating with the node at position B, A has to flood the route towards position B.
3. For creating communication between nodes at position A and B, a unicast feedback has to be considered.

### **B. Proactive Approach**

Proactive approach prevents an attacker from launching any attack through various cryptographic techniques. It also maintains fresh list of destinations and the routes by circulating the routing table throughout the network. Following are the disadvantages of proactive algorithms:

1. Respective amount of data for maintenance.
2. Slow reaction on restructuring and failures.

The proactive routing protocol is purely different from the reactive routing protocol. In proactive protocols, the route is depended on the continuous traffic control. The routing information is stored, updated and maintained at any time because the network is dynamic and it changes frequently. There are two basic things which are to be kept in mind, the first one is that there is a lot of overhead in network due to the continuous traffic control mechanism. In proactive protocol, routes are available at each point of time due to this, the communication between the nodes and devices become very easy. Below are the three steps which are required in the proactive routing protocols:

1. Link/ Neighbor Sensing
2. Multipoint Relaying
3. Link State messaging and route calculation

### **Attacks**

There are mainly two protocols which are used in MANET networks. First, Link layer protocol which is used to establish connectivity between the mobile nodes to ensure one-hop connectivity by using multi-hop wireless channels. If we want to enhance the connectivity to multi-hop channel, then MANET network uses the network layer protocols.

In this coordination process, the distributed protocols and nodes assumes that the neighboring nodes are cooperating with each other with respect to communication. But in case of hostile mobile networks, it is not possible as the cooperation between the nodes in not implemented in MANET. This is because of the malicious attackers who are violating protocol specification in order to disrupt the normal flow of network operation.

### **Network Layer operation**

The two main network-layer operations in MANET are:

1. Ad hoc Routing
2. Data Packet Forwarding

The above operation interacts with each other while delivering the packets from source to destination. It also exchanges routing messages between the neighboring nodes to maintain the information details about the routing at each node. In data packet forwarding, the data packets are used to forward the data to the intermediate next nodes for forming a route to the destination node. These two operations leads to various malicious attacks resulting on malfunction in the network layer.

### **Network Layer Attack**

According to the above network layer operation, the network layer is categorized into two attacks:

1. Routing attacks
2. Packet forwarding attacks( based on the target operation of the attacks)

There are different categories of routing attacks which do not follow routing protocol specification. Due to this there are different attacks related to different routing protocols in MANET. Some of them are classified as follows:

1. In case of DSR routing protocol, following are the attacks which are commonly known:

- An attacker modifies source routing list with respect to RREQ or RREP packets.
  - Switching order of different nodes in the routing list.
  - Deleting entries from the list.
  - Appending new node entries into the list.
2. In case of AODV routing protocol, following are the attacks which are commonly know:
    - An attacker advertise route with wrong distance metric with respect to actual distance to the destination.
    - Advertise wrong routing updates with a large sequence number with respect to actual sequence number.
    - An attacker invalidates all routing updates from other nodes.
  3. In case of TORA routing protocol, following are the attacks which are commonly known:
    - Attackers construct routing paths by interfering with the protocols' mechanisms, e.g. routes can be forced to use attacking nodes to go through them.
    - Attackers can also exhaust network resources by maliciously act of injecting, modifying and dropping data packets.

### Active Attacks

Active attacks are difficult to locate and identify because these attacks are more sophisticated and they are considered as subtle routing attacks. Some of the active attacks are mentioned below:

- Attackers may further subvert existing nodes in the network.
- Attackers can also fabricate their identity
- Attackers can also impersonate other legitimate node
- Attackers in pair nodes may create a wormhole
- Attackers also creates shortcut in normal flows between each other
- Attackers targets the route maintenance process and advertise operational link is broken

There are some other types of attacks with respect to the context of routing such as attacker launches attacks against packet forwarding operations. Due to this, it will not only degrade and disrupt the routing protocol, it will also affect the routing states at each nodes. Just take an example of attacker who establishes the route, drop any packets in middle, modify the contents of the packets or duplicates the packet.

Denial of Service (DoS) is an another type of packet forwarding attack which uses network layer packet blasting. In DoS attacks, attacker inserts large amount of junk packets in the network. This results in wastage of network resource and increases wireless channel contention and network congestion in the network.

There are multiple identified vulnerabilities in the link-layer protocols, especially in the IEEE standard 802.11 MAC protocols, for mobile ad hoc network. 802.11 WEP is vulnerable to different types of cryptography attacks. It is due to the misusing of cryptographic primitives. The IEEE 802.11 protocol is also vulnerable to many DoS attacks. It results in targeting reservation schemes and channel contention. For denying access to the wireless channels in the networks, the attacker exploits binary exponential back off schemes.

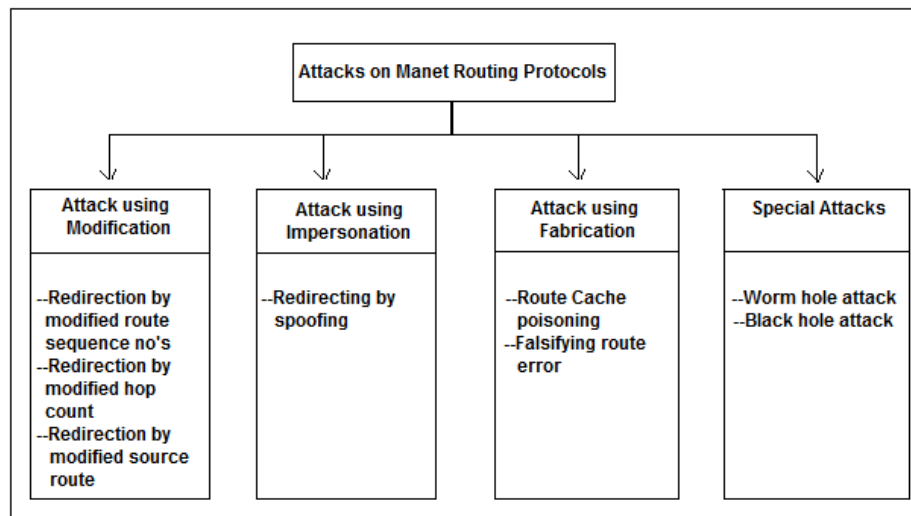
### Routing Attacks

There are four different types of MANET routing protocol attacks. These are further divided into two main types:

1. Routing disruption attacks
2. Resource consumption attacks

For routing disruption attacks, attacker focuses on the disruption of the process by routing protocols to introduce wrong paths. And for resource consumption attacks, attacker focuses on introducing some non-cooperative and selfish nodes which are there to inject false packets in the communication. This results in increase in the load of the network and subsequently it results in consumption of network bandwidth.

These two attacks in MANET are the best examples of Denial of Service attacks. Below is the classification of attacks in MANET routing protocols.



**Figure: Classification of attacks on MANET routing protocols**

### 1. Attacks using Modification

Modification type of attacks is the attacks in which some of the messages are modified in the protocol fields. After that the messages are passed to different nodes. This results in traffic subversion and traffic redirection which in terms results to Denial of Service (DoS) attacks. Some of the attacks are mentioned below:

#### a. Route sequence numbers modification

These attacks are categorized under the AODV protocols. In route sequence number modification attacks, the attacker modifies the sequence number in the route request packets.

#### b. Hop count modification attack

These attacks are also categorized under AODV protocols. As the name suggests, in this type of attacks, the hop count values is changes by the attackers resulting in traffic attract. This forces the system to use a new route so that the hop count value will get reset to some lower value or simply be set to zero.

#### c. Source route modification attack

These types of attacks are categorized under DSR routing protocol. In this type of attacks, the attacker modifies the source address and redirects the traffic towards its own destination.

### 2. Attacks using Impersonation

This type of attack results in violation of authenticity and confidentiality of the network. The attacker is responsible for the same. The attackers impersonate the address of other user node to change the network topology.

### 3. Attacks using Fabrication

Here injection of wrong and fake messages is done in the routing packets to disrupt the routing procedure. Here the attackers are also known as malicious node. It's very difficult to detect these types of fabrication attacks in the mobile ad hoc networks.

### 4. Special Attacks

Some severe attacks in MANET network which are possible against routing protocols such as AODV and DSR.

#### a. Wormhole Attack

Wormhole attack is a very popular type of attack in ad hoc networks. In this type of attacks, more than two malicious nodes are present and the movement of data packets from one end of one node to other end of the other nodes is tunneled using the method of broadcasting.

#### b. Black hole attack

When all the messages which are supposed to be forwarded are deleted by the router, then this type of attack is known as Black Hole attacks. From time to time, nodes advertise a zero metric to all the destinations, which means that the routers are misconfigured to offer a zero-cost route to each and every destination across the

internet. This results in overloading of traffic as all the messages are sent to the channel. Since, there is no device which can sustain the load; the router fails at this point of time.

### Security steps to avoid Attacks in MANET

#### 1. Secure Multicasting

Multicast is a mechanism where any user become the part of multicast group and even send traffic to the multicast users as well as receive traffic, but due to this procedure it can easily fall into denial of service attacks (DoS). There is an architecture usually used to secure multicast traffic that is DIPLOMA. DIPLOMA stands for Distributed Policy Enforcement Architecture which is use to protect or secure end user services as well as network bandwidth. Audio and video traffic usually fall into the category of multicast traffic which is usually use by militaries as well as disaster backup plans (teams). There are some of the major responsibilities of DIPLOMA architecture which are given below.

- It gives solution for both sender and receiver whenever they access to the multicast group.
- It also used to limit the bandwidth.
- DIPLOMA integrates with common multicasting routing protocols like PIM-SM and ODMRP.
- It also uses to provide (allocate) network resources in a fair manner during attacks.

#### 2. Secure routing

MANET is a self-organized wireless network, due to the fact it has vulnerable attacks that can easily damage the whole network; that's why there should be some solutions which works even some of the mobile nodes compromised in the network. One of the primary challenges of secure routing is to provide authentication (trustworthiness) of users in the network. In case of distributed communication environment in MANET, authentication is open and any un-authentic node may be use to compromise routing traffic in order to disrupt the communication. There are some of the major responsibilities of secure routing which are given below.

- It provides assurance that modified and replayed route replies should be rejected in order to avoid fabrication of attacks.
- Routing protocol responsiveness itself provide safety among different routing attacks.
- In section there is detail description of secure routing mechanism and in our simulation we also worked on the authentication mechanism in MANET.

#### 3. Privacy-aware and Position based Routing

MANET is a kind of wireless network in which mobile nodes move from one station to another. In this type of network environment routing process among different nodes is important that's why privacy-aware and position based routing is used to avoid route overhead. In case of position based routing mechanism, a mobile node within the MANET network broadcast its position co-ordinates as well as its one-hop neighbors. This information can easily be attacked, so therefore privacy-aware mechanism is together with position based routing in order to provide secure communication. PPBR stands for privacy aware and position based routing in which a mobile node mainly takes pseudo identifiers that are usually dynamic and it is also use to provide end-to-end inconspicuousness to other nodes.

#### 4. Key management

Certified Authority (CA) is one of the mechanism which provide key management; if it is compromised then entire network can easily be damaged. One of the major functionality of key management and distribution for MANET, it provide solutions for mobility related issues. In section writers discuss different aspect of key management and distribution for MANET. In the paper, the approach for key management use to solve high mobility issue as well as it provide an efficient method to reduce control overhead also gives an idea how to increase reliability in key management with respect to conventional key management process.

#### 5. Intrusion detection System

Intrusion detection system is a complete security solution which provides information about malicious activities in the network, it also uses to detect and report about malicious activities. MANET is also design for route traffic mechanism when there is congestion in the network, faulty nodes as well as topology changes due to its dynamic behavior. IDS use to detect critical nodes and then analyze its data traffic, critical node also degrade network performance. There are different IDS systems which has some specific features, some of them are given blow

- Cluster based voting

- 
- Neighbor-monitoring
  - Trust building

#### **6. Multi-layer Intrusion detection technique**

Multi-layer intrusion detection technique is a technique in which an attacker attacks at multiple layers in order to stay below the detection threshold so that they will escape easily whenever a single layer impropriety detects. These type of attacks mainly attack at cross layer which are more alarming and frightening as compare to single layer attack and they can easily be escaped. Although these type of attacks can be detected by a multiple layer insubordination detector, where with respect to all network layer's input are use to combine and examine by the cross-layer detector in a detailed fashion. There is also another way to detect these kinds of attacks by working together with RTS/CTS and network layer detection with respect to dropped packets.

## ONE-STAGE VIRTUAL TREATMENT PLAN AND COMPLEX DENTAL REHABILITATION

Chegodaeva A.D.<sup>1</sup>, Ryakhovsky A.N.<sup>2\*</sup> and Vykhodtseva M.A.<sup>3</sup><sup>1,3</sup> "Avantis" Dental Clinic, Moscow, Russia<sup>2</sup> National Medical Research Center of Dentistry and Maxillofacial Surgery, Moscow, Russia**ABSTRACT**

*The clinical case shows the possibilities of the one-stage virtual planning of the final result of treatment, including setting the jaws to central relation, teeth alignment using clear aligners, the indirect restoration of teeth, and implementation with the help of 3D computer technologies.*

*Key words: virtual treatment plan; digital dentistry*

The preliminary planning of complex treatment in dentistry is of great importance because it minimizes the probability of errors and increases the predictability of the achieved result [1,2]. Digital technologies open up more opportunities for such planning [3,4,5], but allow it to be performed at one or two stages of treatment. The peculiarity of such sequential planning is that each subsequent stage is planned only after the end of treatment at the previous stage. The further development of digital technologies allows us to move to the simultaneous planning of all stages of treatment immediately from the initial situation to the final result [6].

In this article, we show a clinical example of the possibilities of such a one-stage digital planning and its implementation using digital 3D technologies.

Patient P. came to the clinic with a wish to improve his smile (Fig.1).



**Fig.1. Initial situation**

Complaints: teeth wear, gaps between teeth, dark color of teeth. The patient did not complain of discomfort in the area of the TMJ and masticatory muscles.

Anamnesis: previously, he only underwent therapeutic dental treatment for the development of the carious process.

Objectively: visual examination revealed composite restorations on the 17,16,15,14,22,23,24,25,26,27,37,36,35,45,46,47 teeth and, visually noticeable generalized wear of the occlusal surfaces and the cutting edges of the teeth (Fig.2).



**Fig.2. Dental arches before treatment**



According to the results of occlusal analysis performed in the Avantis 3D software, tooth wear was assessed as grade II (enamel and dentin).

According to the results of the analysis of the parameters of the TMJ, an asymmetry of the width of the joint gap on the right and left was found. There was a slight narrowing of the posterior third of the joint gap on the right, and on the left this indicator was at the lower limit of the norm (Fig.3).

Active coordinate system: CS\_O

Joint space parts are determined by the lowest points of fossae

	Joint space width, mm			Articular eminence inclination, deg	Articular eminence height, mm	Condyle width, mm	Condyle height, mm
	Anterior space	Superior space	Posterior space				
Left	4.24 ± 1.09 (2.57—7.48)	2.78 ± 0.65 (1.74—4.71)	2.68 ± 0.89 (1.74—5.31)	39.97	5.34	21.49	14.23
Right	3.21 ± 0.72 (1.68—5.34)	2.91 ± 0.75 (1.69—5.11)	2.50 ± 0.46 (1.86—3.85)	51.24	5.03	21.42	13.20
Norm	2.40—4.70	2.40—3.70	2.60—3.80	37.00—65.00	4.60—8.60	17.00—21.50	9.70—14.70

**Fig.3 TMJ status report before treatment**

There were tremas between the canines and the first premolars and, a slight crowding of the lower front teeth (Fig.4).



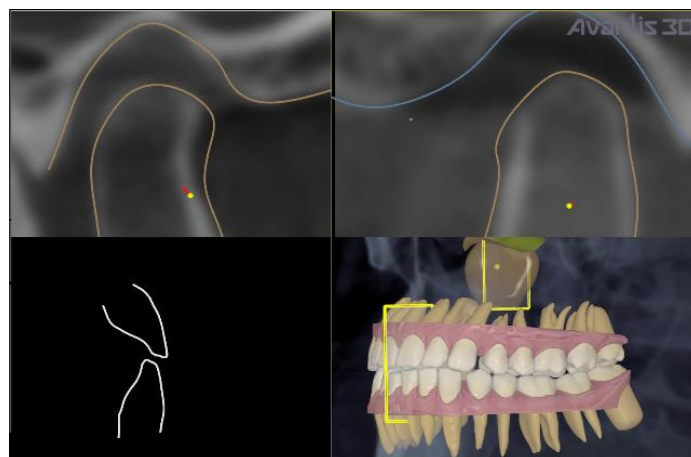
**Fig.4. Teeth appeal before treatment**



Diagnosis: second degree teeth wear (up to dentin), violation of the shape of the teeth, crowding of the lower front teeth, and tremas between the teeth.

The treatment plan consisted of orthodontic correction of the position of the teeth to close tremas, revision of the consistency of composite restorations before prosthetics, determination of the reconstructive LJ position, and manufacturing and fixation of ceramic restorations (veneers, inlays / onlays, and crowns).

Using the Avantis 3D software (LLC “Avantis 3D”, Russia), multi-stage virtual planning was carried out simultaneously to implement the developed treatment plan. Initially, the position of the central jaw relation was virtually determined (Fig.5), which consisted in a small shift of the LJ forward and down with normalization of the width of the articular gap (Fig.6) and a small rotation of the LJ around the anatomical hinge axis to increase the lost height of the bite.



**Fig.5. Virtual LJ positioning**

LJ position: Centric relation

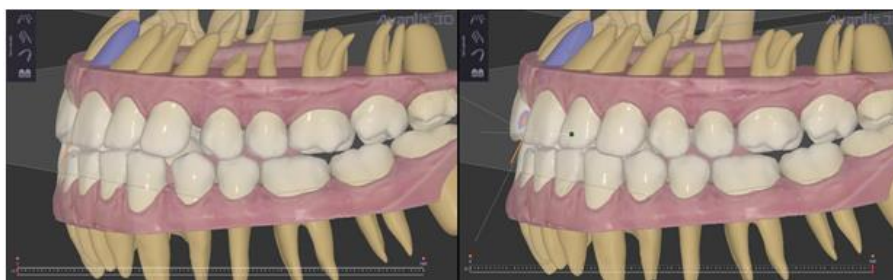
Active coordinate system: CS\_O

	X axis (Transversal)	Y axis (Sagittal)	Z axis (Vertical)
Left condyle shift	-0.1 mm	0.3 mm	0.2 mm
Right condyle shift	-0.1 mm	0.7 mm	0.6 mm
Rotation around intercondylar axis	-0.0 deg		
Shift of hinge axis points (distance 110.0 mm)			
Left side	-0.1 mm	0.3 mm	0.2 mm
Right side	-0.1 mm	0.7 mm	0.6 mm

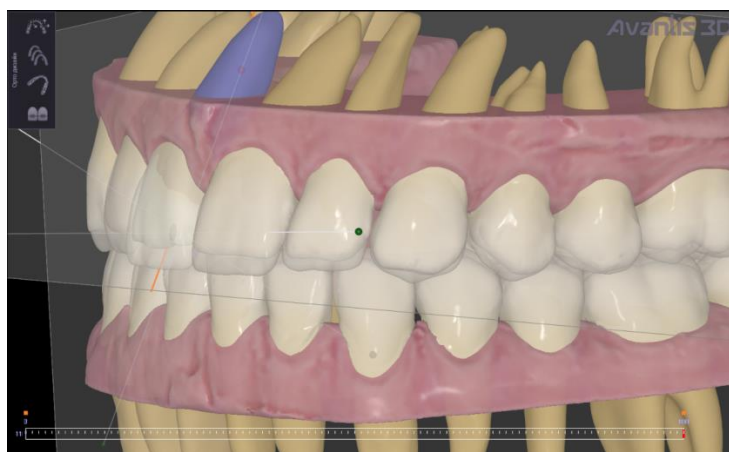
	Habitual occlusion			Centric relation		
	Joint space width, mm			Joint space width, mm		
	Anterior space	Superior space	Posterior space	Anterior space	Superior space	Posterior space
Left	4.24 ± 1.09 (2.57—7.48)	2.78 ± 0.65 (1.74—4.71)	2.68 ± 0.89 (1.74—5.31)	4.22 ± 1.05 (2.59—7.32)	3.06 ± 0.55 (2.16—4.64)	3.10 ± 0.92 (2.15—5.78)
Right	3.21 ± 0.72 (1.68—5.34)	2.91 ± 0.75 (1.69—5.11)	2.50 ± 0.46 (1.86—3.85)	3.28 ± 0.79 (1.53—5.59)	3.63 ± 0.79 (2.25—6.00)	3.31 ± 0.47 (2.68—4.71)
Norm	2.40—4.70	2.40—3.70	2.60—3.80	2.40—4.70	2.40—3.70	2.60—3.80

**Fig.6. TMJ status report before and after LJ virtual positioning**

Next, it was planned to align the teeth with closing the gaps (tremas) between the teeth (Fig.7), and to set up artificial teeth to improve tooth shape and reestablish the vertical dimension (Fig.8)



**Fig.7. Virtual teeth alignment**



**Fig.8. Artificial teeth set up**

The patient was completely satisfied with what he saw and agreed to the treatment.

Orthodontic correction was performed using clear aligners (Fig.9). The treatment took five months. Due to the simplicity of the initial clinical situation and the task, the patient was given the entire set of clear aligners, and he consistently changed them independently, appearing once in the middle of treatment for a control examination.



**Fig.9. Before and after teeth alignment**

Then, based on the previously performed design of the shape of artificial teeth, a MockUp model was printed and teeth shape was transferred to the oral cavity through a silicone index, creating temporary restorations (Fig.10).



**Fig.10. Teeth mock up**

Having made sure of the convenience of temporary restorations, which restored not only the lost shape of the teeth, but also the height of the bite, the prosthodontist performed the tooth preparation (Fig.11) with the subsequent manufacture of prosthetic dentures. Ceramic prosthetics were manufactured using the Emax technology, followed by individualization of shape and color by manually applying the ceramic mass to the vestibular surface of indirect restorations.



**Fig.11. Teeth preparation**

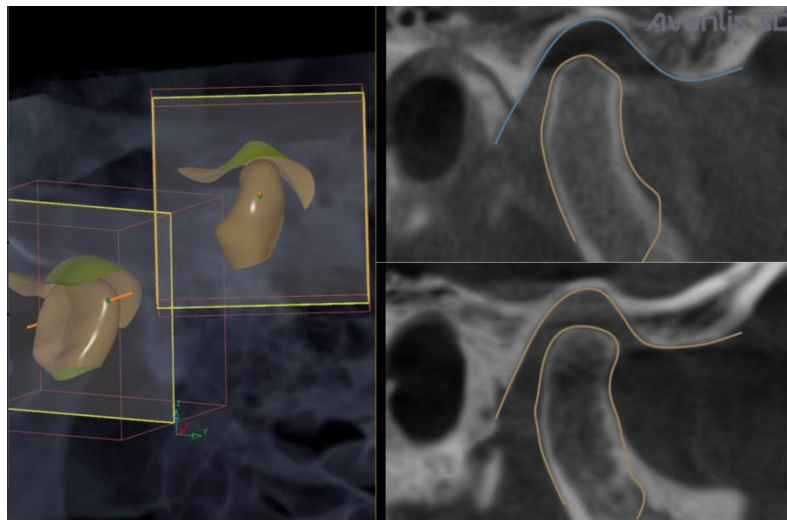
Restorations were tried on and fixed on the teeth by a permanent composite cement (Fig.12)



**Fig.12. Ceramic restorations fixed on the teeth**



The patient was completely satisfied with the functional and aesthetic results of the treatment. A control CT scan performed one year after the end of treatment confirmed the correctness of restoring the lost position of the LJ (Fig.13).



**Figure 13. Condyles position after the treatment**

The analysis showed the restoration of the TMJ parameters to normal values (Figure 14).

Active coordinate system: CS\_O

Joint space parts are determined by the lowest points of fossae

	Joint space width, mm			Articular eminence inclination, deg	Articular eminence height, mm	Condyle width, mm	Condyle height, mm
	Anterior space	Superior space	Posterior space				
Left	4.01 ± 1.05 (2.31—7.14)	2.71 ± 0.59 (1.80—4.47)	2.96 ± 0.88 (1.84—5.58)	45.86	5.72	20.89	14.39
Right	2.94 ± 0.74 (1.87—5.15)	3.01 ± 0.73 (1.69—4.95)	3.15 ± 0.96 (1.87—5.32)	55.77	5.56	21.08	13.01
Norm	2.40—4.70	2.40—3.70	2.60—3.80	37.00—65.00	4.60—8.60	17.00—21.50	9.70—14.70

**Fig. 14. TMJ analysis after dental treatment**

The presented clinical case demonstrates the success of a one-stage complex virtual simulation involving different types of dental treatment. In this case, three types of treatment were combined at once: gnathological, orthodontic and prosthetic. This approach avoids the "accumulation" errors associated with multi-stage virtual planning, when the next stage of planning follows the end of the previous stage of treatment. One-step planning also enables demonstrating to the patients the expected result of treatment, which increases their motivation to receive the treatment.

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**CLOUD COMPUTING AND POLITICS: THE FUTURE OF VOTING SERVICES AND SECURITY**

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**ABSTRACT**

*The concept of cloud computing is the foremost predominant existence in the advent of E-governance in every part of the world. The dominance which leads to cloud computing is High scalability, low maintenance efforts, enormous cost savings potential, and several other benefits for the government sector. From an Information and Communication Security outlook, a structured analysis is adopted to identifying intrusion involved in the digitalization of government transactions and the electoral process and conviction of credence and transparency in every context. We strive to design a secure, stable cloud based framework for online voting systems and analyse its execution based on three cryptographic algorithms namely Blowfish, AES and RSA. To take a cut above this paper proposes a high level implementation of electronic voting system, supported by cloud computing architecture and cryptographic technologies, additionally identifying issues that require further research.*

*Keywords: cloud framework, cloud storage, Data securing, Blowfish, Security.*

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**INTRODUCTION:**

With a Population of 130 billion people India is considered as the world's largest democracy, with over 92 billion eligible voters. The power at Legislative and executive level are decentralized and distributed to different administrative settings from central to local governance. The electoral representatives of all the administrative institutions are elected through the general election process. Major issue with the conventional paper-ballot voting system is a large number of unidentified and invalid votes. This issue can be resolved through the E-Voting system. Another advantage of this system is An increased speed of counting, Reduction in the counting errors, security through

Cloud primarily based system are often one in every of the approaches for effective implementation of higher and error free on-line electoral system. Cloud system supports the usage massive or huge of an enormous variety of secured transactions at constant instance on large knowledge sets. In order to analyse the performance of the system, the key options area unit to be analysed stated as work parameters.

Speed and Security factors area unit the key performance measures admire the analysis of those systems.

**Cloud Computing:**

Cloud computing may be a model for sanctionative convenient, on-demand network access to a shared pool of configurable computing resources, (e.g., networks, servers, storage, applications, and services) which will be quickly provisioned and free with tokenish management effort or service supplier interaction.

The name cloud computing was galvanized by the cloud image that's typically accustomed represent the net in flow charts and diagrams. a definite migration to the clouds has been going down over recent years with finish users maintaining a growing variety of non-public information, as well as bookmarks, images, music files, etc. on remote servers accessible via a network.

Cloud helps you in analyzing giant amounts of information and in detective work any discrepancy. Provides mechanisms to boost the protection and reliableness of information.

Cloud computing is authorised by virtualization technology, a technology that really dates back to 1967, however that for many years was obtainable solely on mainframe systems.

A host laptop runs associate application referred to as a hypervisor; this application creates one or additional virtual machines, that simulate physical computers therefore reliably, that the simulations will run any software package, from operative systems, to end-user applications.

Cloud computing is viewed joined of the foremost promising technologies in computing nowadays, inherently able to address variety of problems.

**LITERATURE REVIEW:****1. Smartphone literacy:**

India has around 650 million smartphone users as of 2020. laptop and Mobile awareness has magnified drastically within the last decade. Mobile usage has increased the accessibility and storage of information from numerous devices connected to every alternative. Security and speed of accessing knowledge|the info|the

information} hold on on cloud is one in every of the most important challenges in sharing the massive data generated by the devices throughout the planet. guaranteeing security and enhancing the speed of information access ar the most important needs in cloud computing.

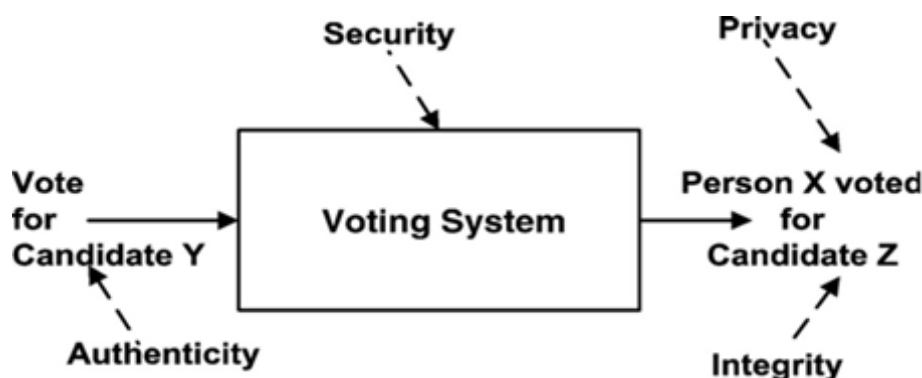
### System of Voting:

Diagrammatic representation of online voting in which the voters can cast their vote from remote places using mobiles and computers. Generic requirements for a voting system should involve the following factors: Authenticity: Eligible and valid voters vote using the system. Integrity/accuracy: Once the vote is casted system should not permit for multiple voting by the same voter and allow for modifications in the vote.

Separation of data content reduces the web content replication and the representation of data is incorporated using extensible markup language. Privacy:

Details of the vote casted should be kept confidential from the external users.

Security: Voting process should be tamper proof and unauthorized access to the process should be avoided. Democracy: System should provide provision for all eligible voters to vote and without any fear and from all parts of the world.



### 2. Electronic voting machine (evm):

The e-voting plan is meant to be used by the entire population of eligible voters irrespective of background and physical disability. People with less technical know-how handle the devices. So, they are expected to be handy and easy to manage. The e-voting system has to be secure and tamperfree. Flows within the voting device lead to inaccurate results. Hence, the system must be secure, transparent, and reliable. The EVM is developed and tested under the Indian election commission administration by the two government-owned companies Electronics

Corporation of India Limited (ECIL) and Bharath Electronics. In Indian elections introductions were made in a phased manner.

### Benefits and Limitations of EVM Benefits:

Approximately 10,000 tons of ballot papers are saved in national elections. This saves around two lakhs of trees.

Present generation EVMs cost around Rs 2000 per unit, the amount is smaller when compared to the printing of ballot documents during every election

Compact and portable when compared to ballot boxes

Counting of votes takes place much faster and accurately. The results can be announced within 3-5 hours

Tallying of votes can be done automatically A person cannot cast more than one vote. This decreases the likelihood of fake votes.

A vote stored in the memory of the control box cannot be deleted or altered No one can link any ballot to an individual. This way it ensures privacy .

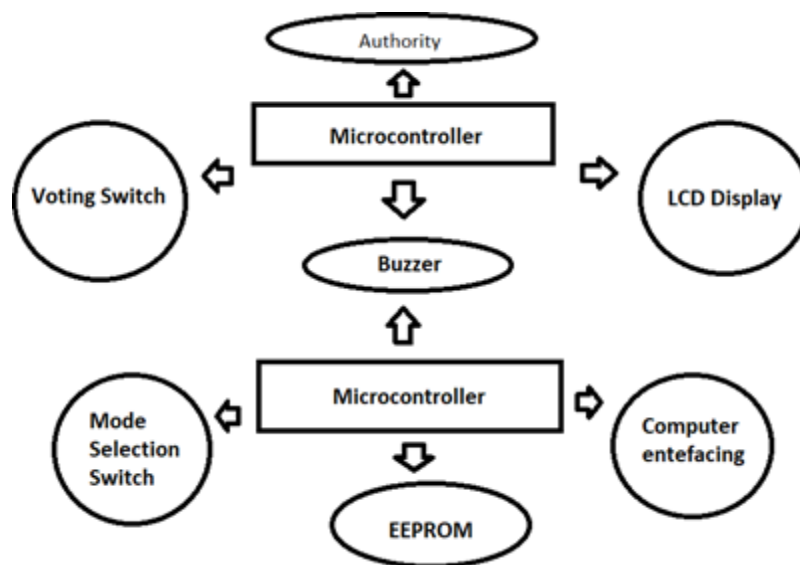
### LIMITATIONS:

EVMs handled by people with minimum technical expertise, they require training for effective use.

No scope for the voters to cast a vote of his/her chosen constituency other than the designated constituency.

They are vulnerable to hacking.

The touch screen is not-efficient for physically challenged people. It leads to voting for someone who is not of their choice.



### Website Voting System:

Voters can also use the Internet for the Voting proposed. Both android phone and the website are linked with the same database on the backend so that the voter can vote from two-way. Only once a voter can vote, otherwise the system will deny him/her to do so.

The above system can define using fore phases:

- 1) Registration
- 2) Authentication
- 3) Voting
- 4) Counting

### Registration Phase:

If Voter want to do voting into the system than, Voter has to register him/herself into the website or system

### Authentication phase:

Voters will be verified from the voter database. If it is completed then it provides access to the next stage.

### Voting Phase:

Voter casts his/her votes for the election and the voting authority encrypts the vote and sends it to the counting authority.

### Counting Phase:

Counting authority directly counts the votes and declares the election results. In this case security is a major issue for voting. Author explains the electronic election process or e voting, involves three basic steps:

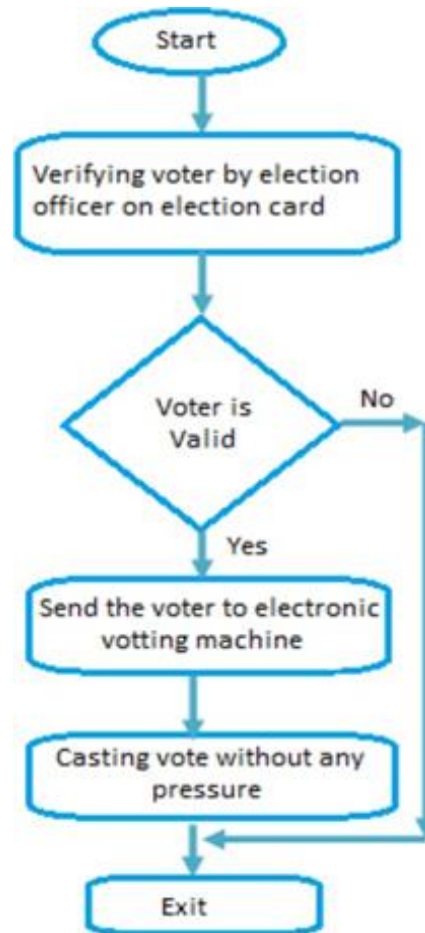
- 1) Election booth setup
- 2) Voting
- 3) Result

### AES Algorithm, Blowfish Algorithm and RSA Algorithm:

Protection and privacy of the info may be achieved by mistreatment refined mechanisms like encoding techniques that depend upon the quantity of key points used and also the sequence of steps concerned within the encoding and decoding method . AES rule may be a bilaterally symmetrical key rule which implies that the key used for encoding and decoding is that the same key. it's principally replaced the normal DES rule that was highly regarded earlier and is currently been replaced by AES and is additionally used for encrypted tip employed by the u. s. government. rule consists of 128 bit block size and also the key size varies from 128, 192 or 256 bits and also the range of repetitions of the cycle depends on the key size standing at ten, twelve and fourteen cycles severally reminiscent of the 3 key sizes. Blowfish rule essentially may be a block cipher having a size of four to fifty six bytes of block. The procedure for decoding is that the same as for encoding which implies to mention that it's a bilaterally symmetrical rule. with the exception of being open supply, it conjointly has the benefits of being quick and secure. encoding and decoding of knowledge in fashionable pc systems and different electronic devices is allotted mistreatment the RSA rule. it's associate uneven scientific discipline rule which needs 2 distinctive keys for encoding and decoding of knowledge. RSA may be a public key crypto system wherever one amongst the distinctive keys is shared to all or any the users .



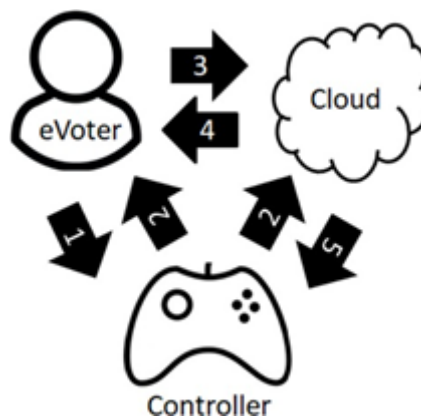
### Existing method:



### Proposed Methodology:

The proposed framework for implementation of a secured cloud environment to enable online voting systems. Proposed framework involves the third party authentication server which can be regarded as a controller. Controller generates tickets and grants access only to authorized voters through online. Cloud can permit access to the account or the information only to the users providing authorized tickets from the controller. Finally cloud acknowledges the controller regarding the account access by the eVoter. To ensure or establish the secured communication between the components, a cryptographic algorithms namely Blowfish, AES and

RSA are employed. In Normal circumstances, as the requirement for the security increases, the performance of the system reduces considerably. Hence the performance analysis of these algorithms is done by considering key tasks in the system and simulated cloud environment.

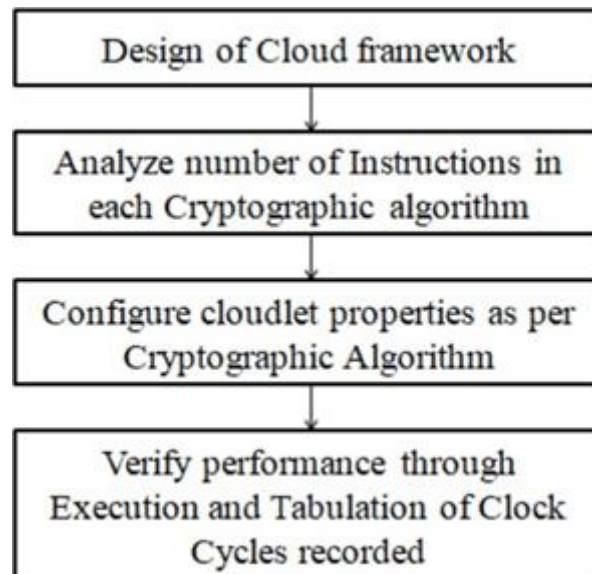


### Proposed Voting methods:

In this system there will be better security and authenticity of the voter over the voting system. Here, the election officers too will not have the control over the system. The cloud voting system will be controlled over the centralized server of the voting system. The voter will be authenticated by the barcode printed over the election card of the voter using the barcode scanner. As soon as the system finds the unique voter Id over the

barcode onto the server database it will give the authority to only the voter once to vote onto the system. The system will open the voter link which will be encrypted with different cryptographic algorithms such as

RSA, Diffie Hellman. The voter will cast the vote once then automatically the system will close the voting link for the voter.



#### An evaluation of cloud computing in relation to electronic government from the perspective of "TIME".

##### Performance criteria

##### Time

Efficiency –Reduces time required to access applications and data

–Reduces time required for installations and modifications

–Reduces monitoring time

Effectiveness

–Applications and resources available on demand

Strategic benefits

–Timely opinion and expression

–Possibility of real time cooperation across agencies

Transparency

–Timely control

#### An evaluation of cloud computing in relation to electronic government from the perspective of "DISTANCE"

##### Performance Criteria

##### Distance

Efficiency –Overcomes geographical difficulties

–Crosses agency and boundaries cooperation

–Reduces distribution and delivery cost

–Improves data quality due to centralization and uniformity

–Improves data accuracy due to centralization and uniformity

Effectiveness

–Improves communication and interaction

Strategic benefits location

–Introduces new services independent of geographical location

–Hybrid centralization

Transparency location

–Access services and data independently from geographical location

#### CONCLUSION:

Cloud Computing has grown exponentially over the decade. It provides cloud solutions to improve accessibility, scalability and reliability while reducing the risk. It is efficient and cost effective. We have tried to provide sufficient statistics for the need of online voting system in the current society. We also have proposed a secured

cloud framework as a technical solution which may enhance the voting rate in elections. Security of the proposed Cloud framework for online voting system is achieved at two levels namely, with the help of encryption and decryption of token at voter and controller by denying direct access of the cloud to the voter. This will reduce the payload on the cloud as the controller shares the majority of the voter related activities. This Paper provides some key findings and shortcomings to aid new students and researchers in the field.

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**CURRENT TREATMENT AND PLANT BASED MEDICINE ON CYTOMEGALOVIRUS INFECTION: A SYSTEMATIC REVIEW**

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**ABSTRACT**

*Viral illnesses cause a considerable health burden having indirect and direct costs, involving productivity loss and hospitalization. It can cause opportunistic diseases, infections of central nervous system and congenital diseases. Symptomatic infection of cytomegalovirus has been treated successfully with ganciclovir, but shows some drawbacks. Traditional herbs are utilized for the chronic disease improvement in the Asian states and details on their efficiency and unfavorable reactions for long-lived use have been gathered for practical use. Many therapeutic regimens till date have highlighted non specific, broad approaches to handle viruses. As specified antiviral treatments become accessible, better approaches for diagnosis to recognize specified pathogens will be needed. In the present review, we summarized the epidemiology and pathophysiology of CMV; current drug regime on infection; and plants as an alternative treatment available to treat the CMV infection.*

*Keywords: Cytomegalovirus, Epidemiology, Pathophysiology*

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**INTRODUCTION**

Infection of cytomegalovirus (CMV) is one of problematic infections in patients, which are immune-compromised, specific recipients of a transplant and AIDS (acquired immunodeficiency) patients [Ho, 1977; Marker et al., 1981; Jacobson and Mills, 1988; Zaia, 1993]. Symptomatic infection of cytomegalovirus has been treated successfully with ganciclovir, but shows some drawbacks. Traditional herbs are utilized for the chronic disease improvement in the Asian countries and details on their efficiency and unfavorable reactions for long-lived use have been gathered for practical use [Jiangxu new Medical College, 1978]. Viral infectious illnesses are a significant threat to the health of human in both developed and developing countries [Vahidnia et al., 2017] and are accountable for the demise of one million individuals universally every year. The illnesses cause a considerable health burden having indirect and direct costs, involving productivity loss and hospitalization [Nichol, 2003]. The novel disease emergence, like Chikungunya virus and Zika virus, early unaffected has generated notable healthcare concerns. The viral infection pathogenesis have produced different varieties of complications which target various body parts and the immune structure and may even encourage progression of tumor. Many therapeutic regimens till date have highlighted non specific, broad approaches to handle viruses. As specified antiviral treatments become accessible, better approaches for diagnosis to recognize specified pathogens will be needed [Martinez, 2007].

Cytomegalovirus can cause opportunistic diseases, infections of central nervous system and congenital diseases. Because of latency characters, mutation and specified life cycles, infection cytomegalovirus is strenuous to treat. In spite of current drug advances utilized for infection treatment for active cytomegalovirus are restricted in their efficiency, and complete removal of cytomegalovirus latent infection is strenuous. Infections of cytomegalovirus are hard to treat because of their specified characters of latency, mutation and life cycles. In spite of current advances, recent drugs utilized for the treatment of active infections of cytomegalovirus are limited in their efficiency, and latent infections eradication is difficult. Present antiviral agents targeting the UL54 DNA polymerase are restricted due to viral resistance and nephrotoxicity. Also the cytomegalovirus cannot be eliminated or prevented with a vaccine. The growing point is emerging antiviral substances both latently and lytically infected cells.

Infection of cytomegalovirus in humans is generally connected with the salivary glands. Infection by cytomegalovirus can be asymptomatic in healthy individuals, but may be deadly in an immune-compromised individual. Congenital infections of cytomegalovirus may even cause death or may morbidity. Post infection, cytomegalovirus can frequently remain latent, but it may reawaken at any time. In due course, it causes mucoepidermoid carcinoma, plus it can be accountable for prostate cancer. Around 60-70% adults gets cytomegalovirus infection in industrialized states. Congenital cytomegalovirus is principal infectious cause of learning disabilities, intellectual disability and deafness (Ngai et al., 2018). Cytomegalovirus is the commonest source of intrauterine infection, taking place in 0.2% to 2.2% of all residing births and is usual source of mental retardation and sensorineural loss of hearing [Stagno et al., 1986; Pultoo et al., 2000]. Most healthy individual

who obtain cytomegalovirus after birth encounter no or few symptoms and no long lived sequelae. Some encounter a mononucleosis-like disorder less commonly involving hepatitis and pneumonia and commonly cervical lymphadenopathy, myalgia, persistent fever and malaise [Raynor, 1993]. Post primary infection, known as infection of CMV in a formerly sero-negative individual, the virus gets dormant and remains in latent phase, from which it may be reactivated. This is known as secondary (recurrent) infection [Nigro et al., 1999]. Majorly utilized drugs for treatment and prophylaxis of cytomegalovirus infection are ganciclovir, cidofovir and foscarnet.

Herbal medicine constitutes one of the most crucial fields of conventional medicine universally. There has been increasing interest in the examination of the genuine outcomes of plants for the finding of novel antiviral substances. The observation of virus resistant strains to antiviral substances is an evolving issue. Hence the ubiquity of virus connected diseases is of increasing interest. For the reason, the enhancement of better and new antiviral agents is desirable and vital. It is indicated that natural compounds are preferable to synthetic products as origin of novel antiviral compounds (Vanden berghe et al., 1986; Vlietinck et al., 1995; Abad et al., 1997). Various compounds having inhibitory action against various viruses replication are extracted via various medicinal plants (De Rodriguez et al., 1990; Marchetti et al., 1996; Hayashi et al., 1997). For anti-cytomegalovirus effect ten types of drugs are reported (Vanden Berghe et al., 1986; Sydiskis et al., 1991).

During infection of cytomegalovirus, new replication of viral nucleic acid begins as soon as 12 h (Stinski 1978; Alford and Britt, 1985) and is detectable readily at 24-36 h after beginning of infection. New infectious particles of virus are released approximately at 72 h post infection (McAllister et al., 1963).

The most extensively utilized drugs for treatment and prophylaxis of infections of cytomegalovirus are ganciclovir, cidofovir and foscarnet. Sadly, these drugs are having dose limiting bone marrow and renal toxicities. Also these drugs long term therapy is essential for infection management, has been connected with the clinically resistant viral strains development (Gilbert and Boivin, 2005). Henceforth, antiviral compounds needs to be developed for the treatment and suppression of cytomegalovirus disease.

### **Pathophysiology of CMV**

The basic concept of pathogenesis of human cytomegalovirus, which connect together the miscellaneous disease connections are viraemia, the threshold relation between disease and viral load and pressure of immunity forcing the virus to remain in sanctuary locations.

Replication rate studies of human cytomegalovirus have indicated that their dynamics are quick, having viraemia doubling time around 1 day [Emery et al., 2002]. This means that the parameters of replication of basic infection by human cytomegalovirus in human are very identical to those of basic infection of HIV [Emery et al., 2002]. The human cytomegalovirus reputation as a slow growing virus is hence is undeserved and is obtained via the slow evolution of cytopathic impacts in cell cultures of fibroblast. Now we know that human cytomegalovirus strains which replicate in these cells have huge genetic changes via the wild type and are low pathogenic to human individuals than viruses which are of wild type [Plotkin et al., 1989]. Endothelial cells and epithelial cells are more indicative of infection of human cytomegalovirus in humans.

More resources are committed by the immune system to control human cytomegalovirus than to another virus, as healthy seropositive personnel are often having higher than 1% of their peripheral blood T cells specified for human cytomegalovirus one antigen. Hence in warfare words, human cytomegalovirus is in a standoff relation with immune responses, assured to rapidly replicate if the accepted immune response becomes reduced. This may happen in patients provided immunosuppressive drugs to avert graft rejection in HIV infected patients, or in those having immature immune system (the bone marrow and fetus transplant patients along novel engrafting marrow). Presumably it may also take place if the immune system is astonished by a unexpected shock adequate to precipitate the admission of patient to the ICU. The supposed pathogenesis is human cytomegalovirus replication invigorating the cytokines release, which are poisonous to lungs. A recent controlled clinical trial was randomizing ICU admitted seropositive patients to receive placebo or ganciclovir, to understand whether this presumed effect can be controlled [National Institutes of Health (NIH), USA].

### **Cytomegalovirus (CMV) Genome**

The genome of human cytomegalovirus is longest between nine human herpes viruses, is a double stranded linear DNA including 230 k to 240 k base pairs [Davidson et al., 2003; Dolan et al., 2004; Bradley et al., 2009]. The viral genome consists of 2 unique regions known as unique short (US) and unique long (UL), and these 2 domains are bounded by a couple of inversely recurring sequences, creating a configuration of genome called as TRL-UL-IRL-IRS-US-TRS.

**Epidemiology of cytomegalovirus (CMV) infection**

In worlds most areas cytomegalovirus is an endemic. The human cytomegalovirus seroprevalence varies in various geographical areas fluctuating via 30-100% [Crough and Khanna, 2009].higher seroprevalence is observed in groups of lower socioeconomic, in older individuals and in females [Bate et al., 2010]. With infectious individuals close contact the infection comes. Transmission may be horizontal (via fluids contact like blood, breast milk, maternal genital secretions, urine or saliva or via sexual intercourse). It is also transmissible via transplantation of stem cell or transplantation of solid organ [Badami, 2014].

**Life cycle of CMV**

CMV parallels the structure of herpes virus virion and the cycle of replication consists of completely controlled gene cascade efficient of expression [Mocarski et al., 2007]. The virion is having an capsid of icosahedral protein which contains the ds DNA. The capsid is covered by a proteinaceous tegument and an outer envelope of lipid [Mocarski et al., 2007]. Virions gets entrance into a cell via event of membrane fusion involving the cell outer membrane and the glycoproteins on the virions lipid envelope. Following the two membranes fusion, the DNA including protein capsid and the tegument proteins are liberated in to cells [Broks et al., 2007]. The pattern of gene expression follows a indistinguishable cascade utilized by other herpes viruses [Kalejta, 2008]. Throughout the lytic infection, viral immediate early genes are manifested [Saffert et al., 2010]. These genes expression results in synthesis of immediate early proteins of virus which regulate the environment of host cell and invigorate the viral early genes expression [Mocarski et al., 2007]. The virus immediate early genes synthesize proteins which are accountable for replication of viral genomic ds DNA. After the replication of DNA, these immediate early genes switch on the viral late genes expression. The viral late proteins are chiefly structural compounds of virus which aid in newly synthesized virus particles assembly and exit [Mocarski et al., 2007]. Human cytomegalovirus immediate early genes may be silenced in certain types of cells upon infection emerging in latent infection [Biron, 2006]. A latent infection is distinguished by the reduction of expression of viral gene and the hindrance of the new viral progeny assembly and exit [Broks et al., 2007]. Nevertheless, latent infections may emerge in to lytic infection in reply to certain signals by environment, which results in disease and favors the virus multiplication [Mocarski et al., 2007, Kalejta, 2008].

**Cytomegalovirus infection in Iraq**

Various studies were carried out in several parts of Iraq, specifically in Baghdad. One such case described by Al-Baiati et al., (2014) involved aborted women 152 and 10% (15) were positive for cytomegalovirus IgM and 85% (129) were positive for CMV IgG [Al-Baiati et al., 2014]. Majeed (2011) described a study, including 20-35 years 270 women. The results disclosed 90 cases positive for cytomegalovirus, out of which 62 cases were cytomegalovirus IgM positive and 28 cases were CMV IgG positive [Majeed, 2011]. Another study described by Hussan (2013) disclosed 44 CMV IgM cases positive out of 210 women with background of one or more unexplored abortions [Hussan, 2013]. Ahmed (2013) described a study carried out on 214 aborted women. Cytomegalovirus specified IgM and IgG antibody were identified in 70.5% (151) of the 214 aborted cases [Ahmed, 2013].

**Current drug treatment and herbal medicines on CV infection**

Sydiskis et al., have indicated that anthraquinone, synthesized via Aloe emodin, had repressive impacts on the enveloped viruses like type 1 and type2 herpes simplex virus, influenza virus, pseudorabies virus and zoster virus. Examinations by electron microscopy indicated that the envelopes were disrupted partially in the herpes simplex viruses which are anthraquinone treated (Sydiskis et al.,1991). Berghe et al., (1986) have indicated that naphthaquinone juglone was impactive against infection of herpes simplex virus (Berghe et al., 1986). Tsai et al., (1985) showed that 2- [(trimethylsilyl)oxy]-1- [(trimethylsilyl)oxy] methyl and 9,12,15- octadecatrienoic acid and ethyl ester were 2 components recognized by methanol extracts of garlic and indicated an antiviral action against CMV and Influenza virus. Also, extracts of garlic have indicated a significant impact on the cytomegalovirus growth on tissue culture.

Edziri et al., (2011) worked antiviral activity of plant extracts concluded that the methanol extract was the most active extract, which inhibited replication of Cox B3 and HCMV viruses at 100 µg/ ml without indicating cytotoxic impacts and having upper to 5 selective indexes. Also good activities were found with chloroform, butanol and ethyl acetate extracts that indicated antiviral impact against both Cox B3 and HCMV viruses at 100 to 250 µg/ ml concentration. Saoo et al., 1996 in their study on antiviral activity of aloe extracts against cytomegalovirus found that aloe extracts best inhibited the CMV proliferation. The results showed that neither temperature nor harvesting time impacted the aloe extracts antiviral effects on infection of CMV. Analysis by flow cytometry has indicated no differences probably because of infected cells low proportion contrasted with

normal cells. They concluded that chief mechanism of aloe extracts antiviral action was at the major DNA synthesis time, specifically of protein synthesis, throughout the cytomegalovirus infection course.

Yukawa et al., (1996) showed that infection of Human cytomegalovirus was early treated with immunoglobulin, foscarnet, ganciclovir, etc. But, the therapy is always not successful in immune-compromised individuals. Plant extracts were studied first for anti-HCMV action in HEL cells and all impeded the formation of plaque at 1-5 µg/ml of the plant extract. These activities of anti-CMV were assessed further by the assays of yield reduction of MCMV and HCMV. They utilized the system of immune-suppressed mouse for infection of cytomegalovirus to examine the anti-CMV action in vivo of plant extracts (Wilson et al., 1987; Ikeda et al., 1993; Neyts et al., 1993; Stals et al., 1993;). Shabat et al., (2020) presented evidence that their work supports that the medicinal plants are having encouraging therapeutic prospective specifically in the case of plant products against infections of viruses. Farther research on technique by which the phytochemicals shows their antiviral impact will permit the evolution of victorious drug delivery susyem which is target specific. Ti et al., (2021) indicated that alkaloids have captivated recognizable attention from researchers universally since the alkaloids study started in 1803 when nicotine was detected. Alkaloids constitute an expanding and promising platform for the evolution of active ntural components as novel pharmaceuticals. The alkaloids molecular structures show beneficial leads for design of antiviral drugs. Alkaloids Isoquinoline (BBR,32) shows comprehensive antiviral action involving action against HSV, IFV, HCV, HIV and can also lower connected anti-inflammatory action.

## CONCLUSION

Cytomegalovirus is an crucial pathogen for humans as its high dissemination rate in the population of human and the disease pathologies multitude bring about by or connected with infection. Human cytomegalovirus arbitrated disease may be grouped loosely into the diseases seen in immunocompromised personnels and the diseases seen in immunocompetent personnels. In immunocompromised individuas, infection of cytomegalovirus may cause critical disease and affect various sytems of organs. Generally human cytomegalovirus is a composite pathogen having an diverse and interesting pathobiology. Supplementary studies into the general concepts of the biology of the virus to the specified procedures which directly generates disease are required. Various antiviral drugs are available like ribavirin and interferon effective against various viruses, but are often ineffective in patients. Henceforth, new treatment options and generation of plant based medicine for cytomegalovirus infection is needed to reduce the mortality and morbidity connected with the cytomegalovirus infection.

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## COMPARISON OF HEART DISEASE IDENTIFICATION USING MACHINE LEARNING, DEEP LEARNING AND MATHEMATICAL MODELING

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### ABSTRACT

*Heart disease is a complex condition that affects a large number of people around the world. Particularly in the field of cardiology timely and accurate diagnosis of heart disease plays a vital role in healthcare. The correct prediction of heart disease can prevent life threats, and incorrect prediction at a same time leads to critical. In this work, we developed a system for diagnosing cardiac disease that is both efficient and accurate. Machine learning, deep learning and mathematical modeling are applied to compare the results and analyze. The system is built on the foundation of support vector machine, artificial neural network extreme learning machine are examples of categorized algorithms. Comparison of machine learning, deep learning mathematical modelling are performed but mathematical modelling has the highest accuracy of 99% for predicting the presence or absence of heart disease. If the patient has absence of heart disease it refers normal but the patient had presence of heart disease such arrhythmia, coronary heart disease, heart failure and heart infections it will perform.*

*Keywords - heart disease classification, feature selection, disease diagnosis, evaluation.*

### INTRODUCTION –

Heart disease is considered as one of the most life snatching disease all over the world. Heart disease is a collection of disease and conditions that causes cardiovascular problems each type of heart disease is caused by something entirely unique to the condition. Coronary Heart Disease (CAD) is plaque buildup in arteries that move oxygenated blood through the heart and lungs. Any heart disease occurs with common symptoms of breath shortness, body weakness, chest pain and discomfort in other areas of upper body. Cardiac arrhythmia occurs when electrical impulses in the heart does not work properly it is due to improper beating of heart whether too fast or too slow fainting spells and dizziness. Heart failure occurs due to blockage and narrowing of coronary arteries are responsible for the supply of blood to the heart itself. It occurs due to the damage or disease in the heart major blood vessel this causes the coronary arteries to narrow limiting blood flow to the heart. Heart infectious occurs when an irritant such as bacteria, virus, a parasite or chemical reaches your heart muscle. To implement an efficient machine learning, deep learning and mathematical modeling-based diagnosis system has been developed for diagnosis of the heart and to improve the performance for predicting the disease. Thus, we develop noninvasive diagnosis system based on classifiers of machine learning and deep learning to solve the solutions. The data is collected from the Kaggle dataset for identify heart disease. The performance of the machine learning model can be increased for balanced dataset is used for training and testing (validation) of model. Data preprocessing is important to improve the predictive capability of machine learning data processing is important for data standardization. Data preprocessing is used to identifying and handle the missing values. Feature selection is the process of reducing the input variable when developing the predictive models it is used to reduce the number of input variables to both reduce the computational cost of modeling and, in some cases, to improve the performance of the model. It is mainly used for training the dataset.

We have referred from author Asif Khan that they have developed a machine learning in different algorithm, classifier and performance analysis are used for prediction.

### SECTION 2:

#### METHADODOLOGY:

##### A) DATASET:

We are collected dataset from Kaggle dataset. It consists of 14 attributes such as Age, sex, chest pain resting blood pressure, serum cholesterol, fasting blood sugar level, resting electrocardiographic, maximum heart rate, exercise reduced angina, old peak = ST Depression induced by exercise relative to rest, the slope of the peak exercise ST segment, Number of major vessels (0-3) colored by fluoroscopy, thallium scan and label it. The output label have five classes when it is normal=1, Arrhythmia=2, Coronary heart disease=3, Heart Failure=4, Heart infections=5 are the prediction the presence or absence of heart disease.

(i) Age—age of patient in years, sex—(1 = male; 0 = female).

- (ii) Cp—chest pain type.
- (iii) Trestbps—resting blood pressure (in mm Hg on admission to the hospital). The normal range is 120/80 (if you have a normal blood pressure reading, it is fine, but if it is a little higher than it should be, you should try to lower it. Make healthy changes to your lifestyle).
- (iv) Chol—serum cholesterol shows the amount of triglycerides present. Triglycerides are another lipid that can be measured in the blood. It should be less than 170 mg/dL (may differ in different Labs).
- (v) Fbs—fasting blood sugar larger than 120 mg/dl (1 true). Less than 100 mg/dL (5.6 mmol/L) is normal, and 100 to 125 mg/dL (5.6 to 6.9 mmol/L) is considered prediabetes.
- (vi) Restecg—resting electrocardiographic results.
- (vii) Thalach—maximum heart rate achieved. The maximum heart rate is 220 minus your age.
- (viii) Exang—exercise-induced angina (1 yes). Angina is a type of chest pain caused by reduced blood flow to the heart. Angina is a symptom of coronary artery disease.
- (ix) Oldpeak—ST depression induced by exercise relative to rest.
- (x) Slope—the slope of the peak exercise ST segment.
- (xi) Ca—number of major vessels (0–3) colored by fluoroscopy.
- (xii) Thal—no explanation provided, but probably thalassemia (3 normal; 6 fixed defects; 7 reversible defects).
- (xiii) Target (T)—no disease = 0 and disease = 1, (angiographic disease status).

#### **PREPROCESSING:**

The preprocessing of the dataset is to handle the missing values and for the greater performance For training the machine learning models.

#### **B) FEATURE SELECTION:**

The feature selection is the process based machine learning algorithm that we are fit to the given dataset. Feature selection methods are intended to reduce the number of the input variables to those that are believed to be the most useful to predictive model. It enables the machine learning algorithm to train faster. It improves the accuracy and interoperability.

##### **1. FSSCHI2;**

Univariate feature ranking for classification using chi-square tests. The chi-square test is used to compare observed results with expected result.

##### **2. FSCMRMR:**

Rank features for classification using minimum redundancy maximum relevance(MRMR). MRMR algorithm chooses features that are suitable for the prediction and selected features that are not redundant.

##### **3. RELEIF:**

Relief algorithm assigns weights to each Data set features and updated weights automatically. The features of high weight values should be selected and low weight will be discarded.

##### **4. FSRF (Feature Selective Spatial Receptance )TEST:**

Univariate Feature Ranking For Regression Using F-tests. The FSRF algorithm can effectively reduce the data dimension and remove the noise information in the data, thus improving the prediction accuracy and speed of the classifier.

##### **5. FSULPLACIAN:**

Rank features for unsupervised learning using Laplacian scores. Laplacian methods are important to machine learning because they are used in deriving features for learning algorithms to build a solution.

#### **C) CLASSIFIER:**

In this paper we have used different classifier for train the model for identification of heart disease. Classifier such as Support Vector Machine, K-Nearest Neighbors, Artificial Neural Network and Extreme learning machine techniques and mathematical modelling are used.

##### **1. SUPPORT VECTOR MACHINE:**

SVM is also one of the classification algorithms in machine learning in which better accuracy can be predicted. In comparison of other algorithms, it is better for predicting accuracy in an expected way.

**2. K-NEREST NEIGHBOUR:**

KNN is a supervised classifier that carry-outs a observations from within a test set to predict classification labels. KNN is one of the classification technique used whenever there is a classification. It has a few assumptions includes dataset has little noise, labeled and it should contains relevant features. By applying KNN in large datasets takes long time to process. It stores the train data we can use the model to compute resubstitution predictions.

**3. ARTIFICIAL NEURAL NETWORK:**

Deep learning is known as deep structured learning or hierarchical learning. Most of the deep learning architectures and algorithms are built with the Artificial neural network (ANN) framework. ANN are composed of neurons(interconnected nodes) arranged in layer. Initially the input layer gets an input and it passes on a modified version of the input to the next layer. The layers between the input and output named as hidden layers and composed of multiple linear and non-linear transformation .

**4. EXTRME LEARNING MACHINE:**

Extreme learning machine (ELM) is a new learning algorithm for the single hidden layer feedforward neural networks. Compared with the conventional neural network learning algorithm it overcomes the slow training speed and over-fitting problems. The algorithm avoids multiple iterations and local minimization.

**5. LINEAR REGRESSION:**

Linear regression is one of the easiest and most popular Machine Learning algorithms. It is a statistical method that is used for predictive analysis. Linear regression makes predictions for continuous/real or numeric variables such as sales, salary, age, product price etc.

**D) VALIDATION:**

Validation is to test the dataset for the trained dataset. The process of evaluating software during the development process or at the end of the development process to determine whether it satisfies specified requirements

**E) PERFORMANCE EVALUATION:**

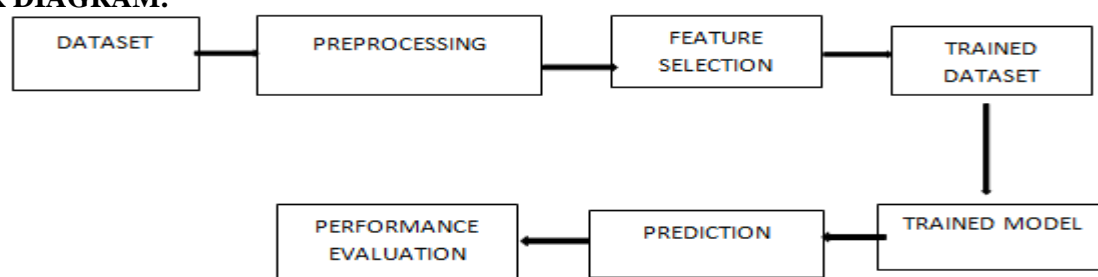
Different performance metrics have been used for classifier performance evaluation. The evaluation matrices are accuracy, sensitivity, specificity, precision, recall, f measure and gmean value.

**F) PROPOSED METHOD:**

The system has been designed for the identification of heart disease. The performances of various machine learning classifiers for Heart Disease identification have been checked on selected features. 1.Fetching the dataset is at the first stage of implementation. 2.The pre-processing of heart disease dataset using preprocessing methods. 3. Features selection using standard state of the art and proposed FS algorithms such as relief, fsrftest, fsschi2, fsulplacian and fscmr. 4.Train the classifiers using training dataset. 5.Validate using testing dataset. 6.Computes performance evaluation metrics.

In this proposed method the system has been designed for the identification of heart disease. The performances of various machine learning classifiers for Heart Disease identification have been checked on selected features. The standard state of art algorithms of features selection includes Relief, MRMR ,fsschi2,fsrftest ,fsulplacian are utilized for features selection. The performance of the classifiers evaluated on selected features sets which are selected by the state of the proposed algorithm. Different multiple class classifiers are used in this work to classify the diseases. KNN at 92 %Extreme learning machine 99%and ANN at 90%are performed at highest accuracy.

The model's performance measuring metrics include accuracy, specificity, sensitivity and processing time is automatically calculated for classifiers evaluation.

**BLOCK DIAGRAM:**

**G) MATHEMATICAL MODELLING:**

A mathematical model is a description of a system using mathematical concepts and language. The process of developing a mathematical model is termed mathematical modeling. Mathematical modelling is the process of using mathematics to make predictions about the real-world, to understand situations and to assist in making decisions. In this paper mathematical modelling are used for predicting the heart disease either presence or absence of HD. Absence of heart disease refers normal=1, Presence of heart disease refers such as arrhythmia=2, coronary heart disease=3, heart failure=4, heart infections=5 are the performance analysis

**SECTION 3****RESULT ANALYSIS AND PERFORMANCE:**

By applying different techniques of machine learning algorithm and deep learning and mathematical modelling. First approach the normal dataset which is acquired is directly for feature selection is used to train the model and then classifier and performance is used in machine learning and deep learning. It gives highest accuracy but can't give the proper result due to high data. But mathematical modelling gives 99% of the output by training and testing model.

**PERFORMANCE ANALYSIS OF MACHINE LEARNING:**

Model	Accuracy	Sensitivity	Specificity	Precision	Recall	Fmeasure	G mean
KNN	92%	0.0	0.9	0.0	0.0	NaN	0.7
SVM	67%	0.8	0.6	0.2	0.8	0.3	0.7
LR	50%	NaN	0.5	0.1	NaN	0.0	NaN

**PERFORMANCE ANALYSIS FOR ANN AND LM:**

Mathematical modelling	Accuracy
Parameters (14)	99%

**MATHEMATICAL MODELLING PERFORMANCE:**

Model	Training performance/optimal	Training	Gradient	Iterations
ANN	0.0060	0.99	0.027	300
ELM	Optimal C 0.0	Train Acc 1.0	Test Acc 1.0	Train time 2.3
RELM	16.44	1.0	1.0	0.5

**SECTION 4:****CONCLUSION:**

In this paper we have developed different machine learning, deep learning and mathematical modelling were proposed. In ML and DL gives high accuracy but can predict the heart disease correctly. So in this mathematical modelling have applied with ECG parameters for 14 features for training and testing the model. Finally give the known data it gives 99% and predict the heart disease such as arrhythmia, coronary heart disease, heart failure and heart infections are label and perform the heart disease.

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**CHANGES IN SCHOOL BASED INTERACTIONS AND PSYCHOLOGICAL WELL-BEING OF ADOLESCENTS: A CROSS SECTIONAL STUDY WITH RECOMMENDATION**

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**ABSTRACT**

*There is a growing understanding of the relationship between pupils' psychological well-being and academic success. However, considerably few researches have concentrated on relationship between adolescents changes in school based interaction and psychological well-being. Psychological well-being in this study consists of student's ability to cope with stress, involvement in learning, expectation for future, financial soundness and perception of life satisfaction during Covid-19 lockdown. A cross sectional survey design and virtual snow ball sampling technique was preformed for collecting primary data for inferential analysis. The result of the study indicates that, the level of psychological well-being is average in adolescents. There is a significant difference in coping strategies, especially stress level management among male and female. In addition, covid-19 has a negative impact on social and personal relationship of students during the crisis. The recommendation of the study is help full for parents, teachers, care takers, researchers for implementation and reference.*

*Keywords: School based interaction, psychological well-being, Adolescents, Coping strategies*

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**INTRODUCTION**

As the world becomes more interconnected, so do the challenges we face. The COVID-19 pandemic has crossed national boundaries. It has affected people of all backgrounds, education, income, and gender. The Covid-19 lockdown has also had a significant impact on school education as school closes. Students from privileged backgrounds who are supported by their parents and who are keen and able to learn might well be able to find their way past closed schools are to alternative learning opportunities. Those from disadvantaged backgrounds have always been frequently shut out when their schools closed.

The psychological well-being of school students is an equal in importance and significant to any other aspects of their growth and development. It is a growing concern to teachers, parents and educationist in the educational context because it is related to educational objective (Dodge et al., 2012; Frydenberg et al., 2009). Before Covid-19; students spend copious amounts of time to school-related activities. These activities necessitate face-to-face interactions with teachers, peer group and other school personnel. Because of the active interactions students have every day in the school context, can have an impact on their psychological well-being (Powell et al., 2018). Balluerka et al., (2016), says that, a student's psychological well-being is intimately connected to their interactions at school (Balluerka et al., 2016). Hence active participation in school-based interactions has the power to enhance the positive feeling, because most school based interactions are constructive in nature. When schools actively enhance students' motivation, allow them to develop proactive strategies to cope, inspire them to see their life in a positive way, and provide opportunities to experience happiness and satisfaction, all pupils, regardless of ability, have a better chance of enjoying psychological well-being and academic success.

**Theoretical framework**

Positive psychology's emergence and growth has resulted in an increase in well-being research that has developed two theoretical approaches: hedonic and eudaimonic (Rayan and Deci, 2001). The hedonic perspective focuses on subjective well-being and represents the concept of well-being as an outcome, comprising of an internal state of happiness and satisfaction. According to Deci and Ryan (2008), well-being is defined as experiencing a high level of positive effect, a low level of negative effect, and a high level of satisfaction with life. Eudaimonic scientist asserted that it is crucial for persons to have a sense of elucidation and personal satisfaction. Inspiring from this, Ryff proposed a theoretical model of psychological well-being that includes six different aspects of positive functioning, namely autonomy, environmental mastery, personal growth, life purpose, positive relationships with others, and self-acceptance. This model was proposed after a comprehensive and detailed investigation of human behavior. It has been used in a number of empirical studies in diverse settings. It includes three adolescent samples. Considering that Ryff's model was designed to represent adults' positive functioning, existing evidence appears insufficient to support its application to adolescents. As a result, it is appropriate to investigate whether Ryff's six-factor model can be used as a solid theoretical framework for exploring adolescents' psychological well-being.

**Absence of School based interactions and psychological well-being**

All schools in India physically closed in March last week two thousand twenty as a precautionary measure in reaction to increasing prevalence of Corona virus. This sudden school shutdown and shift from physical interaction to online interaction with peers and teachers was a challenge for students across grade levels (Magson et al., 2020). Decades of well-being researches have shown that physical school attendance has a positive impact on adolescent mental health. Lawrence et al., (2019), opinion that, the relationship between absenteeism and poor mental health is bidirectional, adolescents have poor mental health resulting in higher absenteeism and chronic absenteeism which lead to poor physical and well-being outcomes for children and teens (Wood et al., 2012). The fact that needed children and adolescents receive mental health care while physically present at school emphasizes the significance of attending school in person (Duong et al., 2021). Adolescence stage has been identified as a crucial period for the social development and the need for interactions with peers, but during this time teenagers spending most of their time with peers than parents. (Meuwese et al., 2017 & Steinberg, 2020). Furthermore, school attendance and engagement have been recognized as protective factors for children and teenagers against a wide range of undesirable mental and health outcomes (Bond et al., 2007). Absence of a formalized school environment for an extended period of time creates problems in habit, boredom, frustration and a lack of innovative ideas for engaging in different academic and extracurricular activities.

**Coping strategies**

Coping has been described as a complex multifaceted process (37). According to Lazarus, coping strategy is a process that is triggered by the perception of a threat in order to regulate the resulting emotional struggle and remove the threat [38]. Coping strategies are purposeful and intentional efforts to moderate emotions, habits, cognitions, environmental and external factors and psychophysiology in response to stressful situations [40-42]. These strategies have two personal dimensions: the internal dimension, which is associated with dispositional variables, genetic inheritance, age, and sexual identity, and the external dimension, which is associated with actions taken in response to the demands of a particular situation or socio-cultural environment. Both dimensions interact with one another by predisposing subject matters to unique and characteristic actions [43]. One of the most important aspects associated with coping strategies during pandemic crisis in India is mental health. However, there is a very few studies in coping strategies and socio-psychological well-being of adolescents in India. In addition, Coping strategies are determined by students' mental health, which has changed significantly during the COVID-19.

**Significance of school psychology practices**

Historically, the primary focus of the school psychology professionals was primarily responsible for identifying students with disabilities and providing advice for appropriate interventions and supports. The primary responsibility of school psychologist being the individual assessment and diagnosis of students who may have difference in their academic, cognitive, emotional, social and behavioral abilities (Jimerson et al., 2009 & Jordan et al., 2009). In the last two decades the role of school psychologist has evolved beyond disability/difficulty assessment and identification to direct consultation and service with parents, care takers, teachers and other stakeholders about intervention for children with learning, emotional, behavioral and social difficulties to provide classroom based or individual prevention and intervention consultation (Canadian psychological association, 2007; Jimerson et al., 2009; Jordan et al., 2009). School based psychological practices important during and after the Covid-19 crisis. Psychological support helps to ensure mental health of adolescents.

**Method and materials****Design and study setting**

A cross sectional survey was carried by the investigators to measure the well-being outcome of adolescence and the exposures in the research respondents at the changed school based interactions due to Covid-19. In addition, the investigators used virtual snowball sampling technique to increase the number of sample. Due to the pandemic situation and online nature of the data collection, authors could not limit its expansion to specific geographical boundaries. **Participants**

Participants of the present study are school going Indian adolescence. We received total of 476 response in the June last week to July second week of 2020. The investigators used time period for data collection was after the commencement of new academic year. Out of 476 responses the authors removed 19 in completed responses and include 457 responses for analysis. 34.135% (n=156) participants are males and 65.457% (n=301) respondents are females.



### Medium and Measurement

In this study, authors used self administrated five point Likert scale focused on school based activities and psychological well-being questionnaire. The questionnaire distributed for data collection in the form of an anonymous Google form. Because of the lock down and home isolation collecting data from adolescence is very difficult. For this, it was circulated through different social Medias such as, Whatsapp, Instagram and Face book contacts with all instruction on how to fill it appropriate manner. The questionnaire consists of 35 items with five responses; strongly agree Agree, Neutral, and Disagree and strongly disagree. For the positive statement of the scale, the score given are 5, 4,3,2,1 and for the negative items the reverse scoring was adopted. After the statistical item analysis 30 item were included in the final analysis.

### Statistical analysis

The SPSS software was used for the inferential statistical analysis of collected data. A descriptive analysis was carried out and normality of the data was confirmed. Person product movement correlation was performed to find out relationship between changes in school based interactions and psychological well-being among adolescents. In addition, independent t-test used for finding the difference of coping strategies among male and female adolescents during the pandemic and impact of school based interaction among male and female students. To understand the effect of changes in school based interaction with their personal and social relationship the linear regression analysis was carried out.

### RESULTS AND DISCUSSION

The level of Psychological well-being of adolescence in the changed school interaction is shown in the Table1, it reveals that, 67.83% (n=310) adolescent having average level of psychological well-being. 17.06% (n=78) and 69 (n=15.09) have high and low level of well-being respectively.

**Table1: level of psychological well-being of adolescent in changes in school based interaction**

Variable	Sample size	Percentage	Level of psychological well-being
Psychological well-being among adolescent	310	67.83	High
	78	17.06	Average
	69	15.09	Low
	457	100	Total

**H1: There is no relationship between changes in school based interaction and psychological well being of adolescent**

**Table2: Changes in school based interaction and Psychological well-being of adolescents**

		ChngSchlinter	Psychowellbeing
ChngSchlinter	Pearson Correlation	1	.429**
	Sig. (2-tailed)		.000
	N	457	457
Psychowellbeing	Pearson Correlation	.429**	1
	Sig. (2-tailed)	.000	
	N	457	457

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficient of 0.429 is a moderate relationship. As changes in school based interactions make moderate changes in psychological well-being of adolescents. For the hypothesis test, our p-value is equal 0.000, it means, p-value is less than 0.01 level of significance. Consequently, we are rejecting the null hypothesis and we can conclude that the relation between both variables is statistically significant.

**H2: The coping strategies among adolescent male and female are not equal.**

Since  $p > .001$  is greater than 95% confidence interval of the difference, So that, we can accept the null hypothesis, and it concluded that, the coping strategies among adolescent male and female not equal. Based on the result of t-test there was a significant result in coping strategies among adolescent males and females.

**Table 3: Coping strategy and adolescents**

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Coping strategy	Equal variances assumed	2.129	.157	-.904	26	.374	-1.37427	1.51941	-4.49746	1.74892
	Equal variances not assumed			-1.062	23.582	.299	-1.37427	1.29372	-4.04688	1.29834

H3: There is no significant difference in mean value of effect of changes in school base interaction between male and female

**Table 4: Changes in school based interaction between male and female**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
	Equal variances assumed	2.739	.110	2.207	26	.036	4.60234	2.08571	.31510	8.88958
	Equal variances not assumed			2.693	25.181	.012	4.60234	1.70918	1.08350	8.12117

The p value is  $> .001$  is greater than our chosen 5% (0.05) significant level. That means, we can accept null hypothesis at 95% confidence interval of the difference. There is no significant difference among male and female adolescent's changes in school based interactions. That means, there is no gender based difference in effect of changes in school based interactions.

**H4: The effect of changes in school based interaction is not associated with their personal and social relationship**

**Table 5: effect changes in school based interaction and relationship**

ANOVA <sup>a</sup>						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1 Regression	1876.452	1	1876.452	48.755	.000 <sup>b</sup>	
Residual	17511.833	455	38.488			
Total	19388.284	456				
a. Dependent Variable: changes in school based interaction						
b. Predictors: (Constant), Relationship						

**Table 6: Coefficients of changes in school based interaction and relationship**

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.198	1.724		13.460	.000
	Relationship	.723	.104	.311	6.982	.000
a. Dependent Variable: changes in school based interaction						

- **P -Value or Sig Value:** 95% 1 confidence interval level chosen for the study. In the above table, the p-value is 0.000, that means, the p-value is less than 0.05. Therefore, the result of the study is significant at 0.05 significant levels.
- **F- ratio:** the F-ratio is greater than 1 for F-ratio yield efficient model, in the ANOVA table (table: 5), the value is 48.755, which is good.

It concludes that, as the P-value of the ANOVA table (table:5) is below the tolerable significant level, therefore we rejecting null hypothesis. The Sig. value of the coefficients is below the tolerable level of significance in this study i.e. below the 0.05 for 95% confidence interval. Therefore, the null hypothesis is rejecting with statistical evidence (table: 6). It means there is an impact in changes in school based interaction and relationship of adolescents during the pandemic crisis.

## RECOMMENDATIONS

It is necessary to formulate strategies to improve children and adolescents' access to psychological well-being services both during and after the Covid-19 crisis. Recommendations for ensuring school going student's mental health during the COVID-19 and after the pandemic crisis as well as the roles of parents, teachers, counselors, doctors, and policy makers medical care system are being discussed. A brief summary of target group, support system needed and primary role of different stakeholders are given in the below Table.

**Table 7: Recommendations for ensure mental health during and after Covid-19.**

Target group of adolescence	Support system/ supporters	Role of support system
Adolescence	Parents	Being best role models, prepare to have positive relationship with peers, elders, teachers etc., mental health hygiene, practicing become a good social, and adaptive coping.
	Teachers	Life skill development programs, develop emotional intelligence, practicing social concern and promoting mental welling through different task/activities.
	School counselors	Epithetical listening of problems, knowledge of client back ground knowledge and referral to medical professionals
	Peer group	Listening, sharing, supportive role and identifying possible solution
	Mental care / social work volunteers	Creating materials for parents, teachers, counselors and students, online portal for sharing, orientation for parents, teachers, students, life skill training, awareness campaigns, follow up activities and research.
	Various online/ social media platforms	Eradication of fake and misleading information, online training and counseling, videos, talk, short films about positive mental health
Adolescence with special needs	Parents	Practicing daily functions, emotional intelligence, prepare to manage emotions, early identification of mode changes, maintaining consistent routine, practice social communication and activities, allow them to being social like typical students.
	Remedial schools/ teachers	Practice emotional intelligence, early identification of mode changes, practice social and soft skills, remedial teaching.
	Social workers/volunteers	Orientation to parents and children, identification of high risk students, training to psychological first aid to parents, care takers, special teachers, referring to mental health care advocates.
	Medical health care support system	Create material and tools for early identification and support, parent-focused intervention, training and meditations to parents, teachers and students.
	Parents	Early identification of character change, practice healthy friendship, being supportive, spends time with children, love and care, being a good listener, prepares them to avoid toxic relationship.
	Social workers/	Financial and educational empowerment, provide opportunity

Adolescence from Vulnerable or underprivileged background	NGOs	to develop, early identification of high risk children and supports, coordinating parents care takers and teachers.
	Police	Awareness about rules and regulations, laws and rights, duties and punishment, importance of being a good citizen, orientation and training.
	Mental health care system	Development and distribution of material for community volunteers , social workers and NGOs for identifying migrants, children from slams, broken family, first aid services, community well-being support, free medical consultations.

## CONCLUSION

Many cross-sectional researches have been conducted to investigate the effects of COVID-19 and confinement on children and adolescents. According to the findings of previous studies, the extent and nature of this impact are dependent on a number of vulnerability factors such as social distancing, educational status, developmental age, pre-existing mental health condition, absence of peer interaction, being economically disadvantaged, or being separate from family due to infection or fear of infection. In addition, studies result that adolescence has more disturbed sleep, inattentiveness, nightmares, clinginess, poor appetite and significant separation problems. In this study, there is a significant difference among psychological well being in male and female students. In addition, the level of psychological well-being in adolescents is average. Covid-19 and changes in school based activities negatively impacted adolescent student irrespective of gender. The findings and recommendation could help to prevent changes in school based interaction stress, frustration and psychological issues with Covid-19 crisis in educational settings, home and we hope that, the recommendation helps to provide a better support system to students during and after pandemic crisis. It ensure a positive psychological and social well-being among students and it leads to better self-confidence, esteem and successful social and academic life..

## FUTURE STUDY

Despite the fact that this study produced some research findings and outcomes, flaws persist. First, the sample technique, but given the constraints, it was the only way to collect data. In the future, stratified sampling will be used, and the number of participants will be increased. Second one the authors concentrated only psychological well-being of adolescence, authors need to expand study to children and higher education people. And also there is need to study the social-wellbeing of students in this crisis situation. In addition, we did not examine the more demographic variables and learning outcome of adolescence in the changed school based interaction, thus this should be investigated further in future research studies.

## ETHICAL CONSIDERATION

Ethical review and approval was not required for the study on undergraduate student participants in accordance with state and national legislation. Written informed consent for participation was not required for this study in accordance with the national legislation and the university requirements, but the introduction part of the questionnaire the researcher explained the purpose of the work and the information provided by the participants will be kept strictly confidential and will be used only for research purpose. The respondents of the study informed that completing the questionnaire is considered as the consent for participation and approval for publication of the study according to ethical publication standards.

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## PRINCIPLES FROM LEARNING THEORIES FOR ONLINE LEARNING

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*Because of coronavirus (COVID-19) spreading the educational institutions are closed which increase the demand of online learning for continuing the educational process. Online learning has increased incrementally in recent months and rapid transitions to online learning were made at all levels of education in order to reduce the traditional classroom environment where face-to-face communication is very intense and social distance is almost non-existent at times. The number of students who cannot attend schools or universities due to the epidemic is increasing rapidly, governments from all over the world have decided to close educational institutions to control this global epidemic (UNESCO, 2020). This study examines the relation between learning theories and online learning. In today's world where online learning has increased due to technological developments and the epidemic (COVID-19), this research is thought to be important in that it analyzes the learning theory and its implication in online learning. Moreover, this research is thought to provide a contribution and resource to the stakeholders in higher education institutions during the epidemic and post-epidemic education and training process.*

*Key words . online learning, learning theory, principle of learning*

**INTRODUCTION**

Students possess certain preconception about the topics under the study sometimes these preconceptions may not be in agreement with the scientific conception or scientist conception (Tytler 2002). These preconceptions are sometimes helpful for assimilating the new knowledge and sometimes it is a hindrance to the assimilation of new knowledge. The preconception which causes hindrance to the assimilation can be called as misconception. For a teaching learning process to become effective the teacher has to identify the preconception of the students. Cognitive structure analysis is very effective in identifying the preconception.

The requirement for an effective teaching learning process is the conceptual modification or conceptual change. According to Piaget the major cognitive process involved in the conceptual modification is assimilation, accommodation and equilibration. For the conceptual change to take place in a desired direction the teacher must have to identify the existing or preconception of students.

The conceptual change means the restructuring of the knowledge (Carey 1985). The restructuring involves the modification of existing linkages between the concepts and establishment of new linkages with the new concepts. The restructuring may be weak or strong restructuring. New relation is established or some modifications are taken place in the weak restructuring but in the strong restructuring moving of one conceptual system to another takes place. Experience makes the restructuring of conceptual structures. This makes the importance of experiences in teaching learning process. Experiential learning provides direct experience to engage learners to increase the knowledge. Focused reflection is also involved in the experiential learning which also results in knowledge development that is conceptual change. Experiential learning involves a four stage cyclic process which involves concrete experience, reflective observation, abstract reasoning, and active experimentation. The individual must reflect on the contradiction between the assumption and actions which leads to the new thought and ideas (Kolbe 2014).

In this COVID-19 period teaching and learning process in colleges, schools and universities are shifted to online mode. This requires a digitally rich educational environment both for teachers and students. On-line learning increases the scope of personal learning platform which requires the flexibility and adaptability from the part of both students and teachers. The online mode of learning requires self-motivated students for which the students must be self-sufficient, independent and self-directed. Self-directed learning means the type of learning in which students are directed by themselves in the learning process; students take the control of learning. Mobile phone usage for academic purposes increases in students which compels the teaching learning process to shift to student-centred learning. Learning experience to be provided to students through on-line learning must be analyzed and made at the same time interactive in nature. On-line learning platform brings the traditional classroom to virtual which changes the meaning of learning by providing active learning experience. Individual needs and differences must be considered in online learning. Students in online learning get the opportunity for differentiated instruction and collaborative learning.

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### Need and significance of the study

This study is aimed to find out the involvement of different psychological principles derived from the 3 group of learning theories. Online learning gain importance not only in the covid period but also in the post covid period . The technological development happened as part of continuing the education process is the major driving force for the continuing the online mode of teaching and learning. The psychological principles derived from the different learning theories must be incorporated the in the online learning. By identifying the principles essential for the different steps in the online learning, the instructors or teachers can successfully implement in the online learning and there by the learners will get maximum benefits from the online learning

### Objectives of the study

The important objectives of the study are

1. Analyse the different learning theories for identifying psychological principles
2. Identifying the psychological principles essential for the different steps in the online learning.

### Learning theory

Various theories are developed for understanding the learning process which is helpful to explain the learning process that involves the receiving, processing, retaining and transforming the knowledge. It give an idea about the learning environment has to be created for the effective learning by understanding the learning process of an individual. Different disciplines are involved in the development of learning theory such as psychology, sociology, neuroscience and education. Most popular learning theores are behaviourism, cognitivism and constructivism.

#### Behaviorism

It gives importance to the question how people behave in a particular situation. In the educational context it gives importance to the 177nalyzin of students while learning after learning. Here involves a cause and effect phenomenon that is in 177nalyzing the the responses of the students towards a particular stimuli. On repeating the stimuli the association is establish for the stimuli and responses. The core idea of behaviourist theory is that learning must produce certain behavioural modification. In the on-line leaning the assessment for the 177nalyzin modification is also included. The mere transaction of content and the development of knowledge is not the ultimate aim of the education process. So in the on-line learning the teachers or instructor must equip the student to change their 177nalyzin. The online content creation is must follow the psychological principle such making learning readiness , principle of simple to complex, developing motivation linking with previous knowledge or existing

#### Cognitivism

In the cognitive theories of learning, development of understanding or insight of the students is given importance. This theory give more emphasize to reasoning , memory and other cognitive factors. Constructivism arise form the thought of the learning will not results in 177nalyzin change , such type of learning cannot be measured. It gives importance thinking process , memory structure and role of motivation. The insight learning theory by gestalt psychologist considers learning as the ability to 177nalyzin the experience provided to the learning in to the cognitive structure. The cognitive structure consist of previously learned concept, ideas and objects. The insight theory does not give any importance to the past learning.

#### Constructivism

This theory focuses on the knowledge construction. It is widely used in science teaching and learning. The construction of knowledge takes place in the context of learners existing knowledge , the social environment and the problem perceived. In the constructivist pattern the teaching learning process must be planned in such away that the process must support construction of knowledge rather than communication. The experiences or the previous learning becomes the strong foundation for the construction of knowledge. Constructivist theory give importance to making association between the concepts and thereby making an expansion in cognitive structure the making of association requires the application of cognitive process like analyse, synthesis, and 177nalyzing177e towards the experience. Individualised experience are one of the important factor in constructivism and thereby developing personal meaning.

The constructivist learning theory is the theory that is still widely used by online earning professionals. This theory states that learners interpret and encode the information on the basis of their own personal perception and experiences. Learners bring with them rich reserves of experiences that form the foundation of their learning. They analyze, rationalize, synthesize, and develop new ideas or tweak old ones through the filter of their

experiences. This means that learners learn better when they are able to attribute a personal meaning or connection to information. The theory is used in online learning by giving real-life perspectives to learners by using simulations, or through story-telling, thus providing learners with something they can relate or emotionally connect with.

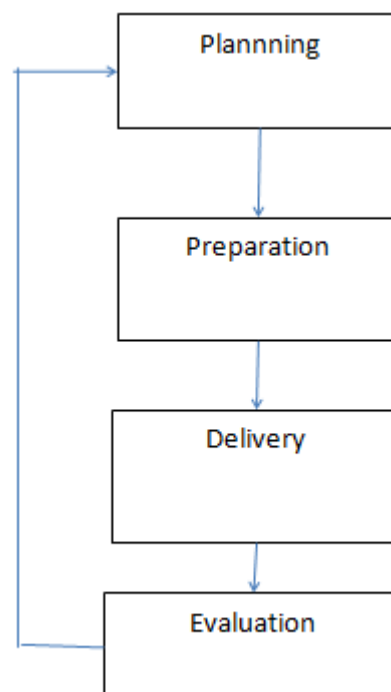
The analysis of the three different learning theory that is behaviourist, cognitive and constructivist, there are 125 psychological principles are altogether from the 14 educational psychologist (Thorndike, Skinner, Pavlov, Guthrie, Tolman, Gestalt, Lewin, Bruner, Vygotsky, Gagne, Ausubel, Piaget And Watson. Among the 125 principle the principles such as self learning, problem solving , learning from know to unknown chaining learning from simple to complex are scored more than 100. The application of these principles are important in the online learning. Other principle have more applicability in online learning are concept learning , discovery learning, child centerdness , insight learning and tormentor (Jaleel S 2010)

### Online learning

Online learning involves the teaching learning process using the internet or web base or by TV streaming. It involves other forms of learning such as E learning, or usage of E content for the learning (Zidat A.H 2021). For on-line teaching learning several application such as ZOOM Goole meet, webex etc are using . the usge of learning management systems such as moodle , MOOC , Microsoft teams are very effective in organising and executing the on-line learning process. Cloud based software such as goggle class room provide real-time communication. The plat form selection for online teaching learning must be wisely in order to achieve the goals set by the educator. The important principles such as accessibility, Equitable distribution communication, monitoring and sustainable.

### Learning theories and online learning

Online learning makes the learning in virtual platform with several advantages such as accessibility, flexibility and personalised. The principle formulated by the learning theories are important in on-line learning also. Online learning involves mainly three phase preparation phase, delivery phase and evaluation feed back phase. The principles derived from the learning theories are important in each phase.



**Figure 1 . Different phases in the online learning**

### Planning phase

This phase is the staring phase in the on-line learning because it involve the setting of objectives for the learning content, selection of content, analysing the learner and content. Before going to prepare the content for the online learning, the teacher must plan very well. The cognitive , psycho motor and affective domains of the learner must be developed . Proper objective must be formulate before the preparing the content. Principle of individual difference, principle goal setting must follow in the step



**Preparation phase**

This is the second phase in the online learning. The content preparation is takes place in this step. Principles obtained from the different learning theories are employed here are the principle of making learning readiness, principle of simple complex, known to unknown , principle reinforcement, self learning , chaining, concept learning , discovery learning , insight learning, Principle of motivation , constructivism, meaning and verbal learning symbolic thinking and collaborative learning.

**Delivery phase**

In this phase the content prepared for the online learning presented to the learner. This can be done in synchronous or asynchronous mode. In the synchronous mode the teacher consider the principle of learning readiness , principle of motivation and principle of curiosity are important

**Evacuation phase**

This the last step in the online learning process . Assessment involves must help tje students get the feed back of the learning process . it also provide measure to improve the learning difficulties. The must be able to identify the different types of learners based on their performance.

**CONCLUSION**

The three brad branches of learning theories , behaviourist , cognitive and constructive theories , on analysis give 125 psychological principles. These principle are applicable not only to traditional methods of teaching but also to the online learning . the online learning involves mainly four phase and the psychological principles derived form the theories are suitable for the different phase are analysed. By considering these principles the the teacher or instructor can effectively carried out the the online learning

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**CORPORATE GOVERNANCE AND BANK PERFORMANCE: AN EMPIRICAL ASSESSMENT**

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**ABSTRACT**

*Key Words of the paper: Corporate Governance, Public Sector Banks, Private Sector Banks, Board of Directors, Banks Performance, Panel Data, Generalized Linear Model*

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**A) INTRODUCTION**

Corporate Governance refers to the way an organization is directed, administered or controlled. It includes the set of rules and regulations that affect the manager's decision and contribute to the way company is perceived by the current and potential stakeholders. The corporate governance structure specifies the distribution of rights and responsibilities among different participants in the corporation such as boards, managers, shareholders and other stakeholders and spells out the rules and procedures and also decision making assistance on corporate affairs. By doing this it also provides the structure through which the company's objectives are set and the means of obtaining those objectives and monitoring performance. Corporate Governance may be the ways of bringing the interests of investors and managers into line and ensuring that firms are run for the benefit of investors.

The underlying philosophy for setting the overall governance framework for the banking sector has largely evolved as an attempt to infuse the banking sector with the best governance practices, keeping in mind the existing structures. In the case of public sector banks the essential elements of governance structure, such as nature of ownership, composition and responsibilities of board and fit and proper criteria for directors is embedded in specific legal statutes. In respect to private sector banks, while certain elements are enshrined in the Banking Regulation Act itself, the other emerging elements have been sought to be addressed through regulatory guidelines.

Adopting a corporate governance perspective, we should start by facing the shareholders' value *versus* stakeholders' value dilemma. If we believe that the purpose of corporate governance is to protect exclusively the interest of shareholders then we would use some of the traditional financial measures to determine performance. On the contrary, we could advocate for a governance system that would take into account the problems of other constituencies, such as employees, creditors, communities in which they operate. Corporate Governance becomes an important issue to explain bank performance, and other measures like entity survival or growth might appear to be more relevant.

While India has adopted a unitary board structure a vast majority of the companies are not having truly independent boards. Most of the companies in India belong to the 'insider' model where the promoter families have a tight control over the functioning of the boards. The non-promoter members of the board often are hand-picked by the promoters themselves either on account of their business dealings with them, or that they have invited them either for bestowing prestige value to their boards or on account of mutual understanding to be on each other's boards.

The International Finance Corporation (IFC) defines Corporate governance as the structures and processes for the direction and control of companies. Corporate governance concerns the relationships among the management, Board of Directors, controlling shareholders, minority shareholders and other stakeholders. Thus, incidental from the above definitions, Corporate governance is a system and process of decision making, control and accountability that assigns corporate resources so as to include and address the interests of all stakeholders of a firm.

The scope and implication of Corporate governance however is quite broad as has been indicated by Claessens (2006). The author investigates the relationship between corporate governance and economic development and find that better corporate governance framework benefit firms through greater access to financing, lower cost of capital, better firm performance, and more favorable treatment of all stakeholders.

According to the Cadbury Committee Report (1992) and Organization for Economic Co-operation and Development (OECD, April 1999), Corporate Governance is defined as the procedures and processes according to which an organization is directed and controlled. The corporate governance structure therefore, specifies the distribution of rights and responsibilities among the different participants in the organization – such as the board, managers, shareholders and other stakeholders – and lays down the rules and procedures for decision-making.

**A) Purpose**

The failure of banks in the global financial crisis has largely been attributed to failures in corporate governance practices underpinning poor corporate culture and ethics (Googoolye 2013). Given the important financial intermediation role that banks play in an economy, the public and the market have a high degree of sensitivity to any difficulties potentially arising from any corporate governance shortcomings in banks. Corporate governance is thus of great relevance both to individual banking organizations and to the international financial system as a whole (BCBS, Principles for Enhancing Corporate Governance, 2010). Corporate governance has gained relevance especially during the last economic crisis and the financial devastation of many companies and banks, still very little attention has been given on both corporate governance and performance of banking sector globally (Ermina and Maria, 2010). A transparent management with a high degree of corporate governance can alone motivate the workforce to keep performing at the highest levels of efficiency over a long period. Furthermore, the ultimate responsibility of the soundness of a bank rests on the board of directors and this requires that the board is well informed of the management's actions and can satisfy itself on the quality of the reports that are being placed to it. These form the basis for corporate governance (Kamath et al. 2003). Fauzi & Locke (2012) investigated the role of board structure and the effect of ownership structures on firm performance in New Zealand's listed firms. They argue that several studies, the majority from the U.S., U.K. and Japan, have examined the relationship between corporate governance mechanisms, ownership structure and firm performance. Those studies yielded different results, affected by the nature of the prevailing governance system for each country. The study uses a balanced panel of 79 New Zealand listed firms, this study employs a Generalized Linear Model (GLM) for robustness. The result reveals that board of directors, board committees, and managerial ownership have a positive and significant impact on firm performance. Meanwhile, non-executive directors, female directors on the board and block-holder ownership lower New Zealand firm performance. Adnan et al. (2011) investigate the impact of corporate governance on efficiency of Malaysian listed banks by using a panel data analysis. Corporate governance variables are represented by board leadership structure, board composition, board size, director ownership, institutional ownership and block ownership. The findings show that smaller board size and higher percentage of block ownership lead to better efficiency of Malaysian banks.

Mohammed (2012) studies the impact of corporate governance on the performance of banks in Nigeria and concluded that corporate governance significantly contributes to positive performance in banking sector and that management independence is positively related to effective corporate performance. Mang'anyi (2011) empirically explored ownership structure, corporate governance and its effects on performance of firms in Kenya with reference to banks. They recommended that corporate entities should promote corporate governance to send a positive signal to potential investors and the banking regulator should continue enforcing and encouraging firms to adhere to good corporate governance for efficiency and effectiveness.

Pandya (2011) opines that there is a significant relationship between governance structures and firm performance. The author studies the effect of corporate governance structures, particularly board independence and CEO duality, on the performance of selected Indian Banks measured by return on assets (ROA) and return on equity (ROE).

The dual charge of Managing Director and Chairman with one person is another cause of worry in most of the PSBs. On the one hand, this helps in removing the rivalry between the two positions and, on the other, it reduces the board's ability to fulfill its proper governance function as an independent body. A proper trade-off between the duality and non-duality of the highest post is thus crucial for institutions like banks, more particularly in PSBs, where the senior directors are nominated by the government. Who is the real boss can be a matter of confusion. The board's leadership structure can be conceptualized as a double-edged sword that forces it to choose between the contradictory objectives of unity of command and effective monitoring. Definitely the dual structure comes with costs; it carries the potentialities of rivalry and conflict between two posts. The non-dual structure, which is not conducive to effective governance, is even more detrimental. Unless one is mistaken, in the public sector institutions (banks), what is being visualized is that the Chairman and the MD would both be full-time executives. This will definitely lead to a bi-polar relationship with "blood-letting internecine feuds".

Another issue arises with the composition of executive and non-executive directors on the board and their autonomy.

Hence in order to identify the significant relationship between CEO Duality, proportion of independent directors and board size to banks performance detailed analysis of interrelationship of key parameters of Corporate

Governance and Banks' performance with special reference to Public and Private Sector Banks in India has been carried out

## B) Methodology

### Objective:

To analyze the interrelationship of key parameters of Corporate Governance and Banks' performance with special reference to Public and Private Sector Banks in India

### Hypothesis:

H1: CEO Duality has significant relationship with Bank's Performance

H2: Proportion of independent directors to Board size has a significant relationship to Bank's performance

H3: Board Size has a significant relation to Bank performance

### Method of Analysis and Interpretation:

The sample consists of 20 Indian Banks, consisting of top ten 10 Public Sector banks and top 10 Private Sector banks during the period 2012-2016. The sample consists of 100 observations over the period. The observations are compiled as Panel data for 5 years and for 20 banks. The study is based on secondary data collected through Bank annual reports and official websites.

### Variables:

1) Dependent Variable – The dependent variable is the performance of Banks, which is measured by Return on Investment (ROI), coded as PERF; computed by dividing Net Income by Total Average Assets

2) Independent Variables : There are three independent variables representing the Corporate Governance parameters for Banks.

These are:

Board size- measured by number of Board of Directors, Code for Board size is BORDSIZ

Duality = Measured by whether chairman and CEO are same person or different.

Code for quality is DUAL

DUAL = 1 if same person is Chairman of Board and CEO

DUAL = 0 otherwise

Proportion of Independent Directors = measures by the proportion of independent directors on Board. Code for proportion of independent directors on board is BPI

3) Control variables

Control Variables – There are 4 control variables related to firm specific characteristics.

Ownership is measured by whether the bank is public or private. Code for ownership is OWN

OWN = 1 if bank is public, OWN = 0 otherwise

Bank size is measured by total assets. Code of bank size is BNKSIZ

Risk is measured by provision for bad and doubtful debts. Code for risk is RISK

Efficiency measured by bank's cost to income ratio. Code for efficiency is EFFE

### Statistical Model:

The complete empirical model is as follows

Regression equation

Performance = f (board size, proportion of independent directors, Duality, public or private, Bank size, efficiency)

$PERF = \beta_0 + \beta_1 BORDSIZ + \beta_2 BPI + \beta_3 DUAL + \beta_4 OWN + \beta_5 BNKSIZ + \beta_6 EFFE + \beta_7 RISK + \epsilon$  (error term), Where

Performance is measured using ROA,

BORDSIZ = Board Size

BPI = Proportion of independent Directors

DUAL = Whether Chairman and CEO are same person

OWN = whether Bank is Public sector or Private

BNKSIZ = Bank Size measured by total assets

EFFE = Efficiency measured by Bank's cost to income ratio

RISK = Risk measured by provision for bad and doubtful debts

### Research Method:

Generalized Linear model has been used to study the Panel data of Banks. IBM's SPSS software package is used to analyze the data through GLM. Previous researches like Adnan et al (2011), have performed Panel data analysis using Generalized least square to overcome problems of non- normal data, heteroskedasticity and auto correlation. Fauzi and Locke (2012), argue that there is ample theoretical and empirical evidence that corporate governance is endogenous with respect to firm performance. To overcome the problems of non- linearity in data, intrinsic heteroscedasticity, homoscedastic additive errors and endogeneity Generalized Linear model was used.

### Empirical Results:

Descriptive Statistics –

**Table -1 – Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
PERF	100	19.12	1584.34	306.8695	278.81212
BORDSIZ	100	7.0	13.0	9.100	1.7951
DUAL	100	.0	1.0	.250	.4352
BPI	100	.0	7.0	2.350	2.1852
OWN	100	.0	1.0	.500	.5025
BANKSIZ	100	36321.57	2259063.05	347929.6766	405031.66544
Valid N (listwise)	100				

### C) Findings:

Table 1 shows the Descriptive statistics of variables used in the study. For Duality, the mean value 0.25, indicates that for almost 25% of the cases, the same person is chairman of Board and CEO, and 75 % have separate chairman and CEO.

The mean value (9.1), of Board Size with minimum 7 and maximum 13, shows the existence of quite reasonable board size.

For BPI indicating the proportion of independent directors on Board, mean value is 2.350, minimum is 0 and maximum is 7.

Ownership, mean value 0.50 indicates that 50 % of banks are Public and 50 % are Private sector banks.

Generalized Linear Model Results:

**Table 2: Omnibus test**

Omnibus Test <sup>a</sup>		
Likelihood Ratio Chi-Square	df	Sig.
73.894	7	.000
Dependent Variable: PERF		
Model: (Intercept), DUAL, OWN, BORDSIZ, BPI, BNKSIZ, RISK, EFFEa		
a. Compares the fitted model against the intercept-only model.		

### D) Findings:

Table 2 shows the Omnibus test for the model predicting the dependent variable PERF. The test is highly significant (at  $p < 0.001$ ), and examines the model fit indicating that the model is significantly suitable to the data.

Table 3. Parameter Estimates

Parameter Estimates							
Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	-125.315	166.6919	-452.025	201.395	.565	1	.452
[DUAL=.0]	335.235	67.0708	203.779	466.691	24.982	1	.000
[DUAL=1.0]	0 <sup>a</sup>	.	.	.	.	.	.
[OWN=.0]	-293.255	63.3841	-417.485	-169.024	21.406	1	.000
[OWN=1.0]	0 <sup>a</sup>	.	.	.	.	.	.
BORDSIZ	37.106	14.8006	8.097	66.115	6.285	1	.012
BPI	-8.536	10.1826	-28.493	11.421	.703	1	.402
BNKSIZ	.000	.0001	.000	.001	11.846	1	.001
RISK	-.031	.0092	-.049	-.014	11.815	1	.001
EFFE	-1.781	2.9269	-7.517	3.956	.370	1	.543
(Scale)	36756.916 <sup>b</sup>	5198.2129	27858.709	48497.253			
Dependent Variable: PERF							
Model: (Intercept), DUAL, OWN, BORDSIZ, BPI, BNKSIZ, RISK, EFFE							
a. Set to zero because this parameter is redundant.							
b. Maximum likelihood estimate.							

Table 3 shows the GLM results for bank performance measured by (PERF), ROA that is ratio of Net Income and Average total assets .

Five variables (Duality,Ownership,Board Size, Bank Size and Risk) were found to be significant in GLM Regression. With regard to Corporate Governance variables, Board Size has a positive significant effect on performance at ( $p<0.05$ ).Duality variable has a positive relationship with performance and is significant ( $p<0.05$ ).Variable for proportion of independent directors is negatively related to performance and is insignificant. The ownership variable has a negative relationship with performance and is significant at one percent level of significance. Bank size variable has a positive relationship with performance and is significant at 5 % level of significance. Variable for efficiency is negatively related to performance and is insignificant.

#### E) Conclusion:

Based on GLM outcome, of proxy of Bank performance, we accept the hypothesis H1 that CEO duality has significant relationship to bank performance. We reject the hypothesis H2, that proportion of independent directors has significant relationship to bank performance.We accept the hypothesis H3 that board size has a significant relationship to bank performance.

#### F) Practical Implications:

The findings of this study have important implication for further research. Corporate Governance and mechanisms to improve and focus on good governance in banks and financial institutions remain in constant focus as the cases of lapses in operational and credit risk mechanism increases in Indian banking sector. The BASEL framework and other regulatory norms in India and the world have increased its attention on corporate governance practices in financial institutions as the banks demand for higher autonomy and reduced supervisory interventions. The financial institutions and their stakeholders need to understand more clearly that good governance is good business and should leverage on the governance principle to improve on the profits of their respective institutions.

The current study however was limited to only ten public sector banks and ten private sector banks from the entire Indian banking sector and pertaining to a smaller period of three years from 2012 to 2016, the validity of the findings interpreted in this study is limited to the scope of the data and the condition of economy for the period of the data. More conclusive evidence may support the hypotheses given a wider data and time period.

#### G) End Notes:

1. Lawrence Tai (2015) The Impact of Corporate Governance on the Efficiency and Financial Performance of GCC National Banks (Pages 12-16)
2. Cynthia A. Utama (2011) The Causality between Corporate Governance Practice and Bank Performance: Empirical Evidence from Indonesia (227-247)

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3. J. Islam, M. Sathye (2015)Examining the relationship between corporate governance and bank performance in Bangladesh (Pages 43-49)
  4. Robin Thomas (2014) Analysis of Corporate Governance and Performance of Indian Banks Assistant Professor, IBMR, IPS Academy, Indore (Pages 5-11)

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**A STUDY OF THE COVID-19 RECOVERY MEASURES IN INDIA**

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**ABSTRACT**

*During COVID-19 period, the people and the government were in a dilemma. They were stood on the path which had two problems that were opposite to each other. It means that the people and government have tried to handle either problem then another one crossed its negative point to its highest, which could have caused lot of disturbance in economy in almost all over the world. Those problems were to save lives of the people from protecting them the COVID-19 virus, the second problem was to ensure the survival of the lower class people local labour, migrant people, street vendor, daily wagers etc. The COVID-19 started to spread rapidly after initial phase than like other governments, our Indian government also had to resort to one and only precaution i.e. stop contact of people. This step is named as lockdown because as the name easily suggest i.e. nobody is allowed to move from anywhere to anywhere in whole India. The main objective of this step was that from stop migration of people from one place to another, they could have stopped spread of COVID-19 virus from one infected person to another healthy person and this would cease COVID-19 virus to one place. This step of government broke the backbone of the lower class.*

*In this study different measures are discussed that were taken during the COVID pandemic by the government and the RBI. India and other countries were also hit by economic slowdown in this pandemic situation, to overcome that slowdown, Government of India and RBI has announced some remedial measures to boost economy. The main measures announced by them were ECGLS scheme, Restructuring Framework, Pradhan Mantri Garib Kalyan Yojana with Pradhan Mantri Garib Kalyan Ann Yojana and PMSVANidhi etc. While these schemes were aimed at achieving much boost to the economy and they have succeeded to enough extent. But for some extent they were not effective as well which means the improper implementation of the schemes made them unfruitful. Although this is true that even every scheme has not implemented effectively but to some extent these schemes were collectively boosted the economy of our country.*

*Keywords: Covid 19, Rbi, Pm Svanidhi, EcglS Scheme*

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**INTRODUCTION**

During COVID-19 period, the people and the government were in a dilemma. They were stood on the path which had two problems that were opposite to each other. It means that the people and government have tried to handle either problem then another one crossed its negative point to its highest, which could have caused lot of disturbance in economy in almost all over the world. Those problems were to save lives of the people from protecting them the COVID-19 virus, the second problem was to ensure the survival of the lower class people local labour, migrant people, street vendor, daily wagers etc. Apart from those micro and small entrepreneurs, shopkeepers were also the part of this. Because other than this class, corporate employees, serviceman or politicians etc. have proper means of survival without coming in contact with other people. On the other hand, the lower class people mentioned above had to make contact with other people for earning money. And we all are well aware that any type of contact was prohibited in order to stop spreading COVID-19 chain. But somehow they have survived the initial phase.

The COVID-19 started to spread rapidly after initial phase than like other governments, our Indian government also had to resort to one and only precaution i.e. stop contact of people. This step is named as lockdown because as the name easily suggest i.e. nobody is allowed to move from anywhere to anywhere in whole India. The main objective of this step was that from stop migration of people from one place to another, they could have stopped spread of COVID-19 virus from one infected person to another healthy person and this would cease COVID-19 virus to one place.

This step of government broke the backbone of the lower class. Their income was fully depending on the daily market sell. But due to lockdown all market places and people gathering were prohibited. So the most affected class by this lockdown was the lower class. After some time of lockdown the government realized and indentified the sectors which were affected by the lockdown and those sectors also contributed in growth and movement of economy. The government then made some committees for discussing some remedial actions to boost the economy of India which has been dropped to negative points due to first phase of lockdown.



International Monetary Fund during COVID pandemic, has cut India's growth forecast for 2020-21 to 1.9% down from its earlier estimation 400 people in India are at risk of sinking deeper in poverty.

After some time of passing lock down some corporate and companies (small) felt that their cost of production or cost of their service has not being met by things receipts. This means that the demand for their service or product has declined. It was also hitting them in their profits. Ultimately they were unable to pay their huge workforce and some of the companies started to pink slips to their employees.

However most of the companies did not want to do this but their financial health was not allowing them to hire such strength of workforce. Thus they had to decide logically more than emotionally because if they decided emotionally then most probably they had not survived themselves. It was a logical step at those times because first objective of those organizations should be survival. Only after surviving that time they would be able to help their employees afterwards. But their logical thinking and steps did not help their employees much. Those employees availed various loans from various financial institutions and were unable to replay their loans. Thus in other words we can summaries that lockdown has ultimately affected the repaying capacity of borrowers and this is process threatened banks and financial institutions for their increasing level of NPA, while on the other hand they cannot even demand for installments from borrowers due to non-availability of funds.

### **RESEARCH DESIGN**

Number of the schemes and plans are implemented by government for recovering from the COVID pandemic. But it was the toughest time for every country and their citizens. They accordingly tried and follow different types of plans for improving the condition of their nation. Some performed well and some failed. Still our government introduced number of schemes and opportunities for the people so that we can come out the trauma of this Corona pandemic. Due to this Covid-19, on the one hand we lost our relatives and friends and on the other hands it hamper the growth of the country. This study is a descriptive study of different plans and schemes of government and Reserve Bank of India. These selective plans have thoroughly analyzed and presented.

### **OBJECTIVES OF STUDY**

The main objectives of this study are given in following manner:

- Overview of different COVID-recovery measures of government and RBI for boosting economy
- Critically discuss these schemes to know that, are these government plans really effective for recovering our economy?

For achieving above objectives the required data has been collected through the interview of some bankers and borrowers and also considered different related literatures of these schemes.

### **Recovery Measures from COVID-19**

Due to corona pandemic, almost all nations of the world are facing the problem of weak economic health of the country. All activities either related from education or business or health is facing downward trend. Each and every sectors of nation are facing one type of stop. Thus for reviving the growth of our country, our government have launched different plans. In which some are discussed in following way-

- 1) After looking this situation RBI came with a solution freezing EMIs. In this step RBI has allowed banks and financial institutions to freeze repayments on loans (term loans as well as working capital), which was outstanding on 1<sup>st</sup> march 2020. In case of term loan, lenders have allowed their customers to give consents for freeze of EMIs. After giving consent, customers have to pay EMIs after three months. In case of working capital the borrower were allowed to not pay their interest for three months. However this interest has to be served in later days. But in both case loans and working capitals would not turn in to bad loans.
- 2) In addition to this the RBI has also instructed to lenders to restructure the small loans for one year, which were on default as on 1<sup>st</sup> march 2020. In another step the various loans which were extended to commercial property were allowed to be treated as standard for one year if they are not being repaid due to reasons beyond control of borrowers.
- 3) For another sector's relief RBI also had come with some other efficient steps. One of them was announcing TLTRO 1.0 (Targeted long term Repo operations 1.0). TLTRO is the method by which RBI allows banks to invest specific sectors through various debt instruments such as corporate bonds, commercial papers and Non-convertible debentures. By this step or investments banks get more than normal cash for themselves. RBI has announced TLTRO 1.0 on 17 April in order to allow banks to increase credit flow to corporate

sector. In TLTRO 2.0, after studying the effect of TLTRO first, RBI has allowed funds of 50000 crore rupees with a condition that at least half of that should go to lower firms. RBI has also allowed 50000 crore rupees to various organization like NABARD, SIDBI, NHB that will ultimately increase credit flow to rural sectors.

- 4) In this series of measures of banks, next measure taken by RBI was making cash available for banks at cheaper cost. The cost of cash for banks is normally affected by CRR, LCR etc. Thus for making cash available at cheaper cost for banks, RBI simply relaxed these and some other ratio. The ratio announced by RBI for tackling during lockdown can be summarized as firstly. RBI has skipped the need of keeping cash aside for small loans. RBI has allowed banks to not set aside cash resources for loans give to small business that were being disbursed between Jan 31 to July 31. This schemes also covers the loans being disbursed to consumers for buying a car or home. In this announcements RBI also had slashed cash reserve ratio to 3% from 4%. By reducing cash reserve ratio, RBI helped banks to retain more cash with them, which will help the lenders to have more liquidity to lend.
- 5) The next step in this series was lowering the liquidity coverage ratio 80% from earlier 100%. LCR is the proportion of highly liquid assets to be held by financial institutions with RBI. It ensures that they have enough capital preservation for economic shocks. The RBI has lowered LCR, which would help banks and other lending institution to have cheaper cash. LCR is also a mandatory requirement under Basel III for banks. The final step for cash at lesser cost for banks was the reduction the repo rate by 75 basis points is a single move during this year. Thus ultimately allowed banks to avail loans from RBI at much lesser cost and they can increase credit flow to the sectors which were being taken by RBI for countering lockdown drawbacks for economy such as regulatory deferrals , higher provisions and half payments of dividends etc. in the steps of regulatory deferrals RBI has delayed the implementation cutoff date of various strict regulations such as the rules that will require banks to fund their activities through stable sources has been delayed by six months. These were have to be implemented by 1<sup>st</sup> April 2020, which has been delayed up to 1<sup>st</sup> October 2020. This will also help banks to reconstruct themselves for tackling lockdown.
- 6) Further RBI has ordered banks to maintain higher provisions of 10% on the loans for which EMI has been frozen for three months. The maintenance of provisions by banks at earlier stage will help banks to adjust the provisions for actual slippage and lastly RBI has instructed banks to half the payments of their dividends to conserve more capital. Bank cannot pay the dividend for the year ended March 31. This decision will be reviewed on September 30 based on their financial position. these were the measures taken by RBI for tackling the lockdown setbacks for banks specifically. There were also some other fields which were demanded attention of RBI and without helping them economy would not be overcome from shocks of this pandemic.
- 7) In this section we will get to know the measures for capital market which were taken during lockdown. It is allowed to companies to avail 45 days extension for declaration of their results i.e. quarterly and annually. RBI also has extended the final date for submission of quarterly governance report. And company was exempted for provisioning of maximum time gap between two meetings.
- 8) RBI also increased trading margin in stocks and reduced market wide position in order to ease volatility in the stocks. In addition the compliance requirements for REITs and INVITs were relaxed to an extent, also extended deadlines was introduced for risk management rules for liquid mutual funds and timelines for filling debentures and preference share issue has also been extended.
- 9) Further RBI has also raised threshold of default amount that is to be needed initiating the insolvency proceedings to 10 million rupees from the amount of one lakh rupees. The top hundred listed companies have been allowed a more month to comply with the requirements of holding Annual General Meetings. Also the rules have been relaxed for recognition of default by local credit rating companies in case of delay in payment of due principal or interest.
- 10) RBI has also allowed foreign portfolio investors for relaxations in processing documents. And lastly shareholders allowed an extension of 45 days for disclosure of their consolidated shareholding in various companies for the financial year ending in March 31. RBI has also taken some measures to help economy boosters in various areas of state and wider economy which will help in boosting economy that have been declined during COVID-19 and lockdown.
- 11) In order to help the state and other wider economy, RBI has introduced measures in major areas such as export and import. The time period for realization and repatriation of the proceeds resulting from export

from shipments before July 31, have been extended for fifteen months. It will provide more flexibility to export. RBI has also allowed the state administrations to borrow as much as half of their annual target for the year starting from April 1. If there were no lockdown, the rules were stricter. But due to erosion of revenue because of corona pandemic, the government and RBI provides number of directly and indirectly relaxation in rules.

- 12) In additions of this RBI has also decided to increase the ways and measurement i.e. short term term funding capital by 60% for all the states over the country which will ultimately enable them to side over the situation. For farmers the government and RBI decided that the government will purchase more oil seeds and pulse from farmers in order to enable them in fighting lockdown with ease.
- 13) Last but not the least, Government of India also comes with the solutions for the public. Government of India has decided to provide free food and fuel for over 80 million poor people, 5 kg wheat or rice and 11g pulse every month regularly from April to June. And all these families will be provided free cooking gas for these three months. As a financial help government has transferred 500 per month for three months in the account of 200 million women with basic bank accounts. While 30 million senior citizens, widows and disabled got 1000 rupees each month and 87 million farmers got 2000 rupees once under an existing program of central government.
- 14) In the insurance field, government announced that number of 2.2 million health workers over the country who are fighting with COVID-19, will get insurance cover of 50 lakh each. It means if they die in the field, their family will get the benefit of fifty lakh rupees. On the front of jobs and wages, government of India has decided to pay the 24% of wages in form of pension and provident fund account to the people who are earning less than 15000 per month. Government has also announced the increment of annual benefit of rupees 2000 to a worker under job guarantee program.
- 15) Finally the government also introduced a scheme named PM SVANidhi for the street vendors. In this scheme the registered street vendor will get a loan of rupees 10000 from the banks for a tenure of 12 months. According to the government this scheme makes them enable to refinance their business activities. The extension of this scheme has been also announced as PMSVANidhi 2.0 in which the borrower who has repaid their first loan successfully will get a loan of rupees 25000 for further 12 months.

### **IMPLEMENTATION**

For banks small and medium business owners having exposure up to 25crore from any institute individually or collectively from one or more financial institutions. RBI has introduced the scheme of BCLGS. In this scheme, government has allocated a fund of rupees 300000 crore for the current financial year. This scheme has introduced and implemented by banks. The reason for this scheme was the poor condition of MSMEs due to COVID-19. Due to which they were unable to repay their dues from banks and other financial institutions. Under this scheme all the MSMEs whose loans or working capital were in standard category as on 29 February 2020, were eligible. Government has provided 100% security for these loans through NCGTC and CGTMSE. The eligible amount in this scheme was 20% of total outstanding and unit must be in running state. It means that any customer or unit whose amount was NPA in prior months but after recovering the due amount, that account has come to standard category as on 29 February 2020. Those account were also eligible under this scheme but with the conditions that the unit would be in running state. The balance sheet and tax returned should be proper for previous years. The maximum limit for this scheme was set to five crore.

For availing this scheme the borrowers should visit their banks with required documents and ask the lending banks for ECGLS. Borrowers don't have to give any additional security for this scheme as government has already provided 100% security. On the other hand banks are also benefited with this scheme as the deteriorating conditions of the units, whose loans were to slipped in Non-performing category would also get fund and run their business successfully. The interest for this scheme was set to 1% above eternal benchmark linked rates subject to a maximum 9.25% per annum. The repayment period was set to maximum four years. The repayment period also included 12 months of moratorium period. However during the 12 months of moratorium period interest should have been disbursed. And for remaining 36 months EMI would have decided in such a way that whole amount should be repaid in time. The amount of interest served should be equal to the amount at the time of application of interest.

The government has decided the timelines for sanctioning the loan under this scheme as on 31 october 2020 or till the target of rupees 3 lakh crore in sanction would be achieved, which ever is earlier. The government has decided the implementation of the scheme in following three phases i.e. ECGLS 1.0, ECGLS 2.0 and ECGLS 3.0. As the scheme would be implemented phase wise the eligibility would also be changed. This can be

understand as all borrowers' account whether they were MSME/individual etc. (but should be for business only) were eligible. The exposure is up to rupees 25 crore across all lending institution. For checking their exposure the lending institution were asked to total help of credit bureau. The borrower's accounts should be in standard category as on 29.02.2020.

While under ECGLS 2.0, the business enterprises/MSME, listed or exiting in 26 COVID related stress sectors, which have been identified by the Kamath Committee on resolution framework and all the healthcare sector who have availed loan from only business purposes were eligible. The condition of total exposure in this phase was set from 50 crores to 500 crores. The standard category condition was same.

While under ECGLS 3.0 all business enterprises in the hospitality trade and tourism and leisure and sporting sector were included in the eligible borrowers' list. The exposure conditions in this phase was set to 500 crore. Standard category conditions were remaining unchanged in this phase too. All the loans which were extended under MUDRA scheme and also reported on MUDRA portal were also eligible. The duration for implementation was kept between the date of the issue of these guidelines by NCGTC to 30 June 2021 or till guarantees for the amount of rupees 3 lakh crore were issued whichever is earlier.

In addition to ECGLS, RBI has also announced the restructuring framework for MSME borrowers, who has availed loans for their businesses and have been affected by COVID-19 badly enough for unable to repay their loans. This framework is strictly restricted to the persons or corporate which have been affected by COVID-19. Under this framework the loans or working capitals which have faced low cash flow during COVID-19, can be restructured after taking proper approvals from borrowers. It means that if a MSME borrower is having a term loan and also unable to repay this due to low cash flow during COVID-19 then his term loan can be rephrased in a manner that the total term of loan can be increased by providing moratorium period up to 24 months. On the other hand, if that same borrower is having working capital loan with the institution then a FITL (Funded Interest Term Loan) can be opened for the interest of the desired period of working capital. This FITL would also have some moratorium period and after completion of that period the borrower had to repay the EMI of that FITL as well as interest of working capital. The second phase of this framework has been announced on June 2021 in the name of Resolution Framework 2.0. The only change made in this next phase was to increase the minimum eligible limit from 25 Crore and above to 50 Crore and above, now the loans or exposure of above 50 crore and above were eligible for restructuring.

The next important scheme announced by Government of India was named as *Pradhan Mantri Garib Kalyan Ann Yojana (PMGKAY)*, which was a part of already running scheme *Pradhan Mantri Garib Kalyan Yojana (since 2016)*. Under this scheme, Government has decided to provide free food grain to about 80 million ration card holders. The objective of this scheme was to enable poor people to face their hunger during COVID 19 lockdown. The Ministry of Finance has announced this scheme initially for three months only i.e. April 2020, May 2020 and June 2020. But after completion of these three months the scheme has been extended till November 2020. The scheme was having an objective of providing the people additional 5 Kg food grains (either Wheat or Rice). These food grains were being provided to the persons who were covered under National Food Security Act 2013 and getting 5 Kg of subsidized food grains. In initial stages i.e. in 2020 duration, Government was also giving 1 Kg pulses along with 5 Kg food grains. The Government has restarted this scheme again in this year 2021 with a modification i.e. disappearance of 1 Kg pulses each month. The expenditure for this scheme was estimated about over Rs. 26000 crore on account of food subsidy and transportation cost from one state to another. This entire cost had to be borne by Government. Apart from PMGKAY, the government had also provided financial help of Rs. 500/- for three consecutive months in the accounts of women having Basic saving accounts.

The Ministry of Housing and Urban Affairs has announced a scheme for street vendors, whose livelihood had affected by lockdown most. This scheme was launched in the name of PMSVANidhi (Pradhan Mantri Street Vendors Aatm Nirbhar Nidhi) on June 2021. It was launched to provide credit for street vendors to recapitalize their business. Under this scheme street vendors can take collateral free loans having low interest rate. The objective of this scheme was to facilitate and make available loan of Rs. 10000/- along with interest subsidy. The other objectives were to sensitize the public with benefits of regular repayment of loans and also provide them advantages of digital transactions. The eligibility criteria for a vendor are following-

- A) Street vendor should be in possession of vending certificate by Local bodies on or before 24 March 2020.
- B) Street vendors, which have been identified in survey but not having any vending certificate should be provided with a provisional certificate.

- C) Street Vendors having LOR (Letter of Recommendation) from ULBs
- D) Street vendors, who have started vending after completion of survey but having LOR from TVC( Town Vending Committee)

The eligible borrowers or Vendors can be benefitted by this scheme in many ways, such as they will get a collateral free loan for their business on a lower interest than market, and on full repayment of first loan the borrowers will be automatically eligible for next enhanced limit. Secondly, they will even get subsidy on interest paid and also get some incentives via digital transactions. Overall, this can be termed as win-win scheme for street vendors.

### **CONCLUSION-**

The COVID-19 virus has definitely affected the whole world very badly in all terms and it is still affecting some of the countries. While some of the countries have overcome the worst situation, some other countries are still under ugly circumstances. Like other countries, India had also been hit by Covid-19 pandemic and we have lost so many lives in this pandemic. But we, as a country, are very thankful to our covid warriors due to them only we are now very much out from that phase. India and other countries were also hit by economic slowdown in this pandemic situation, to overcome that slowdown Government of India and RBI has announced some remedial measures to boost economy. The main measures announced by them were ECGLS scheme, Restructuring Framework, Pradhan Mantri Garib Kalyan Yojana with Pradhan Mantri Garib Kalyan Ann Yojana and PMSVANidhi etc. While these schemes were aimed at achieving much boost to the economy and they have succeeded to enough extent. But for some extent they were not effective as well which means the improper implementation of the schemes made them unfruitful. Such as during ECGLS implementation, DFS had forced the financial institutions to achieve the target of Rs. 3 lakh crore as soon as possible and for achieving this target the institutions pressurize their field functionaries. Which ultimately lose the essence of the scheme as field functionaries started disbursing loans under ECGLS to not eligible customers as well as to unwilling customers. After that when Government transferred Rs. 500/- in the accounts then the Government did not realize the need of consulting with the institutions and they simply choose the accounts with specific product code i.e. PMJDY, and transferred the amount in a single attempt. In this scheme, most of the women who were in need of that money got left out while a lot of wealthy women, who have opened a PMJDY account just for having it and not done a single transaction since the opening, have got money and keep on getting money for three consecutive months. If we see it in another perspective then it can be seen that this money had been transferred during peak of pandemic, and customers had been compelled to visit branch for a mere Rs. 500/- by risking their lives as well as banking personnel lives. Lastly, in the PMSVANidhi scheme, the government had allocated targets to each ULBs without knowing actual number of street vendors, and again pressure game started to achieve the targets anyhow. The field functionaries, either DUDA personnel, Nagar Palika personnel or Bankers, started lending blindly to each applicant without knowing whether the applicant is a street vendor or not. Under pressure of local authorities the ULBs issued vending certificate even to a shop owner and they collectively pressurize bankers for sanctioning loan to these applicants. There were also many misconceptions which were spread by many people like they don't have to repay this loan or if they will not avail this loan then they will not be benefitted by any other forthcoming scheme of Government etc. These all collectively made the scheme unpopular among bankers. In the end this is true that even every scheme has not implemented effectively but to some extent these schemes were collectively boosted the economy of our country and we hope that these will keep on affecting the economy positively.

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## CRITICAL PEDAGOGY AND WORLD CITIZENSHIP EDUCATION

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**ABSTRACT**

*Maximal citizenship educators are dedicated to advancing an strategy to citizenship getting to know which the following staple features: learner centred; experiential; problem- and action-oriented; racialised, classed and gendered evaluation of power; and strengthening the public sphere and democracy. This kind of method to training shares many similarities with the standards of imperative pedagogy. However, in this article we are in search of approaches to refresh and prolong the language and theoretical frameworks used by way of quintessential pedagogues. This is partly due to the fact we have some sympathy with arguments that Frankfurt School Critical Theory stimulated pedagogy nonetheless tends to center of attention on class, at the price of gender and race, analyses. Having stated this, this article seeks to keep away from getting into the interminable debates about what are the most right definitional frameworks for indispensable pedagogy. Instead we suggest to set up the phrases justice pedagogy and complexity pedagogy. The adjective 'justice' does the identical work as 'critical' in signaling our dedication to the usage of schooling as a ability to carry about a greater socially simply world, however has much less baggage. We suppose the current upward push in scholarship in complexity wondering lends itself to conceptualising Justice Pedagogy in always clean ways. We draw interest to the kindred nature of guiding principles in complexity questioning and necessary pedagogy, together with grassroots organizing, allotted selection making and emergent learning, earlier than imparting a description of how such strategies would possibly refresh fundamental pedagogy via a vital citizenship schooling software the use of Justice Pedagogy. We stay in complicated times. For the ultimate forty years, neoliberalism has waged a full-size assault on the shape and function of public education. Under such circumstances, social bonds are being loosened, public items are beneath siege and things of collective accountability are underneath assault by means of the market-driven forces of marketization and egocentric individualism. Given the ongoing assault on democracy, the social contact and the welfare state, necessary pedagogy can play an vital function in reclaiming the public desirable and producing civic education, literacy, individual responsibilities and GCE.*

*Keywords: critical pedagogy, citizenship, education, complexity, justice*

**INTRODUCTION**

As educators, researchers and scholars, we are committed to advancing an method to citizenship gaining knowledge of with the following staple features: learner-centred; experiential; problem and action-oriented; project racial, classification and gendered evaluation of power; and strengthening the public sphere and democracy. This kind of method to training is aligned with more than a few crucial pedagogy traditions. We are, however, searching for methods to refresh and prolong the language and theoretical frameworks we use. This is partly due to the fact we have some sympathy with arguments that Frankfurt School Critical Theory stimulated pedagogy nevertheless tends to focal point on class, at the cost of gender and race, analyses. Having stated this, we nevertheless desire to keep away from debates about what are the most right definitional frameworks for the a number lineages of imperative pedagogy. And in this spirit we recommend to set up the phrases justice pedagogy and complexity pedagogy.

**THE INTENSIFIED CHALLENGES FOR NECESSARY PEDAGOGIES**

The most current traits in capitalism – neo-liberalism and hyper-globalisation – proceed to radically change our lives and society into the photo of the market.

Despite repeated failings, world capitalism privileges market mechanisms with ever greater depth as the most environment friendly and rational device with which to order society. As a consequence, typical values and cultures are in the method of being swept apart and as a substitute changed by means of ideas individualism, indifferent self-interested rationality and opposition between people. Nikolakaki suggests that the force to impenetrable rights for the character has come at the value of the wider community; not like in the past, the place the nation and humans had been companions in a frequent pursuit, now they are pitted in opposition to every different in competition. This kingdom of affairs is, Castoriadis writes, 'self-destructive politically' and requires on the spot motion to remedy. Nikolakaki suggests the following:

Through individualism and opposition humans in a society are marginalized, disempowered and manipulated. Instead, communitarian values, harmony and responsibility, for man or woman and neighborhood autonomy, want to be fostered.

The intensification of this assault is, of course, felt in the instructional sphere. Connell has written how the domains of expertise production, and mainly greater education, have been restructured by means of neoliberal globalisation, which has overwhelmed the collective labor of instructors and lecturers and rather changed it with a opposition the place teachers and lecturers are being subjected to expanded necessities involving accreditation, law and accountability. Salhberg asserts that this intensified hyper-capitalism manifests itself thru the Global Education Reform Movement (GERM). There are three key policy and exercise aspects being pushed by way of this movement: greater market-led opposition will enhance instructional performances; likewise, so will giving college students and households greater capability to select amongst schools; and thirdly, extra standardised checking out will grant imperative facts to extra market- savvy instructional consumers. What follows is growing interference from authorities and non-public enterprise in the day to day jogging of colleges and academic systems, possibly nowhere greater apparent than in the upward shove of the 'edupreneur' - a unusual mixture of salesperson and educator. Describing the effect of hyper-capitalism and neoliberalism on schools, Nikolakaki writes:

Educational establishments have emerge as a foremost goal of marketization agendas that have sought to discursively reconstitute and redefine the nature of training via reworking it from a collective public appropriate into an individualistic commodity that can be sold and offered in the marketplace.

In the case in Australia and New Zealand, as a substitute than capitalising on the innovative motion in training that prevailed in the 1960s, Bronwyn and Davies recommend that neoliberalism capitalised as a substitute on the questioning of teachers' authority:

Neoliberalism strongly bolstered the undermining of the teachers' authority that had been set up with progressivism, moving authority away from each college students and instructors to country curriculum and surveillance authorities. In organising the prerequisites in which neoliberal topics would possibly develop, it brought competitiveness and person responsabilization to pupil 'freedom', hence each appropriating and undermining the revolutionary motion.

This is no longer to argue towards the want for the educational body of workers to have be responsible to the communities we serve. As researchers, there is a want to have interaction with our communities and are seeking for to make certain they advantage from the work we undertake – even of some of these advantages are no longer understand for a generation. Likewise, we should proceed to evolve pedagogically. It is no longer such accountability that we are involved with – nor some broader reform inside the schooling region – however the blind and unquestioned pursuit of the market mechanism in an region that have to be dominated with the aid of the social good.

### **A COMMITMENT TO ACTIVIST TRADITIONS OF CITIZENSHIP EDUCATION**

We distance ourselves from the minimalist, man or woman focused, neoliberal-inspired processes to civics and citizenship training described above. Instead, we align ourselves with longstanding activist traditions of citizenship training.

There are two extensive aspects of activist traditions we desire to spotlight for the purposes of this paper. Firstly, such tactics undertake a a great deal wider definition of citizenship – one that consists of subjects like social justice education, human rights education, carrier studying and democratic education. To our minds, all of these matters ought to be protected as phase of a broader civics and citizenship education. The cause for inclusive of such a numerous vary of matters is linked to the motive of civics and citizenship education. Much like educators such as Dewey (1916; 1938), Freire (1970; 1974) hooks (1994; 2003) and others, we argue for the primacy of civics and citizenship schooling inside school. Rather than being considered as an 'add-on', we agree with these students that getting to know to be an active, engaged and knowledgeable citizen is central to the college experience. Students want to study to realise the reasons of systematic oppression, and to take motion towards that oppression. This motion is collective, now not individual, primarily based on thoughts of solidarity.

From this stems the thought of the instructor as an activist professional. The time period 'activist professional' comes from the writings of Sachs (2000) and it refers instructors who practice widely based totally democratic principles, collective and collaborative motion that builds on a \ of believe aimed at lowering oppression and exploitation. In this model, the activist professional, performing with ardour works with college students to confront troubles in the wider context of citizenship. The identification of the activist expert is one that challenges the fame quo and is worried to 'eliminate exploitation, inequality and oppression'. Activist authorities will shield the sort of schooling which Martha Nussbaum considers crucial to democracy and the



improvement of the respectable world citizen; they will work collaboratively and strategically with others and be organized to take risks to recommend for such an education.

The thought of the activist expert attracts from Freire's imperative pedagogy as nicely as Giddens's generative politics. Freire's necessary pedagogy considers training as a political process, acknowledging the buildings of energy in the gadget on the one hand and the energy of humans to make choices about their personal learning. Giddens's generative politics 'allows and encourages persons and companies to make matters occur as a substitute than to let matters manifest to them'.

The thought of the trainer as an activist expert correlates nicely with Martha Nussbaum's views on the reason of education. She champions training based totally on a mannequin of human development. Such an schooling has as one of its dreams the manufacturing of 'decent world residents who can apprehend the international troubles ... and who have the realistic competence and the motivational incentives to do something about these problems'. To reap this, she identifies three fundamental competencies of citizenship: essential thinking; the appreciation of diversity, 'both the variations that make grasp tough between companies and international locations and the shared human desires and hobbies that make perception essential' and narrative imagination, 'the capacity to suppose what it may be like to be in the footwear of a character distinct from oneself, to be an shrewd reader of that person's story, and to recognize the feelings and needs and needs that anyone so positioned would possibly have'.

In the context of instructors and schools, enabling instructors to be activist gurus permits them to increase questions about whose problems emerge as section of the agenda and how to make certain a vicinity for minority voices and how to set up collaborative tactics to address societal problems based totally on the ideas of justice and equity.

### **CRITICAL PEDAGOGY LINEAGES**

We advocate there are 4 lineages of integral pedagogy which we will briefly outline below. In extending this theoretical framework, we will then argue that there is time for a new and fifth one.

#### **i Public Pedagogy**

For theorists who have a look at public pedagogy: lifestyle can and does function in pedagogical ways. North American pupils – Giroux, Kincheloe, Steinberg, and so forth – put public pedagogy in communicate with cultural studies. This method is a Marxist ideology-critique difficult the educative venture of capitalism transmitted via famous way of life and in search of to mobilise public intellectuals such as writers, journalists, artists and instructors who can train residents to radically change the oppressive prerequisites in which they live.

#### **ii Pedagogies of everyday life**

Not all pedagogy research center of attention on public pedagogy. At the equal time as Giroux, Carmen Luke posted her feminist anthology to study how the home and non-public sphere work pedagogically to instruct youth and female about gender, race and class.

Influenced with the aid of feminist and Foucauldian theories of strength and discourse alternatively than Marxist ideology critique, Carmen Luke describes the goal of her challenge as the interrogation of the pedagogical mission of everyday life: tv and different mass media, parenting magazines, toys, household dinners and feeding work.

#### **iii Cultural Pedagogy**

Australian writers like Megan Watkins, Catherine Driscoll, Anna Hickey-Moodey, Joel Windle and Greg Noble, Rick Flowers and Elaine Swan see North American early public pedagogy as overly deterministic, large brushed and negative. They name for a nearer evaluation of how pedagogy virtually works and for greater interest to be paid to affect, bodies, desire, habituation and embodiment.

#### **iv Experiential, Participatory and Action-oriented Pedagogy**

The fourth lineage attracts on traditions of innovative and constructivist education. Notable icons are John Dewey and Paulo Freire.

### **THE NEED TO RE-INVIGORATE CRITICAL PEDAGOGY**

Critical pedagogy in the twenty first century seems to be at an impasse. Despite being adopted unexpectedly all through North America after Freire's work in the 1960s, it has had solely restricted penetration into formal education. In addition, there are authentic issues that the authentic iterations of integral pedagogy drew too closely from Marxist views on type and for this reason overlooked different vectors of oppression like race and gender. More recently, the influences of the post-discourses such as post-modernism and post-structuralism,

have intended that indispensable pedagogy's declare to a universalising freedom of oppression has been challenged. While a range of crucial pedagogy pupils have addressed these, giving upward jostle to traditions like border pedagogy, liberation pedagogy and radical pedagogy, different imperative pedagogues have counseled that by means of acknowledging the post- discourses, vital pedagogy has opened itself to the criticism that can be visited upon these theories.

It is no longer our intention to have interaction in a definitional debate about which way of life of necessary pedagogy or its descendants is the right one (even had been we to be given such a claim); rather, we desire to enhance a quantity of ideas that we sense would possibly assist the broader vital pedagogical lifestyle to tackle these issues and therefore navigate its way via the definitional mire in which it presently finds itself. It is now not sufficient to repeat calls for greater learner-centered, greater experiential, extra action-oriented, extra participatory and extra emancipatory tactics to citizenship education. We accept as true with these theoretical equipment are important, however we are intent on including and making use of new theoretical equipment drawn from the subject of complexity thinking. We will now talk about these tools, earlier than inserting them into the context of citizenship training to spotlight how they would possibly reinvigorate a necessary approach.

### **EMERGENT LEARNING**

Finally, one of the central tenets of fundamental pedagogy is the method of 'naming the world': that is, to turn out to be literate in the way that energy is introduced in society. This concept is carefully linked to conscientization, which is the procedure through which a character will become conscious of the way that society works to oppress both them or others via covert means. This has hyperlinks with the thought of emergent getting to know and transdisciplinarity in complexity questioning, which is used to describe the new learnings that take vicinity inside a complicated system, commonly as a end result of the interplay between the disparate elements in the system. This new gaining knowledge of impacts each the instructor and students, as a good deal as both of these phrases have any that means in complicated system, and is characterised through being unpredictable and student-directed.

In phrases of fresh indispensable pedagogy, this suggests that educators want to be conscious no longer solely of the content material of the learning, or the pedagogical tactics that they adopt.

### **NAMING THE WORLD AND EMERGENT LEARNING**

As phase of Justice Pedagogy, we have recognized two facets that make contributions to emergent learning: school-community partnerships and experiential learning. During Justice Citizens, we made a aware effort to de-silo training by way of constructing connections between the college students and social corporations exterior to the school. This covered journalists, environmental groups, neighborhood contributors and politicians. This was once finished so that college students had the possibility to trip getting to know in an authentic, actual world setting, as an alternative than in the rather synthetic school room setting, with the goal of presenting an surroundings for the emergence of new types of know-how based totally on the interplay between one of a kind groups.

It ought to be stated that this type of emergent mastering took vicinity for each neighborhood participants and the students. For example, we felt that we grew to be literate in the worries that younger human beings felt had been an trouble in their neighborhood communities, and we additionally grew to become literate in how they felt these issues may be addressed. The participants, on the different hand, started out to discover the a variety of methods in which the neighborhood used to be looking for to tackle their concerns, as nicely as the way strength used to be exercised via organisations.

### **CONCLUSION**

As we stated in the introduction, these are grim instances for vital pedagogues and civics and citizenship educators. Neoliberal forces have engaged in an ongoing assault on the edifice of public education, and the democratic values of unity and collectivism are increasingly being challenged, or even changed via notions of opposition and individualism.

Despite its promise, imperative pedagogy has failed to neutralize the forces of neoliberalism, and is rather wracked via its personal debates about its efficacy and application. However, we agree with that imperative pedagogy can be advanced, even strengthened, by means of drawing on conceptual equipment from complexity thinking. The software of these equipment can reinvigorate essential pedagogy via answering questions about the position of the surroundings and the teacher's authority in crucial pedagogical environments. As an example, these new principles have been utilized to civics and citizenship education, in the structure of Justice Pedagogy, a essential strategy to civics and citizenship education, to illustrate that this re-invigorated method to

necessary pedagogy can discover how to function and even project the dominant neoliberalism current in college environments.

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## CORPORATE SOCIAL RESPONSIBILITY OF NGOS IN CHENNAI

<sup>1</sup>M. Aysamariam and <sup>2</sup>Dr. A. Morarji<sup>1</sup>Research Scholar and <sup>2</sup>Professor, Department of Corporate Secretaryship, Alagappa University, Karaikudi,**ABSTRACT**

Now-a-days Corporate Social Responsibility is a universal topic of these days. Corporate Social Responsibility is a concept where companies combined social and environmental concerns in their business and interact with their stakeholders. A non-governmental organization (NGO) is a non-profit organization that functions separately of government. Though CSR has been carried by most of the companies, there is no information about what extend has been carried out. As per the companies act 2013, section 135(1) states that CSR is mandate for the company having a net worth of Rs.500 crore, b) turnover of Rs.1000 crore c) or net profit of Rs.5 crore. There are many CSR activities performed by the company to fulfill its CSR obligation. This study mainly focuses on the CSR activities taken by the NGOs on behalf of the companies. . The aim of this study is to study about the CSR activities of NGOs and categorization of the activities under four areas. It is observed that all the NGOs are concentrating on health and education and gave less preference to environmental activities. It is suggested to all the NGOs would concentrate on environmental activities to improve the natural resources.

**Keywords:** Corporate Social Responsibility, NGO

**INTRODUCTION**

The widened view of CSR is applicable to government, media, industry, NGOs and other variety of social institutions. The role of corporate social responsibility is to manage its role as producer, employer, customers etc. As a member of society, company creates values for shareholders, employees and customers. Companies are an integral part of society under committed to operating in a responsible and sustainable manner. Many companies that have combined social and environmental aspects into their business plans have found that they can improve relations with legal and political entities. Today companies ought to invest in corporate social responsibility as a part of the business strategy to become more competitive. CSR is recognized as important backbone of the business. The following factors are taken into account for the importance of CSR.

1. Globalization.
2. Increase the size
3. Retrenchment of government
4. Growth of global civil society
5. Companies competing for expertise
6. Increased importance of intangible assets

Today businesses are focused on the triple bottom line. The three lines represent the economy, the environment and the society and they are all depend on each other.

**OBJECTIVES:**

1. To study the CSR activities of NGOs.
2. To categorize the activities under the four heads.
3. To examine the CSR activities are followed as per the companies' act 2013.

**DEFINITION OF CORPORATE SOCIAL RESPONSIBILITY:**

Corporate Social Responsibility may be a concept where companies merge social and environmental concerns in their business and interact with their stakeholders. The aim of corporate social responsibility is give back to the society and offer good value. The four forms of social responsibility are Environmental Responsibility, Ethical Responsibility, Philanthropic Responsibility and Economic Responsibility.

**DEFINITION OF NON -GOVERNMENTAL ORGANIZATIONS:**

A non-governmental organization (NGO) is a non-profit organization that functions separately of government. NGOs are formed on community, national and international levels to serve as a social or political goal for the society. NGOs depend on a variety of sources for funding including:

- membership dues

- private donations
- the sale of goods and services
- grants

**THE FOLLOWING ACTIVITIES CAN BE PERFORMED BY A COMPANY TO SATISFY ITS CSR OBLIGATIONS**

1. Eradicating hunger and poverty
2. Promoting education
3. Promoting gender equality and empowering women
4. Reducing child mortality
5. Promoting Rural Development
6. Improving maternal health
7. Ensuring environmental sustainability
8. Employment opportunities
9. Contribution to the Prime Minister's National Relief Fund or other fund found by the Central Government or the State Governments for socio-economic development.

**TOP NGO's DOING CSR ACTIVITIES:**

1. Bhumi
2. German leprosy & TB relief foundation
3. Sevalaya
4. Hindu mission hospital
5. TVS srinivasan services trust
6. Thuvakkam
7. Ekam
8. All India movement for seva
9. Aide et action
10. Cognizant

**MAJOR CSR ACTIVITIES OF NGO's:**

The following areas are:

1. Health, 2. Education, 3. Women empowerment, 4. Environment

**CSR ACTIVITIES IN HEALTH**

Health services should be improved in India especially in villages. Many companies provide health services through medical camp by various NGOs. Their services are blood donation, providing ambulance, providing covid kit and providing malnutrition.

Name of NGOs	Medical camp	Blood donation	Ambulance	Covid kit	malnutrition	Humanitarian assistance	Free surgeries	Provide oxygen
Bhumi	-	-	-	-	-	-	-	-
German leprosy & TB relief foundation	Yes					Yes	Yes	
Sevalaya	Yes							
Hindu mission hospital							Yes	Yes
TVS srinivasan service trust								
Thuvakkam								
Ekam	Yes				Yes	Yes		
All india movement for seva								
Aide et action								
Cognizant	Yes						Yes	
Total	4				1	2	3	1

Source: secondary data

Among the selected NGOs taken for the study, all of them focus on the health care activities like humanitarian assistance, free surgeries, providing oxygen; conducting medical camps etc. Four out of ten NGOs are organizing medical camps. Three out of ten NGOs conducting free surgeries. And two out of ten NGOs are gave humanitarian assistance.

#### CSR ACTIVITIES IN EDUCATION:



Education programs are conducted for the live of the children to realize the importance of education and provide education assistance. CSR activities conducted by the NGOs are scholarship program, free education; improve the infrastructure, providing libraries etc.

Name of NGOs	Libraries	Value based education	Scholarships	Infrastructure	Community learning centre	Education kits	Education to children
Bhumi	yes	yes	yes	yes	yes		
German leprosy & TB relief foundation							



Sevalaya	yes	yes				yes	
Hindu mission hospital							
TVS srinivasan service trust	yes						
Thuvakkam		Yes	Yes				
Ekam		yes					
All india movement for seva				yes			
Aide et action	Yes	yes					Yes
Cognizant			yes			yes	yes
<b>Total</b>	<b>4</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>

Source: secondary data

Among the selected NGOs taken for the study, all of them focus on the scholarship and children education. Four out of ten NGOs are focusing on libraries. Five out of ten NGOs provide value based education. Two out of ten NGOs provide children education. Three out of ten NGOs provide scholarship. Two out of ten NGOs gave infrastructure facility. And two out of ten NGOs gave educational kits to the rural children.

#### CSR ACTIVITIES IN RURAL DEVELOPMENT:



Rural development refers to the method of enhancing the quality of life of individuals specifically living in remote areas. CSR activities of NGOs are organic farming, gave craft training, infrastructure development etc

Name of NGOs	Organic farming	Craft training	Games	Wealth from waste	Water & Sanitation
Bhumi					
German leprosy & TB relief foundation					
Sevalaya	Yes	Yes	Yes	Yes	
Hindu mission hospital					
TVS srinivasan service trust					Yes
Thuvakkam					
Ekam	yes			Yes	Yes
All india movement for seva					
Aide et action					
Cognizant					
<b>Total</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>

Source: secondary data

Among the selected NGOs taken for the study, all of them focus on the organic farming and Water & Sanitation. Two out of ten NGOs concentrate on organic farming. Two out of ten NGOs focus on waste management. And two out of ten NGOs gave importance for water & sanitation.

#### CSR ACTIVITIES IN ENVIRONMENT:



There are some activities which reduce or eradicate pressures on the environment and which aim at making more coherent use of natural resources. CSR activities of NGOs are animal welfare, ecological balance, waste management, think green etc.

Name of NGOs	Animal welfare	Ecological balance	Waste management	Water and soil conservation	Think green	Environmental sustainability
Bhumi		Yes			yes	
German leprosy & TB relief foundation						
Sevalaya						
Hindu mission hospital						
TVS srinivasan service trust				yes		
Thuvakkam					yes	
Ekam			yes			yes
All india movement for seva						
Aide et action						
Cognizant					Yes	
<b>TOTAL</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>1</b>

Source: Secondary data

Among the selected NGOs all of them focus on the ecological balance and think green activities. Three out of ten NGOs focus on think green activity. One focus on ecological balance and one focus on environmental sustainability.

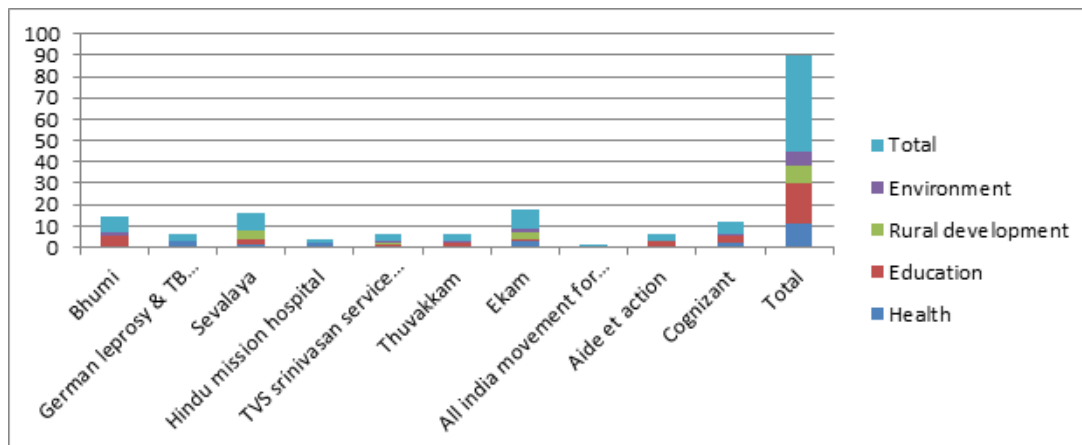
#### ANALYSIS AND INTERPRETATION:

The following table summarizes the NGOs CSR activities under the four heads and their total are:

Name of the NGOs	Health	Education	Rural development	Environment	Total
Bhumi	-	5	-	2	7
German leprosy & TB relief foundation	3	-	-	-	3
Sevalaya	1	3	4	-	8
Hindu mission hospital	2	-	-	-	2
TVS srinivasan service trust	-	1	1	1	3

Thuvakkam	-	2	-	1	3
Ekam	3	1	3	2	9
All india movement for seva	-	1	-	-	1
Aide et action	-	3	-	-	3
Cognizant	2	3	-	1	6
<b>TOTAL</b>	<b>11</b>	<b>19</b>	<b>8</b>	<b>7</b>	<b>45</b>

Source: secondary data



The above table reveals that the ten selected NGOs together perform 45 CSR activities under the different areas. Out of the ten NGOs Ekam foundation doing the maximum CSR activities followed by sevalaya, bhumi and cognizant. Ekam foundation top in the area of health and bhumi top in the area of education.

### CONCLUSION:

CSR activities of the selected ten NGOs are categorized under four areas as Health, Education, Rural development and Environment. It is observed that all the NGOs gave most preference to education. Next, they concentrate on health activities. But they gave least preference to environmental activities. It is suggested to all the NGOs would give preference to environment for the improvement of the natural resources.

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**CUSTOMER SATISFACTION ON E-BANKING PROCESS**

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**ABSTRACT**

*Today's world is one with increasing online access to services. One part of this which is growing rapidly is online banking. Customer satisfaction is imperative for the incessant survival of any organization around the world. The purpose of this study was to examine the relationship between the dimensions of E-Banking service quality and customer satisfaction to determine which dimension can potentially have the strongest influence on customer satisfaction.*

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**INTRODUCTION**

**Online banking**, also known as **internet banking or web banking**, is an electronic payment system that enables customers of a bank or other financial institution to conduct a financial transaction through the financial institution's website. The online banking system will typically connect to or be part of the core banking system operated by a bank to provide customers access to banking services in place of traditional branch banking. Online banking significantly reduces the banks' operating cost by reducing reliance on a branch network, and offers greater convenience to customers in time saving in coming to a branch and the convenience of being able to perform banking transactions even when branches are closed.

**Objectives**

- To Identify the Various Dimensions of E-Banking Service
- To Study the Impact of the E- Banking Service on the satisfaction of customers & Customer Attitude

**Research Methodology**

Empirical research used in this study for the purpose of collecting secondary data. All the data are gathered from journals, websites and published conference papers .

**E- Banking Services Quality**

As the channels of service delivery shifted from traditional to electronic, the need for a scale to measure the e-service quality was felt. Scale was based on twelve dimensions namely:

- ❖ Informational fit to task,
- ❖ Interaction
- ❖ Trust
- ❖ Response time
- ❖ Design
- ❖ Intuitiveness
- ❖ Visual appeal
- ❖ Innovativeness,
- ❖ Flow,
- ❖ Emotional appeal
- ❖ Integrated communication
- ❖ Business processes
- ❖ Substitutability.

The researchers have tried to use the conventional e-service quality models for the measurement of service quality in e-banking.

**E- Banking Services**

- Efficiency

- System Availability
- Fulfillment
- Privacy
- Contact
- Responsiveness
- Website Design

**Bill Payment Service**

Almost all banks have tie-ups with various utility companies, service providers and insurance companies, across the country. One can facilitate payment of electricity and telephone bills, mobile phone, credit card and insurance premium bills. To pay bills, all we need to do is complete a simple one-time registration for each biller. We can also set up standing instructions online to pay your recurring bills, automatically.

**Fund transfer**

One can transfer any amount from one account to another of the same or any another bank. Customer can send money anywhere in India. Once we login to our account, we need to mention the payees' account number, his bank and the branch. The transfer will take place in a day or so, whereas in a traditional method, it takes about three working days.

**Importance of Electronic banking**

Electronic banking has played a significant role in shaping the future of banking in India. So, let's have a look at its importance.

**Convenience**

The greatest advantage that technology has given to people is convenience. Earlier going to the bank for getting things done required time, and energy, but as the technology has evolved so much it has become very quick and convenient. Earlier transferring a small sum of the amount required a few hours, but now this transaction is done within a few seconds, and all this is possible because of the presence of technology. We don't even need to get your passbook updated for tracking your transactions and checking the account balance; all can be done at the tap of your fingers.

**Security**

The problem of security with traditional banking was nowhere to be seen. Even if some amounts were deducted the account holders remain unaware. But with the involvement of technology in the banking system, everything can be tracked, and the best thing is its security. The idea of taking banking online invited fraudulent activities as well, but the banking system is highly secure. Banks use encryption to secure their transactions and customer's privacy.

**Free of cost**

Doing your transactions through the internet or mobile doesn't cost you a penny. All you need a phone with an internet connection or else you can visit your nearest ATM for getting your transactions done. The online payment of bills and the transfer of money everything is possible with the help of the electronic banking system. Earlier the banks charged a nominal amount of money on transactions done online, and because of the amount is very small people were willing to go for it because of the convenience provided to the customers.

**Ease of keeping track**

Another best advantage of using an electronic banking system is the ease of tracking transactions. In the initial step of electronic banking registered bank accounts holders received the information regarding the amount debited and credited along with the total balance that is present in the account. Later with the evolution of technology and the introduction of smartphones, banking applications came into the picture, which reduced all the efforts people made earlier. The need of visiting the bank became irrelevant and minute, as all the details are available on the application which can be accessed anytime.

**Minor banking errors**

Not a lot think about it now, because everything is done online. Earlier when the technology in the banking industry was nowhere to be seen everything was done in the pen-paper mode. And that increased the chances of

clerical mistakes that ultimately caused big blunders. But now as the technology has been involved either the amount has been transferred by the account holders or from the side of the banks, whatever is done it is recorded on the sheets which can be accessed anytime anywhere. .

### **International transfer**

In the initial phase of India's development, transferring money within the country was a big task, and transferring money to international borders was like an achievement. But today this task has become quite easy. All you need to do is feed the account details in the mobile applications and the amount gets be transferred

### **Types of E-banking**

Electronic banking is not a single term it is a vast concept. E-banking has various aspects which are covered under it. Because electronic banking is not done just by one to two modes, there are more than 10 ways by which banking facilities can be availed, and these are:

#### **Telebanking**

It is like the first step taken towards the banking industry which allowed the customers in communicating with the bank. Telebanking helped the customers in making a financial transaction over the call. In this facility, the need of visiting the bank or automated teller machine gets eliminated. The best fact about telebanking is that it remains open for more period than the bank. Nowadays, helpline overcall is available 24×7 throughout the year.

The transactions that can be made through telebanking have some limits. Many banks have imposed restrictions on the types of accounts that can be accessed through the telebanking mode.

#### **ATM**

Automated Teller Machine is one of the first steps taken by banking towards getting technologically involved. It is an electronic computerized telecommunication device, which is totally under the control of financial institutions. You can visit the ATM for withdrawal of money and other account-related queries. At the time when ATM was introduced the account holders had an electronic strip or chip inserted card which helped in the withdrawal of money from the account.

#### **Debit Card**

Debit cards are used for withdrawing money from the automated teller machine. It's a small plastic card embedded with a chip, which helps in providing lots of information about the bank account holder. The best thing about debit cards is that it has reduced the need to carrying cash with us all the time. By using debit cards the amount gets debited directly from your savings account.

we can make purchases from any shops who keep the card swapping machine, which means that if we carry your debit card with yourself, the need for withdrawing cash also gets eliminated. we can make purchases with the help of debit cards, but the amount is limited to what you have kept in your savings account. For shopping beyond the limit overdraft facility has been provided to reputed customers. .

### **Concept Of Customer Satisfaction**

E -banking is an electronic payment system that enables customers of a financial institution to conduct financial transactions on a website operated by the institution, such as a retail bank, virtual bank, credit union or building society. Online banking is also referred as Internet banking, e-banking, virtual banking and by some other terms. This new channel has added a new dimension to the concept of customer satisfaction and how it can be affected in a positive way. All organizations exist and strive to become an integral part of the lives of their customers and therefore always strive harder to keep satisfying their customers through better channels of delivering their offerings.

#### **Determine Customers Satisfaction**

The attributes of e-service quality which predict customer satisfaction, tried to determine if satisfied customers use more online banking features than less satisfied customers and also tried to identify characteristics of less satisfied customers. They found that satisfaction could be generated by improving courtesy, content, timeliness and product and services offered.

The services offered being the most important factor in driving E-banking satisfaction.

- **Efficiency:** The ease and speed of accessing and using the site.
- **Fulfillment:** The extent to which the site's promises about order delivery and item availability are fulfilled.

- **System availability:** The correct technical functioning of the site.
- **Privacy:** The degree to which the site is safe and protects customer information.
- **Responsiveness:** Effective handling of problems and returns through the site
- **Website design:** The degree of ease of navigating through and using the website. Which the site compensates customers for problems.
- **Contact:** The availability of assistance through telephone or online representatives.
- **Dimensions:** a framework was developed for the present study, to develop the relationship between E-service quality in Internet Banking and customer satisfaction.

### Impact of E-banking in India

India saw the rise of technology very late in the phase of rapid development. When the other countries were witnessing technological involvement in the mid-20th century, India was busy with its domestic issues and freedom fighting. Even after Independence India didn't begin stabilizing its economy; and things got more complex. India took a step towards the nationalization of banks, in 1969; where it merged all the small banks into one big bank and involved the government's share as well.

Later in the early 1990s, the World Bank interfered with the matter of the Indian economy. The World Bank advised India to make things easy for the people and ease of doing business should be increased. With the introduction of liberalization, privatization, and globalization, the economy of India started increasing at a rapid pace. And by the mid-phase of the 2000s, India started experiencing technological involvement in the banking system. With the introduction of the telephone and a large number of users, the banking industry took an initiative towards upgrading their system.

With the rapid progress in the IT sector, the Indian economy has seen a prominent rise and the future seems optimistic. The central banking authority of India RBI (Reserve Bank of India) has taken a few points out of the issues that are arising in the process of electronic banking. The issue that the banking system of our country is facing includes security issues, few legal issues, and regulatory and supervisory issues. Electronic banking has been accepted by the citizens of our country, the acceptance has been slow but it has indicated positive promising growth.

The impact of the electronic banking system in India has displayed a positive growth, as lots of technological growth has happened for making the system better. Technological growth has been so immense that it has been the key driver of the economy. With technological advancement, few errors and issues arrived on the way. For eradicating the issues a law has been passed in the year 2000.

RBI has played a major role in uplifting the image of the electronic banking system in India. It has passed laws and special departments are dedicated just to tracking fraudulent activities that are happening online. Today in the condition of the Indian economy in terms of electronic banking has become appreciable. In the emerging phase, only the youth of the country showed a little interest in getting things done online. The payment applications and banking were not commonly accepted by every individual and small business.

After the historic decision of demonetization that happened in the year 2018, changed the way the Indian economy worked. The demonetization left the citizen feeling helpless as cash was the most prominent way of making payment. A crisis of cash was felt immensely at that time. It was a great opportunity for technology to step in and provide a helping hand. The slow down economy of India.

From this landmark event, Paytm emerged as the savior of the people. It is an online payment application from which the amount can be transferred from one party to another. In today's scenario every individual accepts the online payment method. Even small hawkers and business accepts payment through online mode. The method of making payment by using a smartphone became a popular way that provided relief to people. It has helped the economy is standing on its feet again.

### CONCLUSION

This paper aims to make an original contribution to the existing knowledge by investigating the impact of E-banking service quality on customer satisfaction. The various dimensions of the e-banking service quality that were taken into consideration while making the study were: Efficiency, System Availability, Fulfilment,

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Responsiveness, Privacy, Contact and website design. The study revealed that efficiency, privacy and website design are the major integral determinants of E-banking services quality. An understanding of the factors, revealed in the study, allows bank managers and policy makers to undeviating efforts and resources most effectively and efficiently to increase the bank business in the long run and encourage new customers to adopt e- banking and to retain the existing ones.

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**AN OVERVIEW OF CYBERSPACE IMPORTANCE IN SOCIOLOGY WITH REFERENCE TO INFORMATION TECHNOLOGY ACT - 2000****<sup>1</sup>Dr. K. Karthick, <sup>2</sup>Dr. SP. MathiRaj and <sup>3</sup>A. Nithyakarpagam**<sup>1</sup>Assistant Professor, Department of Business Administration, Nachiappa Swamikal Arts and Science College – Kovillor, Karaikudi – 630307<sup>2</sup>Professor and <sup>3</sup>Research Scholar, Department of Corporate Secretaryship, Alagappa University, Karaikudi – 630004

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**ABSTRACT**

*A global domain the usage of internet is very common. The Cyberspace allows users to share the information, interact between two or more members, swap ideas, play games, made discussion or social forums, conduct business and create intuitive media, among many other activities. In India the cyberians are facing more challenging threats and crimes by usage of cyberspace. In this research, the researcher focus on an overview of Cyberspace placing a vital role in the society and what are the regulations amended to the cyberians at the time of usage in Cyberspace under the Information and Technology Act – 2000 . IT Act, 2000 provides the protection to the individuals, corporate, bodies etc. Cyberspace is very common to handle similarly all the age group of the peoples. Now – a – days the hacking, tracing the data, i.e. Cyber Crimes are increased in the society and they are used the data by illegal way. So, the government had focused the cyber space threats and crimes by forming the governance all over the country. The aim of the cyberspace says that, Establish and maintains a secure cyberspace to safeguard national interests and preserve the fundamental rights and values of society. In India, the security was provided to the cyberians in the cyberspace by introducing the Information and Technology Act, 2000. Cyber Law also regulates the cybercrime and Threats.*

*Key Words: Cyberspace, cyberians, Cyber Crime and Threats, Society, Information Technology Act, 2000.*

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**INTRODUCTION**

The Information Technology Act, 2000 and Cyber Law provide the security to cyberians. The term cyberspace was first introduced by William Gibson in his 1984 book, Neuromancer. Peoples are using cyberspace for their innovation, creativity, business, education etc. The Cyberspace allows users to share the information, interact between two or more members, swap ideas, play games, made discussion or social forums, conduct business and create intuitive media, among many other activities. Cyberspace is related to global environment and it is a main component for E-Commerce. In Business or wherever stakeholders set up virtual meeting spaces, we see the cyberspace existing. Cyber space is the vital role for the society. It plays a supreme role for the users. Any persons use the cyberspace we said that, they create the cyberspace. Cyberspace is a vital port for the cyberians to use the E-commerce, share some ideas and provide education etc. Now – a – days there are more threats and crimes are happening when the users are share the information in Face book, YouTube, Twitter, Instagram , Whatsapp, Telegram etc. The fraudulent activities are increased in India regarding the manipulation of cyberspace. India decided to stop the hacking of data by implement the Law like Cyber Law and Information Technology Act, 2000. In India at present scenario the commerce professionals like the Company Secretary, Chartered Accountant & CMA and some other government officers are used digital signature. Digital Signature is confidential for the professionals. So, the government has more responsibilities to give protection to the users. Mostly hackers are hacking the data easily from the cyberspace. The provision of cyber law is prohibited the fraudulent activates in the cyberspace.

**OBJECTIVES OF THE STUDY**

1. To create awareness to the peoples about the cyber threats and crime by usage of cyber space.
2. To give legal recognition to any transaction which is done electronically or use of internet.
3. To educate the general public about the Information Technologies Act, 2000
4. To give legal recognition to digital signature for accepting any agreement via computer.

5. To increase the higher security to cyberspace like Whatsapp, face book, instagram, YouTube, etc.

### BIRTH OF INFORMATION TECHNOLOGY ACT - 2000

The united nation general assembly has adopted the model law on electronic commerce on 30<sup>th</sup> January, 1997. It is referred as the “UNCITRAL model of E – Commerce”. UNCITRAL stands for United Nations commission on International Trade Law”. It has the legal framework. India Enacted the law on 17<sup>th</sup> may 2000. The IT act came into force on 17<sup>th</sup> October, 2000 and it’s amended on 27<sup>th</sup> October, 2009. The amended act is known as “THE INFORMATION TECHNOLOGY (Amendment) act, 2008.

### BASIC DEFINITION OF INFORMATION TECHNOLOGY ACT – 2000

■ **CYBER CAFÉ** : According to Section [2(1)(na)] Cyber Cafe refers that, any facility from where access to the internet is offered by any person in the ordinary course of business to the members of the public.

■ **CYBER SECURITY:** According to the section 2(1)(nb) refers, the protecting information, equipment, device, computer, computer resource, communication device and information stored therein from unauthorized access , use, disclosure, disruption or destruction.

■ **COMPUTER NETWORK:** As per the provision [Section 2(1)(j)] It refers that, the interconnection of one or more computers through -

- (i) The use of satellite, microwave, terrestrial line or other communication media; and
- (ii) Terminals or a complex consisting of two or more interconnected computers, whether or not the interconnection is continuously maintained.

■ **ACCESS:** According to [Section 2(1)(a)] access refers with its grammatical variations and cognate expressions means gaining entry into, instructing or communicating with the logical, arithmetical, or memory function resources of a computer, computer system or computer network.

### EMERGING TRENDS OF CYBER LAW

Organizations are advised to strengthen their data with better inspection methods. Here some of the emerging trends are ,

- ✚ The regulations are strengthening in many countries to prevent unauthorized access to networks. So, such acts are mentioned as penal offence.
- ✚ Mobile company’s stakeholders are call upon the governments of the world to support the cyber legal systems and administration to regulate the emerging mobile threats and crimes.
- ✚ The upcoming trend is growing awareness about on privacy of usage the web browsers like Google, Mozilla Firefox etc.
- ✚ Cloud computing is another major growing trends.

### CREATE AWARENESS TO GENERAL PUBLIC

In India, the government conducted various awareness programs to the professionals about how to prevent your data from the cyber crime and threat. For the general public is partially aware of the crimes. However, the general publics are unaware of the huge picture of the threats that could affect their cyber-lives. There is a biggest lack of knowledge on e-commerce and online banking cyber-crimes among most of the internet users.

- ✓ Be vigilant and follow the tips given below while you participate in online activities.
- ✓ Filter the visibility of personal information in social sites.
- ✓ Do not keep the "remember password" button active for any email address and passwords
- ✓ Make sure your online banking platform is secure.
- ✓ Keep a watchful eye while shopping online.
- ✓ Do not save passwords on mobile devices.
- ✓ Secure the login details for mobile devices and computers, etc.

### MISSION AND VISION CYBERSECURITY PROGRAM

#### MISSION

The following mission caters to cyber security

- To safeguard information and information infrastructure in cyberspace.
- To build capabilities to prevent and respond to cyber threats.
- To reduce vulnerabilities and minimize damage from cyber incidents through a combination of institutional structures, people, processes, technology, and cooperation.

### VISION

- To build a secure and resilient cyberspace for citizens, businesses, and Government.

### CYBER CRIME

The Information Technology Act 2000 or any legislation in the Country does not describe or mention the term Cyber Crime. It can be globally considered as the gloomier face of technology. The only difference between a traditional crime and a cybercrime is that the cyber crime involves in a crime related to computers. Let us see the following example to understand it better

**Traditional Theft** A thief breaks into Ram's house and steals an object kept in the house.

**Hacking** A Cyber Criminal or Hacker sitting in his own house, through his computer, hacks the computer of Ram and steals the data saved in Ram's computer without physically touching the computer or entering in Ram's house.

### NATURE OF THREAT

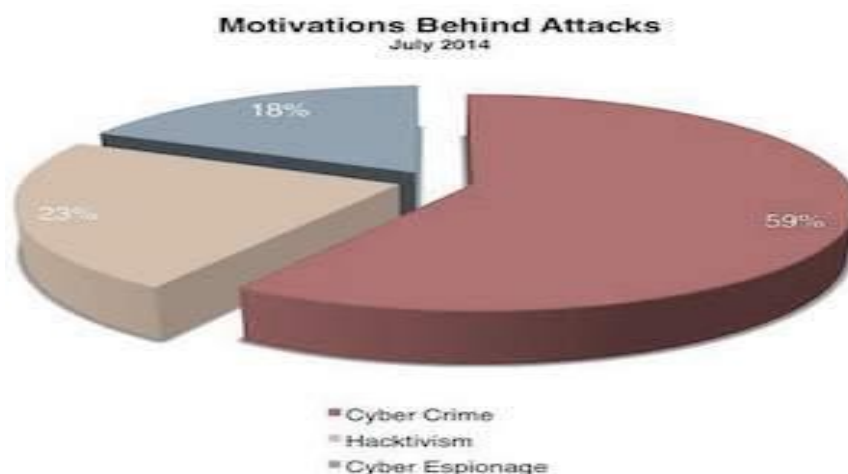
Among the most serious challenges of the 21st century are the prevailing and possible threats in the sphere of cyber security. Threats originate from all kinds of sources, and mark themselves in disruptive activities that target individuals, businesses, national infrastructures, and governments alike. The effects of these threats transmit significant risk for the following

- public safety
- security of nations
- stability of the globally linked international community

Malicious use of information technology can easily be concealed. It is difficult to determine the origin or the identity of the criminal. Even the motivation for the disruption is not an easy task to find out. Criminals of these activities can only be worked out from the target, the effect, or other circumstantial evidence. Threat actors can operate with considerable freedom from virtually anywhere. The motives for disruption can be anything such as

- Simply demonstrating technical prowess
- Theft of money or information
- Extension of state conflict, etc.

Criminals, terrorists, and sometimes the State themselves act as the source of these threats. Criminals and hackers use different kinds of malicious tools and approaches. With the criminal activities taking new shapes every day, the possibility for harmful actions propagates.



### COMPONENTS OF CYBER SPACE

In India the cyberspace plays a vital role for the general public. Now – a – days all peoples including illiterate and literate are using the face book , twitter, instagram , YouTube to share the share information, interact between more peoples, swap ideas between another , play games with one another, engage in discussions or social forums, conduct business and create intuitive media, among many other activities. There are three major components of **physical network, logical network, and cyber- persona.**

### **CONCLUSION**

The cyber space is very vital role in India. In India the cyber security is implemented through Cyber Law and Information Technology Act, 2000. Even though these acts are implemented still now cyber crime and threats are happening in India. So, in future the government should concentrate to incorporate some of the provisions for higher security and strengthening of these acts. Good knowledge and application of the basic information and computer security measures are imperative for cyberspace users to be on the safe side while utilizing computer, computer network or cyberspace resources. Security awareness or consciousness becomes pertinent as a way of exposing reigning or emerging cyberspace crimes or threats, to continually protect innocent cyberspace users and to safeguard their interests. Since cyber criminals now form networks and work in collaboration to rain some cyber havocs, the war against cyber crime should be reinforced with collaborative strategies at the individual, organizational, societal, national and international levels. With all cyberspace stakeholders' hands on deck, cyber crimes/threats can be reduced to the barest minimum and the cyberspace made a better and healthier haven for all and sundry. The information Technology act 2000 provide penalties and adjudication as per sec 43 – 47 speaks about the “Penalty and compensation for damage computer systems”

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**DATA MASKING AND PRIVACY ENHANCED ACCESS CONTROL FOR OUTSOURCED DATA OVER CLOUD COMPUTING**

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**ABSTRACT**

*Data masking, an umbrella term for data anonymization, pseudonymization, redaction, scrubbing, or de-identification, is a method of protecting sensitive data by replacing the original value with a fictitious but realistic equivalent. We propose a novel privacy-preserving mechanism that supports public auditing on shared data stored in the cloud. Recent studies have been worked to promote the cloud computing evolve towards the internet of services. Subsequently, security and privacy issues are becoming key concerns with the increasing popularity of cloud services.*

*Keywords-privacy enhanced, cloud computing, encryption, decryption, product key.*

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**INTRODUCTION**

In this paper, we propose a novel privacy-preserving mechanism that supports public auditing on shared data stored in the cloud. In particular, we exploit ring signatures to compute verification metadata needed to audit the correctness of shared data. With our mechanism, the identity of the signer on each block in shared data is kept private from public verifiers, who are able to efficiently verify shared data integrity without retrieving the entire file. In addition, our mechanism is able to perform multiple auditing tasks simultaneously instead of verifying them one by one

**EASE OF USE****A. Verifier to Audit**

A privacy-preserving public auditing mechanism used for shared data in the cloud. We utilize ring signatures to construct homomorphism authenticators, so that a public verifier is able to audit shared data integrity without retrieving the entire data, yet it cannot distinguish who is the signer on each block

**B. Efficiency of Verifier**

To improve the efficiency of verifying multiple auditing tasks, we further extend our mechanism to support batch auditing. There are two interesting problems we will continue to study for our future work. One of them is traceability, which means the ability for the group manager to reveal the identity of the signer based on verification metadata in some special situations.

**C. Substitution-Permutation Network**

AES is associate degree unvarying instead of Feistel cipher. It supported 'substitution-permutation network'. It contains a series of joined operations, a number of that involve exchange inputs by specific outputs and other involve shuffling bits around.

Interestingly, AES performs all its computations on bytes instead of bits. Hence, AES treats the 128 bits of a plaintext block as sixteen bytes. These sixteen bytes square measure organized in four columns and 4 rows for process as a matrix

**I. PRIMITIVE APPROACH**

In that existing system They are designed for private audit, only the data owner is allowed to verify the integrity and repair the faulty servers in that public auditing the third-party auditor demands the local copy of data for auditing the files. The traditional approach for checking data correctness is to retrieve the entire data from the cloud, and then verify data integrity by checking the files. And there is a chance for auditor can be see the all files of the user.so there is a privacy issue can be occurred that time.

To improve the efficiency of verifying multiple auditing tasks, we further extend our mechanism to support batch auditing. Here the auditor did not have the copy of the owner data at the time of uploading the encryption file that will be stored in another one backup files.

**A. Improved Efficiency**

To improve the efficiency of verifying multiple auditing tasks, we further extend our mechanism to support batch auditing. Here the auditor did not have the copy of the owner data at the time of uploading the encryption file that will be stored in another one backup files.

Using in this file link only auditor can check the file is corrupted or not. And if the file is corrupted auditor can be regenerated the file without demanding the local copy of data. At that time of auditing file will be corrupted or modified means mail will be send to data owner.

- Stands for "Simple Mail Transfer Protocol." this can be the protocol used for causation e-mail over the web. Your e-mail shopper uses SMTP to send a message to the mail server, and also the mail server uses SMTP to relay that message to the proper receiving mail server. entifiers in trade, such as "3.5-inch disk drive".
- Basically, SMTP could be a set of commands that certify and direct the transfer of electronic message.
- Once configuring the settings for your e-mail program, you always ought to set the SMTP server to your native net Service Provider's SMTP settings. However, the incoming mail server (IMAP or POP3) ought to be set to your mail account's server, which can differ than the SMTP server.

#### B. Advanced Encryption Standard (AES):

The Advanced Encryption Standard (AES) is an encryption algorithm for securing sensitive but unclassified material by U.S. Government agencies and, as a likely consequence, may eventually become the de facto encryption standard for commercial transactions in the private sector. (Encryption for the US military and other classified communications is handled by separate, secret algorithms.)

#### C. DES

In January of 1997, a process was initiated by the National Institute of Standards and Technology (NIST), a unit of the U.S. Commerce Department, to find a more robust replacement for the Data Encryption Standard

(DES) and to a lesser degree Triple DES.

#### D. Symmetric Algorithm

- The specification called for a symmetric algorithm (same key for encryption and decryption) using block encryption (see block cipher) of 128 bits in size, supporting key sizes of 128, 192 and 256 bits, as a minimum.
- The algorithm was required to be royalty-free for use worldwide and offer security of a sufficient level to protect data for the next 20 to 30 years. It was to be easy to implement in hardware and software, as well as in restricted environments (for example, in a smart card) and offer good defenses against various attack techniques.
- The entire selection process was fully open to public scrutiny and comment, it being decided that full visibility would ensure the best possible analysis of the designs.
- In 1998, the NIST selected 15 candidates for the AES, which were then subject to preliminary analysis by the world cryptographic community, including the National Security Agency.
- . On the basis of this, in August 1999, NIST selected five algorithms for more extensive analysis. These were:
- MARS, submitted by a large team from IBM Research
- RC6, submitted by © RSA Security
- Rijndael, submitted by two Belgian cryptographers, Joan Daemen and Vincent Rijmen
- Serpent, submitted by Ross Andersen, Eli Biham and Lars Knudsen
- Twofish, submitted by a large team of researchers including Counterpane's respected cryptographer, Bruce Schneier

Implementations of all of the above were tested extensively in ANSI C and Java languages for speed and reliability in such measures as encryption and decryption speeds, key and algorithm set-up time and resistance to various attacks, both in hardware- and software-centric systems.

Once again, detailed analysis was provided by the global cryptographic community (including some teams trying to break their own submissions). The end result was that on October 2, 2000, NIST announced that Rijndael had been selected as the proposed standard.

On December 6, 2001, the Secretary of Commerce officially approved Federal Information Processing Standard (FIPS) 197, which specifies that all sensitive, unclassified documents will use Rijndael as the Advanced

Encryption Standard. Also see cryptography, data recovery agent (DRA) RELATED GLOSSARY TERMS: RSA algorithm

(Rivest-Shamir-Adleman), data key, greynet (or graynet), spam cocktail (or anti-spam cocktail), fingerscanning (fingerprint scanning), munging, insider threat, authentication server, defense in depth, nonrepudiation

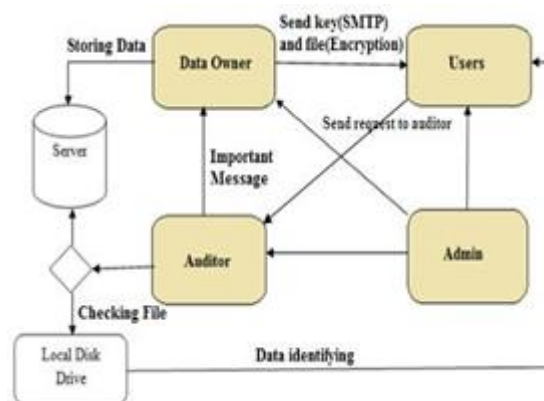
AES is based on a design principle known as a Substitution permutation network. It is fast in both software and hardware. Unlike its predecessor, DES, AES does not use a Feistel network. AES has a fixed block size of 128 bits and a key size of 128, 192, or 256 bits, whereas Rijndael can be specified with block and key sizes in any multiple of 32 bits, with a minimum of 128 bits. The blocksize has a maximum of 256 bits, but the key size has no theoretical maximum. AES operates on a 4×4 column-major order matrix of bytes, termed the state (versions of Rijndael with a larger block size have additional columns in the state). Most AES calculations are done in a special field.

The AES cipher is specified as a number of repetitions of transformation rounds that convert the input plaintext into the final output of ciphertext. Each round consists of several processing steps, including one that depends on the encryption key. A set of reverse rounds are applied to transform ciphertext back into the original plaintext using the same encryption key.

#### E. ,52.

- a) KeyExpansion—round keys are derived from the cipher key using Rijndael's key schedule,
- b) Initial Round
- c) AddRoundKey—each byte of the state is combined with the round key using bitwise xor
- d) SubBytes—a non-linear substitution step where each byte is replaced with another according to a lookup table.
- e) ShiftRows—a transposition step where each row of the state is shifted cyclically a certain number of steps.
  - bytes in each column.
  - AddRoundKey
  - Final Round (no MixColumns)
  - SubBytes
  - ShiftRows
  - AddRoundKey

#### SYSTEM ARCHITECTURE:



#### LITERATURE SURVEY

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2) Efficient and Secure Multi-Keyword Search on Encrypted Cloud Data

(1Y. Prasanna, 2Ramesh)

3) Oruta: Privacy-Preserving Public Auditing for Shared Data in the Cloud (Boyang Wang †,††, Baochun Li †† and Hui Li † † † State Key Laboratory of Integrated Services Networks, Xidian University, Xi'an, China †† Department of Electrical and Computer Engineering, University of Toronto, Toronto, Canada Email: {bywang, bli} @eecg.toronto.edu,

lihui@mail.xidian.edu.cn)

4)Randal Burns Department of Computer Science Johns Hopkins University {ateniese, randal}@cs.jhu.edu)

6 Short Group Signatures(Dan Boneh<sup>1,?</sup>, Xavier Boyen<sup>2</sup>, and Hovav Shacham<sup>3</sup> <sup>1</sup> Stanford University, dabob@cs.stanford.edu <sup>2</sup> Voltage Security, xb@boyen.org <sup>3</sup> Stanford University, hovav@cs.stanford.edu)

7 Storing Shared Data on the Cloud via Security-Mediator (Boyang Wang<sup>†§</sup>, Sherman S. M. Chow<sup>‡</sup>, Ming Li<sup>§</sup>, and Hui Li<sup>†</sup> <sup>†</sup>State Key Laboratory of Integrated Service Networks, Xidian University, Xi'an, China <sup>‡</sup>Department of Information Engineering, Chinese University of Hong Kong, Hong Kong <sup>§</sup>Department of Computer Science, Utah State University, Logan, Utah, USA)

8 Dynamic Audit Services for Outsourced Storages in Clouds

## CONCLUSION:

We propose a novel privacy-preserving mechanism that supports public auditing on shared data stored in the cloud. In Our future work will be how to avoid this type of re-computation introduced by dynamic groups while still preserving identity privacy from the public verifier during the process of public auditing on shared data.

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**DESIGN AND OPTIMIZATION OF HERBAL GEL CONTAINING ANDROGRAPHIS PANICULATA NEES****Dr. Vijayendra Swamy S. M<sup>1</sup>, Mr. Biradar Krishna J<sup>2\*</sup>, Dr. Nagoba S. N<sup>3</sup> and Mr. Hindole S. S<sup>4</sup>**<sup>1</sup>Principal, Channabasweshwar Pharmacy College, Kava Road, Latur – 413512, Maharashtra, India<sup>2,3</sup>Department of Pharmaceutics, Channabasweshwar Pharmacy College, Kava Road, Latur – 413512, Maharashtra, India<sup>4</sup>Department of Pharmacognosy, Channabasweshwar Pharmacy College, Kava Road, Latur – 413512, Maharashtra, India**ABSTRACT**

*In the present research work an attempt was made to design and optimization Andrographis paniculata extract herbal gel. Andrographis paniculata were standardized and gel of Andrographis Paniculata extract were prepared containing polymers like Xanthan gum, HPMC, Carbopol. The Gel was prepared by simple homogenization method. All formulations were checked for PH, Spreadability, Drug content, in-vitro diffusion studies, viscosity, and results were within the limits. The in-vitro diffusion studies were carried out using diffusion cell. Among all the formulations (F1 to F8) prepared, batch F6 was the best formulation released 88.5 %. In the formulation F1-F8 Xanthan gum has been used as natural Gelling agent using as the lower to higher concentration it was increase their Viscosity and Spreadability. It is efficient to formulate andrographis paniculata herbal drug extract in the form of herbal gel using different polymer for safety, efficacy and better promote skin bacterial infections, patient compliance as an formulation.*

*Key words: Andrographis paniculata; Antibacterial; Herbal gel; Kalmegh; Hepatoprotective.*

**INTRODUCTION:**

Skin is one of the most readily accessible organs on human body for topical administration and is main route of topical drug delivery system. Topical delivery can be defined as the application of a drug containing formulation to the skin to directly treat cutaneous disorders (e.g. acne) or the cutaneous manifestations of a general disease (e.g. psoriasis) with the intent of containing the pharmacological or other effect of the drug to the surface of the skin or within the skin. A number pharmaceutical product widely used in topically for preventing topical disease or disorders. Semi-solid formulation in all their diversity dominate the system for topical delivery, but foams, spray, medicated powders, solutions. While the intact skin is much less permeable than other tissues many substances do penetrate the skin to some degree, at relatively slow rates the penetration of the drugs and other substances through skin depends on; the physiochemical properties of the penetrant, the state of the skin and the nature of the vehicle. Drugs applied topically, mainly for local action, include anti-septic, anti-fungal, anti-inflammatory agents as well as skin emollients for protective effects.

Gels are semisolid systems in which a liquid phase is constrained within a three dimensional polymeric matrix (consisting of natural or synthetic gums) in which a high degree of physical (or sometimes chemical) cross-linking has been introduced. The polymers used to prepare pharmaceutical gels include the natural gums tragacanth, pectin, carrageen, agar and alginic acid, synthetic and semisynthetic materials such as methyl cellulose, hydroxyethylcellulose, carboxymethylcellulose and the carbopols which are synthetic vinyl polymers with ionizable carboxyl groups.

Andrographis paniculata also called Kalmegh or "King of Bitters" belongs to family Acanthaceae. It has been used for centuries in Asia to treat gastro-intestinal tract and upper respiratory infections, fever, herpes, sore throat, and a variety of other chronic and infectious diseases.

**MATERIALS AND METHODS:****A) Materials:**

Andrographis Paniculata were obtained as a gift sample from Sun pure extract pvt, Ltd. Other ingredients are Mthanol solvent (HiMedica Laboratories pvt. Ltd.), Carbopol 934 (Loba chemie Mumbai), Xanthan Gum (Meher chemical Mumbai), HPMC K4 (Moly chemie Mumbai), Glycerin (Vikash Pharma Mumbai), Rosemerry oil (Vishal chemie Mumbai), Methyl paraben or Propyl paraben (Ozone international Mumbai) Triethanolamine or Propylene glycol (Moly chemie Mumbai).

**B) Methods:**

1. **Preformulation study:**
2. **Preliminary phytochemical tests:**

### 3. Formulation of Gel –

Gel formulations prepared by simple homogeneous gel formulation preparation method. Weighing quantity Xanthan gum, Carbopol and HPMC gelling bases was dispersed slowly in 50ml of distilled water in a 250ml beaker. Then the mixture was stirred mechanical stirrer and kept the beaker aside to swell these gelling bases half an hour. Take 5ml distilled water and required quantity of methyl paraben they mixed properly by heating on water bath. Then solution was cooled and add on 5ml propylene glycol was added to it. Further, required quantity of *andrographis paniculata* extract was mixed to the above mixture and volume made up to 100ml by adding remaining distilled water. All the ingredients were mixed properly and with continuous stirring. Triethanolamine was added drop wise to the formulation for the adjustment of skin pH (6-7), and add on flavoring agent. Mixing was continued until a gel consistency was formed. Prepared gel was filled in container and stored at a cool and dry place.

Formulation table:

Table 1: Formulation Table

Sr. No	Batch Ing. (gm)	F1	F2	F3	F4	F5	F6	F7	F8
1.	Andrographis Paniculata	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2.	Xanthan gum	0.25	0.50	0.75	1	1.25	1.50	1.75	2
3.	Carbopol 934	0.25	0.50	-	0.75	-	0.50	-	1
4.	HPMC K4M	1	1.25	1.5	-	1.25	1	1.25	-
5.	Methyl paraben	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
6.	Propylene glycol (ml)	5	5	5	5	5	5	5	5
7.	Triethanolamine (ml)	q.s	q.s	q.s	q.s	q.s	q.s	q.s	q.s
8.	Flavoring agent	q.s	q.s	q.s	q.s	q.s	q.s	q.s	q.s
9.	Dist.Water(upto) (ml)	100	100	100	100	100	100	100	100

## RESULT AND DISCUSSION

### 1. Pre-Formulation Study

Physical appearance of *Andrographis Paniculata* Extract:

Table. 2: Physical appearance

Sr. No.	Parameters	Specification as per IP 2014	Result
1	Appearance	Light green to dark green powder	Light green to dark green powder
2	Odour	Odourless	Odourless
3	Taste	Intensely bitter	Intensely bitter

**Melting Point:** Melting point of *Andrographis Paniculata* (Kalmegh) powder by capillary method was found to be 235°C.

**Solubility:** The solubility of *Andrographis Paniculata* (Kalmegh) powder was checked in different solvents and was found to be Freely Soluble in Methanol.

### pH values

The mean pH value of 1 % w/v solution of drug *Andrographis Paniculata* (Kalmegh) was found to be 6.8.

### Determination of various ash values:

The total ash value, acid insoluble ash value and water soluble ash value were found to be 5% w/w respectively. Ash value is useful in determining authenticity and purity of *Andrographis Paniculata* drug and these values are important quantitative standards.

Ash value:

Ash value of pure drug was found to be- Total Ash Value = 10%

### TLC Plate Method

Mobile Phase – A mixture of 7 volumes of chloroform and 1 volumes of methanol.

Apply to the plate 10microlit of each solution as bands 10mm by 2mm. Allow the mobile phase to rise 8cm. Dry the plate in air and examine under ultraviolet light at 254nm and 365nm and also under day light.

### The Rf value

The retention factor, or Rf, is defined as the distance travelled by the compound divided by the distance travelled by the solvent.

$$Rf = \frac{\text{Distance traveled by compound}}{\text{Distance traveled by solvent front}}$$

$$Rf = \frac{4.5}{4.8}$$

Rf = 0.9

### Observations:

**Table 3: Standardization *Andrographis Paniculata* Extract**

Sr. No.	Parameters	Specification as per IP 2014	Result
1	Appearance	Light green to dark green powder	Light green to dark green powder
2	Odour	Odourless	Odourless
3	Taste	Intensely bitter	Intensely bitter
4.	pH	6 - 8	6.8
5.	Total Ash Values	Not more than 15%	10%

### Preliminary phytochemical analysis:

Preliminary phytochemical analysis of *Andrographis paniculata* shows presence of flavonoids, phenols, alkaloid, glycosides, saponins and tannins. Observations and inference of preliminary

Phytochemical analysis are illustrated in table.

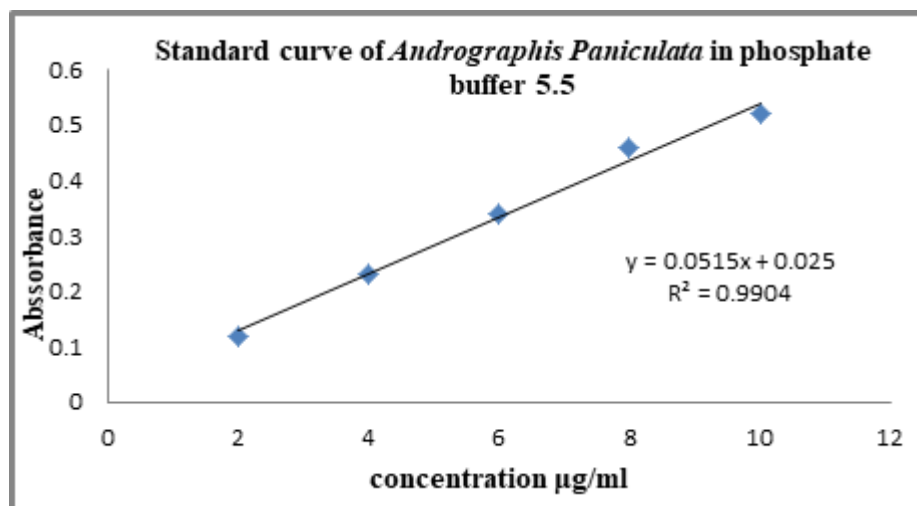
**Table 4: Inference from tests for phytochemical constituents of *Andrographis paniculata*.**

S.No.	Test	Observation	Inference
1.	Baljet's test	Yellow to orange colour	Suggest the sample Contained glycosides.
2.	Fehling's test	A brick red precipitate	Indicates the presence of reducing sugars, formed from the hydrolysis of glycosides.
3.	Frothing test	A rich froth persisting for 10 minutes	Indicates the presence of saponins.
4.	Ferric chloride test	A blue-green coloration	Indicates the presence of tannins.
5.	Mayer's test	Cream coloured precipitate	Indicates the presence of alkaloids.
6.	Dragendorff's test	An orange-brown precipitate	Indicates the presence of alkaloids.
7.	Shinoda test	Pink to magenta red colour	Flavonoids present.
8.	Zn/Hcl reducing test	Magenta red colour	Flavonoids present.

### Estimation by UV spectroscopy:

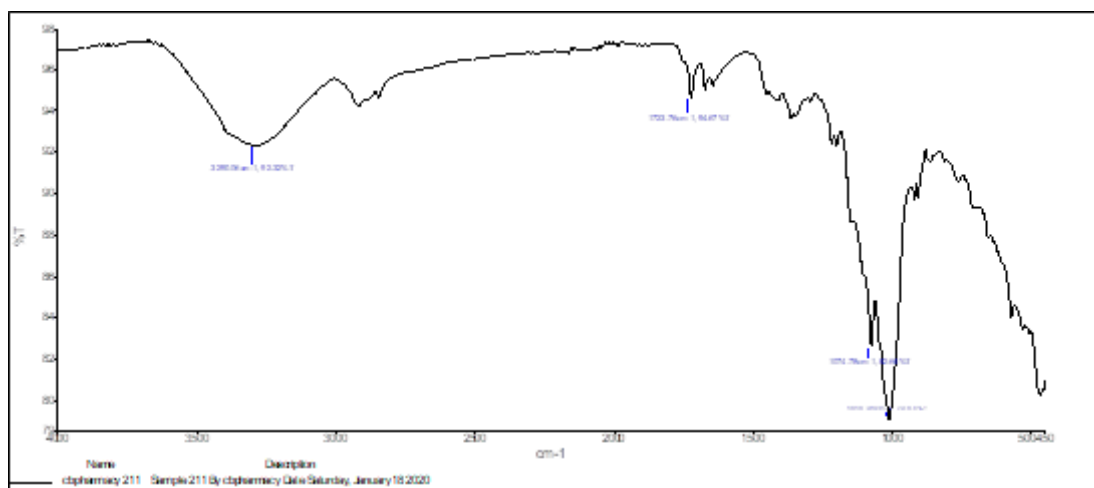
**Table 5: Calibration of *Andrographis Paniculata* extract**

Sr. no.	Concentration (ug/ml)	Absorbance ( $\lambda_{\text{max}}$ observed at 321nm)
1	2	0.1200
2	4	0.2300
3	6	0.3400
4	8	0.4600
5	10	0.5200

Fig No.1: Calibration Curve of *Andrographis Paniculata* Extract

### Interpretation of FTIR Spectra

#### 1) FTIR of pure *Andrographis Paniculata* extract:

Fig. No 2 : FTIR graph of Pure *Andrographis Paniculata* (Kalmegh) extract

From the above observation table, FTIR study of pure *Andrographis Paniculata* (Kalmegh) extraction observes their peak and comparing to their standard frequency of FTIR.

#### 2) FTIR graph of Drug and Excipients

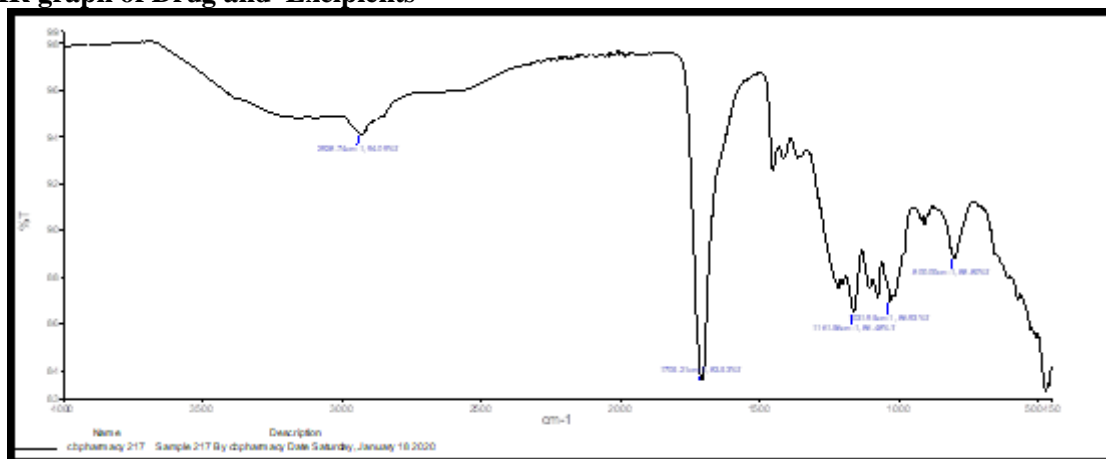


Fig. No. 3: FTIR graph of Drug and Excipients

Table No. 6 : FTIR graph of Drug and Excipients

Functional group	Standard Frequencies	Drug and Excipients	Pure <i>Andrographis Paniculata</i>
CH-OH stretching	3290-2850	2928.74	3290.06
C=O stretching	1600-1900	1705.21	1723.76
C-O stretching	1050-1150	1140.56	1074.78
C-O stretching	1050-1150	1031.95	1010.98

From the above observation table, FTIR study of pure *Andrographis Paniculata* (Kalmegh) extraction and FTIR graph of Drug and Excipients they are compatible to each other and to observe their peak and comparing to standard frequency of FTIR.

## 2) Evaluation of Topical Gel Formulation

### a) Physical Evaluation:

Table No. 7: Physical appearance such as colour

Sr. No	Batch	pH	colour	Homogeneity	Consistency	Spreadability(g.cm/sec)
1	F1	6.2	Yellowish Brown Gel	Homogeneous	Smooth	22.06
2	F2	7.1	Yellowish Brown Gel	Homogeneous	Smooth	27.77
3	F3	6.6	Yellowish Brown Gel	Homogeneous	Smooth	21.13
4	F4	6.4	Yellowish Brown Gel	Homogeneous	Smooth	11.01
5	F5	6.9	Yellowish Brown Gel	Homogeneous	Smooth	29.01
6	F6	6.8	Yellowish Brown Gel	Homogeneous	Smooth	20.12
7	F7	6.6	Yellowish Brown Gel	Homogeneous	Smooth	22.04
8	F8	6.7	Yellowish Brown Gel	Homogeneous	Smooth	25.02

### b) Viscosity:

Viscosity of gel was determined by using Brookfield viscometer at 8, 6, 4 rpm. Each reading was taken after equilibrium of the sample at the end of two minutes. The samples were repeated three times.

Table No. 8: Viscosity of formulation

Shear rate (RPM)/ ST	Viscosity of the formulation in centipoises							
	F1	F2	F3	F4	F5	F6	F7	F8
08	23100	22500	25400	24300	30100	30700	31000	28100
06	21700	20100	24400	26400	29500	29300	29500	26200
04	19800	24000	20700	26400	27400	28000	26800	24350

### c) Drug Content

Table No. 9: Drug content of formulation

Sr.No	Batch	Drug content (%)
1	F1	95.88%
2	F2	96.78%
3	F3	97.55%
4	F4	96.63%
5	F5	95.11%
6	F6	98.44%
7	F7	96.24%
8	F8	97.87%

### d) In-Vitro Diffusion Studies

Table No. 10: In-vitro diffusion study of *Andrographis Paniculata* [F1-F8].

Time (Min/hr)	% Cumulative Drug release							
	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>
1	4.41	5.63	6.94	7.53	6.5	7.3	7.64	8.26

2	15.32	16.43	17.45	18.79	19.3	20.19	18.15	20.22
3	26.42	27.3	28.53	30.2	29.24	32.35	28.38	30.41
4	37.36	40.78	42.25	43.8	41.12	45.57	39.86	40.71
5	43.56	49.33	51.18	52.3	52.32	58.36	51.42	50.56
6	59.23	60.51	62.61	67.5	62.51	69.14	63.5	60.31
7	60.4	61.33	63.66	69.25	73.12	72.85	74.4	71.42
8	75.06	78.3	79.63	83.3	86.16	88.5	82.18	85.31

In present study or work, an attempt has been made to increase the % drug release of *Andrographis Paniculata* (Kalmegh) with changes in concentration of polymers by cold fusion method.

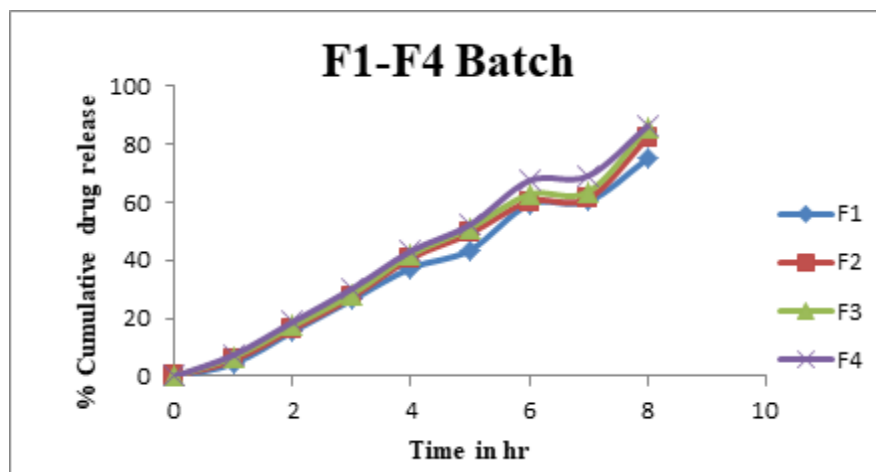


Fig No. 4: In-vitro of diffusion *Andrographis Paniculata* of batches F1-F4.

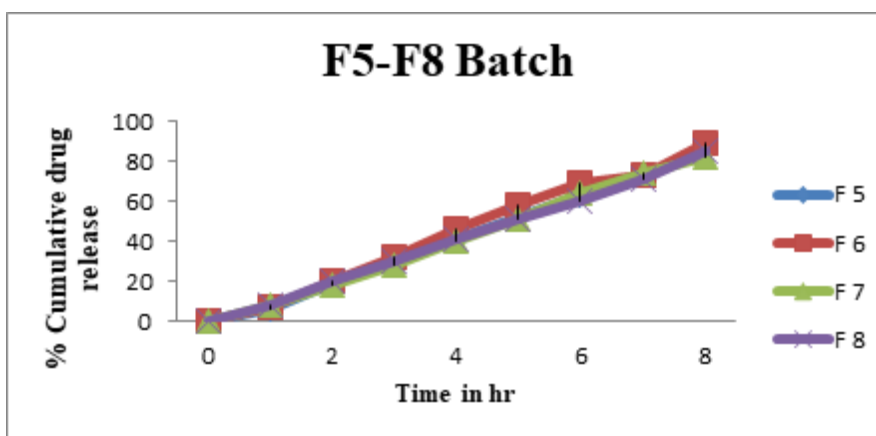


Fig No. 5: In-vitro of diffusion *Andrographis Paniculata* of batches F5-F8.

#### e) Stability Study:

Sufficient quantity of gel formulation were packed in stability container and kept in a Stability chamber at Temperature 40°C & RH 75%.

Table No. 11: Stability study of formulation.

Sr.no	Parameter	Stability after 1 month of a optimized batch	Stability after 2 month of a optimized batch	Stability after 3 month of a optimized batch
1	Colour	Yellowish Brown	Yellowish Brown	Yellowish Brown
2	Physical Appearance	No change	No change	No change
3	Drug Content (%)	98.5%	98.1%	97.7%
4	In vitro drug release	88.5%	88.1%	87.8%
5	pH	6.7	6.7	6.5

6	Consistency	Smooth	Smooth	Smooth
7	Homogeneity	Homogenous	Homogenous	Homogenous

## CONCLUSION

From the research executed, it can be concluded that combination of carbopol, hpmc and xanthan gum can be used as gelling base and is best suitable for gel formulation with drug assay and drug diffusion. The gel prepared is simple and easy to use. It is a very good attempt has made to establish the herbal gel containing *Andrographis paniculata*. All formulations were checked for PH, Spreadability, Drug content, in-vitro diffusion studies, viscosity, and results were within the limits. Among all the formulations (F1 to F8) prepared, batch F6 was the best formulation released 88.5 %. In the formulation F1-F8 Xanthan gum has been used as natural Gelling agent using as the lower to higher concentration it was increase their Viscosity and Spreadability. It is significance to formulate andrographis paniculata herbal drug extract in the form of herbal gel using different polymer for safety, efficacy and better promote skin bacterial infections, patient compliance as an formulation.

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**A COMPARATIVE STUDY ON THE INFLUENCE OF CHROMIUM DIET & LOW INTENSITY GROUP EXERCISE ON CONTROLLED TYPE 2 DIABETES MELLITUS AMONG CHENNAI OBESE POPULATION**

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**S. M. Divya Mary and S. Dinesh Kumar**Faculty of Physiotherapy, Dr. MGR Educational & Research Institute, Deemed To Be University, India, Tamil Nadu, Chennai-95.

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**ABSTRACT****OBJECTIVE:**

*Objective of the study is to compare the influence of chromium diet & low intensity group exercise on controlled Type 2 Diabetes Mellitus & Obesity population in Chennai.*

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**BACKGROUND:**

*Chromium was first proposed as an essential element for normal glucose metabolism in 1959 and was widely accepted by the 1990. Life style changes can develop type 2 diabetes. Exercise lowers blood sugar because it forces cells in the body to take in more glucose for energy. This may lead to a decreased need for insulin to help maintain normal blood sugar levels. When it comes to getting started an exercising it is actually better to start with low intensity exercise.*

**METHODOLOGY:**

*After obtaining ethical clearance from the institutional review board of ACS medical college and Hospital; 50 subjects of both gender with age group 35-55years, and recent onset of type 2 diabetes mellitus were included, and subjects with type 1; and age group less than 35 and more than 55 age, recent fracture, injuries & surgeries, other systemic illness & were excluded. The pre and post test was recorded with blood glucose level and BMI. A detailed explanation about the treatment protocol was given to the patient. Demographic data like name, age, sex, chief complaints were collected and they are selected by random sampling method.*

**PROCEDURE:**

*Group-A Chromium diet & anti-diabetic medication.*

*Group-B Chromium diet & low intensity exercise.*

*RESULT: The result will be revealed at the end of the study*

*KEY WORDS: Type 2 diabetes mellitus, low intensity group exercise, chromium diet.*

**INTRODUCTION**

With the ever-growing epidemic of type 2 diabetes, investigations are directed toward prevention and pharmaceutical and lifestyle interventions to treat type 2 diabetes. Several studies have attempted to identify the mechanism linking obesity with insulin resistance with Type 2 Diabetes Mellitus and number of factors have been suggested as significant contributors<sup>1</sup>.

It has been evolved that the tissue serves not only as an energy store but also as an endocrine organ producing hormones such as adipocytokines (adiponectin, leptin, resistin, TNF- $\alpha$  etc.)<sup>3</sup>. Due to the changes in the serum concentration of adipose tissue hormones and significantly affects insulin sensitivity and in some cases even directly induce Insulin Resistance<sup>4</sup>. Since insulin resistance is seen as a major contribution to the development of overt type 2 diabetes, efforts are being directed towards the improvement of insulin insensitivity. One possible method to improve insulin sensitivity is chromium supplementation.

In 1954, the dietary need of chromium for maintenance of normal glucose tolerance in mammalian was first postulated in 1959<sup>9</sup>. Also, in various animal studies<sup>16-81</sup> have shown chromium to have a positive effect on insulin sensitivity. Dietary chromium intake in the US and other countries is suboptimal, with less than 90% of normal diets providing less than the minimum suggested safe and adequate chromium intake of 50 $\mu$ g<sup>10</sup>. Insufficient dietary chromium intake by free living individuals leads impaired glucose and lipid metabolism, elevated circulative insulin, and decreases insulin receptor number<sup>11</sup>. Several studies reported beneficial effects of chromium on glucose tolerance and or lipid metabolism of subjects eating varied diets of unknown chromium content.

The most common forms of chromium are the metallic form, chromium (6), trivalent chromium (III) and hexavalent chromium (VI). In which chromium (III) is essential for proper insulin action, is required for normal protein, fat and carbohydrate metabolism and is considered as a dietary supplement<sup>12</sup>.

Exercise without dietary modification might be insufficient to improve (SI) sensitivity in equids despite inducing weight loss, although exercise could provide other health benefits<sup>21,22</sup>. Chromium possibly influences glucose metabolism by enhancing or potentiating the action of insulin<sup>23</sup>. The low molecular weight chromium binding substance (CMWCr) has been postulated to be a part of an insulin signal amplification mechanism. LMWCr oligopeptide is composed of cysteine, glutamate, aspartate and glycine but not nicotinic acid<sup>24</sup>. The binding of the chromium to the apo-form of LMWCr results in stabilisation of the active conformation of insulin acceptor tyrosinekinase, thereby facilitates the action of Insulin. In one human study on type 2 diabetes mellitus patients, chromium supplementation has been found to decrease insulin resistance as was measured by the HOMA technique<sup>25</sup>. Meanwhile, the insulin resistance returns to the baseline, when the chromium supplementation stopped<sup>26</sup>. Chromium picolinate, which is a complex of trivalent chromium bound to three molecules of picolinate acid, was widely used as a supplement of chromium in the treatment of Diabetes Mellitus population.

Exercise is a cornerstone treatment for obesity related metabolic complications including insulin resistance, which is a primary cause of type 2 DM<sup>27</sup>. Low intensity Aerobic exercise involves repeated and continuous movement of large muscle groups<sup>29</sup>. Activities such as walking, cycling, jogging and swimming rely primarily on aerobic energy producing systems. The health benefits of exercise training for all adults include improvements in muscle mass, body composition, strength, physical function, mental health, bone mineral density, insulin sensitivity, blood pressure, lipid profiles and Cardiovascular health<sup>30</sup>. It also been proved that single session of exercise can greatly enhance insulin sensitivity in insulin resistant obese individuals. Moreover, this study compares the influence of chromium diet and low intensity group exercise on controlled type 2 Diabetes Mellitus and obesity in Chennai population.

## METHODOLOGY

After obtaining ethical clearance from the institutional review board of ACS medical college and Hospital; 50 subjects of both gender with age group 35-55years, and recent onset of type 2 diabetes mellitus were included by random sampling method, and subjects with type 1; and age group less than 35 and more than 55 age, recent fracture, injuries & surgeries, other systemic illness & were excluded. The pre and post test was recorded with blood glucose level and BMI. Group-A was given Chromium diet & anti-diabetic medication and Group-B was given Chromium diet & low intensity exercise. At first, before the intervention patients were clearly explained about the procedure and signed in the consent form. Baseline characteristics were also noted and blood glucose levels were obtained before and after the intervention were also collected. During the first week of the study were to familiarize the subjects with the diet and testing procedure and to establish caloric intake and baseline values. At the beginning of week 1, the subjects received tablets containing either 200µg Cr as chromium picolinate. Chromium picolinate is complex trivalent chromium bound to three molecular of picolinate acid and in this study as chromium supplement. It is produced by solgar vitamin and herb. An adequate intake of chromium is 25 and 35µg per day for normal men and women.

## INTERVENTION

### GROUP A- CHROMIUM DIET AND MEDICATION

Subjects who have been recently diagnosed with diabetes type ii were included in the study. In the group A, The patients were intervened with diet including chromium and also following their regular medication for diabetes. At the beginning of week 1, the subjects received tablets containing either 200µg Cr as chromium picolinate or chromium chloride included as a chromium supplement and continued for 12 weeks. They were monitored weekly.

### CHROMIUM DIET FOOD

VEGETABLES	Broccoli, Potatoes, Green beans.
FRUITS	Apples, banana, grapes, orange
DAIRY PRODUCTS	Milk
NON VEGETARIAN	Beef, poultry.

### GROUP-B- MEDICATION AND LOW INTENSITY AEROBIC EXERCISE

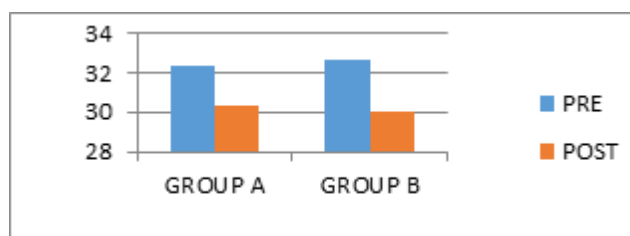
The subjects was treated with diet modification, medication and low intensity exercise. The low intensity aerobic exercises were performed in a group. Activities such as walking, cycling, jogging, swimming and yoga rely primarily on aerobic energy producing systems. Intensity level differs from each patient according to their VO2 MAX. The exercise program performed weekly 5 days 45 minutes including warmup & cool down for 3 months.

**TABLE – 1 COMPARING THE VALUES OF BMI WITHIN PRE AND POST TEST VALUES IN GROUP-A AND GROUP-B USING PAIRED t -TEST**

BMI	PRE TEST		POST TEST		t - TEST	df	95% CI of the difference		SIG (2-tailed)
	MEAN	S.D	MEAN	S.D			Lower	Upper	
Group-A	32.29	1.41	30.28	2.03	6.801	24	1.40	2.63	.000***
Group-B	32.61	1.37	30.0	2.01	2.243	24	1.19	3.47	.000***

**GRAPH – I**

**COMPARING THE VALUES OF BMI WITHIN PRE AND POST TEST VALUES IN GROUP-A AND GROUP-B USING PAIRED t -TEST**

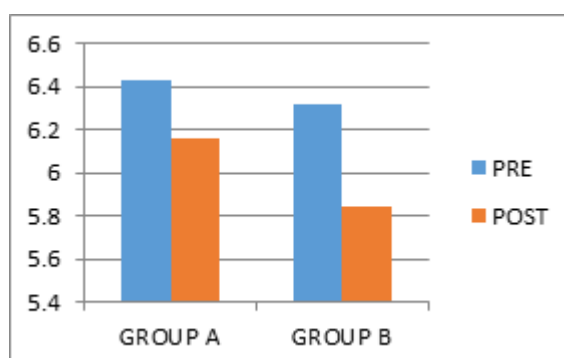


**TABLE – 2 COMPARING THE VALUES OF BLOOD GLUCOSE LEVEL WITHIN PRE AND POST TEST VALUES IN GROUP-A AND GROUP-B USING PAIRED t -TEST**

Blood glucose level	PRE TEST		POST TEST		t - TEST	df	95% CI of the difference		SIG (2-tailed)
	MEAN	S.D	MEAN	S.D			Lower	Upper	
Group-A	6.43	0.37	6.16	0.42	2.149	24	0.01	0.52	.000***
Group-B	6.32	0.41	5.84	0.35	7.308	24	0.30	0.34	.000***

**GRAPH – II**

**COMPARING THE VALUES OF BLOOD GLUCOSE LEVEL WITHIN PRE AND POST TEST VALUES IN GROUP-A AND GROUP-B USING PAIRED t -TEST**

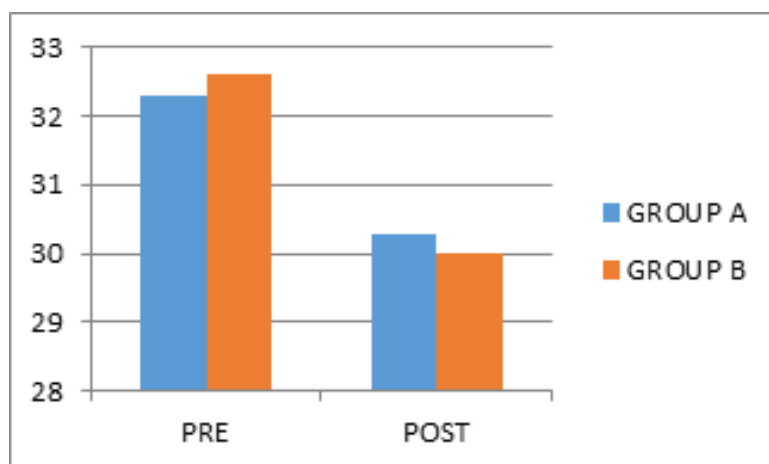


**TABLE – 3 COMPARING THE VALUES OF BMI BETWEEN GROUP-A AND GROUP-B IN PRE AND POST TEST VALUES USING INDEPENDENT (student) t –TEST**

BMI	GROUP A		GROUP B		t - TEST	df	95% CI of the difference		SIG (2-tailed)
	MEAN	S.D	MEAN	S.D			Lower	Upper	
PRE TEST	32.29	1.41	32.61	1.37	0.802	48	-1.109	0.477	0.863*
POST TEST	30.28	2.03	30.0	2.01	1.10	48	-1.15	1.15	0.110*

**GRAPH – III**

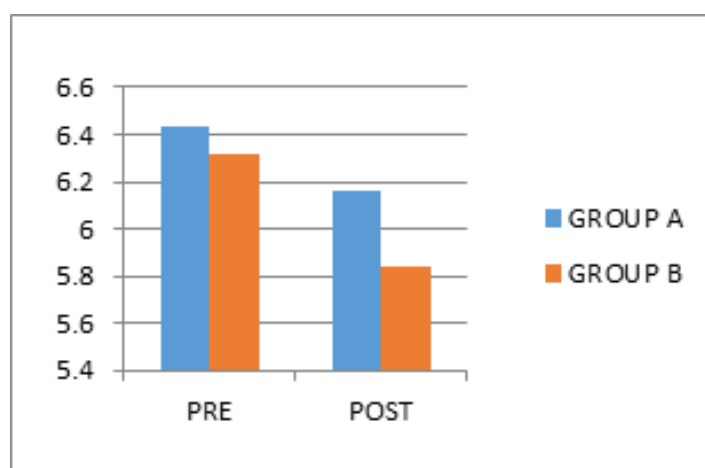
**COMPARING THE VALUES OF BMI BETWEEN GROUP-A AND GROUP-B IN PRE AND POST TEST VALUES USING INDEPENDENT (student) t –TEST**

**TABLE – 4 COMPARING THE VALUES OF BLOOD GLUCOSE LEVEL BETWEEN GROUP-A AND GROUP-B IN PRE AND POST TEST VALUES USING INDEPENDENT (student) t –TEST**

BLOOD GLUCOSE LEVEL	GROUP A		GROUP B		t - TEST	df	95% CI of the difference		SIG (2-tailed)
	MEAN	S.D	MEAN	S.D			Lower	Upper	
PRE TEST	6.43	0.37	6.32	0.41	0.79	48	-0.11	0.33	0.323*
POST TEST	6.16	0.42	5.84	0.35	2.85	48	0.09	0.54	0.006**

**GRAPH – IV**

**COMPARING THE VALUES OF BLOOD GLUCOSE LEVEL BETWEEN GROUP-A AND GROUP-B IN PRE AND POST TEST VALUES USING INDEPENDENT (student) t –TEST**



## RESULT

There is a significant difference in the pre-test and the post-test values of BMI between the Group A and Group B. On comparing the mean values of BMI scores between the Group A and Group B, both the groups have showed improvement in the post test mean values although the group-B post-test mean value (30.0) showing lesser mean value is more effective than Group-A post-test mean value (30.28) and statistically significant at (\*\*\*)-  $P \leq 0.001$ ). There is a significant difference in the pre-test and post-test values of Blood glucose level between the Group A and Group B. On comparing the mean of Blood glucose level between the Group A and Group B, both the groups showed decreased Blood glucose level in the post test mean values. But the Group B post-test mean value (5.84) showing the lesser mean value is more effective than Group A post-test mean value (6.16) and highly statistically significant at (\*\*\*)-  $P \leq 0.001$ ).

## DISCUSSION

The present study was conducted with the sample size of 50 subjects to evaluate the the influence of chromium diet and low intensity group exercise on controlled type 2 Diabetes Mellitus and obesity in Chennai population.

The mean values of group-A, in pre-test of BMI is 32.29 and the post test score is 30.28.64 and the mean values of group-B in the pre-test score is 32.61 and in post test score 30.0. The mean values of group-A, in pre-test of blood glucose level is 6.43 and in the post test is 6.16 and in the group-B, the pre test score is 6.32 and the post-test score is 5.84. Although there is no significant difference is found between the group-A and group-B pre-test values at (\*\*\*)-  $P < 0.001$ ), there is a significant difference is found between the post test mean values of group-A and group-B at (\*\*\*)-  $P < 0.001$ ).

For example, a study of obese Shetland ponies demonstrated improved glucose tolerance using a protocol that gradually restricted forage intake to as little as 35% of maintenance energy requirements, yielding much greater reductions in body mass of approximately 16% BW over 17 weeks.<sup>11</sup> Greater levels of dietary restriction or a longer study period might therefore have yielded different results for animals in the DIET group. Plasma adiponectin concentrations were higher in both DIET and DIET+EX groups after weight loss compared to starting concentrations. Adiponectin is an adipokine secreted by mature adipocytes that has insulin sensitizing and anti-inflammatory properties.<sup>29</sup> Hypoadiponectinemia has been associated with insulin resistance in humans with metabolic syndrome<sup>20</sup> and also has been identified in equids with insulin resistance and a history of laminitis.<sup>16,26</sup> Importantly, low plasma adiponectin concentration has been identified as a risk factor for future episodes of laminitis in ponies. Strategies that can ameliorate hypoadiponectinemia are therefore desirable in the management of animals with EMS to decrease the likelihood of laminitis. A previous study failed to detect changes in adiponectin in ponies after short-term low-intensity exercise without dietary modification.<sup>23</sup> Our results suggest that regular low-intensity exercise provides additional health benefits when combined with dietary restriction as part of a weight loss program for obese equids. In a study by Nicholas et al., reported that, at the end of a 12-week weight loss program, animals in both the DIET and DIET+EX groups had decreased adiposity (BCS, BW, CNS, and TBFM), decreased basal insulin and leptin concentrations, and increased adiponectin concentrations. Furthermore, horses and ponies in the DIET+EX group exhibited improved SI and decreased SAA concentrations relative to those in the DIET group. On comparing the mean of Blood glucose level between the Group A and Group B, both the groups showed decreased Blood glucose level in the post test mean values. But the Group B post test mean value (5.84) showing the lesser mean value is more effective than Group A post test mean value (6.16). Over all in this study, the subjects with type 2 diabetes mellitus and obesity showed control and reduction the blood glucose level and reduction in the BMI.

## CONCLUSION

This study concludes that the low intensity exercises with diet modification had considerable effects in improving the control over blood glucose level and also in reducing the body weight. However, the group B undergone the chromium supplement has lesser improvement in the control over blood glucose level and also in reducing the body weight.

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## DISTRIBUTED ENCRYPTION AND DECRYPTION STANDARDS - A CONTEMPORARY DISTRIBUTED CRYPTOGRAPHIC ALGORITHM

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### ABSTRACT

*With the advancement in technology, plenty of data is shared over the Internet. And from the past few years, big data has also come into the picture, and data security has become a primary concern for everyone connected to the web. Without protection, the information exchanged over the Internet is not safe. Encryption Algorithms protect the data which gets exchanged over the Internet. This paper proposes a new cryptographic algorithm, Distributed Encryption and Decryption Standards (DEDS), designed by combining the Substitution Cipher and Stream Cipher algorithms. Also, we have compared the Distributed Encryption and Decryption Standards algorithm with the existing AES and DES algorithms to check the security and robustness for data security.*

*Keywords: Cryptography, Data Security, Encryption, Symmetric Key Encryption, Private Key Cryptosystem, Ciphertext, AES, DES, DEDS, Security Algorithm.*

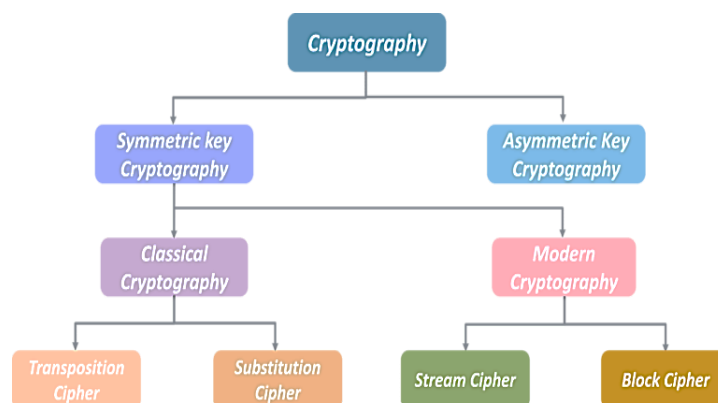
### 1. INTRODUCTION

In the present era, Internet has covered the complete globe. It has become a necessity of the people. From social media platforms to web portals, a lot of data is stored in electronic messages. And for the transmission of the data, various electronic mediums like mobile phone communication, electronic commerce, online chat service, etc., are widely used. But, unfortunately, those ways of transmitting the data are not very safe. Now it is pervasive that the data shared over the Internet can be easily stolen or monitored.

Four main data security pillars were introduced for secure data transmission to make people believe that they share over the Internet is secure. Those security goals are Confidentiality, Authenticity, Integrity, and Non-Repudiation. Cryptography is the technique that is used to achieve the confidentiality of data, which means that the data shared will remain between the sender and the receiver; no third person will be able to access that data. In Greek, cryptography means "Secret Writing." To maintain secrecy, the information is shared in encrypted format using various cryptographic algorithms.

In the present scenario, every single bit of data over the Internet is in encrypted form. Billions of people and organizations throughout the globe use cryptography consistently to protect their data and information, although most people are not even aware that they are using it. In addition to being extremely useful, cryptography is considered as highly brittle as cryptographic systems can become a primary concern if a single programming or specification error occurs in the process.

Cryptography entirely revolves around the two concepts: Encryption and Decryption. In which encryption is a process in which the data, whether text or graphics, is converted into an unintelligible form called cipher data. And decryption is the technique that transforms the cipher data back to original data. And the two main types of encryption that encrypt the data are Symmetric and Asymmetric Encryption.



**Figure 1. Types of Cryptography**

There are two types of cryptographic algorithms: Symmetric-key cryptography and Asymmetric key cryptography, as shown in figure 1.



The first type is Symmetric-key cryptography (see figure 2), also known as the private key or one key encryption algorithm. In this algorithm same key is used for encrypting and decrypting the data, such as DES (Data Encryption Algorithm) and AES (Advanced Encryption Standard) algorithms. There are two different DES techniques: Classical and Modern techniques. The classical style uses Transposition and Substitution Cipher, and modern technology uses stream cipher and block cipher.

The substitution and transposition techniques are used for converting the plaintext into ciphertext, where substitution technique replaces the characters whereas transposition technique rearranges the symbols to form a ciphertext.

The second type is the Asymmetric key (see figure 3), also known as the public-key encryption algorithm, which uses one key for encrypting data and another key for decryption of data such as RSA and ElGamal algorithms.

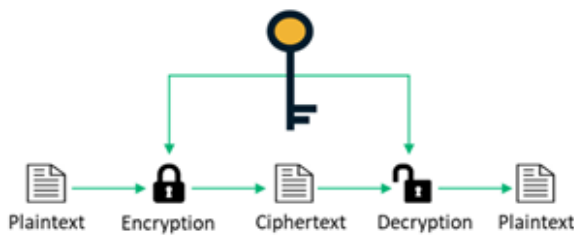


Figure 2. Symmetric Cryptography [6]



Figure 3. Asymmetric Cryptography [7]

### 1.1 Concepts used in Cryptography

- **Plain Text:** The original message that the person wants to communicate is defined as plain text. For example, Ken is a person who wishes to send a “Hi, how are you” message to person Daniel. In this conversation, “Hi, how are you” is referred to as plain text.
- **Cipher Text:** The message which no one can understand is defined as ciphertext; for example, “s6ds8\$jke32@>\*D12” is a ciphertext produced for the plain text “Hi, how are you.”
- **Encryption:** The process of converting plain text to ciphertext is known as encryption. Two main processes are required for Encryption: An encryption algorithm and a key.
- **Decryption:** It is the process of converting ciphertext to plain text. This also needs two techniques Decryption algorithm and key.
- **Key:** It is a combination of alphanumeric text or numeric or special symbols. It is one of the essential parts of the cryptographic system as it is used at the time of encryption or decryption.

In this paper, we propose a new Symmetric Cryptographic Algorithm Distributed Encryption and Decryption Standards (DEDS), designed by integrating the Substitution Cipher and Stream Cipher algorithms.

## 2. LITERATURE REVIEW

S. M. Seth et al. [1] investigated and discussed different test factors used to test the research's cryptography algorithms. The text files used and the test results presume that the DES algorithm takes less encryption time, and the AES algorithm utilizes the least memory. Encryption time varies in both AES and DES algorithms.

Diaa Salama el. al [2] presented the evaluation of various symmetric encryption algorithms based on their performance. The AES, DES, Blowfish, 3DES, RC2, and RC6 algorithms were used to check the implementation of each selected algorithm.

B.B. Zaidan et al. [3] discussed the comparative analysis of various encryption algorithms based on Nine comparison factors, which are vital length, cipher type, block size, developed, cryptanalysis obstruction, security, probability key, conceivable ASCII printable character keys, the time needed to check all credible key at 50 billion seconds. And the analysis concluded that the AES algorithm is much better.

B. Padmavathi and S. R. Kumari [4] reviewed the current encryption procedures like RSA, AES, and DES algorithms with the LSB substitution method. Based on test results, it was analyzed that the AES algorithm uses the least encryption and decryption time compared to DES evaluations. Yet, RSA consumes more encryption time, and buffer usage is likewise exceptionally high. We also analyzed that the decryption of the AES algorithm is more advanced than all other existing algorithms.

Dr. V. Palanisamy et al. [5] examined that the AES algorithm presumes a better solution in symmetric essential encryption technique than the blowfish algorithm. On the other hand, in the Asymmetric encryption technique, the RSA algorithm is considered the safest in terms of secure key generation.

### 3. RESEARCH METHODOLOGY

Existing AES, DES, and the proposed Distributed Encryption and Decryption Standards (DEDS) algorithms are implemented in the java programming language during this research. After completing the execution process, all the algorithms are compared based on cipher type, encryption and decryption time, key length, key combinations, levels of encryption, and memory utilization.

### 4. ARCHITECTURE & WORKING

In the proposed model, the security maintains using 2-level encryption to generate highly secured cipher data out of the provided data. Also, for each level of encryption, the encryption key varies. The first level of encryption completes using the key generated using the Distributed Encryption and Decryption Standards (DEDS) algorithm. After completion of the first level of encryption, the Distributed Encryption and Decryption Standards (DEDS) key are converted to a hybrid binary key to perform the second level of encryption.

#### 4.1 Encryption Process:

As shown in Figure 4, the data has to go through two different levels of encryption, and for each level of encryption, there are two different types of keys. Also, for the encryption process, the data is converted in various formats for a fast conversion.

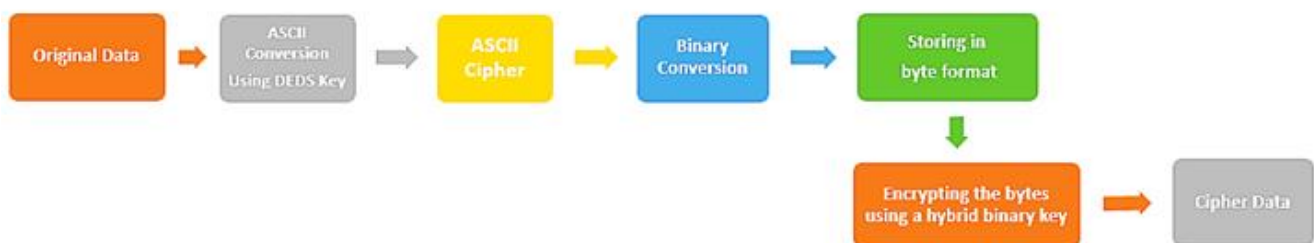


Figure 4. Encryption Process

#### 4.2 Decryption Process:

Similar to the encryption process, decryption, keys, and data type vary in the decryption process. In the decryption process, the data has to go through the stream cipher process and the data substitution process to retrieve helpful content from the cipher data, as shown in Figure 5.

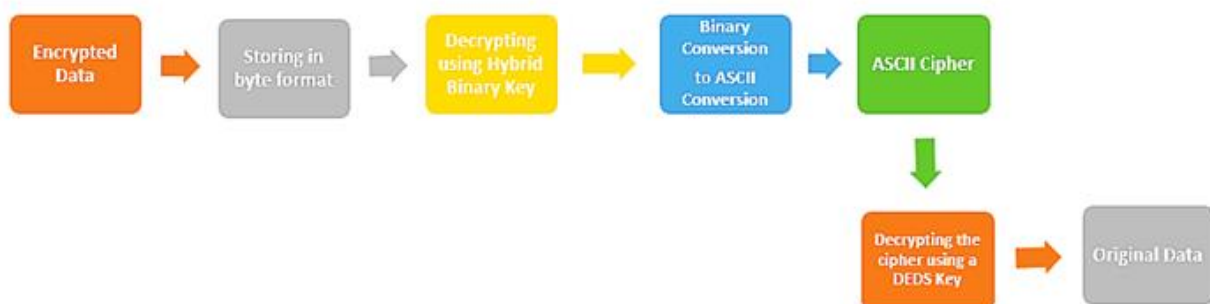


Figure 5. Decryption Process

#### 4.3 Working

During the encryption and decryption process, the data has to go through two different phases/levels of security. In the first phase of encryption, data (figure 7) has to be encrypted using the Distributed Encryption and Decryption Standards (DEDS) key (see figure 6). Distributed Encryption and Decryption Standards (DEDS) key is the security key generated using alphanumeric, numeric, or special symbols after performing some security checks. After crucial creation, the data encrypts using the substitution cipher technique using the generated key (see figure 6). In first-level encryption, specific bytes of data are substitutes with some cipher values formed using the key. And after substituting the bytes, data is stored in the file in the form of ciphertext (see figure 8).

```

D:\Project testing\File Encryption & Decryption using java\main>java
Crypto
Enter your choice:
1. Encrypting Text Document
2. Decrypting Text Document
Choice: 1

Enter key: 00twlyz
Enter the path of File to be encrypted (eg: c:\Users\Abc\File.txt) :
original.txt
Enter the path of File to be encrypted data to be saved(eg: c:\Users\
Abc\File.txt) : Level2.txt
2009

- - - - - Encryption Done - - - - -

```

Figure 6. Key Verification &amp; Encryption Process

After completing the first phase, the ciphertext (see figure 8) passes for second-level encryption. Next, the Distributed Encryption and Decryption Standards (DEDS) key, generated in the first phase, is converted into binary format for the second level encryption. Finally, a new secret key develops using the combinations of the Distributed Encryption and Decryption Standards (DEDS) key and the system-generated key.

After the key generation process, the ciphertext is converted into bytes and stored into a byte array. Then, in the second level encryption, each byte of data is encrypted using the generated secret key into the stream cipher. And at the end of the encryption process, the encrypted bytes are stored at the user-defined path (see figure 9).

Similarly, In the decryption process, the user must first enter the Distributed Encryption and Decryption Standards (DEDS) key, which is provided during encryption (see figure 11). After the key verification, the Distributed Encryption and Decryption Standards (DEDS) key are converted into binary format. Finally, a secret key is generated using the private key generation algorithm used in the second-level encryption.

After the key generation, the stream cipher (see figure 9) converts into byte format. Then, the second level encryption is reversed to get back the data into substitution cipher format (see figure 8). When the substitution cipher file is generated, the cipher file is then sent for reversing the first level of encryption: the ASCII conversion or the substitution conversion. Every single byte stored in the substitution cipher is analyzed and substituted with the corresponding value provided in the encryption algorithm. Finally, the cipher file converts back into a plain text file (see figure 10).

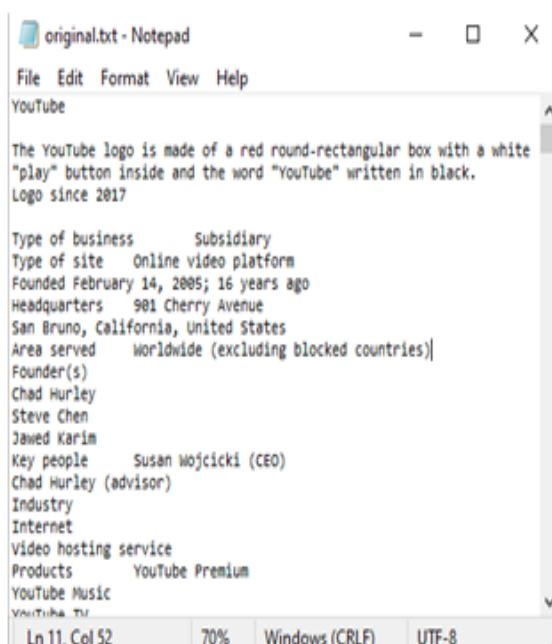


Figure 7. Original file used for Encryption

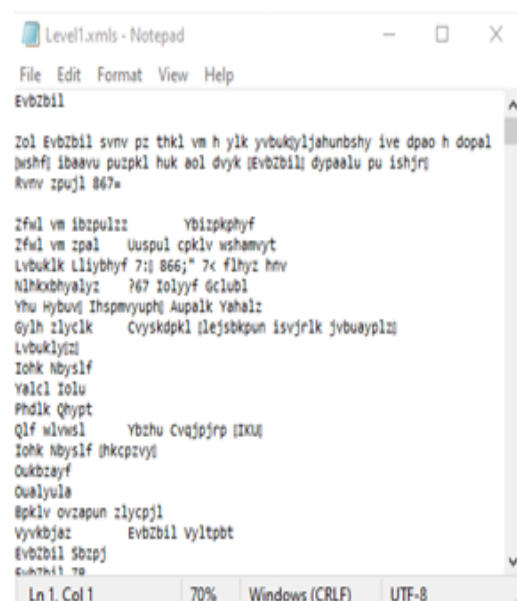


Figure 8. First level Encryption Result

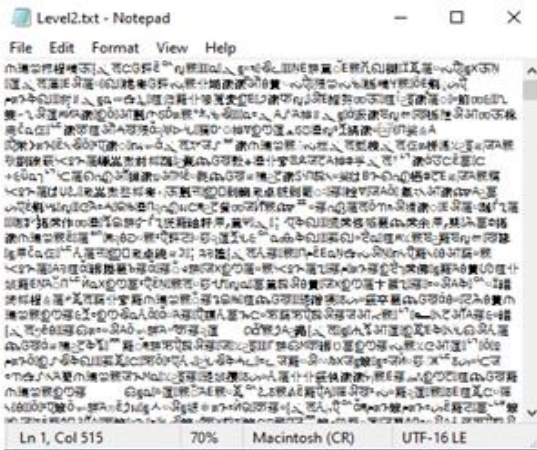


Figure 9. Second level Encryption Result

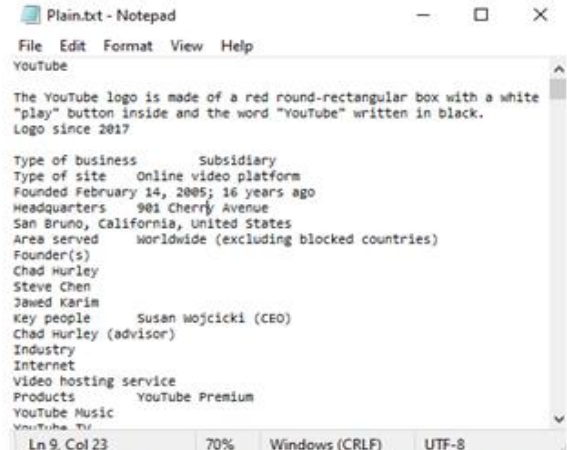


Figure 10. Plain Text/ Decrypted Test

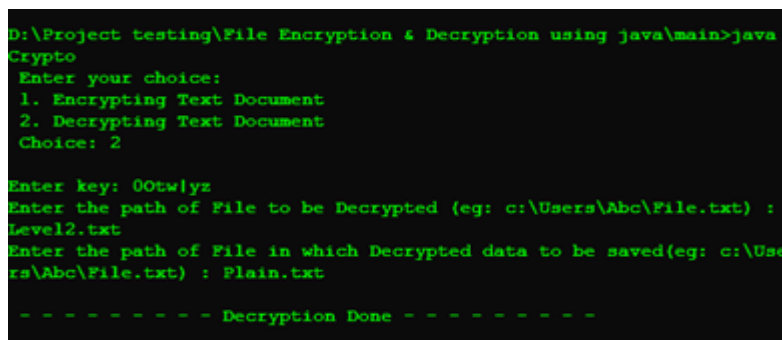


Figure 11. Decryption Key Verification and Decryption

## 5. ALGORITHM TESTING & RESULTS

The proposed algorithm was implemented and tested using Java Programming Language. Furthermore, the algorithm was tested over various datasets with a specific number of characters and tried over text files of a particular size.

For the first stage, the algorithm is tested over a text file of size 73kb containing 72958 characters, including numbers, symbols, space, and alphabets. After this, the algorithm is tested on a file of size 171kb containing 172335 characters. For the 3rd stage, the file size increased by five times the file used for the 2nd stage, and the number of characters was almost 3.5 times more than the 2nd stage. The file size was 589kb which contains around 591832 characters. Finally, a file with a length of 2356 KB and containing around 2367328 characters is used to test the algorithm.

### 5.1 Encryption Results

S.no	File Size (in kb)	No. of Input Character	No of output Characters (encrypted)	Encryption Time (in seconds)	Encrypted File Size (in kb)
1.	73kb	72958	36907	1.48	73kb
2.	171kb	172335	87502	2.192	171kb
3.	589kb	591832	301438	6.31	589kb
4.	2356kb	2367328	1205755	24.02	2356kb

Table 1. Encryption Results

### 5.2 Decryption Results

S.no	File Size (in kb)	No of Input Characters	No. of Output Character	Decryption Time (in seconds)	Decrypted File Size
------	-------------------	------------------------	-------------------------	------------------------------	---------------------

		(Encrypted)	(Decrypted)		(in kb)
1.	73kb	36907	72958	1.826	73kb
2.	171kb	87502	172335	2.43	171kb
3.	589kb	301438	591832	7.09	589kb
4.	2356kb	1205755	2367328	25.38	2356kb

**Table 2. Decryption Results**

During the testing process, it was analyzed that the number of characters decreases after the data is encrypted, but the size of the file remains the same, and also, after decrypting, the number of characters gets restored.

It was also noticed that the decryption process took more time than the encryption process.

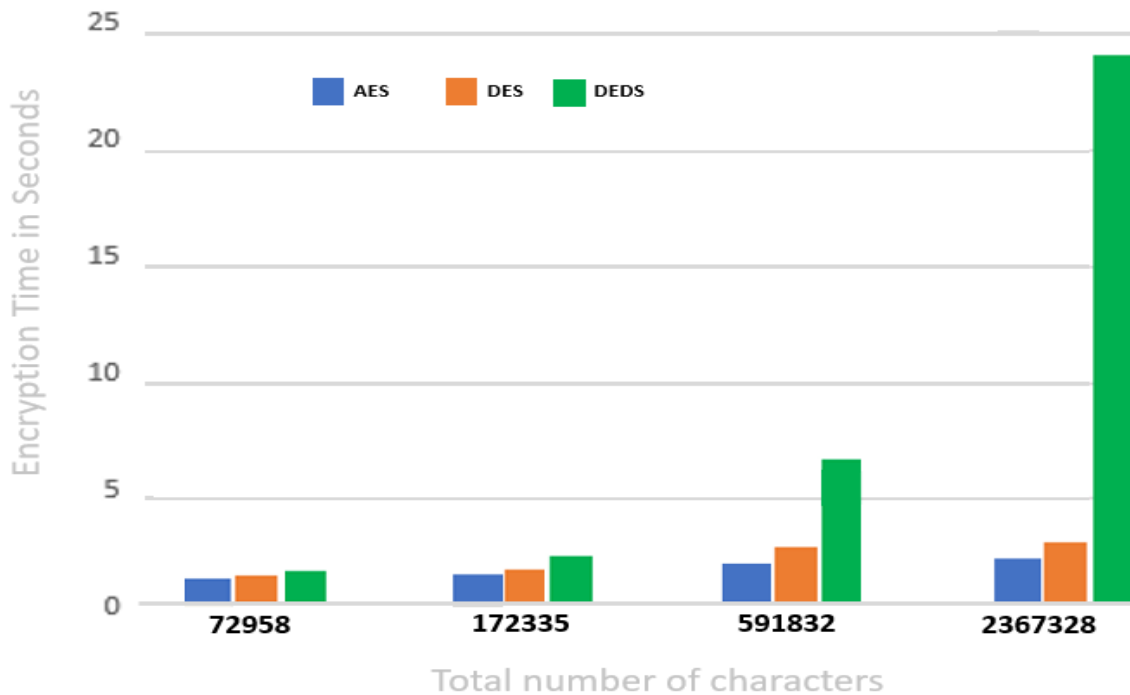
## 6. COMPARISONS AND EVALUATIONS

### 6.1 Encryption Time and Reliability

Algorithm	No of Input Characters	No. of Output Character (Encrypted)	Encryption Time (in seconds)
AES	72958	36915	1.01
DES		36908	1.2
DEDS		36907	1.48
AES	172335	87505	1.1
DES		87518	1.6
DEDS		87502	2.192
AES	591832	301496	1.327
DES		301504	2.56
DEDS		301438	6.31
AES	2367328	1206008	1.655
DES		2393286	3.133
DEDS		1205755	24.02

**Table 3. Comparison of Encryption Time and Reliability**

In table 3, the Encryption Time on a specific set of data is recorded (see figure 12). Also, it confirmed how reliable and secure files are generated after the encryption process. Finally, the compression level after the encryption process is analyzed in terms of total input and output characters (see figure 13).



. Figure 12. Comparison of Encryption Time and Reliability

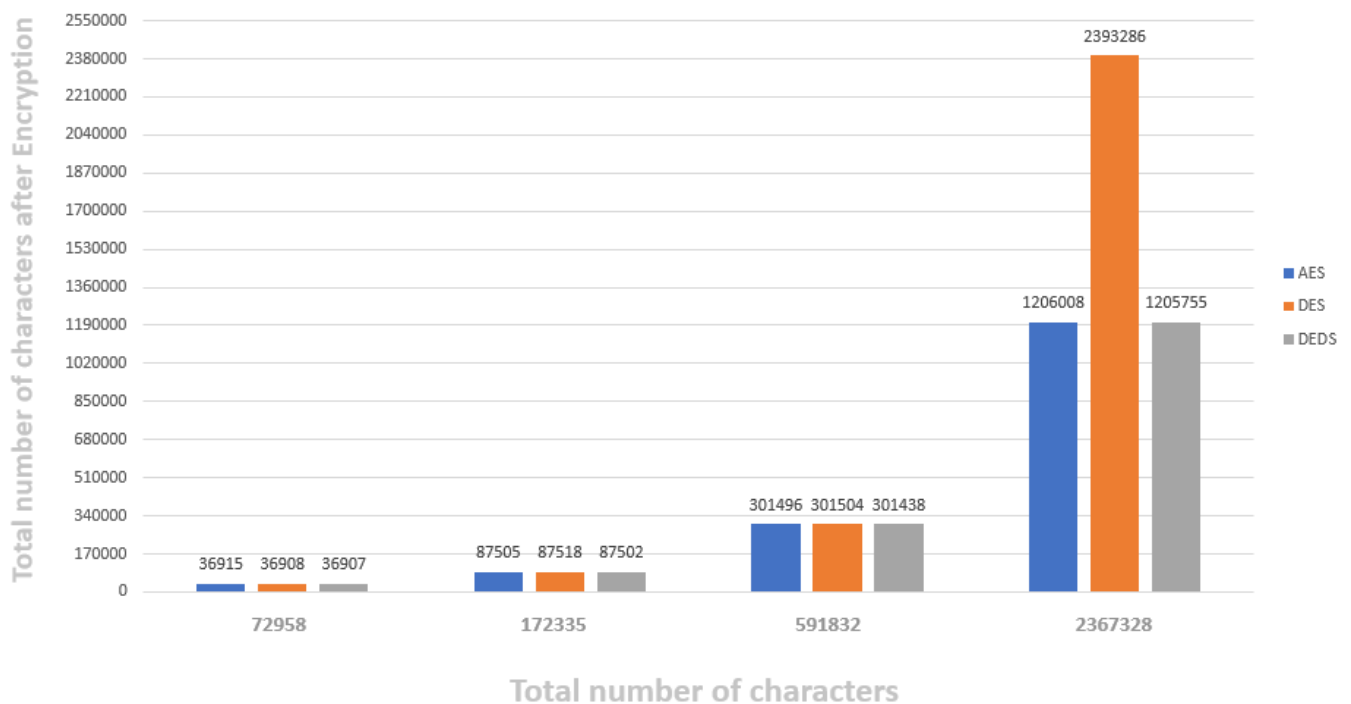


Figure 13. Comparison of Data Compression during Encryption

## 6.2 Decryption Time

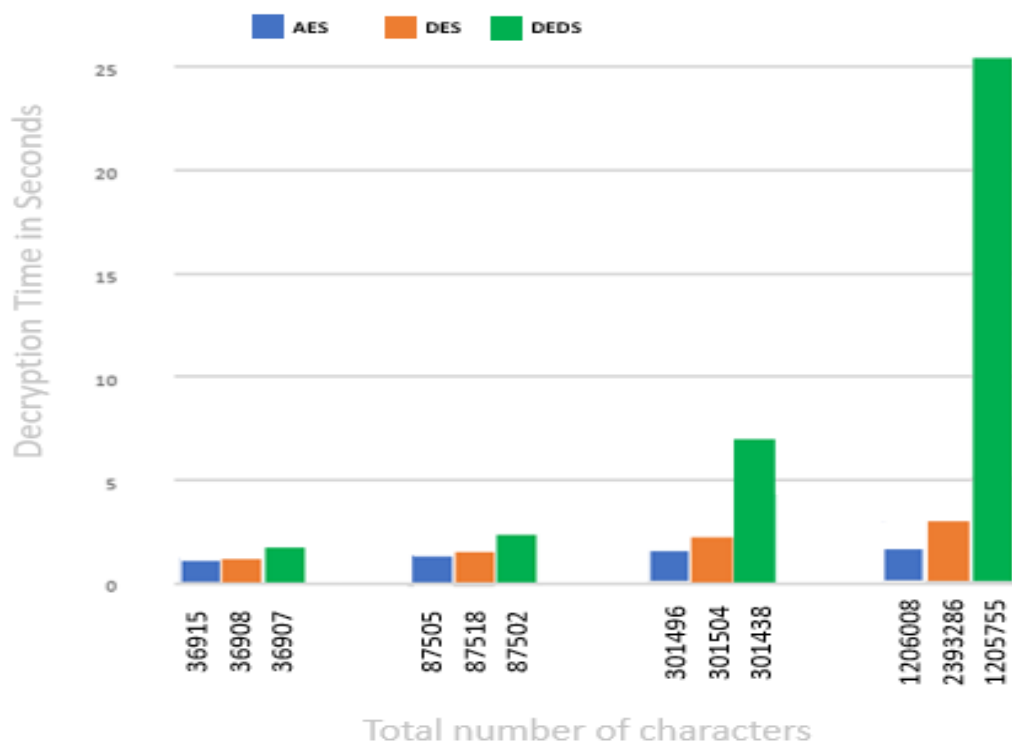
Algorithm	No. of Input Character (Encrypted)	No of Output Characters (Decrypted)	Decryption Time (In seconds)
AES	36915	72958	1.03
DES	36908		1.23
DEDS	36907		1.826



AES	87505	172335	1.202
DES	87518		1.71
DEDS	87502		2.43
AES	301496	591832	1.4
DES	301504		2.283
DEDS	301438		7.09
AES	1206008	2367328	1.803
DES	2393286		2.98
DEDS	1205755		25.38

**Table 4. Comparison of Decryption Time**

In table 4, the Decryption Time on a specific set of data records. It also proved how secure a file is in decryption, as if a file gets decrypted very easily in just a few seconds, then that algorithm is not much fast (see figure 14).

**Figure 14. Comparison of Decryption Time**

### 6.3 Major Comparison based on various factors

S.no	Factors	AES	DES	DEDS
1.	Average Encryption Time (in seconds)	1.273	2.123	8.5
2.	Average Decryption Time (in seconds)	1.36	2.050	9.186

3.	Key Length	256	56	112
4.	Maximum Key Combinations	$2^{256}$	$2^{56}$	$2^{112}$
5.	Cipher Type	Symmetric Block Cipher	Symmetric Block Cipher	Symmetric Stream Cipher
6.	Data Compression during Encryption	Data compression is there, but DEDS is more accurate.	Data compression is there, but DEDS is more accurate.	Data compression is more accurate than DES.
7.	Level of Encryption and Decryption	1	1	2
8.	Memory Usage	Normal	Normal	Normal
9.	Turnability	No	No	Yes
10.	Hardware & Software Implementation	It can be implemented on both hardware and software.	Better in hardware than in software.	It can be implemented on both hardware and software.

**Table 5. Major Comparison based on various factors**

After testing and comparing the algorithms based on encryption and decryption time, as shown in Table 5, the algorithms were compared based on ten critical factors, which helps to check the security and feasibility of the algorithm. The essential factors were: Average Encryption and Decryption Time, Length of Security Key, Possible Key Combinations, Type of Cipher, Compression Level, Levels/Layers of Encryption and Decryption, Memory Usage, Turnability, and the implementation of the algorithm in different work environments.

## 7. CONCLUSION

Encryption algorithms play a significant role in communication security where encryption/decryption time, Memory usages, Data Optimization, Security Levels, Implementation, and Turnability are the critical issues of concern. Therefore, the selected Encryption Advanced Encryption Standard (AES), Data Encryption Standard (DES), and Distributed Encryption and Decryption Standards (DEDS) algorithms are used for performance evaluation.

Based on all the above-mentioned critical comparison factors, it can be concluded that Advanced Encryption Standard (AES) uses less memory, and Data Encryption Standard (DES) takes less encryption time. On the other hand, the proposed Distributed Encryption and Decryption Standards (DEDS) algorithm might take a longer encryption time because when the level of encryption is increased, the encryption time also increases. But, DEDS is more useful and secure as compared to Advanced Encryption Standard (AES) and Data Encryption Standard (DES) algorithms; when it comes to security, an algorithm is said to be secure when the algorithm is more complex and not easy to break, and also the algorithm should be reliable and turnable which means that the encrypted part and the encryption parameters can be dynamically defined for different applications and requirements.

In the future, the proposed algorithm could be implemented in various commonly used devices, and also it could be used in smartphone applications to secure the data. Even in the future, this algorithm can be helpful in speech encryption.

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## EXPORT PERFORMANCE OF GARLIC IN INDIA

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**ABSTRACT**

*The nature of data used for the study is entirely based on secondary source of data from 1990-91 to 2019-20. Instability analysis of area, production, productivity, export quantity, export value and unit value of export of garlic showed highest variation in export value in the overall period. In period I, instability analysis of area, production, productivity and unit value of export garlic showed less variability whereas instability analysis in period II showed high variability in export quantity and export value. Instability showed lowest stability in the overall period with high co-efficient of variation except in productivity. Overall period showed lowest stability in garlic with high co-efficient of variation.*

*Coppock's instability index showed highest variation in export value of garlic. In period I, instability index of area, production, productivity, export quantity, export value and unit value of export showed less variability compared to period II. Instability index in period II showed high variability in export value among instability index of area, production, productivity, export quantity, export value and unit value of export. Instability index in the overall period was less stable with high instability index except in export quantity comparatively with period II. Trend analysis in area, production, productivity, export quantity, export value, unit value of export, domestic and international price of garlic was carried out by using wide range of parametric models. Among the competitive models, best model based on  $R^2$  significance is fit to know the trend. It was observed that area, production, productivity, export quantity, export value of garlic showed cubic trend indicating that the movement of all the series was uniform throughout India and for unit value of export, domestic and international prices of garlic, compound trend was observed to be best fit based on  $R^2$  significance. NPC values of garlic for period I was 1.70, for period II was 1.60 and for overall period was 1.65. NPC values indicate non-competitiveness of garlic in all the three period.*

*Keyword: instability, trend, export competitiveness Correspondence- [rajeshvaidkar@yahoo.com](mailto:rajeshvaidkar@yahoo.com) 9850488710*

**INTRODUCTION**

The word vegetable refers to any kind of flora or plant product. It also means the fresh, edible portion of a herbaceous plant. It is consumed or taken either in raw or cooked form. The edible portion could also be a root like beet, carrot, rutabaga and sweet potato, the stem like in asparagus and kohlrabi, a bud like brussels sprouts, a tuber or storage stem like potato and taro, a bulb like in onion and garlic, a petiole like celery and rhubarb, a leaf like cabbage, lettuce, parsley, spinach and chive, the mature fruits like tomato and pepper, an immature flower like cauliflower, broccoli and artichoke, a seed like pea and lima bean, the immature fruit like eggplant, cucumber and sweet corn.

Garlic prefers cool and moist weather during vegetative growth and bulb development stages but during maturity it requires warm and dry weather. Critical day length for bulbing of garlic is 10-12 hours for short day garlic and 13-14 hours for long day garlic. Garlic can be grown in wide range of soil types but it grows well in exceedingly well-drained moderately clay loam with a pH of 6-8. It needs a higher elevation (900 to 1200 mtrs). In India, garlic is planted in both kharif (June-July) and rabi (October-November) seasons. It is a rabi crop in Andhra Pradesh, Bengal, Bihar, Haryana, Orissa, Punjab, Rajasthan, Uttarakhand, Uttar Pradesh and hilly regions. It is planted as both kharif and rabi crop in Tamil Nadu, Karnataka, Maharashtra, Gujarat, Madhya Pradesh and Chhattisgarh.

**Objectives**

1. To estimate the growth in area, production and export of garlic
2. To workout instability in area, production and export of garlic
3. To study the trend in domestic and international prices of garlic
4. To examine export competitiveness of garlic

**METHODOLOGY**

The nature of data used for the study is entirely based on secondary source of data. The annual data on area, production, productivity, export quantity, domestic prices and international prices are compiled from India stat, Agricultural and Processed food products Export Development Authority (APEDA) and agmarknet. The data

regarding the area, production, productivity and export of garlic in India was collected from 1990-1991 to 2019-2020, which includes 30 years data. The time period data has been divided in to three sub-periods.

### Compound Annual Growth Rate

In the present study, the compound growth rates in area, production and productivity of garlic in India were estimated by fitting exponential type of equation

$$Y = ab^t$$

Where, a= Intercept

b= Regression co-efficient or trend value

t= time variable

Y= Area/production/productivity/export

$$CGR = (\text{Antilog } b - 1) \times 100.$$

### Coefficient of Variation:

Coefficient of variation (C.V) = standard deviation \*100

Mean

### Coppock's Instability Index (CII)

$$\text{Coppock's instability index} = \text{Antilog} \left( \sqrt{V \log} - 1 \right) \times 100$$

$$\text{where, } V \log = \frac{\sum \left( \log \frac{X_{t+1}}{X_t} - m \right)^2}{n}$$

$X_t$  = Area/Production/Productivity/Export

t = number of years

m = mean of the difference between logs of  $X_{t+1}$ ,  $X_t$

Log V = Logarithmic variance of the series

### Trend Analysis:

Trend analysis in area, production, productivity, export quantity, export value, unit value of export, domestic and international prices of garlic for the overall period 1990-91 to 2019-20 was carried out.

List of different parametric models with their equations		
S.No.	Function	Equation
1	Linear	$Y_t = a + b_t$
2	Logarithmic	$\text{Log } Y_t = \text{Log } a + \text{Log } b$
3	Inverse	$Y = f(x); Y = f^{-1}(f(X))$
4	Quadratic	$Y_t = a + b_t + c_t^2$
5	Cubic	$Y_t = a + b_t + c_t^2 + d_t^3$
6	Compound	$Y = b_0 * (X^{b_1})$
7	Power	$Y = b_0 * (b_1^X)$
8	Square root	$Y = a + b * \sqrt{x}$
9	Growth	$Y_t = a + bc$
10	Exponential	$\text{Log } Y = b_0 + b_1 x$
11	Logistic	$Y = K / (1 + \exp(a + b * x))$

### Nominal Protection Coefficient:

The Nominal Protection Coefficient was calculated to estimate the extent of the commodity's competitive advantage in the context of free trade. In a free trade situation, the coefficient revealed if a country has a comparative advantage in the export of that commodity. The ratio of the domestic price to the world reference price of the commodity under consideration is known as the NPC. Symbolically,

$$NPC = P_d / P_r$$

Where,  $P_d$  = Domestic price of the commodity

$P_r$  = World reference price of the commodity

If  $NPC > 1$ , the commodity is protected, compared to the situation that would prevail under free trade and if  $NPC < 1$ , the commodity is not protected

## RESULTS AND DISCUSSION

Data was analysed for the period 1990-91 to 2019-20 and the major findings of the study are presented.

**Table 1 Compound Growth rate of area, production, productivity, export quantity, export value and unit value of garlic (1990- 2020)**

Particulars	CGR	SE
Area		
Period I	2.58*	0.0039
Period II	6.51**	0.0019
Overall Period	5.42**	0.0014
Production		
Period I	3.93**	0.0051
Period II	9.32**	0.0040
Overall Period	7.25**	0.0019
Productivity		
Period I	1.33**	0.0017
Period II	2.63**	0.0032
Overall Period	1.74**	0.0009
Export Quantity		
Period I	-7.64	0.0241
Period II	11.22	0.0392
Overall Period	7.57*	0.0118
Export Value		
Period I	-0.26	0.0217
Period II	21.33*	0.0370
Overall Period	15.41**	0.0111
Unit Value of Export		
Period I	8.01**	0.0062
Period II	8.92**	0.0074
Overall Period	7.32**	0.0024

**Note:** \*\* - significant at 1 % level, \* -significant at 5 % level.

The total study period (1990-91 to 2019-20) was divided in to three sub-periods viz., period I (1990-91 to 2004-05), period II (2005-06 to 2019-20) and period III (1990-91 to 2019-20). The exponential functional form was employed to compute the growth rates and the results are presented in the Table 1.

The data presented in Table 1 revealed that the area of garlic in period I and period II had shown a positive growth rate of 2.58 per cent per annum and 6.51 per cent per annum respectively. In period I, the growth rate of area of garlic was found to be statistically significant at 5 per cent level of significance whereas in period II, it was found to be statistically significant at 1 per cent level of significance. Growth rate of production of garlic had shown a positive growth rate of 3.93 per cent per annum and 9.32 per cent per annum in period I and period II respectively and found both to be statistically significant at 1 per cent level of significance. Growth rate of productivity of garlic had shown a positive growth rate in period I and period II with 1.33 per cent per annum and 2.63 per cent per annum respectively and found both to be statistically significant at 1 per cent level of significance.

It was also observed that in the overall period area of garlic had shown a positive growth rate of 5.42 per cent per annum and found to be statistically significant at 1 per cent level of significance. This shows that the area of garlic was increasing during the overall period. Similarly, production and productivity of garlic in the overall period had shown a positive growth rate of 7.25 per cent per annum and 1.74 per cent per annum respectively and found to be statistically significant at one per cent level of significance. This shows that the production and productivity of garlic was increasing during the overall study period along with area.

In case of export of garlic, it was observed that the export quantity and export value in period I showed a negative non-significant growth rate with -7.64 per cent per annum and -0.26 per cent per annum respectively, whereas unit value of export of garlic in period I showed a positive significant growth rate with 8.01 per cent per annum at 1 per cent level of significance. In period II, export quantity of garlic showed non-significant positive growth rate with 11.22 per cent per annum whereas export value and unit value of export in period II showed positive growth rate with 21.33 per cent per annum at 5 per cent level of significance and 8.92 per cent per annum at 1 per cent level of significance respectively.

In overall period, it was observed that the export quantity, export value and unit value of export of garlic showed a positive growth rate of 7.57 per cent per annum, 15.41 per cent per annum and 7.32 per cent per annum respectively. It was found that the export quantity of garlic was statistically significant at 5 per cent level of significance whereas export value and unit value of export was statistically significant at 1 per cent level of significance. This showed that the export quantity, export value and unit value of export have been increasing throughout the study period. **Instability Index**

In order to study the variability in area, production, productivity, export quantity, export value and unit value of garlic exports during the study period, co-efficient of variation and coppock's instability index was worked out. Coefficient of instability is another measure of instability besides coefficient of variation. Coppock's Instability Index is close approximation of the average year to year percentage adjusted for the trend and pronounced than the absolute variation. The results are presented in the table 2

**Table 2 Instability in area, production, productivity, export quantity, export value and unit value of export in India during the period (1990-91 to 2019-20)**

Period	Particulars	Area	Production	Yield	Export Quantity	Export Value	Unit Value
<b>Period I</b>	MEAN	105.05	460.47	4.34	3591467.93	35907585.20	11.88
	SD	18.48	111.59	0.38	2786843.92	25756355.65	5.52
	CV (%)	17.59	24.23	8.66	77.60	71.73	46.41
	CII (%)	12.02	12.93	10.91	25.78	22.10	15.15
<b>Period II</b>	MEAN	247.38	1439.45	5.62	17534496.2	556016550	32.95
	SD	69.65	671.19	1.05	12113838.76	431715199.71	15.01
	CV (%)	28.15	46.63	18.70	69.09	77.64	45.55
	CII (%)	13.37	15.30	11.82	45.13	49.30	16.01
<b>Period III</b>	MEAN	176.21	949.96	4.98	10562982.07	295962067.60	22.42
	SD	88.01	686.55	1.01	11174513.06	400320116.04	15.44
	CV (%)	49.95	72.27	20.33	105.79	135.26	68.85
	CII (%)	16.27	19.14	11.99	41.47	56.63	19.59

It could be seen from Table 2 that the instability in area of garlic was higher in the overall period with 49.95 per cent whereas in period I and period II instability in area of garlic was 17.59 per cent and 28.15 per cent respectively. The production of garlic exhibited higher variability in the overall period with 72.27 per cent whereas in period I and period II instability in production garlic was 24.23 per cent and 46.63 per cent respectively. The instability in productivity of garlic was higher in overall period with 20.33 per cent whereas in period I and period II instability in productivity of garlic was 8.66 per cent and 18.70 per cent respectively.

Coppock's instability index showed high variation in the overall period for area, production and productivity of garlic with 16.27, 19.14, 11.99 per cent respectively. In period II, coppock's instability index for area, production and productivity of garlic was 13.37, 15.30 and 11.82 per cent respectively followed by period I with 12.02, 12.93 and 10.91 per cent for area, production and productivity of garlic respectively. Coefficient of Variation and coppock's Instability Index was higher in production followed by area and productivity in all the periods.

Export quantity of garlic showed variability of 105.79 per cent in overall period followed by period I with 77.60 per cent and period II with 69.09 per cent. Instability in export value of garlic is highest in overall period with 135.26 per cent followed by period II with 77.64 per cent and period I with 71.73 per cent. Unit value of export of garlic showed high instability in the overall period with 68.85 per cent followed by period I with 46.41 per cent and period II with 45.55 per cent. Coppock's Instability index showed highest variation was in export value of garlic in the overall period with 56.63 per cent similar to Co-efficient of Variation. I. However instability

index for export quantity, export value and unit value of export was 25.78, 22.10 and 15.15 per cent respectively during period I. However instability index for export quantity, export value and unit value of export was 45.13, 49.30 and 16.01 per cent respectively during period II. Instability index for export quantity, export value and unit value of export was 41.47, 56.63 and 19.59 per cent respectively during the overall period.

### **Trend in area, production, productivity, export quantity, export value, unit value of export, domestic and international prices of garlic**

The trend equations were fitted to assess the trend in area, production, productivity, export quantity, export value, unit value of export, domestic and international prices of garlic. Depending upon its better fit, the trend and the results are assessed. The assessed results are presented under different categories namely trends in in area, production, productivity, export quantity, export value, unit value of export, domestic and international prices in the table 3.

To assess the trends in area, production, productivity, export quantity, export value, unit value of export, domestic and international prices of garlic, data from 1990-2020 was considered.

Knowing the overall performance of area, production, productivity, export quantity, export value, unit value of export, domestic and international prices of garlic, path of movement of the series was traced through parametric trends model (Table 3). A wide range of models are explored, among the competitive models the best fitted models are selected based on the  $R^2$  along with significance of coefficients.

$R^2$  value in trend analysis of garlic area varies from 0.21 to 0.97, where maximum  $R^2$  value is 0.97, observed in quadratic and cubic trend but cubic trend was considered as best fit based on high  $b_1$  value. Interm of production trend analysis of garlic,  $R^2$  value varies from 0.17 to 0.93 in which 0.93 was the maximum  $R^2$  value in the cubic trend considered as best fit. Trend analysis of productivity showed  $R^2$  value varying from 0.19 to 0.74, in which 0.74 was the maximum  $R^2$  value in the cubic trend suited for best fit. Trend analysis of Export quantity showed  $R^2$  value varying from 0.01 to 0.41 in which 0.41 was the maximum  $R^2$  value in the cubic trend suited for best fit. Export value showed  $R^2$  value varying from 0.10 to 0.61, in which 0.61 was the maximum  $R^2$  value observed in the cubic trend considered as best fit. Unit value of export showed  $R^2$  value varying from 0.21 to 0.86, in which 0.86 was the maximum  $R^2$  value observed in the compound, growth, exponential and logistic trend, in which compound trend considered as best fit based on high  $b_1$  value. Domestic prices showed  $R^2$  value varying from 0.17 to 0.75 in which maximum  $R^2$  value was observed in compound, growth, exponential and logistic trend but compound trend was considered as best fit based on high  $b_1$  value. International prices showed  $R^2$  value varying from 0.21 to 0.84 in which maximum  $R^2$  value was observed in compound, growth, exponential and logistic trend but compound trend was considered as best fit based on high  $b_1$  value.

**Table 3 Trend in area, production, productivity, export quantity, export value, unit value of export, domestic and international prices of garlic.**

**Overall Period (1990-2020)**

Sr. No.	Particulars	Function	$R^2$	Coefficient		
				$b_1$	$b_2$	$b_3$
1	Area	Cubic	0.97**	-1.834	0.301	0.002
2	Production	Cubic	0.93**	67.543	-5.704	0.207
3	Productivity	Cubic	0.74**	0.217	-0.016	0.000
4	Export Quantity	Cubic	0.41*	-3687829.427	328145.207	-6763.059
5	Export Value	Cubic	0.61**	-83014881.100	6966774.105	-117285.129
6	Unit Value of Export	Compound	0.86**	1.073		
7	Domestic price	Compound	0.75**	1.056		
8	International price	compound	0.84**	1.069		

Note: \*\*, \* - denotes significant at 1 % and 5 % level respectively.

Among the competitive parametric models, cubic models are found to be best fit for area, production, productivity, export quantity and export value indicating that the movement of all the series except for unit value of export, domestic prices and international prices was uniform throughout the India. This may be due to changes in policy and their implications at different periods of time. Liberalization of trade policies impact the

marketing structures and price received by farmers and other marketing middlemen.  $R^2$  value of area, production, productivity, export value, unit value of export, domestic and international prices of garlic was significant at 1 per cent level except export quantity which was found to be significant at 5 per cent level

### Export competitiveness of garlic

The export competitiveness of garlic was analysed using Nominal Protection Co-efficient. The competitiveness of market is based on NPC ratio. If NPC ratio is less than 0.5, the market is highly competitive. If NPC ratio varies between 0.5 to 1 then the market is moderately competitive and if the ratio is greater than one, then the market is non-competitive and it is presented in table 4.

**Table 4 Export Competitiveness of garlic**

Period	Year	Domestic Prices (Rs/Qtl)	International Prices (Rs/Qtl)	NPC
Period I (1990-91 to 2004-05)	1990-91	1399.67	539.68	2.59
	1991-92	1388.21	693.89	2.00
	1992-93	1357.53	798.19	1.70
	1993-94	1416.50	775.67	1.83
	1994-95	1519.91	1029.30	1.48
	1995-96	1581.04	945.25	1.67
	1996-97	1563.78	1059.90	1.48
	1997-98	1553.80	901.53	1.72
	1998-99	1591.69	1134.57	1.40
	1999-00	2044.68	1270.83	1.61
	2000-01	1865.69	914.88	2.04
	2001-02	2753.50	1162.30	2.37
	2002-03	2793.77	2433.45	1.15
	2003-04	1882.78	2292.05	0.82
	2004-05	1774.89	1060.01	1.67
Average Period I				1.70
Period II (2005-06 to 2019-20)	2005-06	1653.90	1729.92	0.96
	2006-07	3315.81	1151.43	2.88
	2007-08	3882.63	1581.06	2.46
	2008-09	2240.80	2321.66	0.97
	2009-10	2993.12	2441.07	1.23
	2010-11	6240.24	2503.77	2.49
	2011-12	6323.67	3750.29	1.69
	2012-13	2539.29	3722.42	0.68
	2013-14	3363.77	2086.65	1.61
	2014-15	4505.69	2557.86	1.76
	2015-16	5549.13	2657.19	2.09
	2016-17	7726.05	4732.45	1.63
	2017-18	5350.53	6054.29	0.88
	2019-20	3327.72	4248.84	0.78
Average Period II				1.60
Average Overall Period NPC (1990-91 to 2019-20)				1.65

It was observed from the Table 4 that the NPC value of garlic in overall period was 1.65, indicating non-competitiveness of garlic in international markets. During period I and period II, average NPC values of garlic were 1.70 and 1.60 respectively indicating non-competitiveness of garlic for the period I and period II. Hence, the hypothesis i.e., Indian garlic has better competitiveness in international market is not accepted here. The results are similar to finding of (Patidar and Din, 2018) concluded that elasticity of demand of Indian garlic is less than one indicating non-competitiveness of Indian garlic in international markets. Non-competitiveness of Indian garlic is due to high quality Chinese garlic contributing 90 per cent world garlic trade.

### CONCLUSIONS

1. There is increase in agriculture exports in the whole period of study. Percentage share of agricultural export to total exports was decreased from 18.49 per cent in 1990-91 to 11.9 per cent in 2018-19 due to increase in share of manufacturing and service sectors.

2. There is an increase in the quantity of India's garlic export during whole period of study. Percentage share of India's garlic exports to world garlic exports was decreasing in the whole period of study.
3. The growth rates of garlic area, production and productivity in India was found to be positive and significant during overall period.
4. The growth rate analysis of export quantity, export value, unit value of export of garlic was found to be positive and significant during the overall period.
5. The instability rates of garlic area, production, productivity in India was found to be highly instable during the overall period.
6. There was high variability in export quantity, export value and unit value of export during the overall period.
7. Coppock's Instability Index shows highest variation in area, production, productivity, export value and unit value of export of garlic in India in the overall period. Period II showed highest variation in export quantity.
8. Trend analysis showed a uniform and significant increase in trend of area, production, productivity, export quantity and export value in the overall period. In almost all cases cubic models were found to best fit based on  $R^2$  but for unit value of export, domestic and international price of garlic, compound model was found to be best fit based on  $R^2$ .
9. NPC values showed non-competitiveness of garlic in all the three periods.

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**ZPD AND SCAFFOLDING: WHAT AND HOW IN EDUCATION**

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**ABSTRACT**

*Constructivist teaching is new approach to teaching learning environment. It initiate educational environment into learning teaching environment. Constructivism means construction of knowledge. To engage in knowledge construction teacher need to organize activities and assist them to reached learning goal. For better understanding and practice of constructivist practice one must aware about two important concepts namely ZPE and Scaffolding. Both the concepts majorly influence on how to engage students in knowledge construction.*

*Key Words: Constructivism, Zone of Proximal Development, Scaffolding, Child Centered Education*

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**INTRODUCTION**

Constructivist teaching is new approach to teaching learning environment. It initiate educational environment into learning teaching environment. Constructivism means construction of knowledge. To engage in knowledge construction teacher need to organize activities and assist them to reached learning goal. For better understanding and practice of constructivist practice one must aware about two important concepts namely ZPE and Scaffolding. Both the concepts majorly influence on how to engage students in knowledge construction. In the present paper discussion about concept of ZPD and Scaffolding and its significance in educational practice.

**Zone of Proximal Development (ZPD)**

While pioneering the social constructivism, Vygotsky has developed new notion called Zone of Proximal Development (ZPD). According to him (1978) ZPD is “the distance between a child’s actual developmental level, as determined by independent problem solving and the higher level of potential development, as determined by problem solving under adult guidance or in collaboration with more capable peers” (Elliott, Kratochwill, Littlefield, & Travers, 1999). It is considered as important concept in cognitive development for several facts. First, it helps to recognize what child is able to do independently. Second, it highlights bringing cognitive development within the limit of “Zone” (Passer & Smith, 2013). Third, it benefits the teacher to decide appropriate assistance to reach that Zone. With this, the social constructivism trusts cognitive development in social process and intelligence of a child is not innate or static but everyone has potential to learn. Students reach that potential development and fill-up the gap by interacting with peers, teachers and classmates (Phillips, 2010). ZPD advocates need for scaffolding to achieve potential development.

**SCAFFOLDING:**

Scaffolding is a key concept often associated with ZPD in social constructivism. Towards attaining potential development in ZPD one needs assistance from the elder. The assistance process is called scaffolding. It used to elucidate “the nature of the progress of learning and the support systems which may enhance the process” (Pritchard & Woollard, 2010). It is socially mediated dialogic learning that results from interaction between teacher and students. Its objective is providing assistance and guidance when it is impossible to achieve the goal without assistance (Cruz, 2008). By using this technique teacher accelerates and inspires the students to learn by giving hint, clue, assistance and encouragement (Parkay & Stanford, 1999). Undeniably, it is considered as a support mechanism to help the child to grow and develop within the zone of proximal development (Jarvis, 2006). However for fruitful scaffolding, educators and parents should scale the degree and types of instruction needed according to the current ability and knowledge of the child (Nevid, 2007). The strategy asserts that support needed to withdraw when the child able to develop abilities independently. The effective scaffolding situation appeared to be based on two main rules. Indeed, tutor offer immediate more help to children when they are struggle to learn. Later, gradually withdraws or provides less support until child performs proficiently (Long, Wood, Littleton, Passenger, & Sheehy, 2011).

According to Kampen (2020) there are three categories of scaffolding used. They are sensory, graphic and interactive. In sensory scaffolding, physical and visual elements manipulative and visual aids together used in scaffolding. Concerning to graphic, mind maps, graphic organizers and anchor charts etc are used draw abstract concepts. Whereas interactive collaborative learning environment is created using various strategies to engage students in individual, group as well as collaboration between teacher and students.

## QUALIFYING TEACHING LEARNING AS SCAFFOLDING

For effective scaffolding teacher has to organized systematic teaching and learning environment. Concern to this Mercer and Fisher (1993, as cited by Wells, 1999) listed the following suggestions to qualify teaching learning as scaffolding. Teaching learning event should: Enable the learners to carry out the task which they would not have been able to manage on their own; and be intended to bring the learner to a state of competence which will enable them eventually to complete such a task on their own; and Be followed by evidence of the learners having achieved some greater level of independent competence as a result of the scaffolding experience.

Scaffolding draws many premises for teacher and parents and they can use in many ways to engage their children in knowledge construction. They are; “demonstrating how to do things; explaining procedures; providing written or actual model; systematically developing all the pre requisite skills required for more demanding tasks; correcting on task errors, identifying and correcting misconceptions; motivating students and providing clear and realistic objectives” (Lefrancois, 2000).

## ESSENTIAL ELEMENTS OF SCAFFOLDING

Larkin, (2008) has listed essential elements of scaffolding and it can be followed in different stages of lesson. And it is not necessary to follow in order. They are,

1. The teacher considers curriculum goals and standards along with students and needs to select appropriate tasks.
2. The teacher works with the students to establish shared goals. This involvement may result in students who are motivated and invested in learning.
3. The teacher actively diagnoses student needs and understanding to ensure that student are making progress.
4. The teacher provides tailored assistance through promoting, questioning, modeling, telling or discussing.
5. The teacher helps students to remain focused on the intended goals by asking questions and providing clarification as well as offering praise and encouragement.

North Illinois University recommended a four-stage method of scaffolding. They are

- First stage- Instructor introduces the subject and performs a task related to that subject.
- Second stage – teacher ask for the class as a whole to participate in completing a similar activity.
- Third stage- Bringing groups together to complete a similar activity.
- Fourth stage – teacher allowing students to complete a similar task on their own. (Loveless)

## CONCLUSION:

So, absolutely new educative experience should always carried in the light of ZPD and Scaffolding to create learner centered environment. Teacher has to consider their new role and it need to be initiate in the light of what child able to perform by own or perform with guidance and assistance. Hence, in constructivism the teacher role is like a director and guide instead of main person on the stage. Especially, ZPD and scaffolding plays pivot position in social learning and in other from the constructivism. Hence, the main claim of this technique is “Teacher centered education”.

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**A STUDY ON IMPACT OF PROMOTION MIX ELEMENTS ON BUYER BEHAVIOUR TOWARDS PURCHASE OF TWO WHEELER IN HYDERABAD.**

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**ABSTRACT**

*Purpose – The main purpose of the study is to study the impact of promotional mix elements on buyer behaviour towards two wheelers in Hyderabad region in presence of another important variable i.e. customer perception.*

*Design/methodology/approach – Henry Garrett Raking method and Multiple Linear Regression is adopted to meet the purpose of the study. Garrett method is used to find the customer preference towards elements of promotional mix and the regression is applied to test the impact of independent i.e. Promotional mix elements on Dependent variable i.e. customer perception. Intern impact of customer perception on buying behaviour is also studied.*

*Findings – The result of the study portraying that the promotional mix elements has significant impact on customer perception. Further, it is also observed from the study that the customer perception is proved its significant positive effect on buying behavior. The present study found to be empirically robust.*

*Research limitations – For the study, the sample was drawn from Hyderabad region and the result of the study covered various important touch points for absolute coverage in studying impact of promotional mix elements.*

*Practical implications – Findings of present study provide more useful and valid inputs to two-wheeler industry. Based on the trend in the result, the manufacturer can formulate better strategies to gain competitive advantage.*

*Keywords: Advertising, Direct Marketing, Personal Selling, Sales promotion, Publicity, Customer perception, Buying behaviour.*

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**1. INTRODUCTION:**

Consumer behaviour, in general, refers to the study of the behaviour displayed by individual consumers while purchasing products and services to meet their desires. Consumers purchase products to meet their requirements. Consumer behaviour refers to the process of making decisions while purchasing products and services. Consumer behaviour is frequently shown to entail a mental decision process as well as physical activities. Consumer behaviour is a subject that the researcher has extensively researched. The researcher provides many explanations for why the issue of consumer behaviour should be investigated. There is open competition all across the world, which has made it difficult for suppliers and sellers to comprehend customer behaviour. According to Kotler and Keller, it is critical to understand and meet customer requirements and desires since consumer behaviour has become an essential component that has a direct influence not only on a portion of the business but also on entire business success.

Today, understanding and fulfilling what consumers want is critical; gone are the days when suppliers were in a stronger position since there is fierce competition in the market and customers are in a stronger position. As a result, it is critical to understand the elements that influence customer purchasing behaviour.

In India, the two-wheeler industry is a thriving one. There have been and continue to be several elements that influence the customer's decision to purchase a two-wheeler. Many of which are listed above, such as Internal, External, and so on. The rise of the two-wheeler sector in the country, particularly in Telangana, is astounding. What the consumer values the most is extremely important to suppliers or vendors. In India, there is a high demand for two-wheelers. In the present study, the researcher thrown a light on impact of promotion mix elements on customer behaviour which is most important for the marketers as presented in the earlier section. During the study, the researcher was intended to study how the promotional mix elements, i.e. advertising, sales promotion, personal selling, direct marketing and publicity/public relation are showing impact on customer perception which intern affects consumer behaviour.

## 2. REVIEW OF LITERATURE

*Najeemudeen & Panchanatham (2016)* stated that the importance of information in our lives cannot be overstated. A customer's knowledge or information about the goods he plans to purchase is critical. Similarly, understanding the sources from which customers obtain information is critical for a marketer in channeling his marketing messages in such a way that it reaches his target customers in the most efficient and cost-effective manner. In this context, the current study aims to explore and identify the information sources used by consumers to obtain information about two-wheelers, as well as the relative value of these sources in their purchasing choice. This study also examines the influence of customers' socioeconomic factors on different information sources. This study is based on a questionnaire survey of 681 two-wheeler riders in Kerala's Malappuram district. The study's findings will enable them to tailor their marketing efforts to be more customer-centric, as well as to choose the best medium for connecting with customers.

*Saravanakumar & Archana (2021)* The research aims to look at the impact of advertising on consumer purchase behaviour, with a particular focus on two-wheelers in the Chennai district. Purposive sampling was used to collect 50 samples for the final analysis, which examined the link between demographic characteristics and advertisement aspects impacting buying motivations, product recognition, and purchasing decisions of two-wheeler customers. This study suggests that advertisement has an important influence in consumer behaviour when it comes to marketing two-wheelers, and there is room for additional in-depth research in this area.

*Yadav & Shirke (2021)*, It is not just the customer, but also a variety of internal and external stimuli, such as demographic variables, economic considerations, social issues, and psychological aspects, among others. The purpose of this study is to examine the demographic aspects and purchasing decisions of two-wheeler consumers. The demographic parameters of customers were examined, as well as the elements impacting client purchasing behaviour.

*Vikram & Yogita (2018)* A study on the impact of advertising on purchase of two wheelers by women in Panipat city" discovered that the two-wheeler is extensively utilized by the population, that people want to buy their own two-wheeler, and that advertising has a significant influence on the buying desire of the two wheeler. The sample size in this study is set at thirty. Panipat city is the focus of the study. A percent approach was applied for the investigation. After analysing the data, I discovered that the majority of respondents possess a moped and that the majority of respondents are influenced by advertising and word of mouth. And the majority of respondents are pleased with the after-sales services offered by their firm two-wheeler.

*Jayaraj (2017)* The study of consumer behaviour is the study of when, why, how, and where consumers buy or do not buy a product. Sociology, psychology, social anthropology, and economics are all incorporated. It seeks to comprehend the consumer decision-making process on an individual and collective level. It investigates individual consumer attributes such as demographics and behavioural variables to better understand people's needs and desires. It also attempts to measure the effect of groups such as family, friends, reference groups, and society in general on the consumer. The study of consumer behaviour is centred on consumer purchasing behaviour, with the customer acting in three separate roles: user, payer, and buyer.

*Chauhan V.S (2015)* In his study, 'A Research Paper on Impact of Social Media on Sales Promotion – A Case Study on Indian Automobile Industry,' he discusses the various types of social media and their impact on sales promotion, as well as how this would affect individuals and organisations in their purchasing decisions. According to the findings of this study, social media has a substantial influence on automotive sales and sales promotion.

## 3. RESEARCH METHODOLOGY

Research in common parlance refers to search for knowledge. Research is an academic activity and as such it is used in a technical sense.

### Objective Of the Study

1. To study the demographic factors of respondents
2. To find out most attractive promotional adopted by two-wheeler firms.
3. To measure the impact of promotional elements on customer perception.
4. To measure the impact of perception on buying behaviour.

**Data for the study:** The primary data collected through questionnaire from the population of Medchal of Hyderabad region. The questionnaire was pre-designed and pre-tested before it was administered. Secondary data was collected through various publication of books, magazines, annual report, newspapers and websites.

**Sample Size:** For the study, the sample size is determined as 160. As the study is conducted in Hyderabad. Chochran's sample formula was used to determine the sample size as 160. By adopting convenient sampling technique, the required sample were drawn from entire population. Questionnaire tool is adopted as primary data collection tool to collect the data from the respondents. A well-structured questionnaire was used.

#### 4. ANALYSIS AND INTERPRETATION:

a. *Objective 1: To study the demographic profile of the respondents.*

As a part of data collection, the structured questionnaires were spread to 193 respondents throughout study area. Out of which, the researcher identified that only 160 responses are completely filled. Hence, the researcher considered 160 as a sample size. The demographic factor wise distribution is presented in Table 2.

**Table 1: Socio-Demographic wise distributions**

		Frequency	Percent
Age	25-35 Years	15	9.4
	36-45 Years	66	41.2
	46-55 Years	62	38.8
	Above 55 Years	17	10.6
	<b>Total</b>	<b>160</b>	<b>100.0</b>
Gender	Male	98	61.2
	Female	62	38.8
	<b>Total</b>	<b>160</b>	<b>100.0</b>
Educational Qualification	SSC	17	10.6
	Diploma	41	25.6
	UG	54	33.8
	PG	48	30.0
	<b>Total</b>	<b>160</b>	<b>100.0</b>
Occupation	Student	9	5.6
	Business owner	61	38.1
	Employed	15	9.4
	Unemployed	75	46.9
	<b>Total</b>	<b>160</b>	<b>100.0</b>
Income	Below 30000	11	6.9
	30001-40000	66	41.2
	40001-50000	48	30.0
	50001-60000	35	21.9
	<b>Total</b>	<b>160</b>	<b>100.0</b>

b. *Objective 2: To find out most attractive promotional tools adopted by two-wheeler firms*

Through "Henry Garrett Ranking Technique" the researcher tries to find out order of order of promotional tools adopted by Yamaha.

**Table – 2 - Preference factor of selection bikes**

Factors	Rank Scales	I 75	II 60	III 50	IV 40	V 25	Total	Total score	Mean score	Rank
Advertise ment	F	57	33	17	30	23	160	8880	49.33	1
	Fx	4275	1980	850	1200	575				
Personal selling	F	16	25	44	40	35	160	7375	40.97	5
	Fx	1200	1500	2200	1600	875				
Sales promotion	F	18	44	40	40	18	160	8040	44.66	2
	Fx	1350	2640	2000	1600	450				
Direct Marketing	F	38	25	25	32	40	160	7780	43.77	3
	Fx	2850	1500	1250	1280	1000				

Publicity / Public relation	F	31	33	34	18	44	160	7825	43.47	4
	Fx	2325	1980	1700	720	1100				

From the Table 2, it is very clear that the respondents in the study area were attracted towards Advertisement, Personal Selling, Direct Marketing, Publicity/Public Relation and Sales promotion with the respective mean scores 49.33, 40.97, 44.66, 43.77 and 43.47.

c. *Objective 3: To measure the impact of promotional elements on customer perception*

i. *To measure the impact of Advertising on customer perception*

To test the impact of independent variable on dependent, Multiple linear regression is adopted. As a part of the test, elements of advertising are considered as independent variables and customer perception is considered as dependent variable.

Table 3: Coefficients							
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	F
		B	Std. Error	Beta			
1	(Constant)	37.648	2.682		14.035	.000	F = 40.087 R = 0.805 Adjusted R <sup>2</sup> = 0.632
	Newspaper (X1)	8.893	2.977	.736	2.987	.003	
	Magazine (X2)	24.038	4.511	1.493	5.329	.000	
	Television (X3)	-3.879	1.097	-.373	-3.536	.001	
	Posters (X4)	-16.924	3.541	-1.634	-4.780	.000	
	wall painting (X5)	-11.231	2.699	-.970	-4.161	.000	
	cinema ads (X6)	6.100	1.359	.496	4.490	.000	
	social media (X7)	-7.278	1.500	-.643	-4.851	.000	

From the Table 3, it is noted that seven independent elements were showing impact on dependent variable i.e., customer perception. The Standardized  $\beta$  value indicates the impact intensity of independent on dependent. By observing those  $\beta$  coefficients, it can be easily understood that which of the independent variables had high impact on dependent. From the table, it is clear that X1 to X7 are showing significant impact on dependent variable. The independent variable from X1 to X7 were significant at 1% level of significance. With the Standard  $\beta$ , it can be concluded that, out of seven significant variables (X1 to X7), X2 is showing high impact.

ii. *To measure the impact of Sales Promotion on customer perception*

Table 4: Coefficients							
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	F
		B	Std. Error	Beta			
1	(Constant)	19.660	2.092		9.400	.000	F = 21.169 R = 0.594 Adjusted R <sup>2</sup> = 0.337
	price packs (X1)	-.339	1.062	-.030	-.319	.750	
	Gifts (X2)	-2.203	1.063	-.220	-2.073	.040	
	patronage rewards (X3)	-1.406	.929	-.121	-1.513	.132	

	sweepstakes, contests and games (X4)	6.508	.902	.520	7.213	.00 0	
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The table 4 is portraying that the combination of elements of sales promotion has 59.4% effect on customer perception which is dependent. The value R<sup>2</sup> (0.337) value of all independent variables from X1 to X5 is showing high effect on dependent variable. The adjusted R<sup>2</sup> is contributing more than 33% to the response variable.

It is noted that two independent elements were showing impact on dependent variable i.e., customer perception. From the table, it is clear that ,X3 X5 are showing significant impact on dependent variable. The independent variable from X1 to X5 were significant at 1% level of significance. With the Standard  $\beta$ , it can be concluded that, out of four significant variables (X1 to X5), X4 is showing high impact.

iii. *To measure the impact of Personal Selling on customer perception*

From the above table ,it is showing that three independent variables X1,X2,X3 are not showing any significance impact on dependent variable that is perception

iv. *To measure the impact of Direct Marketing on customer perception*

Table 5: Coefficients							
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	F
		B	Std. Error	Beta			
1	(Constant)	8.229	1.108		7.426	.00 0	F = 21.169 R = 0.594 Adjusted R <sup>2</sup> = 0.337
	telemarketing (X1)	2.674	1.469	.260	1.820	.07 1	
	catalogs (X2)	4.104	1.142	.461	3.594	.00 0	
	newspaper (X3)	.236	.873	.032	.270	.78 7	

From the Table 5 it is noted that one independent element were showing impact on dependent variable i.e., customer perception. The Standardized  $\beta$  value indicates the impact intensity of independent on dependent. From the table 5, it is clear that X2 are showing significant impact on dependent variable. The independent variable from X1 to X3 were significant at 1% level of significance. With the Standard  $\beta$ , it can be concluded that, out of three significant variables (X1 to X3), X2 is showing high impact.

d. *Objective 4: To measure the impact of perception on buying behavior*

To test the impact of independent variable on dependent, Multiple linear regression is adopted. As a part of the test, elements of Perception is considered as independent variables and buying behavior is considered as dependent variable. The regression analysis explains clear insights on performance of predators on dependent variables. Through the result of this test, one can understand the impact level of each independent variable on dependent variable.

Table 6: Coefficients							
Model		Unstandardize d Coefficients		Standardized Coefficients	T	Sig.	F
		B	Std. Error	Beta			
1	(Constant)	3.01 5	.385		7.828	.00 0	F = 182.952 R = 0.962 Adjusted R <sup>2</sup> = 0.920
	I would be interested in reading about information on service (X1)	.062	.088	.016	.702	.48 4	
	I would read a consumer report article about service (X2)	5.28 4	.399	1.390	13.236	.00 0	
	I have compared	.988	.222	.296	4.442	.00	



characteristics among brand (X3)					0	
I think there is a great difference among brands (X4)	-1.760	.184	-.642	-9.549	.000	
I like to have most preferred brand (X5)	-1.215	.239	-.350	-5.091	.000	
I usually pay attention to ads (X6)	.173	.681	.053	.254	.800	
I usually talk about the service with the people (X7)	-.816	.247	-.245	-3.311	.001	
I usually seek advice from other people prior purchasing (X8)	-.138	.387	-.047	-.357	.722	
I usually consider many factors before purchasing (X9)	1.294	.177	.500	7.324	.000	
I usually spend a lot of time choosing what to buy (X10)	-.220	.669	-.069	-.329	.743	

From the Table 6 it is noted that six independent elements were showing impact on dependent variable i.e., buying behavior. The Standardized  $\beta$  value indicates the impact intensity of independent on dependent. From the table, it is clear that X1, X6, X8, X10 are showing no significant impact on dependent variable.

## 5. FINDINGS

- Out of all the promotional mix elements considered for the study (Advertising, Personal selling, Sales promotion, Direct Marketing and Publicity or public relation), the elements advertisement was given high priority. By this, it can be noted that advertisement the best mode of communication with the market. The sales promotion is given 2<sup>nd</sup> priority by the respondents followed by Direct marketing, Publicity/public relation and personal selling.
- The impact of promotional elements on customer perceptions is also studies in the present study. Through Regression analysis, the impact of each element of promotional mix on dependent variable i.e. customer perception is tested. From the result of the test, it is noted that Advertisings, Sales promotion and Direct marketing had shown significant impact on customer perception. The other elements (Publicity/public relation and personal selling) of promotional mix proved its insignificant effect on customer perception.
- Further, the study is also focused in studying the impact of customer perception on customer buying behaviour. It is proved in the study that the customer perception is significantly affecting buying behaviour of the customers.

## 6. CONCLUSION

The study was conducted as per the framed objectives. The data had been collected through the well-structured questionnaire which purely framed as per the objectives. The sophisticated statistical tools were used to extract the results from the collected data. The results of the study revealed that the perceptions of the customers certainly varies according to the element of promotional mix. Promotional element wise impact on customer perception is measured and tested. Further it is noticed that the perception affect customer buying behaviour.

As the promotional mix elements proved its significant effect on buying behaviour of the customers, the two wheeler companies should be very particular in designing and selection of promotional mix element which helps the firms to gain more attention towards the products of the company.

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**EXPERIENTIALITY AND STORY WORLDS IN ERNEST HEMINGWAY'S "THE SNOWS OF KILIMANJARO"**

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**ABSTRACT**

*"The Snows of Kilimanjaro" is a short story by Ernest Hemingway, the American author who was awarded Nobel Prize in 1954 for his extraordinary influence on twentieth century fiction. This short story written in stream of consciousness technique delineates the persona of Harry, the complacent writer who considers his life a failure on his deathbed. This paper focuses on the experiential consciousness and multiple story worlds in the selected short story based on the theory of Narratology. The story begins with Harry affected by Gangrene on the plains of Africa and the narration ends with the dream of him being carried to the snow hills of Kilimanjaro on plane. The five flashbacks in italics provide his multifaceted experiences in different dimensions and they are the incoherent descriptions of various worlds of his past life. The narration of the short story brings out the distorted encounters, his procrastinated decisions and his futile wish to pursue writing during his declining days.*

*Keywords: Death, experience, failure, life, memory, snow*

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**1.0 INTRODUCTION:**

Ernest Hemingway, the renowned American author is known for his war time experiences and adventurous lifestyle portrayed in his writing. "The Snows of Kilimanjaro" is the story about the frustrated last days of the complacent writer named Harry. This article attempts to explain the experiential consciousness of the protagonist and the multiple story worlds portrayed in the story based on the theory of Narratology. Narratology is the study of narrative structures building an effect on human perception. Experientiality is defined as "the impact of narrated situation and events on an experiencing consciousness" (Herman 256). Developing gangrene, a deadly disease with no pain, Harry feels nostalgic and painful of how he has wasted his entire life after women and money. The plot represents a story world with various timeframes and recollection of affected memories. The construal narrative of the author portrays the emotional outbreak of his wrong decisions and thus missing the purpose of life.

**2.0 NARRATIVE MODES:**

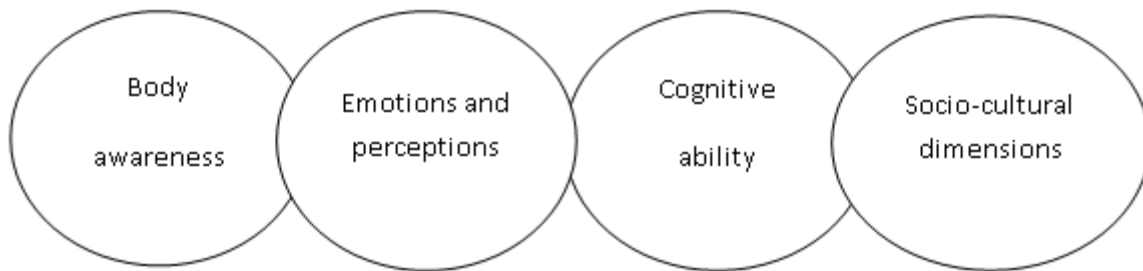
The two important techniques of narration in this short story are intensified parallelism and trajectory interruption. "Intensified parallelism involves the repetition of more or less isomorphic sequences, or structurally similar complexes of characters, actions, and/or situations. Trajectory interruption occurs when one emotionally significant causal sequence remains incomplete because another such sequence is initiated" (Hogan 51). Harry's memories and interior monologues recall the repetitive mistakes of his life, where he has chosen women and money instead of being a creative writer. The few instances of intensified parallelism in the story are Harry's interest to settle with rich women, the comparison of his personality to the leopard's effort in reaching the altitude of Kilimanjaro and the little help he has delivered to the affected people during his travel. The symbols like snow, laugh of hyena, waiting of vulture are repeated which depict the vulnerability of Harry's last days.

The salient features of trajectory interruption include the anxiety and dull spirit of Harry, who is pessimistic and expecting his death. The past, present and future are mixed with incoherent memories and his mental record of unwritten stories. He knew he was in an emotionally barren marriage and continuously insulted Helen but never reveals the truth that he has never loved her. His attempts to pacify his frustration by thinking of his good old poor days of where he was trying to be a good writer. He wished a luxurious life and thus gave up the art of his potential writing. He even blames Helen, "Your damned money was my armour. My Sword and my Armour"(Hemingway 9) for selling his vitality for her wealth.

**2.1 Experientiality:**

Experientiality refers to the intentional actions and perceptions of an individual. Based on John Searle's Theory of Intentionality, the interactions emote from the consciousness of the mind. Harry's narrations focus on his linguistic and cultural experiences. The Fig.no.1 is the extension of Caracciolo's sketch of experiential diagram based on John Searle's Theory of Intentionality. "Intentionality is that property of mental states and events by which they are directed at or about, or of object and states of affairs in the world" (Searl 1). The experience of a

person depends on the four phases — physiological factors, emotional attributes, cognitive patterns and socio-cultural practices.



**Fig.no.1** Redrawn by the author based on Caracciolo's sketch of Experiential diagram, 2014 (Source: Caracciolo, Marco. "Those Insane Dream Sequences: Experientiality and Distorted Experience in Literature and Video Games." *Storyworlds across Media: Toward a Media-Conscious Narratology*. Ed. Marie Laure Ryan and Jan Noel Thon. University of Nebraska Press, 2014. p.233)

Describing the experiential consciousness, the first factor is about the awareness of bodily perceptions. It is followed by the emotional values associated to the structure of intentions of mind. The personality is also affected by the cognitive functions like imagination and memory. The next circle discusses the cultural and social values. Here is the illustrative passage from "The Snows of Kilimanjaro" elucidating all the four factors:

- Body awareness: "Now he would not care for death. One thing he had always dreaded was the pain. He could stand pain as well as any man, until it went on too long, and wore him out, but here he had something that had hurt frightfully and just when he had felt it breaking him, the pain had stopped" (Hemingway 23)
- Emotional attribute: "And then he knew that there was where he was going"(Hemingway 27)
- Perceptual experience: "There wasn't time, of course, although it seemed as though it telescoped so that you might put it all into one paragraph if you could get it right"(Hemingway 18)
- Cognitive ability: "I'm getting as bored with dying as with everything else, he thought"(Hemingway 24)
- Socio-cultural conventions: "The very rich are different from you and me" (Hemingway 23)

## 2.2 Multiple Story worlds:

The story worlds include the characters' construction of the textual world comprised of dynamic events, chronotypes and behavioural manifestations. "Storyworld is a broader concept than fictional world because it covers both factual and fictional stories, meaning stories told as true of the real world and stories that create their own imaginary world, respectively" (Story/Worlds 33). The multiple story worlds portrayed through Harry's consciousness and narrative fiction elucidate his frustration of his present life and the pining of past poor life.

The story world consists of the following components: "*Existents*: the characters of the story and the objects that have special significance for the plot; *Setting*: a space within which the existents are located; *Physical laws*: principles that determine what kind of events can and cannot happen in a given story; *Social rules and values*: principles that determine the obligations of characters; *Events*: the causes of the changes of state that happen in the time span framed by the narrative; *Mental events*: the character's reactions to perceived or actual state of affairs"(Story/World 34-36). The sick, annoying Harry and subservient Helen are the predominant existents arguing throughout the story. Though the present story is set on the plains of Africa, the interior monologues of Harry whirl around Bulgaria, Constantinople and Paris. Discussing the physical law, the three dimensions of time are mixed as the Stream of Consciousness technique is employed. The social rule explains the greed and love for luxurious lifestyle of Harry renouncing the ambition of writing. The events include Harry's gangrene, his war time experiences, his pretentious love for Helen, his previous affairs, his remorse over his neglected passion for writing and his dream of being taken over to the hills of Kilimanjaro as an act of purification of his guilty purposeless life. The mental events record Harry's frustration, anger, anxiety and grief over his last days.

## 3.0 CONCLUSION:

The research paper has identified the experientiality and the multiple story worlds constructed in this sensitive plot of battle between the futile lifestyle and slow death. The objective is to prove that the conscious experience of the protagonist Harry is related to his distorted discourse elements. His intention to become a better writer was never fulfilled but he dreams his travel to the snow hills of Kilimanjaro has cleansed his soul. The concerned study has prompted the researcher to analyse the dimensions of Harry's relationship with his wife

Helen and his past life ruined by his wild desires. The experiential consciousness reveals Harry's emotional turmoil and the genuine love of Helen. The multiple story worlds portray the conflict between his past mistakes and present dying moments. The narration has the biographical tones with fused sentiments and the grief over the procrastinated decisions.

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**ANALYTICAL AND EXPERIMENTAL INVESTIGATION ON BEHAVIOUR OF GEO TEXTILES IN EARTHEN DAMS TO CONTROL SEEPAGE**

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**ABSTRACT**

*Earthen dams are mostly prone to failures. Seepage failure accounts for 40% of the total failures. So, it is necessary to minimize the seepage within the embankment to increase stability and thereby increasing the life of the structure. This project focuses on calculating the amount of seepage from the earthen dam using Geo-studio software and comparing it with practical results. Filters are essential component of large earthen dams. They are provided to lower the phreatic surface function properly. When granular material isn't easily available (or) when the right aggregate isn't available in large enough quantities, in such situation geo textile filter constitute an attractive solution and can be used as a replacement to conventional granular filter. Seepage analysis is done by using the Geo- studio software. The governing differential equations relating to seepage through the dam's body are solved using a finite element technique in this study. Seepage concerns in porous soil medium are calculated using this programme. In order to fulfil the study's goals. This project focuses on calculating discharge from earthen dam using SEEP/W software and comparing it with analytical results.*

*Key words: Earthen dams, seepage, Geotextiles, filters.*

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**1 INTRODUCTION**

Earth fill dams, also known as earthen dams or embankment dams, are constructed by compacting successive layers of earth, forming a core with the most impermeable materials and spacing more permeable materials on the upstream and downstream edges. This type of dam has a trapezoidal cross section and is made of earth components (sand, loam, clay, and so forth). An earth dam is made up of appropriate soils dug out from borrow sites or excavated and mechanically compacted into levels. Earth from borrow areas and needed excavations is hauled to the site, dumped, and spread in layers of appropriate depth following foundation preparation. Tamping rollers, sheep foot rollers, vibratory rollers, tractors, large pneumatic tyre rollers, or earth-hauling equipment are used to compact the soil layers.

Earthen dams may be erected on almost any sort of foundation (except strongly liquefactive muddy soil). A cut-off or a concrete joint tongue is generally used to link the watertight portion of the dam (the baffle & core) to the rocky foundation, under which a grouted cut-off is put in fissured rock. On a non-rock basis, the impermeable section of the dam is linked to the water-resistant material (clay or rock) by a positive ground cut-off, a sheet pile bulkhead, or a curtain if the water-resistant material (clay or rock) is placed at an acceptable depth (partial cut-off). For deep-lying water support, a blinker or partial cut-offs, as well as a sheet pile bulkhead, are placed. One advantage of an earth dam is that it may be adapted to a poor foundation if comprehensive foundation research, testing, and design are considered.

**1.1 Geo Textiles**

Geotextile and geomembrane are geosynthetic materials produced from synthetic polymers (including all types of plastic, synthetic fibre, and synthetic rubber) as the basic material. Geo- synthetic materials have the advantages of light weight, good entirety, product standardisation, high strength, strong corrosion resistance, easy transportation, storage, and construction simplicity, which can save project investment and shorten the construction period when used in earth dam projects. As a new form of dam, geo-synthetic materials are a very promising material with many purposes such as seepage control and drainage, filtration, strengthening, isolation, and protection, to name a few. With the expansion of the application, the variety continues to grow, and the quantity performance has greatly improved.

Filters and the drains that go with them aid in reducing the phreatic surface of the dam and preventing water from leaking downstream. When granular material is not accessible on or near the job site, or when aggregate of acceptable sizes cannot be procured in sufficient quantities, designing and building a filter can be a time-consuming and costly operation. Purchases of graded filters might be costly or difficult to come by. It may potentially take a long time to install. As a result, its filtering efficiency may be jeopardised. In such cases, a geotextile filter may be an interesting alternative to a granular filter. Because of the significant expenses involved in manual sand mining, the price of sand has risen as a result of the Supreme Court's recent prohibition on sand quarrying in India (and maybe other nations). In the current situation, a Geotextile filtration system with

trustworthy design considerations can be of great assistance, acting as a cost-effective option without jeopardising hydraulic structural safety.

## **2 LITERATURE REVIEW**

For more than 45 years, geo-synthetics have been utilised in dam construction and restoration across the world, and they are now being used at an ever-increasing pace in a range of functional applications in all types of dams, including rock-fill, RCC, concrete gravity, and embankment dams. Geo-synthetics are not a new material in the dam building and restoration business; in fact, they are well recognised as a practical and long-lasting civil engineering material with proven performance in a variety of exposed and buried applications. Geo-synthetics are used in dam construction and rehabilitation, where they can be accessed if necessary, not only because they may be the only viable option for a particular application, but also because they are a viable and long-lasting economic alternative to other types of civil engineering materials. Geo-synthetics have been put on or in hundreds of dams across the world since the first use of a geo-synthetic in a dam in 1959 (contradasabetta, Italy).

Geo-synthetics is a broad term that refers to a variety of materials used in civil and geotechnical engineering. In reality, in this fast-growing and dynamic geotechnical sector, "geo-synthetics engineering" is an acknowledged engineering discipline with BS, MS, and PHD degrees available. What exactly is geosynthetic? A geo-synthetic is defined as "a planar product created from polymeric material utilised with dirt, rock, earth, or other geotechnical engineering related material as an integrated element of a man-made project, structure, or system," according to ASTM (2005). As a result, the phrase combines the terms "geo" (earth-related) and "synthetic" (man-made).

Filters are an important part of big earth dams. They are installed to reduce the phreatic surface of the dam. The filter must meet a few engineering requirements in order to work effectively. The design and building of filters can be a lengthy and costly process in projects where granular material is not easily available or where the necessary aggregate sizes cannot be obtained in sufficient quantities. In such a circumstance, geotextile filters are a viable option that may be utilised in place of traditional granular filters. Satyendra Mittal and Ms. Anamika (2016). This research compared the functionality of a traditional granular filter to a novel geo-textile filter. Aiming to build an appropriate granular filter for the given base soil (sand), and then analysing the dam model with both the granular and geo-textile filters. Analytical analysis of the dam model using SEEP/W –Geo-Studio 2007 software verified the experimental test findings.

Earthwork synthetic material is a highly promising new form of dam material that is being more frequently employed as building technology advances. It has seepage control and drainage, filtration, isolation, protection, and other properties, which are particularly useful in earth dam seepage management. Earthwork synthetic material had a positive impact on project investment and construction time, and it is worth promoting for wider usage in earth-rock dam engineering. Ying gao (2016).

The newest information and progress, as well as the standard of practise for tailing dams, will be reported during the IMWA '99 Congress. These structures are required for the functioning of mining businesses. As they are created for power plants, drinking water reservoirs, and other reasons, these embankment dams and buildings frequently have enormous volumes and reach water heights that equate to those of genuine barrages. These structures have a unique status both nationally and internationally. The construction and security requirements of these plants, which are primarily located on the operator's company property and are thus frequently inaccessible, are not legally bound by the applicable rules and instructions of DIN or other institutions, as they are in the normal construction of embankment dams. In Germany, it is proposed to add a comment on tailing dams to the current DIN 19700 in leaf 15. Proposals for the construction and operation of tailing dams have been presented in ICOLD meetings, as well as, for example, in Bulletin 106. ( ICOLD, 1996 ). The authorities, on the other hand, lack the necessary operating rules, particularly the formal introduction with instructions for planning and calculations for the project and its subsequent application. Franz List (2012)

In 1970, France built the first big earth dam utilising geosynthetic materials. On the upstream slope between the rocks and the earth fill, and on the downstream slope surrounding the major drains, the geotextile functions as a filter at that time. Since then, several dams have been erected using geo-textile filters. In addition, numerous researches on the long-term behaviour of the utilised geo-textiles have been conducted in recent decades in order to enhance both filtration design guidelines and products. Filtration design guidelines have been refined as a result of this extensive experience, and new filtration systems with enhanced characteristics have been produced. In addition to these filtering systems, a novel monitoring technology based on optical fibres has been

created to identify and locate early symptoms of dam failure, such as leaks or instability, in order to improve the dams' long-term performance. O.Arteries, K.Oberitter and F.Aschauer (2010)

### 3 METHODOLOGY

Red soil, fly ash, and geotextiles are just a few of the materials needed to build a model earthen dam. Tests were carried out on red soil to determine the index characteristics. The index characteristics of fly ash were determined by tests. Geotextiles and Their Properties, Geo Studio was used to conduct a seepage analysis of an earthen dam. Model of a prototype Earthen dam is being built.

#### 3.1 Wet Sieve Analysis

The following steps should be addressed in this process:

- (i) For cohesive soils, wet sieve analysis is usually chosen. Wet sieve analysis was performed on our sample since it is a cohesive soil.
- (ii) Soak a 200-gram sample of (dry) soil in water for two hours. The water should subsequently be drained from the soil in which it is installed.
- (iii) Remove the soil from the pan and set it on a 75 Micron Sieve. Then place the sieve under the tap and gently turn it on. Water will begin to flow through the sieve, removing the tiny particles in the moist soil. Allow the water to run freely for about 20 minutes, or until the finer particles have been removed.
- (iv) Collect the sample that has been retained on the 75-micron sieve and sundry it before putting it in the oven for 24 hours. After 24 hours in the oven, take a sample and weigh it to determine the soil's residual water content.



**Figure 1:** Paste of soil sample soaked in water, Separation of particles by flow of water and oven dried soil sample

Total weight of soil taken =200 gms

% of Gravel = 86.64

% of Silt = 32.37

% of Fines = 0

As our soil is a fine grain & we done wet sieve analysis there is no graph possible for this part.

#### 3.2 Standard proctor Test

Following steps which are to be considered in this process are

Take about 20 kg of soil and sieve it through 20mm and 4.75mm.

- A 100 mm diameter proctor mould is to be used if the soil fraction that passes 4.75 mm sieve is greater than 80% by weight.
- Take about 2.5 kg of soil sample and water to get the moisture content around 2% leave the mix to mature for few minutes.
- Clean and grease gently the inside surface of the mould and the base plate.
- Take the weight of empty mould with the base plate.
- Fix the collar and place the mould on a solid base.
- Place first batch of soil inside the mould and apply 25 blows of standard rammer that the compacted layer thickness is about 1/3<sup>rd</sup> height of the mould scratch the top of the compacted soil before the second layer is placed.



- Repeat the above procedure for water content values of 14%,16%,18%,20%.



**Figure 2:** Compaction Test Apparatus

Empty weight of mould = 5575 gms

Diameter of mould = 10 cm

Height of mould = 127 cm

Volume of mould (V) = 997.45 cm<sup>3</sup>

### 3.3 Permeability Test

#### Preparation of remoulded soil specimen

- Weigh the required of oven dried soil sample. Evenly sprinkle the calculated quantity of water corresponding to the OMC (optimum moisture content). Mix the soil sample thoroughly.
- Clean the mould and apply a small portion of grease inside the mould and around the porous stones in the base plate. Weigh the mould and attach the collar to it. Fix the mould on the compaction base plate. Keep the apparatus on solid base.
- The soil sample is placed inside the mould and is compacted by the standard compaction tools, to achieve a dry density to equal to the pre-determined
- 3d MDD ( Maximum dry density). Weigh the mould along the compacted soil.
- Saturate the porous stones. Place the filter paper on both ends of soil specimen in the
- mould. Attach the mould with the drainage base and having saturated porous stones.

#### Variable Head Permeability Test

- Disconnect the water reservoir from the outlet at the bottom and connect the stand pipe to the inlet at the top plate.
- Fill the stand pipe with water. Open the stop clock at the top and allow water to flow out so that all the air in the cylinder is removed.
- Fix the height h<sub>1</sub>, and h<sub>2</sub> on the stand pipe from the centre of the outlet such that (h<sub>1</sub>-h<sub>2</sub>) is about 30 cm to 40 cm
- When all the air has escaped, close the stop clock and allow the water from the pipe to flow through the soil and establish a steady flow.
- Record the time interval t for the head to drop from h<sub>1</sub> to h<sub>2</sub>.
- Take about five such observations by changing the values of h<sub>1</sub> and h<sub>2</sub>.
- Measure the temperature of water.

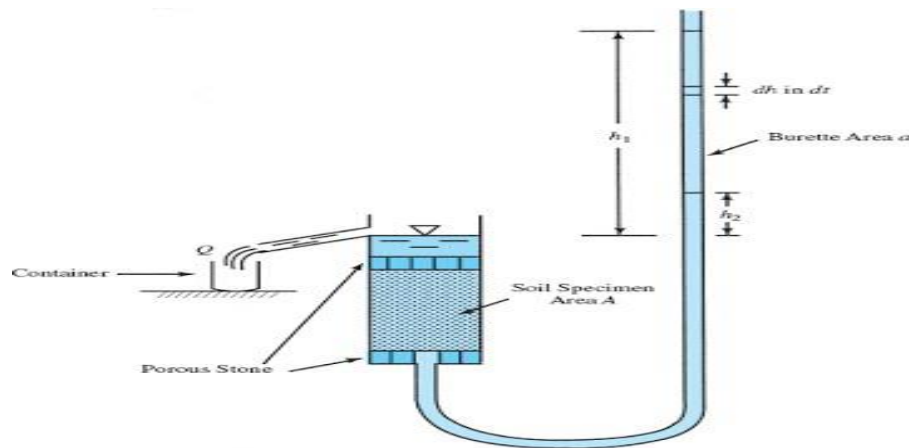


Figure 3: Variability head permeability test

### 3.4 Tests on Earthen dam Earthen dam Prototype model

#### Test on Earthen dam model – With filter :-

- Earthen dam model was constructed using red soil as core , Fly ash is used as embankment & non-woven geo textile is used as conventional granular filter.
- This model was tested for seepage flow through the geo textile filter.
- Soil retention criteria for steady state flow conditions through dam bodies.
- Minimum allowable Geo-textile permeability using permeability criteria is  $K_g > I_s K_s$   $I_s$  = Hydraulic gradient.  $K_s$  = Soil Hydraulic conductivity.
- The Seepage flow through the downstream side of the cross – section in the presence of non-woven geo textile filter.
- Schematic of cross-sectional profile of the model & the model constructed in the laboratory.
- The earthen dam model was prepared in a glass tank with following dimensions. Height = 12.31 cm. Length = 70 cm. Top width = 2.35 cm.
- The upstream side of the embankment was filled with water upto a height of 11.2 cm.
- A constant head was maintained at the upstream side by providing an outlet for water in the tank at 11.2 cm height.
- The downstream side whole width of the tank was sealed with a glass in which small PVC pipe is provided as an outlet to collect the water seeping through downstream side which was measured with time

#### The dam has following dimensions:-

- Total dam cross-sectional Area =  $445.31 \text{ cm}^2$  Slope angle = 21.76 degrees (for Embankment).
- Slope angle = 63.32 degrees (for core construction).
- Cross-sectional area of core =  $104.35 \text{ cm}^2$
- Total dam model Volume
- Volume of Earthen embankment =  $445.31 * 70 = 31,171.7 \text{ cm}^3$
- Volume of Core =  $104.35 * 70 = 7304.5 \text{ cm}^3$
- Volume of Embankment =  $31,171.7 - 7304.5 = 23,867.2 \text{ cm}^3$
- Weight of red soil for Core = density of red soil \* Volume =  $1.414 * 7304.5 = 10,328.56 \text{ gms}$
- Weight of fly ash for embankment = density of fly ash \* Volume =  $0.92 * 23,867.2 = 21,957.82 \text{ gms}$

## 4 ANALYTICAL STUDY OF SEEP/W : WITH FILTER

### 4.1 Introduction

Results of all the experimental model setups were also validated with the help of SEEP/W-GEO studio 2020 software.

SEEP/W is a numerical model that can mathematically stimulate the real physical process of water flowing through a particulate medium. Numerical modelling is purely mathematical and in this sense is very different than scaled physical modelling in the laboratory.

First of all layout of the problem was drawn then various materials with their hydraulic properties were defined. After defining the material, these were assigned and assigned to specific nodes, lines (or) regions, then much properties were defined and finally the problem was solved using solve analysis tool.

#### 4.2 Introduction to Software

Geo-Studio is analysis based software in which we can perform various types of analysis related to Geo – technical studies, It is user friendly software which is solving complex problems using Finite element method of analysis. Flow quantity is a key parameter in quantifying seepage losses from a reservoir (or) identifying a potential water supply for domestic use. Pore pressures associated with ground water flow are of particular concern in Geo-technical engineering. The pore-water pressure, whether positive (or) negative, is an integral component of the stress state within the soil and consequently has a direct bearing on the shear strength and volume change behaviour of soil.

It is no longer acceptable to simply ignore the movement of water in unsaturated soils above the phreatic surface. Not only does it ignore an important component of moisture flow in soils, But it greatly limits the type of problems that can be analyzed. It is central to the analysis of problems involving infiltration and moisture redistribution in the vases zone. Transient flow problems such as the advance of a wetting front within an earth structure. After rapid filling are typical examples of situations in which it is impossible to stimulate field behaviour without correctly considering the physics of flow through unsaturated soils. Fortunately it is no longer necessary to ignore the unsaturated zone with the help of this document and the associated software, flow through unsaturated soils can be incorporated into numerical models so that almost any kind of seepage problem can be analysed.

In general, all water flow is driven by energy gradients associated with the associated with the total head of water as represented by the components of pressure heads and elevations . The term seepage is often used to describe flow problems in which the dominant driving energy is gravity, such as a case in which seepage losses occur from a reservoir to downstream exit point.

In other situations, such as consolidation, the primary driving energy may be associated with the creation of excess pore-water pressures as a result of external loading . However both of these Situations can be described by a common set of mathematical equations describing the water movement.

As a result, the formulation used to analysis seepage problems can also be used to analysis the dissipation of excess pore-water pressures resulting from changes in stress conditions.

In the context of the discussions and examples in this document and in using the Geo- Studio Software, the term seepage is used to describe all movements of water through soil regard less of the creation (or) source of the driving energy flow is through saturated (or) unsaturated soils,

Dimensions of Earthen dam

- *Height = 12.31 cm.*
- *Length = 70 cm.*
- *Top width = 2.35 cm.*
- *Slope angle = 21.76degrees.*
- *Slope angle = 63.62degrees.*
- *Type = Zoned Embankment.*
- *Total water Storage dimensions as per dimensions = 15 Litres.*

## 5 SEEPAGE ANALYSIS OF EARTHEN DAM BY USING GEO-STUDIO SOFTWARE

### 5.1 Analysis Types

There are two fundamental types of seepage

(i) Steady state

(ii) Transient state

- **Steady-state:**-A steady state analysis is an analysis type where water pressures and water flow rates don't change with time. Since steady state analysis ignore the time domain, it generally simplifies the equations being solved.
- **Transient Analysis:-** A transient analysis is an analysis where pressure conditions that change with time. In general a transient analysis can provide more accurate results when soil conditions are modelled, However they are significantly more complicated than steady-state analysis When developing a numerical steady state model using SEEP/W one must determine geometry, assign materials, assign boundary conditions, then review and finite element mesh

## 5.2 Soil Geometry

The first step to determine soil geometry is to create a scale model of cross- section of the system being evaluated.

The second step is to define soil regions to the cross section both steps are described below in detail.

### Creating cross- section

There are two features that will also allow the user to create a cross section in SEEP/W. The first feature utilises the draw function to create lines that makes up the geometry. This is an easy tool for creating cross sections where the user wants to simply geometry.

- (i) Utilise the KEY IN function and click on points.
- (ii) Establish a datum along the cross section and record its elevation in the Y- column; the Y-column will be zero since it represents the datum.
- (iii) Find the cross section location on a topographic map and document the elevation and horizontal distance from the datum in the KEY IN points table In general utilize two-foot intervals for elevation and record its associated horizontal distance from datum.
- (iv) Utilize boring logs obtained from a geotechnical investigation to mark boundary locations between soil layers and document the elevation and horizontal distance from the established datum in the KEY IN points table
- (v) Once the points are entered, the points should now display in SEEP/W.
- (vi) Additional points may be required to carry out boundary conditions of sub-surface layer to the extent of domain.

### Creating Regions

Regions are created by connecting points and are used to define areas of different material properties and conditions step-by-step instructions on how to create a region are provided below.

- (i) Utilize the draw function and click on REGION. This will allow the user to create a polygon that connects points defined in the previous section. The user can "snap" to near by points (or) create a near point if one is not defined near by simply left-clicking with the mouse. Regions can also be created by utilizing the KEY IN function and clicking on REGION.
- (ii) To close the polygon, Click on the first point defined in the Region, or Right-click with the mouse. Each polygon created should define a specific material layer within the cross section.
- (iii) Define the remaining material layers in the model by creating additional regions In general, there should be a region for each other material type (e.g. Clay, Sand, granular backfill, impervious) additional regions should be defined And modelled if material properties change dramatically within a soil type.

### Assign Materials

The next step in developing a numerical model in SEEP/W is to assign materials to the Regions defined in previous sub-section.

- (i) Utilize the KEY IN function and click on materials. Add a new material ,design it a name and provide it a colour.

- (ii) Use the material model drop down menu to select one of the options:
  - (a) Saturated Only: Use if a steady state analysis is conducted to a domain that will remain saturated for the entire duration of the stimulation.
  - (b) Saturated / Unsaturated: Use if unsaturated zones are expected to occur.
  - (c) Interface: Use for materials with a hydraulic conductivity value if zero
- (iii) If the saturated only option is chosen, provide the saturated hydraulic conductivity, Anisotropy, Saturated water content, volume and the coefficient of volume compressibility for each material
- (iv) To create a volumetric water content function follow the steps below:
  - (a) Click on the ellipsis button next to the volume water content function and assign the function material type to its corresponding name
  - (b) From the types drop down menu, choose the VOL WC DATA POINT FUNCTION option and click on ESTIMATE
  - (c) Use the SAMPLE FUNCTIONS option from the estimation method drop down menu and provide a saturated WC and select the sample material from drop down menu
  - (d) Repeat steps A through C each material type in the steady-state analysis
  - (e) The data points can be edited by clicking the EDIT DATA POINTS option.
- (v) To create a Hydraulic conductivity function follow the steps below:
  - (a) Click on the ellipsis function next to the Hydraulic conductivity function and provide it with one of the names created in step iv
  - (b) From the TYPES drop down menu, choose the HYDRA DATA POINT FUNCTION option and click on ESTIMATE
  - (c) Two estimation methods can be chosen for the Hydraulic conductivity function. Van Genuchten method and Xing method. Choose the associated VOL WATER CONTENT FUNCTION developed.
  - (d) Repeat the steps A through C for each material type in the steady state analysis.

### Assign Boundary conditions

The next step in performing a seepage analysis in SEEP/W is to assign boundary conditions. Setting up the boundary conditions in the MODEL in an essential component as the solution is dependent upon the type of boundary conditions defined in the model.

As stated in the SEEP/W manual provided as a supplementary document along with this thesis “Boundary conditions can only be one of two fundamental options- you can specify

H (Head) or Q (Total flux).

- (i) **Potential seepage Phase:** A boundary condition where both the head and total flux are unknown along a slope.
- (ii) **Head:** A boundary condition used where there is free water present within domain such as reservoir behind a dam.
- (iii) **Zero Pressure:** A boundary condition used to model a drains and areas where pore water pressure dissipates instantly.

Fine tuning the finite element mesh. As stated earlier, SEEP/W uses finite element numerical modelling to solve ground water problems.

In order to solve these problems, SEEP/W divides the entire domain of the model into smaller parts known as discretization. This discretization is shown by viewing the finite element mesh. To view the finite element mesh.

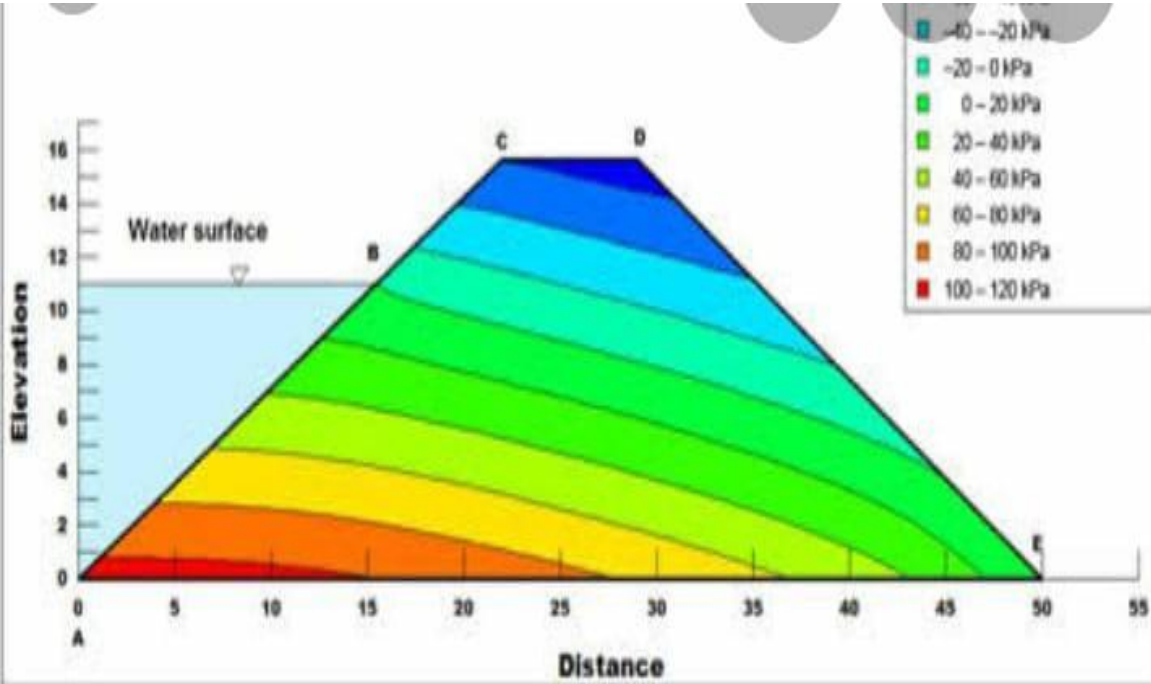


Figure 3: Different Flow paths

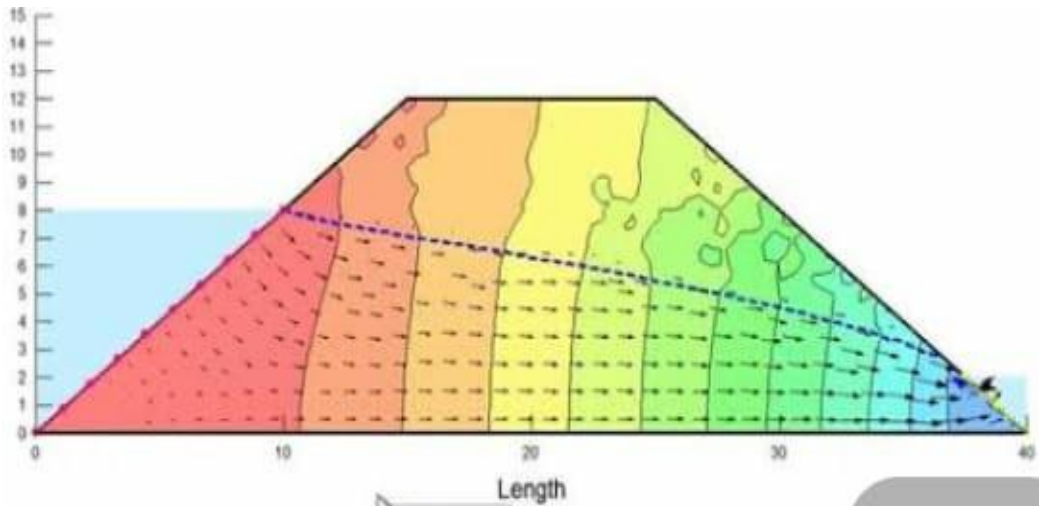
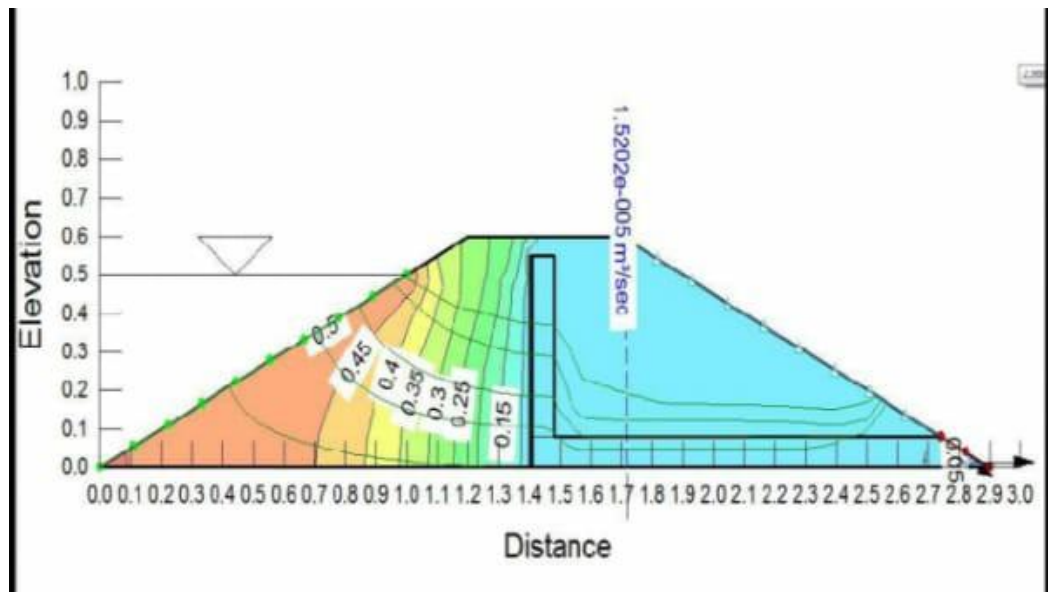


Figure 4: Total Flow path line



Figure 5: Flow Net Section



**Figure 6:** Total head contours obtained with geo textile filter by using SEEP/W

## RESULTS AND DISCUSSIONS

Calculation of seepage through the earth dam by Practically. In this model test flow rate was measured, i.e. The particular quantity of water coming out of the filter material and the time taken for that . The details of the results are presented below .

- From the earth dam dimensions the total height of dam is 12.3 cm, upstream and downstream is 1:2 , top width of the dam is 2.35 cm and the length of the dam is 70 cm and the coefficient of permeability is  $1.02 \times 10^{-2}$  cm/sec. and the free board is 1.5 cm
- Therefore seepage through the earth dam is  $1.106 \times 10^{-6}$  cm<sup>3</sup>/sec/cm.
- Seepage analysis by using SEEP/W:- Input data: (a) Earthen dam dimensions
- (b) Soil properties
- (a) **Earthen Dam dimensions** Top width = 2.35 cm Bottom width = 70 cm Total height of the dam = 12.3 cm Maximum water level = 11.2 cm
- (b) Soil properties: Permeability of soil =  $1.02 \times 10^{-2}$  cm/sec. Liquid limit = 31% Dry density of soil= 1.442 kg/m<sup>3</sup> Water content = 15.4 Plastic limit = 15.75% Specific Gravity = 2.7 This soil properties are input in SEEP/W software then we can get the seepage through the dam is  $1.116 \times 10^{-6}$  cm<sup>3</sup>/sec/cm.

**Table 1:** Showing Types of Analysis and seepage

S.NO	Type of Analysis	Seepage
1	Practically	$1.106 \times 10^{-6}$ cm <sup>3</sup> /sec/cm
2	Analytically	$1.116 \times 10^{-6}$ cm <sup>3</sup> /sec/cm
3	without geotextile filter	$1.216 \times 10^{-6}$ cm <sup>3</sup> /sec/cm

## CONCLUSIONS

- The prototype model is understanding seepage through the body of the dam and time taken by the water to seep through the dam model cross-section.
- The dam model is observed in the practically and software analysis by using geo-textile filter.
- Geo-textile filter design based upon above study forms a coherent criteria that allows safe filter of geo-textile filter . Since seepage rate for granular filter and geotextile filter was observed to approximately same. These two can be used at site.
- The sites, where granular material isn't available in adequate quantity, geo-textile filter can be adopted with the same output.
- Installation of geo-textile filter involves less manual labor and there is no risk of segregation of material



during placement as compared to pure granular filter.

- Seepage rate through the dam model cross-section for a case obtained by analytical analysis using SEEP/W – Geo- Studio 2019 software was founded to be comparable with the model test results. Obtained from the model tests Conducted in the lab.
- The comparison was done between practical and Software results. The variations in the results is about 5-10%.
- The results obtained theoretically and by using software are approximately same.

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## A STUDY ON EDIBLE OIL PRICE HIKE DURING COVID-19 PANDAMIC

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*Eatable oil prices in India have surged to the loftiest stratum in over a decade this month, sizzling in woe among millions of Indian homes. There rise in retail price of eating oils — mustard, vanaspati, soya, triumph, sunflower and groundnut — is a blow to millions of poorer homes in the country that have been financially hit during the separate Covid-19 swell. The Department of Food and Public Distribution held a meeting with all stakeholders to argue ways to address the issue of 'abnormalrise' in native prices. Food Secretary Sudhanshu Pandey asked countries and industriousness stakeholders to find ways to soften the prices.*

*Key words:Edible oil,imports,exports,rice,price.*

**INTRODUCTION**

In the sometime five whiles, India's work of oilseed has increased by further than 44 percent, from about 25.3 million tons in 2015-16 to near 36.5 million tons in 2020-2021. Notwithstanding, yea this meets minor than incomplete India's eating oil demand. Predicated on periodic per capita consumption mathematics — 19 kg per span — India has an periodic demand of 25 million tons of eating oil, of which only 10.5 million tons are supplied from domestic product. The remaining 60 per cent is supplied by purports. Oilseed and eating oil costs in the international market are currently at record highs, influencing domestic prices.

Win and soybean oils reckon for 86 per cent of India's total eating oil purports. Malaysia and Indonesia are the biggest global exporters of win paintings, and prices in these countries have fought up in the other span. In May this span, win oil futures were trading at about Ringgit (Rs) per tons; last span, the prices had seen a low of Ringgit (Rs) per tons. In other words, the price has risen about 133 per cent in the other span. On June 1, prices had softened scarcely, to about Ringgit (Rs) per tons.

The triumph Oil sector is really labour excruciating, and Malaysia, one of the world's largest triumph Oil exporting countries, is really dependent on migratory labourers. Since borders have been closed by Covid, there has been a deficit of workers, affecting fruit." He adds that there has also been a clap in demand for vegetables Oil es in the energy sector — the result of biodiesel programmes that dictate minutest conflation odds of vegetable Oil es in nonnatural powers — which is pouring price surges.

When it comes to soyabeans, there's a comparable price rise visible. Brazil and the United States are the major global backers of this crop, and multinational prices have risen by farther than 80 per cent in the onetime bit (with a partial softening in the onetime fortnight. Soyabean futures for July were trading at Rs\$ on June 1, down from\$ on May 12. On June 1 last bit, the price was nigher to\$ 840. Explaining the multinational demand, Hemant Gupta, general registrar of the Bharatiya Udyog Vyapar Mandal, says, " China is buying soybeans heavily, which is a big reason for the increase in price. In the first four months of 2021 from January to april, China imported about 28.6 million tons, 17 percent farther than during the same period last cycle." He adds, "Inundations in Brazil, the world's largest exporter, affected crop and exports, corroborating the ( price rises) in soybeans." Multiple countries, including the US and Brazil, have also begun using soybean Oil inrenewable energy programs, indicating that this will continue even after covid.

**Importance of Edible Oils within the Country's Economy**

Oils can be toasted to temperatures significantly forward than the boiling point of water, 100 °C (212 °F), and used to fry foods. Oil es for this purpose must have a high flash point. Correspondent Oil es include both the major cookery Oil es – soybean, rapeseed, canola, sunflower, safflower, peanut, cottonseed, etc. – and tropical Oil es, correspondent as coconut, palm, and rice bran. The hindmost are particularly valued in Asian lifestyles for high-temperature cookery, because of their astonishingly high flash points.

Oilseeds and edible oils are two of the foremost sensitive essential commodities. India is one of the largest manufacture of oilseeds in the world and this sector occupies an eventful position in the farming economy, considering for the estimated fruit of 36.56 million plenty of nine cultivated oilseeds during the year 2020-21(November-October) as per 3rd Advance Estimates released by the Ministry of Agriculture on 25.05.2021.

**Types of Oils ordinarily in use in India**

India is providential in having a good range of oilseeds crops cultivated in its distant agro climatic zones. Groundnut, mustard, rapeseed, sesame, safflower, linseed, nigerseed, castor are the main traditionally developed oilseeds.

Soyabean and sunflower have also assumed import in recent days. Coconut is most vital amongst the colony crops. Expenditures are being made to grow Oil triumph in Andhra Pradesh, Karnataka, Tamil Nadu and North-Eastern corridor of the country in addition to Kerala and Andaman & Nicobar Isles. Among the non-conventional Oil es, rice bran Oil and cottonseed Oil are the most important. In addition, oilseeds of tree and timber origin, which grow generally in ethnic inhabited areas, also are a big source of Oil es. Calculus concerning estimated handiwork of major cultivated oilseeds, attainability of comestible Oil es from all domestic sources (from Domestic and Import Sources) during the last ten days and current day are as under-

( Quantity in lakh Tons)

Oil Year (Nov.- Oct.)	Production of Oilseeds*	Net availability of edible oils from all domestic sources	Imports**	Total Availability of Edible Oils
2010-11	324.79	97.82	72.42	170.24
2011-12	297.98	89.57	99.43	189.00
2012-13	309.43	92.19	106.05	198.24
2013-14	328.79	100.80	109.76	210.56
2014-15	266.75	89.78	127.31	217.09
2015-16	252.50	86.30	148.50	234.80
2016-17	312.76	100.99	153.17	254.16
2017-18	314.59	103.80	145.92	249.72
2018-19	315.22	103.52	155.70	259.22
2019-20	332.19	106.55	134.16	240.71
2020-21#	365.65	113.09	74.40 (Nov-May 21)	

\* Ministry of Agriculture

\*\* Directorate General of Commercial Intelligence & Statistics (Ministry of Commerce)

# Based on 3<sup>rd</sup> Advance Estimates (declared by Ministry of Agriculture on 25.05.2021).

**Major Features of Edible Oil Economy**

There are two considerable features, which have significantly contributed to the growth of this sector. One was the hatching up of the Technology Mission on Oilseeds in 1986 which has been proselyted into a National Mission on Oilseeds and Oil Palm (NMOOP) in 2014. As per a decision regarding linking/ transfigurations or liaison of Schemes/sub-Schemes/ programmes, etc. having matching ingredients matching as provocation for seed, demonstration, and grange tools including operative water usage tools covered under NFSM and Oil seeds was integrated under revamped NFSM from the span 2018-19.

This gave a thrust to Government's troubles for multiplying the product of oilseeds. This is putative by the really poignant increase in the product of oilseeds from about 11.3 million tons in 1986-87 to 33.22 million tons in 2019-20. Top of the oilseeds are cultivated on frontier land and are dependent on rainstorm and other climatic conditions. The other dominant peculiarity which has had significant impact on the present status of eating oilseeds/ painting sedulity has been the program of liberalization under which the Government's paying policy allowing lower freedom to the open request and encourages healthy competition and nature regulation rather than protection and control. Controls and regulations have been relaxed affecting in a considerably competitive request dominated by both domestic and transnational players.

**Export Import Policy on Eating Oils**

The country has to lean on purports to meet the gap between demand and pool. Import of eating Oil es is under Open General License (OGL). In order to harmonize the interests of growers, processors and consumers, Government reviews the duty structure of eating Oil es from time to time. With effect from 14.06.2018, the import duty on all crude and refined eating Oil es, except Palm Oil and Olive Oil was raised to 35 and 45 separately while the import duty on Olive Oil was increased to 40. With effect from 01.01.20 the import duty on crude oil and purified palm oil was reviewed to 37.5 and 45 evidently with result from 08/01.20. import policy of Refined Palm Oil is amended from 'free' to 'Finite' order. With effect from 27.11.2020, the import duty on crude palm Oil was revised from 37.5 to 27.5.

As per union budget 2021-2022 the elemental custom duty on crude palm oil has been decreased from 2 to 15 and that on Crude Soyabean Oil and Crude Sunflower Oil from 35 to 15. An agri-cess of 17.5 has been fined on Crude Palm Oil and 20 on both Crude Soyabean and Crude Sunflower Oil. With this, the effective rate of duty on Crude Palm Oil has increased from 30.25 to 35.75. when compare to Crude Soyabean oil and Crude Sunflower Oil, the actual rate of duty remains the same 38.5.

In order to guaranty vacancy of eating Oil in the country, goods of eating Oil has been banned w.e.f. 17.03.08, which was prolonged from time to time. With effect from 06.02.2015, goods of rice bran Oil in large quantity has been authorized. With effect from 27.03.2017, goods of groundnut Oil, sesame Oil, soyabean Oil and sludge (sludge) Oil has been permitted.

With effect from 06.04.2018, goods of all eating Oil es except mustard Oil was made free without quantitative ceiling; pack size etc, till farther orders. Goods of mustard Oil is permitted in packs of up to 5 Kg with a Minimum Export Price (MEP) of USD 900 per MT.

**Status of the Vegetable Oil Industry (as on 22.06.2021)**

Vegetable Oil Industries registered under VOPPA(R) Order, 2011, with the Directorate

Type of Industry	No. of Units Registered
1. Vanaspati, Interestified Vegetable Fats	109
2. Refinery along with Solvent Plant & Oil Mills.	235
3. Oil Mill & Blended Edible Vegetable Oil.	493
4. Solvent Extraction Units	130
Total	967

**EDIBLE OIL IMPORTS INDIA**

India's intents of eatable Oil could fall to their minimum in six periods, condensing for a alternate straight period because of the coronavirus breakout and demand compressed by record prices. India's utilization which had raised every period before the coronavirus flutter hit last period fell to 21 million tons in the marketing period that wrapped up last October 31.

India's eatable Oil intents in 2020/21 could fall to 13.1 million tons, the fewest in six periods, from last period's figure of 13.2 million. Imports meet nearly two-thirds of India's demand, he said, with palm Oil coming generally from top auteurs Indonesia and Malaysia, while other Oil es, correspondent as soy and sunflower, originate from Argentina, Brazil, Ukraine and Russia.

But intents of palm this marketing period could rise 8 on the period to 7.8 million tons, he said, as India allowed intents of refined palm Oil and cut import imposition on the crude variety to lower domestic prices.

Domestic prices have nearly twice in the once period. India's overseas purchases of esculent painting were also limited by progressive domestic thing, which rose 1 million tons to 9 million in the current marketing stretch, after soybean and groundnut thing rose.

Name of Oils	Rates of Import Duty . Effective Dates												
Crude Palm Oil	0% (17/03/12)	2.5% (23/01/13)	2.5% (23/01/13)	7.5% (24/12/14)	12.5% (17/09/15)	7.5% (23/09/16)	15% (11/08/17)	30% (17/11/17)	44% (01/03/18)	40% (01/1/19)	37.5% 1.01.2020	27.5% 26.11.2020	15% + 17.5% (Agri Cess) 1.02.2021
RBD Palmolein	7.5% (17/03/12)	7.5% (17/03/12)	10% (20/01/14)	15% (24/12/14)	20% (17/09/15)	15% (23/09/16)	25% (11/08/17)	40% (17/11/17)	54% (01/03/18)	50% (IND) 45% (MAL) (01/1/19)	45% 1.01.2020	-	-
Crude Soyabean Oil	0% (17/03/12)	2.5% (23/01/13)	2.5% (23/01/13)	7.5% (24/12/14)	12.5% (17/09/15)	12.5% (17/09/15)	17.5% (11/08/17)	30% (11/08/17)	35% (14/06/18)		-	-	15% + 20% (Agri Cess) 1.02.2021
Refined Soyabean Oil	7.5% (17/03/12)	7.5% (17/03/12)	10% (20/01/14)	15% (24/12/14)	20% (17/09/15)	20% (17/09/15)	20% (11/08/17)	35% (17/11/17)	45% (14/06/18)		-	-	-
Crude Sunflower Oil	0% (17/03/01)	2.5% (23/01/13)	2.5% (23/01/13)	7.5% (24/12/14)	12.5% (17/09/15)	12.5% (17/09/15)	17.5% (11/08/17)	30% (17/11/17)	35% (14/06/18)		-	-	15% + 20% (Agri Cess) 1.02.2021
Refined Sunflower Oil	7.5% (17/03/12)	7.5% (17/03/12)	10% (20/01/14)	15% (24/12/14)	20% (17/09/15)	20% (17/09/15)	20% (17/09/15)	35% (17/11/14)	45% (14/06/18)		-	-	-
Crude Rapeseed oil	0% (17/03/12)	2.5% (23/01/13)	2.5% (23/01/13)	7.5% (24/12/14)	12.5% (17/09/15)	12.5% (17/09/15)	12.5% (17/09/15)	25% (17/11/17)	35% (14/06/18)		-	-	-
Refined Rapeseed oil	7.5% (17/03/12)	7.5% (17/03/12)	10% (20/01/14)	15% (24/12/14)	20% (17/09/15)	20% (17/09/15)	20% (17/09/15)	35% (17/11/17)	45% (14/06/18)		-	-	-
Others	-	-	-	-	-	-	-	Crude-30% ref-35% (02/02/18)	Crude-35% ref-45% (14/06/2018)		-	-	-

Source:-As notified by Department of Revenue.

**EDIBLE OIL EXPORTS INDIA**

The country has to lean on senses to meet the gap between demand and repertoire. Import of eating oil is under Open General License. In order to harmonize the interests of planters, processors and consumers and at the same time, regulate large import of eating oils to the extent possible, import duty structure on eating paintings is reviewed from time to time. In order to ice vacuity of eating oil in the country, wares of eating oil has been banned w.e.f.17.03.28, which was extended from time to time. With effect from 06.02.2015, wares of rice bran oil in bulk has been permitted. With effect from 27.03.2017, wares of groundnut oil, sesame oil, soyabean oil and slush ( slush) oil has been permitted.

(Qty in MT)

OILS	2015-16	2016-17	2017-18	2018-19	2019-20
Soyabean oil Ref	1307.16	425.56	2186.62	0	11048
Groundnut Oil Crude	8110.39	5499.77	948	5072.35	75991
Groundnut Oil Ref	3181.08	7053.54	17229.96	4334.38	15132
Sunflower oil Ref	2366.51	2534.34	3174.82	3309.84	2743
Cottonseed Oil Crude	1500.31	184.4	10.79	7.14	31
Coconut Oil Crude	10669.7	6031.17	86.41	21.67	130
Coconut Oil Ref.	10868.1	12756.4	6565.58	7432.36	9101
Rice Bran oil	7294.62	9584.23	12829.3	13154.13	10354
Sesame oil Ref	331	1411.28	309.18	26.44	1641
Mustard Oil Crude	2181.05	630.91	0.18	20.21	715
Mustard Oil Ref.	67.16	1831.12	3695.42	3828.86	5095
<b>TOTAL</b>	<b>47894.8</b>	<b>47962.3</b>	<b>47036.7</b>	<b>37208.05</b>	<b>130340</b>

Source : Department of Commerce

**PRICE COMPARISON OF EDIBLE OIL PRICE SURGE STATE WISE DEPARTMENT OF CONSUMER AFFAIRS (PRICE MONITORING DIVISION) retail price on 01/01/2020(Rs/Kg)**

Groundnut Oil (Packed)	190	AMBIKAPUR	90	JHANSI
Mustard Oil (Packed)	164	KURNOOL	85	BHUJ
Vanaspatti (Packed)	131	PORT BLAIR	62	AGARTALA
			62	ADILABAD
Soya Oil (Packed)	120	JAMMU	74	NASHIK
	120	SILIGURI		
Sunflower Oil (Packed)	150	KOTA	83	INDORE
Palm Oil (Packed)	112	PORT BLAIR	44	MUZZAFARPUR

**Price before covid 19 pandemic****DEPARTMENT OF CONSUMER AFFAIRS (PRICE MONITORING DIVISION) retail price on 30/09/2021(Rs/Kg).**

Groundnut Oil (Packed)	251	MORADABAD	120	DIMAPUR
Mustard Oil (Packed)	227	PORT BLAIR	120	JABALPUR
Vanaspatti (Packed)	224	MYSORE	85	AHMEDABAD
Soya Oil (Packed)	209	SAHIBGANJ	99	GORAKHPUR
Sunflower Oil (Packed)	229	BIKANER	105	GORAKHPUR
Palm Oil (Packed)	185	LUCKNOW	76	KOTA

**Price after covid 19 pandemic****FIGURE :****CONCLUSION**

The difference price between 2020 and 2021 groundnut oil (32.1%), Mustard oil (38.4%), Vanaspatti (70%), Soya oil (74%), Sunflower oil (52%), Palm oil (65.1%) which is high and one of the short term add-ons for reducing

edible oil charges is to lower import duties. As stated in SEAI (seafood Exporters Association of India), the productive rate of import duties, including farming fabric and growth cess and social interest cess, has been 35.75 with effect from February 2, 2021. The successful import duties on 'refined, decolourize and deodorised (RBD) palm oil' is 59.40. Likewise, the rate of effective import duties on crude and refined soybean oil and sunflower oil is in the range of 38.50 to 49.50.

Amidst a surge of up to 62 per cent in domestic eating oil prices. As per the government data, the retail prices of eating canvases have risen over 62 per cent in over a span and is adding straits to consumers before reeling under the profitable affliction got by the Covid-19 epidemic. The standard cost of crude palm oil at Indian harbours was \$ 1173 per ton in April 2021 in comparison to \$ 599 a span ago. Domestic soy oil prices have also fresh than doubled in the other year. Palm and soybean oils reckon for 86 per cent of India's total eating oil imports. Many countries, including the US and Brazil, have also begun using soybean oil in renewable energy programmes, denoting that this drift will carry on well after the ending of Covid.

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- [https://fcainfoweb.nic.in/reports/report\\_menu\\_web.aspx](https://fcainfoweb.nic.in/reports/report_menu_web.aspx)
- <https://consumeraffairs.nic.in/>

## EMOTION RECOGNITION USING EEG SIGNAL

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## ABSTRACT

*This paper aims to propose emotion recognition using Electroencephalography techniques. Recognizing emotion by using computers is becoming popular these days. This paper is based on calculating eeg signals and recognizing emotion from human brain activity. Emotions recognition could be done from the text, speech, facial expression or gesture. Here, we concentrate on recognition of "inner" emotions from electroencephalogram(EEG)[11]. Electroencephalogram(EEG) signals are taken from the scalp outside the brain and assessed in response to several stimuli from the four basic emotion on the IAPS emotion stimuli. Emotions have an important role in daily life. Electroencephalography (EEG) based emotion recognition studies have been conducted in recent years. With EEG based emotion recognition, the computer can actually take a look inside the user's head to observe their mental state[1] We propose an approach that compares different EEG signals of different subjects corresponding to different emotional parameters such as music, news and videos. In the last years, Electroencephalography (EEG) received considerable attention from researchers, since it can provide a simple, cheap, portable, and ease-to-use solution for identifying emotions. Emotion have an important role in human life, not only in human interactions but also in decision making process. We focus our analysis in the main aspects involved in the recognition process (subjects, feature extracted, classifiers). From this analysis, we propose a set of good practice recommendation that researchers must follow to achieve reproducible, replicable, well validated and high quality results.*

*Keywords: Electroencephalogram(EEG), Support vector machine(svm), k-Nearest Neighbour(k-NN), Discrete wavelet transform(DWT), Daubechies wavelet('db8'), Graphical user Interface (GUI)*

## I. INTRODUCTION

Emotion are the most fundamental feature for Non-verbal communication between human and machine. Nowadays, it is important to make computers understand user's emotion who interact with it in human computer interaction system. Electroencephalogram(EEG) signals are the main source of emotion in human body. This was done by measuring EEG signals from people who were emotionally stimulated by Music, News, or videos. Different types of features were extracted from EEG signals then different types of classifiers were applied to these features. Emotion recognition from EEG is proved to be a good choice as it cannot be mimicked like speech or facial expressions. EEG signals are unique and it varies from person to person as each one has different emotional responses to the same stimuli. Thus EEG signals are subject dependent and proved to be effective for subject dependent emotion recognition. However, subject independent emotion recognition plays an important role in situations like emotion recognition from paralyzed or burnt face, where EEG of emotions of the subjects before the incidents are not available to build the emotion recognition model. Automatic EEG emotion recognition could also help enrich people's relationship with their environment.

## II. METHODOLOGY

In order to gather enough data for our project have used database as the starting part of our project. This dataset was unstructured by recording EEG signals from people that watched videos and listened different types of songs with some emotional content in order to evoke some emotion and some other random datasets and you from different people. While listening to music and watching different videos it is possible that the experienced emotions differs from the expected one. Before the data can be used in our program, it has to be preprocessed. These datasets contain noises, so that we are preprocessing it. In addition to this external noise, the EEG signal is most of the times heavily influenced by artifacts, that originated from body movements or eye blinks. This is done by low pass filter in our project. In order to extract the useful informations from the signal, feature extraction is done. From this 75 best features were collected for recognizing emotion. The resulting features were given to two different classifiers to classify, in order to find the accuracy of the classifiers. We have used Support Vector Machine (SVM) classifier, and K-Nearest Network (KNN) classifier.



BLOCKDIAGRAM

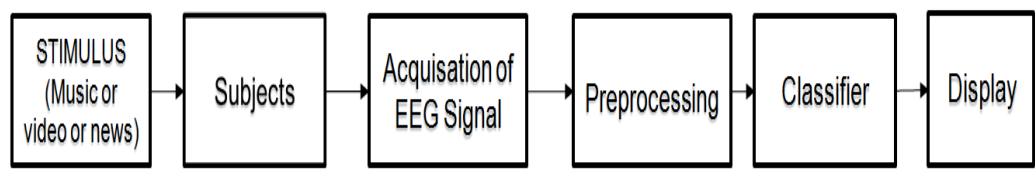


Fig-1

FLOWCHART

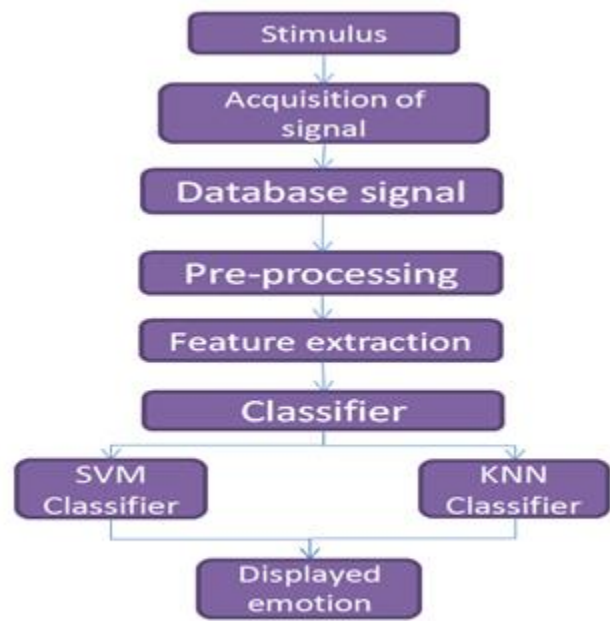
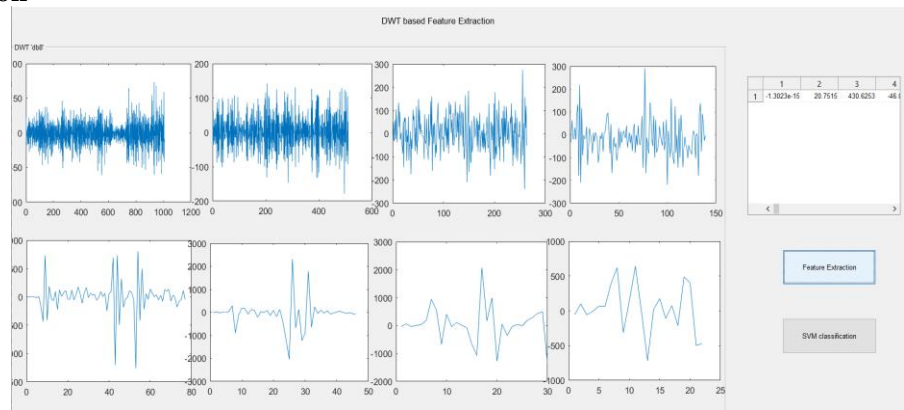


Fig-2

Preprocessing

Preprocessing is the very first step after collecting datas from subjects, that will be used to train the classifier. Giving datas directly to the classifier without preprocessing will lead to bad classification performance. Preprocessing is the procedure of transforming new data into a format that is more suitable for further analysis and interpretable for the user. In the case of EEG data, preprocessing refers to removing noise from the data to get closer to the true neural signals. Here we have used Low pass filter to remove noises and artifacts. Low pass filter removes the unwanted frequencies from a signal above a determined cutoff frequency. It progressively filters out the high end above its cutoff frequency while allowing the low end to pass through, ideally without any changes.

Feature extraction





Feature extraction is a process, where a features of an subject's dataset is extracted. Here we have used wavelet based feature extraction which is Discrete Wavelet Transform(DWT). EEG signals are decomposed into the Gamma, Beta, Theta, Delta and Alpha frequency bands using discrete wavelet transform, and spectral features are extracted from each frequency band. Wavelet based features will be extracted from EEG signal. Different standard wavelets have been tried and Daubechies wavelet ('db8') was found to be the most suitable for the analysis of EEG signals. It is a type of interface which uses interact with electronic devices via visual indicator representation through graphical icons instead of text based user interfaces, typed command labels or text navigation.

### SVM Classifier

Support vector machines(SVM) are supervised learning models with associated learning algorithms that analyze data for classification and regression analysis. SVM needs a proper phase of training to classify data. SVM separates binary data belonging to either of one class. The support vector machine.

### K-NN Classifier

KNN is the simplest algorithm only based on memory. Being simple, elegant and straight forward, many researchers often adopt KNN as a classifier for the classification purpose. The KNN is a non parametric method. K-Nearest Neighbors algorithm is a type of supervised algorithm which can be used for both Classification and Regression. KNN classifies data based on the distance metric. KNN is used as a multi class classifiers.

### GUI Graphical User Interface

It is a type of interface which uses interact with electronic devices via visual indicator representation through graphical icons instead of text based user interfaces, typed command labels or text navigation.

## III. DATA ANALYSIS

### Data sets

We have collected 40 datasets.

Each and every subject's emotions were stimulated by different type of Audios and videos

Acquired Emotions.

Six different emotions have been acquired;



### Accuracy

Classification accuracy is a metric that summarizes the performances of a classification model as the no of correct predictions divided by the total no of predictions. It is easy to calculate and intuitive to understand making it the most common metric used for evaluating classifier models.

$$\text{Accuracy} = \frac{TP + TN}{TP + FP + TN + FN}$$

$$\text{Sensitivity} = \frac{TP}{TP + FN}$$

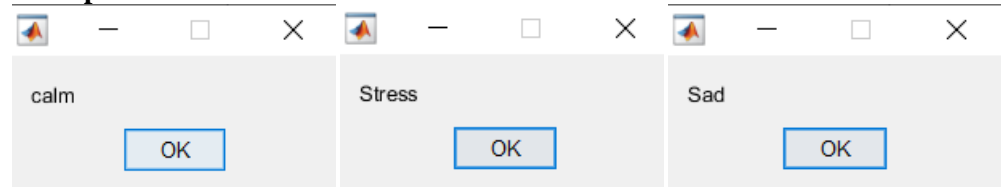
$$\text{Specificity} = \frac{TN}{TN + FP}$$

Here

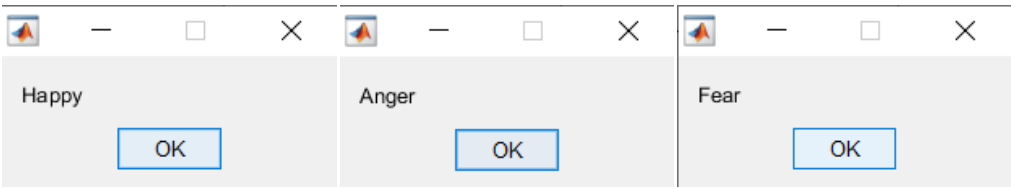
- TP-True Positive
- TN-True Negative

- FP-False Positive
- FN-False Negative

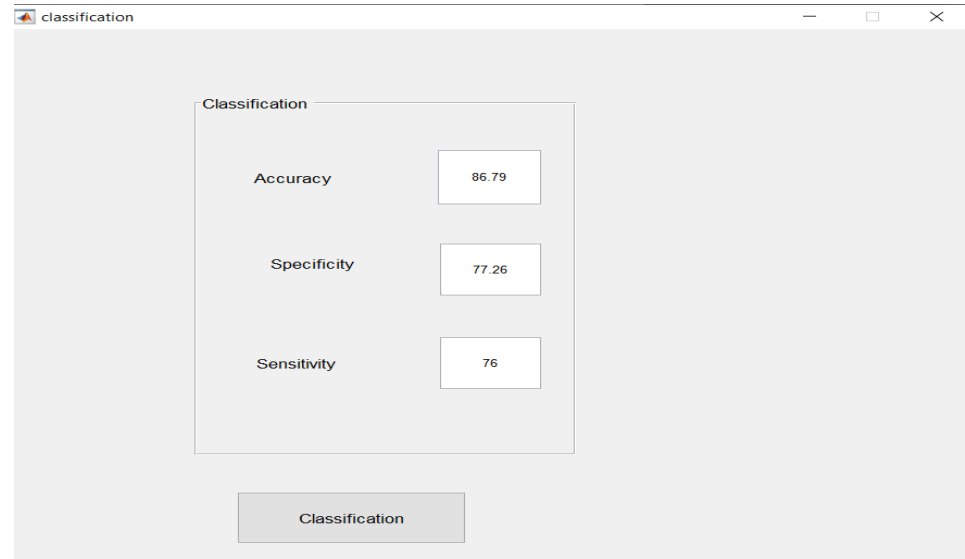
SVM Classifier output



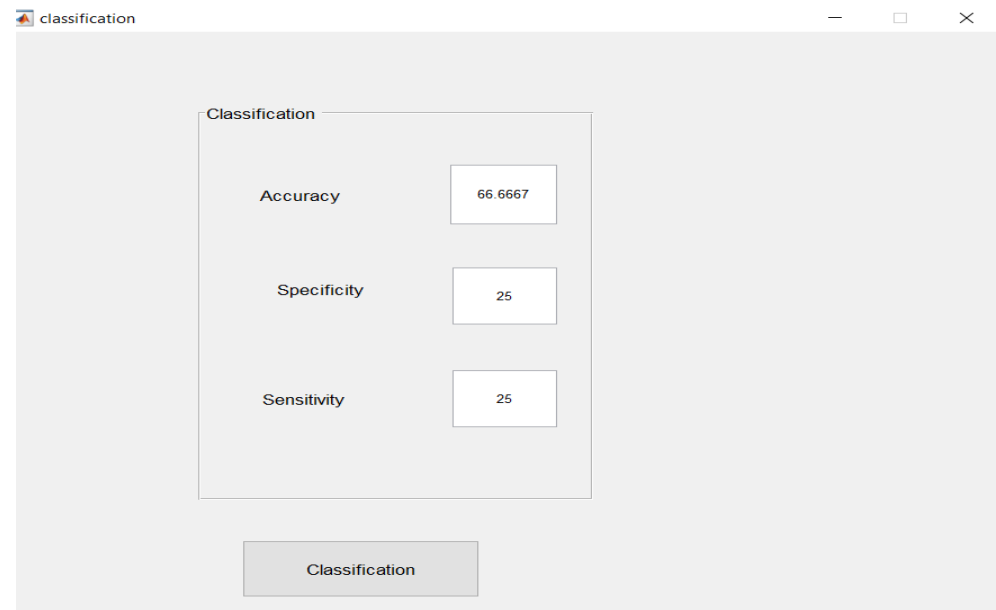
KNN Classifier output



SVM Classifier Accuracy



KNN Classifier Accuracy



IV. CONCLUSION

The proposed work provide a better view in understanding the emotion recoginition using EEG signals. We

have used the EEG techniques gives better results of EEG for signal acquisition. We proposed Support Vector Machine (SVM) classifier and K-Nearest Neighbour (kNN) classifier for classification to get the emotional state. Finally we compare the two classifiers SVM and k-NN for accuracy and we got the greater accuracy in SVM classifier than k-NN classifier.

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**EFFECT OF YOGA ON IMMUNITY SYSTEM OF CHILDREN**

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**ABSTRACT**

*As COVID-19 is an associate degree infection of the higher system respiratory system it's crucial to strengthen the muscles of your lungs to chop down the danger of infection and yoga will be nice for that. Practiced for quite 5000 years across the country, this ancient Indian style of yoga has been touched by science for its varied health edges. Yoga will help to overcome all the physical as well as mental obstacles and keep the body and mind united. Due to COVID-19 the children are going through lots of mental stress and problems with the help of yoga children can overcome these kinds of mental, emotional and spiritual obstacles in the life.*

*Keywords: Yoga, COVID-19, Children, Immunity*

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**INTRODUCTION**

Yoga; Sanskrit; lit. 'yoke' or 'union' could be a cluster of physical, mental, and religious practices or disciplines that originated in ancient Asian nation, geared toward dominant ('yoking') and stilling the mind, and recognizing the detached 'witness-consciousness' as untouched by the activities of the mind and mundane suffering. There are a broad form of yoga colleges, practices, and goals in Hinduism, Buddhism, and Jainism, and ancient forms and trendy strategies of yoga are practiced worldwide. There are loosely 2 varieties of theories on the origins of yoga. The linear model argues that yoga has Aryan origins, as mirrored within the sacred writing matter corpus, and influenced Buddhism; in step with Crangle, this model is principally supported by Hindu students. The synthesis model argues that yoga could be a synthesis of native, non-Aryan practices with Aryan elements; this model is favoured in western scholarship.

**YOGA FOR IMMUNITY**

Exercising helps to spice up our metabolism and if you decide on the proper reasonably exercise, it may also raise immunity and strengthen your systema respiratorium. As COVID-19 is associate degree infection of the higher systema respiratorium it's crucial to strengthen the muscles of your lungs to chop down the danger of infection and yoga will be nice for that. practiced for quite 5000 years across the country, this ancient Indian style of physical activity has been touched by science for its varied health edges. Acting some straightforward yoga asanas pre- and post-infection will facilitate to boost the system and strengthen the muscles of the lungs. Yoga has been used for hundreds of years to keep the body functioning match and fine, holistically. However, the advantages of yoga don't seem to be simply restricted to worry relief and mental eudaimonia. If practiced properly, yoga will recharge your body, get obviate the toxins, negative energy and keep your very important organs functioning well. It will assist you build resilience each within and out. bound yoga positions will facilitate support, balance and boost the system. It may also facilitate fight aerophilous stress that poses a risk to the healthy cells. If done frequently, yoga reduces stress systemically within the body, that successively, cuts down inflammation and degeneration. Hence, whereas yoga will provide an excellent deal of eudaimonia and support for your mind and body as an entire, here ar four yoga poses that you'll be able to attempt to recharge your immunity and impede your risk of danger.

**FIVE TYPES OF YOGA POSE IN CHILDREN FOR IMMUNITY**

1. NATARAJASANA Practising this position provides strength to your chest, ankles, hips, and legs. Natarajasana will increase your metabolism and helps in weight loss and digestion.
2. PADMASANA Padmasana stretches the ankles and knees and conjointly calms the brain. It keeps the spine straight and helps develop a decent posture. It conjointly eases expelling discomfort and neuralgia.
3. PINCHA MAYURASANA Pincha Mayurasana makes the rear, shoulders, and arms sturdy. It provides the neck, shoulders, chest, and belly a decent stretch. It improves balance and concentration.
4. DHANURASANA Dhanurasana provides most stretch on the abdomen and abdominal sides. Regular follow of this position helps to shed and burn fat in varied regions of the body. It conjointly helps you tone your overall body form.
5. VRKSASANA Vrksasana improves balance and stability within the legs. It helps in achieving a balance in alternative aspects of life.

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**CONCLUSION**

Research suggests that mind and body therapies, like yoga, will facilitate boost your child's immunity. Results of thirty-four studies in to the impact, showed that active yoga and meditation, each within the short term and long term, reduced markers of inflammation and improved immune responses to infectious diseases. It's still felt additional that additional investigation must be done, however early results were promising. If you would like to urge your youngsters to eat higher, then yoga may facilitate place them within the right attitude. Sought to grasp however yoga intervention may facilitate encourage healthy feeding and exercise. It was a serious piece of labour, staring at one,820 teens and young adults and results were encouraging. Following regular yoga follow, participants were shown to eat additional servings of fruit and vegetables. They conjointly consumed less snack foods, nutrition and honied beverages. Statistics from the Yankee Psychological Association, show that one in 5 youngsters report worrying "a nice deal". With about four.1 million youngsters within the USA, aged between three and seventeen years previous, diagnosed with anxiety. School-based yoga has been shown to be significantly helpful for managing stress and anxiety. Focusing on third-grade students, a 2018 study staring at stress and anxiety in youngsters, incontestable however regular yoga follow may facilitate. Results showed magnified psychosocial and quality of life scores, each connected to emotional health.

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## SPECIES OF ALNUS GENUS FROM THE CURVATURE CARPATHIANS

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## ABSTRACT

There approximately 25-29 *Alnus* species in the entire world. *Alnus incana* and *Alnus glutinosa* are the most widespread species from Romania. The present article focuses on the Curvature Carpathians (Romanian Carpathians) by using data from forest management plans. We have taken into account all forest districts that contain *Alnus* species. The studied characteristics are: occupied area, altitude, relief form, slope aspect and biometric characteristics (diameter, height, age). The area occupied by *A. incana* is larger than the one occupied by *A. glutinosa*. The maximum altitude for black alder was of 1300 m, while grey alder increases up to 1500 m.

Keywords: *Alnus* genus, grey alder, black alder, Curvature Carpathians

## INTRODUCTION

Alder belongs to the *Betulaceae* Family where it is unique due to the fact that it can fix nitrogen in root nodules, living in symbiosis with *Frankia alni* (Benson et al., 2004). The entire world contains approximately 29-35 *Alnus* species, most of them being located in the north hemisphere, with 4-5 species in Europe and 18-23 in Asia (Furrow, 1979; Govaerts and Frodin 1998; Chen, 1999; Bao-Qing et al., 2010; Dinca et al., 2019).

The most widespread *Alnus* species from Romania are *Alnus incana* (L.) Moench ssp. *incana* and *Alnus glutinosa* (L.) Gaertn.

Grey alder (*Alnus incana*) is an important pioneer species, with a fast capacity for regeneration and colonizing damaged areas from meadows. In Romania, it grows in meadows from rivers located in mountains and high hills (Doniță et al., 1990; Sanda and Mihăilescu, 2003; Dănescu et al., 2018; Schneider-Binder, 2019). In some cases, it can even reach altitudes of 1800 m (Schütt and Lang, 2014; Houston Durrant et al., 2016). The species is resistant to frost and vegetates well on soils with humidity excess, realizing the soil's biologic drainage (Tallantire, 1974; Chichifoi, 1996; Mandák et al., 2016; Vít et al., 2017). Furthermore, it vegetates well on poor, acid or infertile soils (Rytter, 1996). Due to these characteristics, grey alder was successfully used in the afforestation of degraded fields from many countries (Popov et al., 2017; Constandache et al., 2019). In Romania, the most active growths were realized by grey alder on the degraded lands from Bogdan Valley (Sinaia). In this case, the massif was closed in a very short time period (3-5 years) (Traci, 1958).

Black alder (*Alnus glutinosa*) is widespread all around Europe, starting from the Scandinavian Peninsula and up to the Mediterranean, extending towards north Morocco and Algeria (Kajba and Gracan, 2003; Claessens et al., 2010). The species is common for riparian forests that maintain and increase biodiversity. Black alder create habitats for different flora and fauna species. At the same time, its radicular system helps in filtering water from flooded soils (Schnitzler și Carbiener, 1993; Dussart, 1999) as well as in controlling floods and stabilizing river valleys (Piégay et al., 2003). In alluvial and swamp ecosystems, black alder is successfully used in conserving nature, managing hydrographic basins and wood production (Claessens, 2010). Furthermore, black alder is also used in transforming spruce and poplar plantations in more natural stands (Schäfer and Joosten, 2005). Outside the forest, black alder is important in open landscapes, especially in stands located on river valleys.

Alder stands ensure numerous ecosystem services, such as: soil resources (Enescu et al., 2019; Crisan et al., 2020), medicinal plants (Vasile et al., 2018), mushrooms (Dinca et al., 2011), forest fruits (Tudor et al., 2020; Enescu et al., 2020), game species (Ciontu et al., 2018; Crisan et al., 2020), and biodiversity (Timis-Gansac et al., 2020; Dinca et al., 2020; Cantar et al., 2021), etc.

The aim of study is to characterise the *Alnus* stand from the Curvatures Carpathians by using forest management plans from Romania as a source of information.

## MATERIAL AND METHODS

The research was realized in the Romanian Carpathians, more exactly in the Curvature Carpathians (fig. 1). The present study was based on data from Romanian forest management plans realized during 1999-2005 (\*\*\*Forest management plans). We have taken into account all forest districts that contained *Alnus* species. This amounted to 12 forest districts, namely: Câmpina, Comandău, Gura Teghii, Întorsura Buzăului, Lepșa, Năruja, Nehoiașu, Nehoiu, Nereju, Săcele, Soveja, and Tulnici. All these forest districts are located in five counties:

Brasov, Buzau, Covasna, Prahova and Vrancea. The following characteristics were taken into account: occupied area, altitude, relief form, slope aspect and biometric characteristics (diameter, height, age). All these characteristics were then organized in a database with the help of Excel.

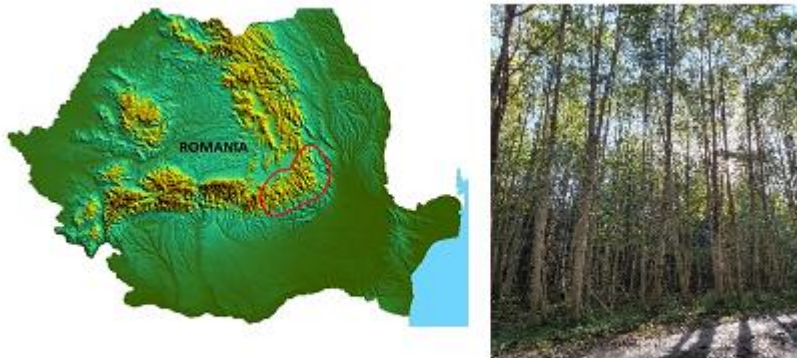


Fig. 1. Curvature Carpathians (source: www.wikipedia.org) (left) and *Alnus incana* stands from Curvature Carpathians (original photo) (right)

## RESULTS AND DISCUSSIONS

Two of the three *Alnus* species present in Romania were located in the Curvature Carpathians, namely grey alder (*Alnus incana*) and black alder (*Alnus glutinosa*). The area occupied by grey alder is of 1745,7 ha, while black alder occupies only 322,5 ha. This difference is explained by the fact that black alder is more pretentious towards soil humidity so that its spreading is conditioned by the existence of a high water quantity in the soil (Șofletea and Curtu, 2007).

In regard to the altitudinal distribution of these two alder species (fig. 2), it can be observed that grey alder prefers 900-999m intervals, while black alder is present at 700-799 m. Practically, black alder is replaced by grey alder at high altitudes (Șofletea and Curtu, 2007). At low altitudes (<400 m), *A. glutinosa* occupies the largest surfaces. *A. glutinosa* is well represented at lower altitudes, compared with *A. incana*. Furthermore, the maximum altitude from the Curvature Carpathians where black alder is present was of 1385m, while grey alder extended up to 1500m.

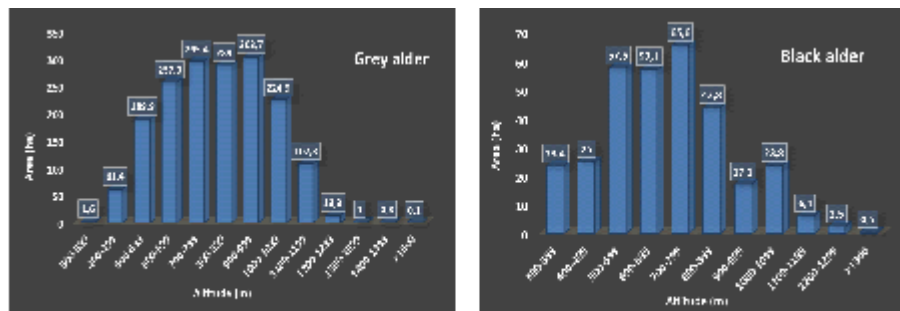


Fig. 2. Distribution of grey alder and black stands on altitude categories

Regarding the distribution of the two species on relief forms (fig. 3), it can be noted that both species prefer slopes, while the second place is reserved for meadows. Other relief forms on which the two species vegetate are plateau and terrace. However, these two have higher percentages for black alder.



Fig. 3. Distribution of grey alder and black stands on types of relief forms

The distribution of the two species on slope types is rendered in figure number 4. In the case of *A. glutinosa*, the first place is occupied by the SW slope aspect, namely a sunny slope aspect. This situation is supported by the fact that the black alder's shade-endurance is represented by light (Clinovschi, 2005). In addition, the S slope aspect also has an important percentage as it is also sunny slope aspect. On the other hand, the N slope aspect (shade slope aspect) occupies the lowest area. Unlike the black alder, grey alder endures better shadowed areas but it also installs easily on sunny slopes aspect (Sofletea and Curtu, 2007). This fact can be seen in figure number 4, where both shade and sunny slopes aspect have very similar percentages in the specie's distribution.

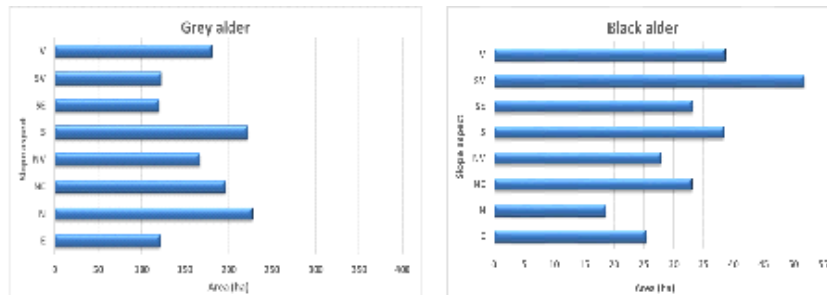


Fig. 4. Distribution of grey alder and black alder stands on slope aspect types

As for the biometric characteristics of both species, this was obtained by the arithmetical average of diameter, height and age (tab. 1). As such, the average diameter for *A. incana* in the Curvature Carpathians is of approximately 17 cm, while *A. glutinosa* records 20 cm. Black alder has active growths on a longer period of time, compared with grey alder (Sofletea and Curtu, 2007). Significant differences between the two species are not recorded for the average height, as their value is of approximately 13m. As for the average age, black alder records higher values (42 years), compared with grey alder (35 years). It is common knowledge that *A. glutinosa* is more long-lasting than *A. incana*.

Tab. 1. Statistic parameters of biometric characteristic for grey and black alder stands

Statistic parameters	Characteristic	Grey alder	Black alder
Mean	Diameter (cm)	17,29	20,09
	Height (m)	12,81	13,21
	Age (years)	35	42
Standard error of mean	Diameter (cm)	0,18	0,62
	Height (m)	0,15	0,41
	Age (years)	0,61	2,05
Standard deviation	Diameter (cm)	7,90	9,71
	Height (m)	4,58	4,64
	Age (years)	18,42	22,92

## CONCLUSIONS

The Curvature Carpathians contain two out of the three *Alnus* species from Romania, namely *Alnus incana* (grey alder) and *Alnus glutinosa* (black alder). The area occupied by *A. incana* is of 1745,7 ha, while *A. glutinosa* covers 322, 5 ha.

Black alder predominates at lower altitudes, while grey alder prefers higher altitudes. The maximum altitude is of ~ 1300 m for black alder and 1500 m for grey alder. The slope is the relief form with the largest surfaces occupied by both species. In regard to the slope aspect categories, it was observed that black alder prefers sunny slope aspect, while grey alder has an equal distribution on all slope aspect categories.

The average diameter for *A. incana* is of 17 cm, while for *A. glutinosa* is of 20 cm. Both species have an average height of around 13 m. The average age is higher for black alder (42 years) than for grey alder (35 years).

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## FACTORS INFLUENCING USAGE OF E-PAYMENTS IN HYDERABAD CITY, INDIA

Dr. Dowlath Ahammad<sup>1</sup> and Ms. Kondrapally Keerthi<sup>2</sup><sup>1</sup>Assistant Professor, Department of MBA, CMR College of Engineering & Technology, Hyderabad<sup>2</sup>Student of MBA, Regd. No: 20H51E0074, CMR College of Engineering & Technology, Hyderabad**ABSTRACT**

*New digital payment technologies have created both possibilities and difficulties across many industries. The purpose of this study is to look at the major factors that impact the adoption of new e-payment technologies, particularly in cities like Hyderabad. Based on earlier research, a thorough theoretical framework was developed that comprised the factors: perceived usefulness, perceived trust, perceived personal innovativeness, perceived ease of use, and perceived risk. The findings of this study demonstrate that all recommended criteria have a substantial impact on the adoption of e-payment in Hyderabad; however, perceived usefulness is not as significant as the other ones.*

*Keywords: E-payments, digital payments, TAM, UTAUT, Regression*

**1. INTRODUCTION**

E-payment is one of the revolutionary improvements brought about by technology in the realm of financial services, which has drastically affected people's lives by making them simpler and easier than they were previously. E-payments have currently taken over the whole world of financial transactions, whether for personal or business usage (Z. J. Zuopeng and J. M. Sajjad 2010), since they provide several benefits to users, such as cost-effectiveness and time and energy conservation. In India, new creative e-payment systems have widely implemented, with numerous e-payment service providers offering many payment services for traffic fines, power bills, parking penalties, and university fees etc.

Despite their fast expansion, e-payment systems are not without flaws. Some disadvantages are obvious, such as hacking dangers and the expensive expense of setting up and updating the system. Some people are discouraged from using e-payment systems because of these drawbacks. This article looks at the fundamental elements that impact the adoption of new e-payment technologies in the cities like Hyderabad. As a result, assist companies in Hyderabad in supporting the adoption of novel e-payment services through smart and effective design that is more aware of the critical variables in the adoption criterion. The growth of new e-payment adoption research helps businesses and organizations to invest less effort and time in establishing new e-payment services with greater market potential.

Many researches used the TAM or UTAUT models to study the factors influencing e-payment acceptance. However, the paradigm presented in (J. M. Gray 2015) is thought to be more appropriate for the current study's objectives. The study looked at Malaysian customers' perceptions of e-payment and identified Benefits, Trust, Self-Efficacy, Ease of Use, and Security as the most important elements influencing consumers' perceptions of e-payment. Perceived Usefulness, Perceived Trust, Perceived Personal Innovativeness, Perceived Ease of Use, and Perceived Risk were added to the prior frameworks in this study.

**2. LITERATURE REVIEW****E-payment systems**

E-payment systems, like all other e-services, require an electronic platform to work. E-payment covers a wide range of monetary transactions (Z. J. Zuopeng and J. M. Sajjad 2012), including normal transactions such as paying for groceries or utility bills, as well as B2B transactions and others, allowing the buyer and seller to benefit from a faster and easier payment system (W. Chaiyasoonthorn and W. Suksa-ngiam 2019).

There are various advantages to using e-payment methods. For example, they provide speedier monetary transactions, eliminating the need for long lines and waiting times for payments and receipts. People can pay and receive money remotely using their cell phones or another way of payment. Furthermore, the expenses associated with financial transactions when utilising e-payment systems are far lower than transaction fees when using traditional methods in most countries, particularly in Hyderabad. Even if there are no direct costs, the customer may have to pay indirect fees, such as transportation fees, to go to the bank to withdraw money or to the store to purchase products and services.

However, e-payment systems have several drawbacks, such as the security risk that users experience while using the e-payment system, as well as the risk of hacking the system, which results in the loss of money and

personal information. Another downside would be the cost; while the cost for users will be lower, some expenditures associated with protecting the system and installing or updating it may be rather expensive.

### Theories and Related frameworks

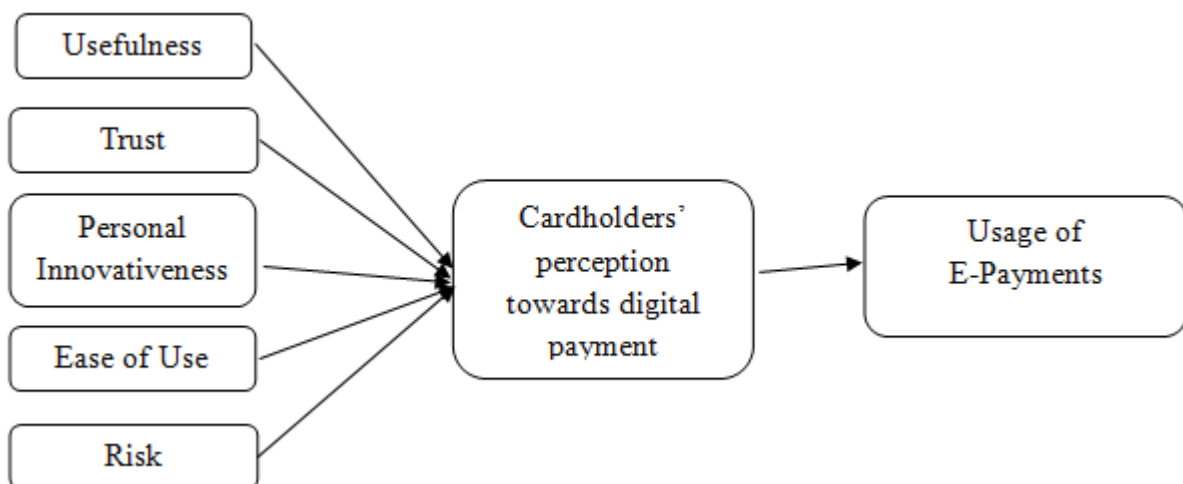
Technology Acceptance Model (TAM), which was established by Davis with the goal of determining and forecasting the elements that impact a system prior to its implementation. The majority of studies used TAM to create the framework in order to explore the elements that drive e-payment acceptance. The TAM model found two important aspects: perceived usefulness and perceived ease of use, both of which may be influenced by outside sources (F. D. Davis 1989). Later, it was expanded to incorporate more elements, such as perceived risk, security, perceived benefit, trust, web assurance seals, and usability (S. Ozkan , G. Bindusara and R. Hackney 2010). Others included Perceived Risk and E-payment Information as additional criteria. Trust, self-efficacy, and security were included as additional criteria (C. Lin and C. Nguyen 2011).

The variables of Usability (Perceived Ease of Use) and Technological and Transaction System, as well as access to protective regulations (Perceived Usefulness), were employed by the authors in (M. Barkhordari at al 2017), when conducting study on e-payment acceptance in the context of Iran. Furthermore, (E. Oney, G. O. Guven and W. H. Rizvi 2017) highlighted technical security, security reports, transaction system, and personal familiarity with e-payment systems as external factors. While in (A. Riskinanto, B. Kelana and D. R. Hilmawan 2018), age was added as a mitigating factor.

Other researchers modified the UTAUT model to include the trust component while removing the user behaviour factor. Another modification made to this model was the replacement of Behavioral Intention with Continuance Intention (Indrawati and D. A. Putri 2018).

### 3. RESEARCH MODEL & HYPOTHESES

Figure 1 depicts the theoretical framework used in the current study. This study is being conducted to evaluate the variables influencing inhabitants of Hyderabad's attitude of utilizing e-payment. The assumptions in the following subsections are based on the linkages between the elements influencing residents' perceptions of utilizing e-payment. In light of previous findings in the literature, we utilized the following elements in our conceptual model:



**Figure 1: The Modified and Developed Conceptual Framework**

#### Perceived usefulness

The consumer's view of the efficacy and convenience provided by e-payment systems in streamlining his everyday transactions is referred to as perceived usefulness (S. Roy and I. Sinha 2014). In other terms, it refers to the advantages that e-payment systems provide. E-payment systems provide the user a simple method of payment as well as the capacity to store and move money values (S. Chakravorti, 2003).

Furthermore, e-payment systems can give other benefits such as time and cost savings. One of the most significant elements influencing the utilisation of e-payment systems is usefulness (S. Ozkan, G. Bindusara and R. Hackney 2010), (C. Lin and C. Nguyen 2011), (S. San Martín, B. López-Catalán and M. A. Ramón-Jerónimo 2012), (Y. Chou, C. Lee and J. Chung, 2004). However, according to other experts, significant time and effort may be required by the user to learn how to utilize the e-payment system (C. Kim, W. Tao, N. Shin and K.-S. Kim, 2009), and so e-payment systems may be costly rather than cost-saving technologies. As a result, it is hypothesized:

H1 - There is a substantial association between perceived usefulness and customers' attitudes regarding e-payments.

**Perceived Trust**

Perceived In the context of e-payment systems, trust denotes the user's confidence in the system's dependability in protecting the user's personal data and money against abuse and theft (T. Kongprapunt and N. Pupat 2018), (D. Abrazhevich 2004).

Many academics have claimed that a high level of trust is required for the adoption of an e-payment system (D. Abrazhevich 2004), (Indrawati and D. A. Putri 2018). Similarly, users' concerns about data privacy, internet security, and other issues lead to a low degree of confidence, which has a negative influence on the adoption of e-payment systems (N. B. Tasin 2017).

However, some researchers argue that trust alone is not enough to entice people to use e-payment systems. For example, if a reputable organisation provides e-payment functions, the consumer will gladly use them; however, the user will be hesitant to use e-payment services provided by an untrustworthy organisation (S. Ozkan , G. Bindusara and R. Hackney 2010). Others discovered that trust is not strongly related to people's attitudes regarding e-payment (E. Oney, G. O. Guven and W. H. Rizvi 2017) (W. M. Teoh, S. C. Chong, B. Lin and J. W. Chua 2013). As a result, it is hypothesized:

H2 - There is a substantial association between customers' perceived trust and perception of e-payments.

**Perceived personal innovation**

Individuals' innovativeness is defined as the extent to which they regard themselves as technological leaders and pioneers (A. Parasuraman and C. Colby 2002). This aspect has been identified as a significant influencer on user acceptance of e-payment systems (C. Lin and C. Nguyen 2011), (E. M. Rogers 2003), (C. Kim , K. Takashima and S. Newell 2018). As a result, it is hypothesized that: As a result, it is hypothesized:

H3 - There is a substantial association between perceived personal innovativeness and customer attitudes about e-payments.

**Perceived ease of use**

The degree to which a person will not exert effort when utilising an e-payment system is characterised as ease of use (S. Roy and I. Sinha 2014). It may be achieved through a variety of means, including content, design (D. Abrazhevich 2004), information management, and speed (M. Jun and S. Cai 2001). These issues can have a substantial impact on e-payments systems (P. Guriting and N. O. Ndubisi 2006). Previous study has demonstrated that simplicity of use has a beneficial influence on e-payment system adoption (C. Lin and C. Nguyen 2011), (A. Riskinanto, B. Kelana and D. R. Hilmawan 2018). As a result, it is hypothesized:

H4: There is a substantial association between perceived ease of use and customer attitudes about e-payments.

**Perceived Risk**

Risk is described as an individual's doubt regarding e-payment systems (S. Ram and J. .. sheth 1989), which derives from their fears of fraud, theft, hacking, misuse of personal information, and so on. Individuals may be cautious to use the e-payment system since risk is a key element influencing e-payment system adoption (S. L. Jarvenpaa, N. Tractinsky and M. Vitale 2000). Individuals' apprehension about the system may also be a barrier to its adoption (S. Sarin, T. Sego and N. Chanvarasuth 2003).

Contrary to the majority of studies, some researchers suggest that there is no relationship between Risk and desire to embrace e-payment systems; while Risk influences payment system adoption, there is no direct correlation; hence, individuals may utilise the system despite their concerns (S. Ozkan , G. Bindusara and R. Hackney 2010). Therefore, it is hypothesized as:

H5: There is a strong link between perceived risk and customer attitudes regarding e-payments.

**Consumer's perception towards the actual use of e-payment**

User perceptions regarding IT systems are a major element influencing users' actual use of a given system (F. D. Davis 1989). As a result, it is speculated that:

H6: Consumer impression of e-payment has a beneficial influence on real e-payment use.

#### 4. RESEARCH METHODOLOGY

Respondents in this research used e-payment in Hyderabad. For this study, a nonprobability sample approach is employed to collect responses. Convenience sampling is a sort of non-probability sampling in which population items are chosen for inclusion in the sample based on their convenience of access.

According to the hypotheses stated above and the conceptual research framework developed, the proposed factors are: perceived usefulness (PU), perceived trust (PT), perceived personal innovation (PPI), perceived ease of use (PEOU), perceived risk (PR), and consumers' perception of e-payment (CP). Notably, the questionnaire items for each of these characteristics were carefully tailored from previous investigations. The phrasing, on the other hand, was maintained as consistent as feasible among investigations.

To ensure face validity, a pilot study of 25 customers was conducted prior to its distribution. Cronbach Alpha, a measure of dependability based on construct internal consistency, was determined for each element. The dependability for each element was more than the acceptable 0.75 level suggested by (J. C. Nunnally 1978). The overall Cronbach Alpha for the data instrument was 0.873, suggesting that the questionnaire has a good level of reliability. As a result, all goods are kept.

Six variables were developed prior to the regression analysis. For each responder, the elements relevant to each component were summed together, and the average was calculated. The mean ratings ranged from 1 to 5, with 1 reflecting entire disagreement with all stated things and 5 representing total agreement with all said items—the research included two types of variables: dependent factors and independent variables. The primary goal of this study is to look at the predictors/variables that influence customers' perceptions about using e-payment in Hyderabad city. The independent variables in this study are the PU, PEOU, PT, PR, PPI, and CP. These six independent factors would be examined to see if they had an effect on the dependent variable, which is the actual usage of e-payments (UEP).

#### 5. DATA ANALYSES

##### Descriptive findings

Based on our suggested conceptual framework, we performed an online survey to study variables influencing customers' perceptions of e-payment disparities across generations. A total of 370 people viewed the survey link, and 236 people (63.8 percent) finished it. After excluding respondents who stated that they are not presently utilizing any of the e-payment options, 204 (85.5 percent) were judged suitable for this study.

Table 1 displays the demographic characteristics of e-payment users in Hyderabad. Males made up 52.8 percent of those who responded to the questionnaire, while females made up 47.2 percent. Twenty-two percent of the participants were married, and 12.2 percent were executives, 10.2 percent were non-executives, 2.3 percent were housewives, 61.3 percent were students, 5.4 percent were self-employed, and 8.6 percent were in other professions. In addition, 31 percent of the participants had a high school diploma or less, 12.5 percent had a diploma, 37.8 percent had a bachelor's degree, 10.2 percent had a master's degree, and 9.6 percent had a Ph.D. In terms of monthly income, the study discovered that 55.2 percent of respondents earned less than 10000 Rupees, 14.3 percent earned between 10000 and 20000 Rupees, 18.2 percent earned between 20000 and 30000 Rupees, 5.9 percent earned between 30000 and 40000 Rupees, and 6.3 percent earned more than 40000 Rupees.

**Table 1: Demographic characteristics of the sample (n=207)**

Criterion	Category	Frequency	%
Gender	Male	108	52.8
	Female	98	47.2
Marital Status	Single	160	77.8
	Married	45	22.2
Current Professional Position	Executive	25	12.2
	Non-executive	21	10.2
	Housewife	5	2.3
	Student	127	61.3
	Self-employed	11	5.4
	Others	178	8.6
Education	High school or lower	62	31.0
	College (2 years program)	26	12.5
	Bachelor's degree	78	37.8
	Masters	21	10.2

	Ph.D.	20	9.6
Monthly Income	Below 10000	113	55.2
	10000 up to less than 20000	29	14.3
	20000 up to less than 30000	38	18.2
	30000 up to less than 40000	12	5.9
	40000 or above	14	6.4
<b>Total:</b>		207	100

### Relationships between the factors affecting the Consumers' perception towards e-payment

Table 2 displays the results of the regression model we have created so far using SPSS, after we verified the regression analysis assumptions. Based on these findings, we infer that the parameters under consideration explained 78.2 percent of the variance in customers' willingness to utilize e-payments in Hyderabad. Other factors not specified in our conceptual framework can explain the remaining 21.8 percent of the variation. The lowest significance F in the ANOVA table (Table 3) demonstrates that our regression model is viable at a 0.05 significant level.

**Table 2. Regression Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.782 <sup>a</sup>	.611	.602	.40269
a. Predictors: (Constant), PR, PEOU, PPI, PT, PU				

**Table 3. ANOVA Table**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1					
Regression	51.303	5	10.261	63.274	.000b
Residual	32.595	201	.162		
Total	83.898	203			
a. Dependent Variable: CP					
b. Predictors: (Constant), PR, PEOU, PPI, PT, PU					

**Table 4: Regression coefficients of the factors affecting consumers' perception of e-payment**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	Constant	.656	.239		2.742	.007
	PU	.144	.076	.143	1.911	.057
	PT	.116	.056	.110	2.073	.039
	PEOU	.446	.077	.452	5.782	.000
	PPI	.219	.048	.238	4.529	.000
	PR	-.096	.034	-.127	-2.797	.006
a. Dependent Variable: CP						

Table 4 displays the estimated regression coefficients, as well as their t-ratios and probability values. PEOU, PT, and PPI all had a favorable and statistically significant influence on the CP. The PR, on the other hand, has a negative and statistically significant influence on the CP. Table 4 data, on the other hand, show that there is no significant link between PU and the CP (p-value 0.057). As a result, hypotheses H2, H3, H4, and H5 of the current study have been validated, however there is insufficient evidence to accept H1 at a 5% level of significance.

The study's sixth hypothesis posits that customers' perceptions of e-payment have a favorable influence on their actual use of e-payment. A correlation analysis was done to evaluate this idea. The Pearson's correlation coefficient between customers' perceptions of e-payments and actual use of e-payments is significant at the 0.01 level ( $r = 0.452$ ,  $p\text{-value} = 0.000$ ). The data corroborate the stated hypothesis H6 and demonstrate that customers' perception of e-payment has a favourable influence on e-payment use.

## 6. RESULT AND DISCUSSION

The first hypothesis, H1, was shown to have no meaningful link with customers' actual use of e-payment in Hyderabad. The findings were consistent with prior research (C. Kim, W. Tao, N. Shin and K.-S. Kim, 2009).

The findings imply that, independent of a person's view that utilising an e-payment system will improve his day-to-day performance, customers are more likely to utilise e-payment.

Perceived Trust was found to have a substantial association with customers' actual use of e-payment in Hyderabad in the second hypothesis, H2. Previous research (Indrawati and D. A. Putri 2018), (D. Abrazhevich 2004) -(N. B. Tasin 2017) yielded similar results. As a result, a high level of trust is required for e-payment adoption.

Perceived personal innovation was discovered to have a substantial association with customers' actual usage of e-payment in Hyderabad, supporting the third hypothesis H3, which was consistent with many another research. (C. Lin and C. Nguyen 2011), (E. M. Rogers 2003), and (C. Kim, K. Takashima and S. Newell 2018). As a result, the extent to which individuals regard themselves as technological leaders and pioneers is regarded as a significant element affecting user acceptance of e-payment.

Perceived Ease of Usage was discovered to have a substantial link with customers' actual use of e-payment in Hyderabad, supporting the fourth hypothesis H4, which was consistent with many another research (C. Lin and C. Nguyen 2011), (A. Riskinanto, B. Kelana and D. R. Hilmawan 2018), and (P. Guriting and N. O. Ndubisi 2006). This suggests that the ease of use of handling e-payment, such as convenience, speed, flexibility, simplicity, accessibility, and availability, is also seen as an important element affecting user acceptance of e-payment.

Perceived Risk was found to have a considerable negative influence on customers' actual use of e-payment in Hyderabad, supporting the fifth hypothesis H5. This was consistent with several previous investigations (S. L. Jarvenpaa, N. Tractinsky and M. Vitale 2000), (S. Sarin, T. Sego and N. Chanvarasuth 2003). This means that people's apprehension about the system may be a deterrent to its adoption.

The sixth hypothesis, H6, discovered a substantial positive association between customers' perceptions of e-payment and their actual use of e-payment in Hyderabad. This suggested that the user's attitude regarding IT systems is a critical element influencing the actual use of e-payment.

## **7. CONCLUSION**

The researchers investigated the impact of several factors on the adoption of new e-payment systems and technologies in this report. Based on an enhanced paradigm that reflects the distinct position of cities like Hyderabad, which move quicker in digital transformation than less developed cities. On the implementation of e-payment systems in Hyderabad, the expanded framework includes all of Perceived Usefulness, Perceived Trust, Perceived Personal Innovativeness, Perceived Ease of Use, and Perceived Risk.

Surprisingly, we discovered no significant variations in e-payment use amongst generation cohorts in Hyderabad. We believe this is due to the Government's attempts to digitally convert all of its E-Government services, and the acceptance of digital payments toward a cashless economy might be one of the reasons. The findings suggest that the government's initiatives encourage customers to adopt technology in general, as e-payment systems are functional. This research will aid future studies that focus on more current technology in the area, such as the adoption of cryptocurrencies by consumers and companies in the context of cities in India.

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**FANTASY SPORTS AS A STRESS BUSTER MYTH OR REALITY?****Ms, Sarita Gopinath Nair**

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**ABSTRACT**

*According to ,RitaMae Brown “Gambling operates under the premise that greed can be satisfied by luck.” Fantasy Sports works on the premise that it is “game of skill”, not a “game of chance.” The pandemic, and subsequent lockdown led to people forced to be at home with no sporting or physical activity. According to a press report in Business India there was an 87% increase in social media usage amid lockdown. Fantasy sports has been a huge attraction with different motivations, which included the chance of winning big, entertainment to pass time, social interaction with friends and family.*

*Key words: Fantasy sports, mental health, pandemic, motivation*

**INTRODUCTION**

Fantasy sports growth in India can be attributed to different reasons primarily being changing demographics, growth in digital infrastructure, rising disposable income, tech-savvy sports following youth. The number of online apps has been increasing and this is a favorable trend as it has also led to increase in jobs, advertising revenue, introduction of new sporting leagues and increase in foreign investments. The downside is also the negative impact on the mental health of the participants. Strong motivation of power of choosing and owning a team can lead to fear and insecurity on the team losing too. David McClelland's Need theory states the needs of achievement, power and affiliation which influence the behaviour of the individual. This theory can also be applied in this case as participants are encouraged to play more to win more money , the power of selection, owning a team and playing the game with friends and family fulfills the social affiliation need.

**LITERATURE REVIEW**

( Dr. Griffiths, 2017) **The psychosocial impact of daily fantasy sports games, Casino and Gaming International, www.core.ac.uk, pp47-49**

The author personally believes that Daily Fantasy Sports, which is part of multibillion dollar business in United States, is a form of gambling. Legally it has been contested as a game of skill and not a game of chance .Participants have the drive, are highly involved and also enjoy the thrill of showing off when they win.

( Columb, Dr.Griffiths, & O’Gara, 2020)**Fantasy Football (Soccer) Playing and Internet Addiction Among Online Fantasy Football Participants: A Descriptive Survey Study, Springer, International Journal of Mental Health and Addiction, DOI:10.1007/s11469-020-00436-4**

The authors have discussed the growing issue of internet addiction and the role of Fantasy sports on the same. Participants of the game constantly seek information, and also be part of additional dialogue related to the sport. According to their study, men spend around 4.7 hours per week and women 3.5 hours on selecting their team. Majority of the participants were male, and used Reddit app on their smartphone. 74.3% participants gambled less than €50 yearly on Fantasy sports. There is a need for further study to understand the growing involvement of women and also to separate the impact of social media, and fantasy sports on prevalence of anxiety, depression and substance misuse combined with sleep disorder.

(Farquhar & Meeds, 2007)**Types of Fantasy Sports Users and Their Motivations, Journal of Computer-Mediated Communication, doi:10.1111/j.1083-6101.2007.00370.x, pp1208-1228**

The authors through their findings state that for casual players, surveillance, and fun was the dominant motivation. For skilled players it was high regard and involvement of both time and money in their favorite sport. A strong attraction was also found due to the virtual world escapism, social interactions; ability to control a Fantasy sport team with high degree of personalization.

(Kurian, 2020)**The allure of fantasy cricket and why it should bother us, The News Minute, www.thenewsminute.com**

The author has highlighted on the impact of resumption of IPL during the pandemic and role of Fantasy sports organisations. He reports on the suicides of the 19 year old migrant worker in Telengana and another suicide at Puducherry who left behind an audio clip asking for a ban on Fantasy sport organisations. Legally, it has been in favor of Fantasy sport organisations but there is a growing need to understand the ill – effects of the game too.

(Saksham & Tagat, 2021) 'The House Always Wins' but it wins big online: A behavioural perspective to online gambling, The Indian Express, [www.indianexpress.com](http://www.indianexpress.com).

According to the authors, registration for poker websites, betting apps including fantasy sports hit new records during the pandemic where fantasy sports platforms saw revenue grow from Rs 920 crore in 2019 to Rs2400 crore in 2020. They report on the practice by these organisations in form of 'nudges' to motivate people to play and spend more. There is very little check on conditions to be met to participate which is needed. They believe and recommend that there should be a form of 'circuit breakers' to curb excessive spending.

### OBJECTIVES OF THE STUDY

- To study if there is an impact of demographic factors, on Online Fantasy Sports participation as a source of entertainment/ stress reliever.
- To study the reasons for participation in Fantasy sporting games.

### HYPOTHESIS

**H0** – There is no significant relation between demographic factors and participation for source of entertainment and stress relieving in Online Fantasy sports games.

**H1**– There is a significant relation between demographic factors and participation for source of entertainment and stress relieving in Online Fantasy sports games.

### SCOPE

The study aims to understand the impact of the pandemic and the participation in online sports usage. The motivation factor is restricted to Fantasy sports participation as an entertainment and stress reliever.

### METHODOLOGY

**Primary data**- Questionnaire method was used to collect primary data

Data analysis was done using Ms. Excel and Chi-square test.

**Secondary data** – Journals, press articles and websites.

### LIMITATIONS

- Primary data is from only from 157 respondents and 65% of the respondents are from Mumbai region. The methods of research have its own limitation and viability of time and limited knowledge of researcher in their area is also to be considered.

### DATA ANALYSIS

Contingency Tables- Gender

Gender	Online Sports-Entertainment/ Stress reliever			Total
	Agree	Disagree	Neutral	
Female	19	14	35	68
Male	35	14	40	89
Total	54	28	75	157

$\chi^2$  Tests

	Value	df	p
$\chi^2$	2.31	2	0.316
N	157		

- Degree of Freedom is 2 and at 5 % level of significance our calculated  $\chi^2$  is 2.31 which is less than the table value of  $\chi^2$  is 5.991. of Hence we fail to reject H0

Contingency Tables- Occupation

## Online Sports-Entertainment/ Stress reliever

Occupation	Agree	Disagree	Neutral	Total
Home Maker	1	3	7	11
Private Sector	31	14	34	79
Public Sector	1	4	4	9
Student	21	7	30	58
Total	54	28	75	157

 $\chi^2$  Tests

	Value	df	p
$\chi^2$	10.4	6	0.108
N	157		

- Degree of Freedom is 6 and at 5 % level of significance our calculated  $\chi^2$  is 10.4. which is less than the table value  $\chi^2$  i.e 12.59. Hence we fail to reject  $H_0$

## Contingency Tables- Age

## Online Sports-Entertainment/ Stress reliever

Age	Agree	Disagree	Neutral	Total
18-24	24	10	33	67
25-30	13	2	15	30
31-40	12	5	11	28
41above	5	11	16	32
Total	54	28	75	157

 $\chi^2$  Tests

	Value	df	p
$\chi^2$	12.4	6	0.053
N	157		

- Degree of Freedom is 6 and at 5 % level of significance our calculated  $\chi^2$  is 12.4. which is less than the table value  $\chi^2$  i.e 12.59. Hence we fail to reject  $H_0$

## Contingency Tables- Employment Status

## Online Sports-Entertainment/ Stress reliever

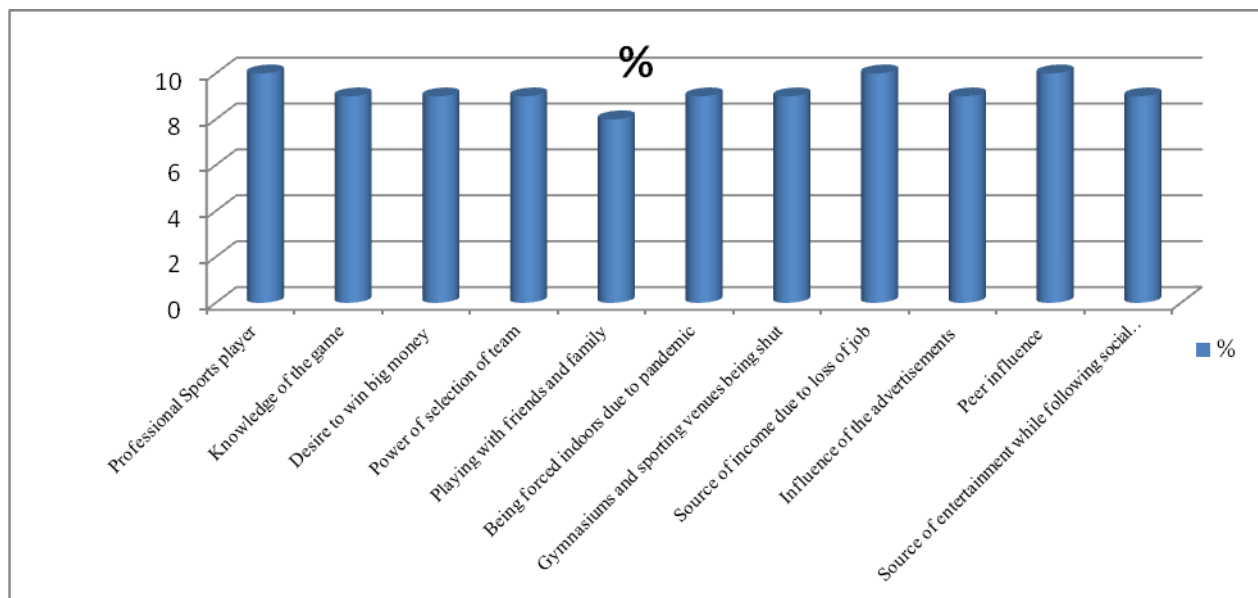
Employment Status	Agree	Disagree	Neutral	Total
Employed	32	20	44	96
Retired	1	1	4	6
Unemployed	21	7	27	55
Total	54	28	75	157

## Contingency Tables- Employment Status

			Online Sports-Entertainment/ Stress reliever		
			Agree	Disagree	Neutral
Employment Status					
$\chi^2$ Tests					
	Value	df	p		
$\chi^2$	2.65	4	0.619		
N	157				

- Degree of Freedom is 4 and at 5 % level of significance our calculated  $\chi^2$  is 2.65 which is less than the table value  $\chi^2$  i.e. 9.49. Hence we fail to reject  $H_0$ .

## Reasons for Participation in Fantasy Sports



The major motivation for participating in Online Fantasy Sports is the desire to win big money along with factors like they are professional players, knowledge of the game, the power of selecting a team and influence of advertisements.

**CONCLUSION**

71% of the respondents claimed that the pandemic affected their physical activities.

24% of the respondents participated in Online Fantasy Sports.

26% of the respondents spend between 1-3 hours on Online Fantasy sports

10% of the respondents spend less than Rs 500/- ,6% between the range of Rs501-Rs1000/-, 1% between the range of Rs1001 to Rs 2000/-, 3% on above Rs 2000/- on Online Fantasy Sports.

35% of the respondents agree that online sports games help in relieving stress and are a good source of entertainment.

29% of the respondents state that they will continue participating in Online Fantasy Sports games post the pandemic too.

**RECOMMENDATION**

Online Fantasy Sports growth has been phenomenal over the years in India. Emergence of new sports leagues have added to the excitement and increased participation too. Regulations and common laws is the need of the hour for the business to grow. According to the KPMG report, 72% of the respondents consider fun and

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excitement as the primary motivator. It requires skill and knowledge of the game and definitely be considered as a source of entertainment.

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**DIURON PESTICIDE KINETIC DISSIPATION IN WATER AND SOIL SAMPLES USING LANTHANUM DOPED COPPER OXIDE NANOPARTICLES AS PHOTO-CATALYST**

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**S. Siva Shankar Prasad and D. Easwaramoorthy\***Department of Chemistry, B.S. Abdur Rahman Crescent Institute of Science and Technology, Chennai, India

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**ABSTRACT**

*Lanthanum doped copper oxide Nanoparticles (NPs) were prepared as a photo-catalyst by using a precipitation method for the removal of diuron pesticide in water and soil. The experiment was performed under direct sunlight at single fortification level (0.5 µg/mL) in milli Q water by varying pH proportions (pH 4.0, 7.0 and 9.0) and different soils (Loamy sand, sandy loam, clay and sandy clay). The optimum catalyst concentration recommended for complete degradation was found as 0.05% under sun light. Diuron residues in water were determined by UHPLC- PDA method and the rate constant and DT50 values were calculated from the obtained data. From data without the addition of nanocatalyst, the half-life of diuron pesticide is approximately in water and soil is 180 days maximum and the half-life of diuron with nanocatalyst is approximately 96 hours maximum. Based on the results, we found that Lanthanum doped copper oxide NPs were an excellent photo catalyst for the decontamination of residues of diuron pesticide in water and soil samples.*

*Key words: Lanthanum-doped copper oxide NPs, Diuron, UHPLC-PDA, SEM, DT50*

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**NARRATIVE TECHNIQUE IN THE PLAY THE CAUCASIAN CHALK CIRCLE**

**Sampath Kumar Y.G.**

Asst Professor, Dept of English, IDSG Govt College, Chikkamagaluru, Karnataka

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**ABSTRACT**

*This entire prologue is extremely Communist in its message. Any capitalist society would argue that whoever originally owned the land should get it. Brecht instead argues that whoever can best use the land should get it. The prologue serves yet a third function of allowing Brecht to present his ideas before the play even starts. This is clever of him because the audience receives the moral of the play without even having to watch it. Thus, he gets his Communist message across immediately and only after he has presented the message does he actually allow the play to begin.*

*Key words: Communist, Prologue, Coup, Behead, Capitalist.*

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**DEVELOPMENT OF E-LEARNING MATERIALS: AWARENESS OF PUPIL TEACHERS**

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**<sup>1</sup>Dr. Dayal Pyari and <sup>2</sup>Prof. (Dr.) Alka Muddgal**<sup>1</sup>Assistant Professor, AIE, (Amity University, Noida, Up)<sup>2</sup>Head of The Institute, AIE, (Amity University, Noida, Up)

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**ABSTRACT**

*The success of any educational institute is majorly depending on the quality of its teachers. If a school/college have excellent material resources in term of building, library, laboratory and many others but if it does not have good quality competent teachers then it is impossible for that institute to sustain in future. Any material resources, textbook, methodology, curriculum etc. cannot overpower the importance of a good competent teacher.*

*A country development majorly depends on its skilled and knowledgeable society and it has been observed that education helps in enhancing skill and knowledge of society and hence contributes in development of a country. The process of education starts from school. We can easily say that schools are the nurseries where future of country is being shaped. Indian Education Commission, 1966 quoted: 'The destiny of the country is being shaped in its classrooms'. Teacher should be creative and innovative in nature. Digitization, new technological innovation and globalization have completely changed the traditional teaching learning process. In order to meet the changes, teacher should be well versed with each and every aspect of digital education and ready to use his digital knowledge for education purpose. In other words, we can say that teacher should know how to make, transact and assess the digital learning material. This paper gives insight about the ability of the pupil teacher to create e learning materials.*

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**EFFECT OF PRE-TREATMENTS ON THE YIELD AND FUNCTIONAL PROPERTIES OF CHIA SEED MUCILAGE**

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**Sameera Nayani\*and Subba Rao Dakinedi**Jawaharlal Nehru Technological University, Ananthapur, Andhra Pradesh,

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**ABSTRACT**

*In recent times, chia seeds are considered as Modern age functional food due to its rich source of Omega-3 fatty acid and functional properties of mucilage. The purpose of this study is to extract the mucilage from the meal which is a by-product of chia oil. Raw chia seed was subjected to different pre-treatment conditions including microwave heating at 6 W/g (60, 90 and 120 sec) and oven drying at 105°C (15, 30 and 45 min). The mucilage is separated from the fiber rich and protein rich meal by sieving. The effect of different pre-treatments on the yield, functional properties, color and rheological properties of the mucilage obtained after oil extraction were evaluated. Results show that the microwave pre-treatments significantly affected the rheological and functional properties of the mucilage and found to be better than over drying technique in terms of viscosity, color and water holding capacity. The pre-treated and mechanically separated mucilage can be utilized as potential fat replacer or emulsifier in food industry.*

*Key Words: Chia seed mucilage, yield, microwave drying, hot air oven drying, viscosity*

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**SINUSOIDAL PWM SIGNAL GENERATION TECHNIQUE FOR THREE-PHASE VOLTAGE SOURCE INVERTERS**

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**Ismail Marouani<sup>1</sup>, Yousef Hameed Alharbi<sup>2</sup> and Hani Ahmed Algaizani<sup>3</sup>**<sup>1</sup> Assistant ProfessorElectrical Department, College Technology of Jeddah, Kindgom of Saudi Arabia

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**ABSTRACT**

*The inverter is the most important device for efficient use of electrical energy sources. The sinusoidal pulse width modulation (SPWM) technique is one of the most popular PWM techniques for harmonic reduction of inverters, because three sine waves moved in a phase difference of  $120^0$  as the reference signals for the three-phase inverter are used. This paper represents the SPWM technique for harmonic reduction and shows how to generate an SPWM switching signal using matlab Simulink for a three phase pulse width modulated (PWM) voltage source inverter (VSI). The simulation results show that the PWM command gives the greatest flexibility of use in these applications, which is why it is the most used currently.*

*Keywords: PWM techniques, Sinusoidal pulse width modulation (SPWM), three-phase inverter, voltage source inverter (VSI).*

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**POWER FLOW SOLUTION USING GAUSS-SEIDEL TECHNIQUE IN ELECTRICAL POWER SYSTEMS ANALYSIS**

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**Ismail Marouani<sup>1</sup>, Fares Saleh Mohammed Al-Ghamdi<sup>2</sup> and Abdullah Ayed BinMahfooz<sup>3</sup>**<sup>1</sup> Assistant ProfessorElectrical Department, College Technology of Jeddah, Kindgom of Saudi Arabia

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**ABSTRACT**

*The analysis of load flow is a very fundamental and important tool in the analysis of interconnected electrical systems. The results of the load flow analysis play a major role during the operating stages of any electrical system for its control and economic operation, also during the expansion or design stages. The primary objective of any load flow analysis is to calculate the steady state voltages and precise voltage angles of all buses in the network, reactive and active power flowing through each overhead transmission line and power transformer (located in substations), under the hypothesis of a known production and load. In this paper the load flow analysis problem can be formulated as a set of nonlinear algebraic equations, which can be solved by an iterative algorithm called Gauss-Seidel method. The performance and effectiveness of the proposed algorithm are verified via numerical studies on the 30-bus IEEE test system network. The results of simulation are obtained using matlab environment.*

*Keywords: load flow, electrical systems, Gauss-Seidel method, voltages magnitude and voltage angles, reactive and active power, power losses.*

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**NEWTON RAPHSON METHOD APPLIED TO LOAD FLOW ANALYSIS IN ELECTRICAL POWER SYSTEMS**

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**Ismail Marouani<sup>1</sup>, Asaad Abdullah Almutharri<sup>2</sup> and Mohammed Hassan Al-Qurashi<sup>3</sup>**<sup>1</sup> Assistant Professor, <sup>2</sup>ProfessorElectrical department, College Technology of Jeddah, Kindgom of Saudi Arabia

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**ABSTRACT**

*Load flow, or Power flow, is widely used in the planning and operation of the electrical power system. The model of power flow in an electrical system is built using the relevant grid, load and production data. Outputs of this power flow model include line transmission flows (active and reactive power) in the electrical network, voltages (magnitude and phase angle) at different buses, and system power losses. Because of its convergence, the Newton Raphson method is presented and used to find the power flow solution in this work. In this paper the load flow analysis problem can be formulated in a polar form, which can be solved by Newton Raphson method. The performance and effectiveness of the proposed algorithm are verified via numerical studies on the 30-bus IEEE test system network. The results of simulation are obtained using matlab environment.*

*Keywords: Power flow, Newton Raphson method, voltages (magnitude and phase angle), electrical power system, Active and reactive power, power losses.*

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**LAGRANGE MULTIPLIERS METHOD APPLIED TO ECONOMIC OPERATION OF POWER SYSTEMS**

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**Ismail Marouani<sup>1</sup>, Radwan emam khan<sup>2</sup>, Mohammed Saud Al-Sagri<sup>3</sup> and Ayman AL-Harthi<sup>4</sup>**<sup>1</sup> Assistant ProfessorElectrical department, College Technology of Jeddah, Kindgom of Saudi Arabia

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**ABSTRACT**

*The objective of this paper concerns the problem of economic dispatch of electricity production or planning the outputs of the production units engaged in such a way as to meet the required load demand at the minimum operating cost, while satisfying all the units. and the constraints of equality and inequality of the system. In the operation of power supply system, an economic planning problem is one of the variables that must be taken into account because economic planning will give more efficiency in operational costs. In this paper an iterative technique using the gradient method based on Lagrange multipliers algorithm applied to economic operation of power systems. The performance and effectiveness of the proposed algorithm are verified via numerical studies on the 26-bus test system network. The results of simulation are obtained using matlab Simulink.*

*Keywords: Economic Dispatch problem, iterative technique, Lagrange multipliers, constraints of equality and inequality of the system, costs of generation, demand power, power losses.*

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**OPTIMAL DISPATCH PROBLEM FORMULATION IN ECONOMIC OPERATION AT THERMAL PLANTS**

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**Ismail Marouani<sup>1</sup>, Omar Mohammed Hassan Ali<sup>2</sup> and Ismail Salah Hassan<sup>3</sup>**<sup>1</sup> Assistant ProfessorElectrical department, College Technology of Jeddah, Kindgom of Saudi Arabia

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**ABSTRACT**

*A power system is generally divided into three parts, namely power generation, power transmission and power dispatching. In power system, the generation of thermal energy is considered in this work. In economic dispatch problem, the mathematical optimization in power system operation that aims to determine the best setting power generation or optimal number of generating units so as to meet the needs of the load on the system with minimum production cost. The highest cost of electricity generation operation is fuel cost. Therefore, it is necessary to optimize the thermal generator scheduling. The present study aimed at obtaining the schedule and load sharing of the electric power generation, in order to gain the minimum fuel cost, with regard to inequality and equality constraints. In this paper an analytical technique using the power flow program applied to economic operation of power systems. The performance and effectiveness of the proposed algorithm are verified via numerical studies on the 5-bus test system network. The results of simulation are obtained using matlab Simulink.*

*Keywords: Economic Dispatch problem, power flow program, analytical technique, costs of generation, demand power, power losses.*

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**TIDAL ENERGY TECHNOLOGIES REVIEW**

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**Ismail Marouani<sup>1</sup>, Fawaz Alghamdi<sup>2</sup>, Abdullah Aljaber<sup>3</sup> and Nasser Abdullah Al-Qahtani<sup>4</sup>**<sup>1</sup> Assistant ProfessorElectrical Department, College Technology of Jeddah, Kindgom of Saudi Arabia

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**ABSTRACT**

*Tidal energy or tidal power is a form of renewable energy obtained due to alternating sea levels. The kinetic energy from the natural rise and fall of tides is harnessed and converted into electricity. Tides are caused by the combined gravitational forces of the moon, sun, and earth. Tides are due to the combined effects of gravitational attraction and the revolution of the Earth-moon system about its common center of mass. At this point (which lies within the solid Earth) the gravitational attraction between Earth and moon exactly balances the forces required to maintain the moon's orbit. Elsewhere the two forces are not in balance and give rise to the so-called tide generating force. Maximum diurnal tidal ranges occur when lunar declination is greatest and become smaller when the declination is zero. Solar tides are larger when the Sun is in its perihelion position, when Earth is closest to the Sun in its elliptical orbit. In this paper, the tides at some locations across the world and along the Indian coast, tidal power plants across the world, resource allocation of tidal power plants, advantages and disadvantages of tidal power will be reviewed from the literature.*

*Keywords: Tidal energy, renewable energy, resource allocation, electrical energy, advantages and disadvantages of tidal power.*

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**THE IMPACT OF INTERNET EXPERIENCE AND IMPULSE BUYING BEHAVIOUR OF ONLINE CONSUMERS**

**<sup>1</sup>Mr. Debjyoti Das and <sup>2</sup>Dr. Manoranjan Dash**

<sup>1</sup>Research Scholar and <sup>2</sup>Associate Professor, Faculty of Management Sciences, Siksha O Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India

---

**ABSTRACT**

*Online shopping is one of the widely accepted alternate distribution channel for providing the goods and services over the internet. Day by day is proliferating across all the segments. Marketers and researchers always had interest in the impact of internet experience and impulse buying behavior of online consumers. Internet technology is changing our society and economy. Consumers and businesses are very much thoughtful of the prospects and arrest the benefits of adopting this platform. Ultimately, it has changed the structure and dynamics of the Indian market and marketing discipline has been exposed to various changes and challenges. This study attempted to find out the relationship of demographic characteristics with impulse buying tendency of consumers and the impact of internet experience on e-shopping Results indicate that only gender and age has a significant relationship with the impulse buying tendency whereas income are not significantly related to it.*

*Keywords: Internet experience, impulse buying tendency, e-shopping.*

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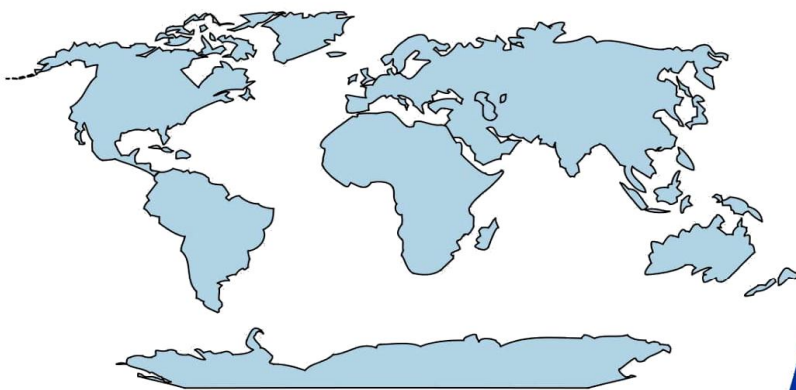
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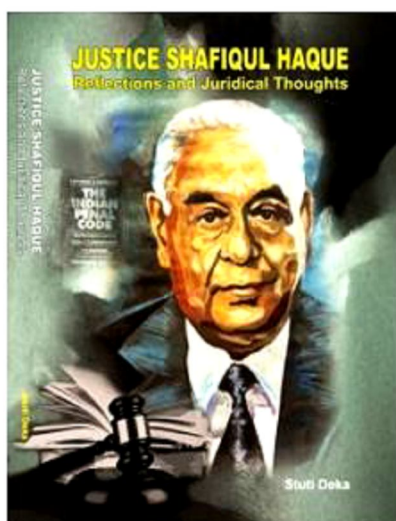


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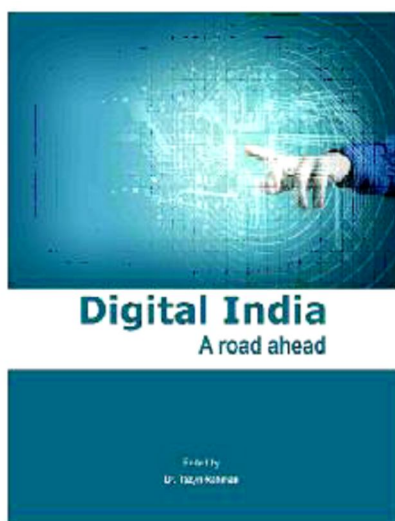
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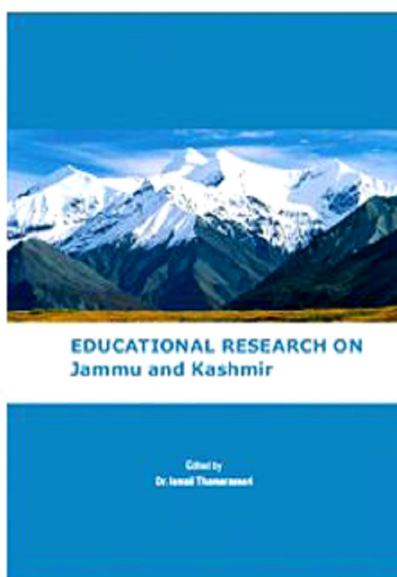
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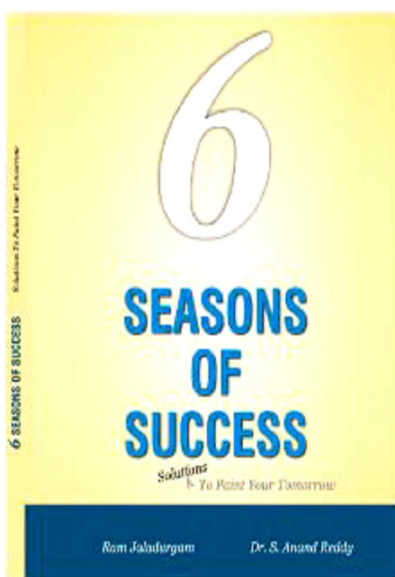
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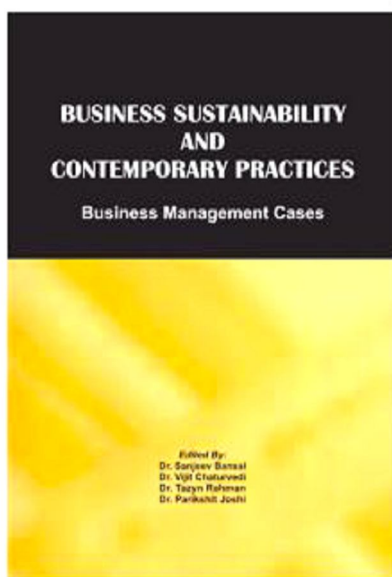
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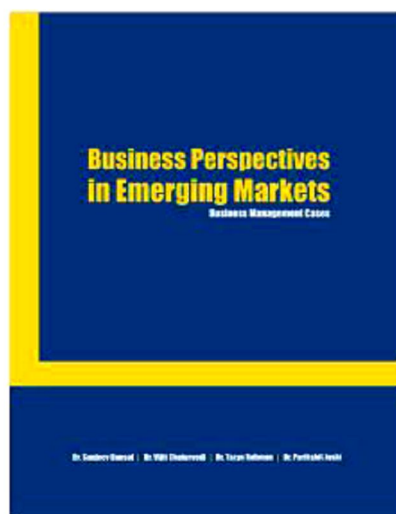


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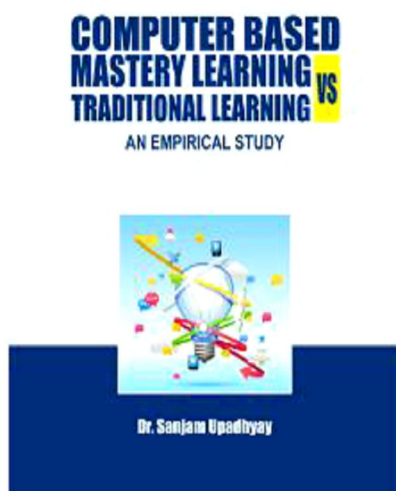
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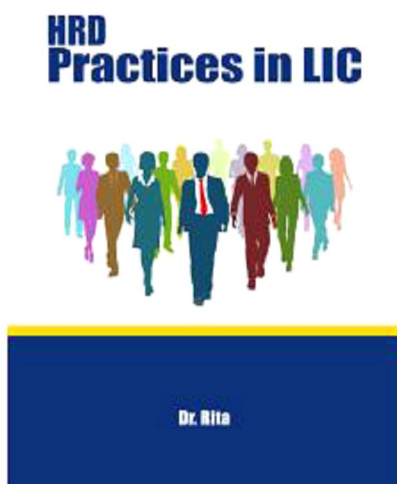
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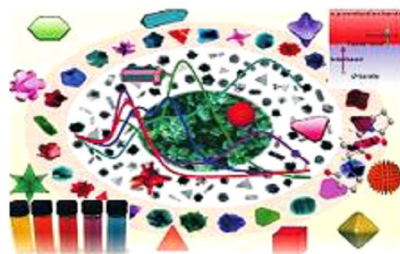
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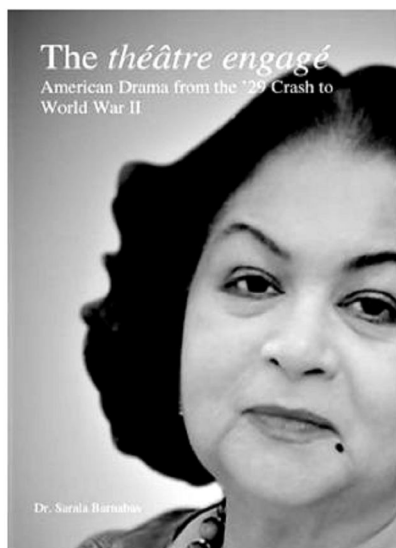
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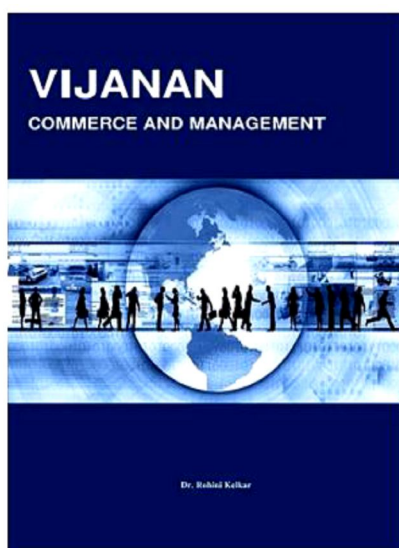
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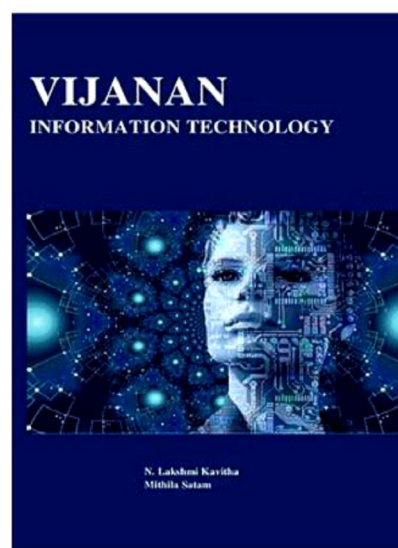
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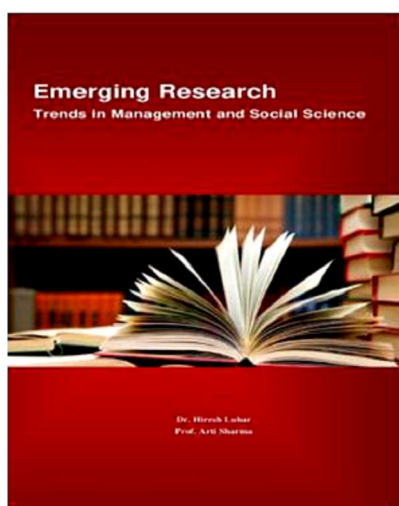
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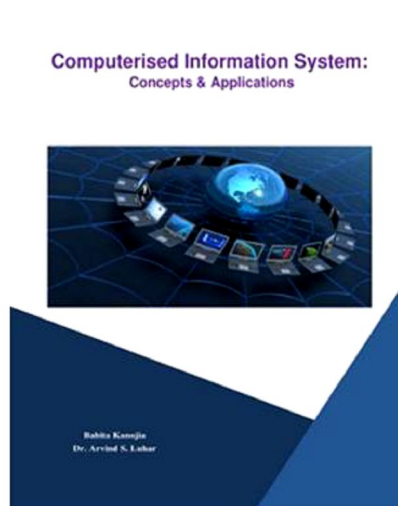
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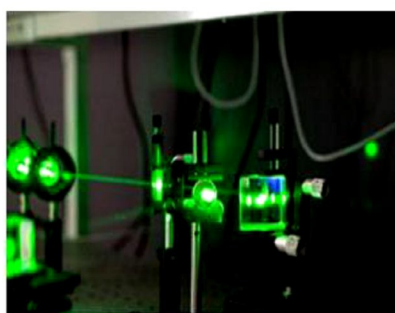


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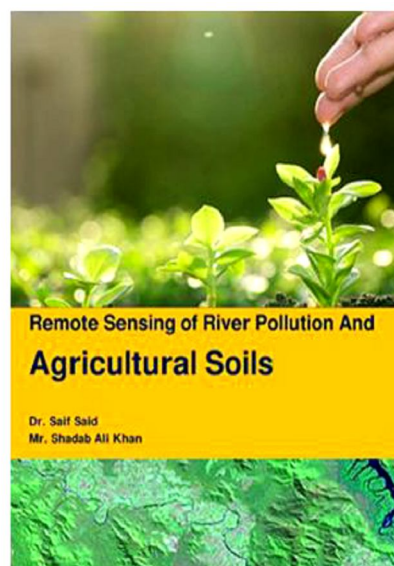
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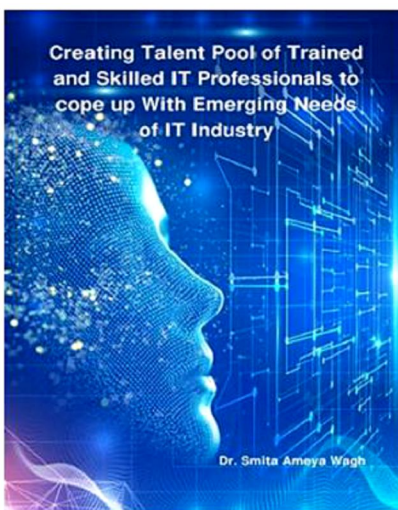
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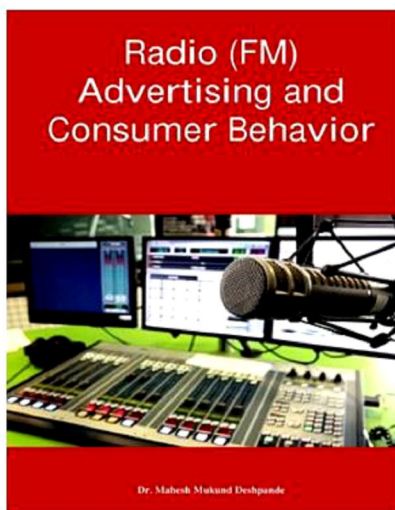
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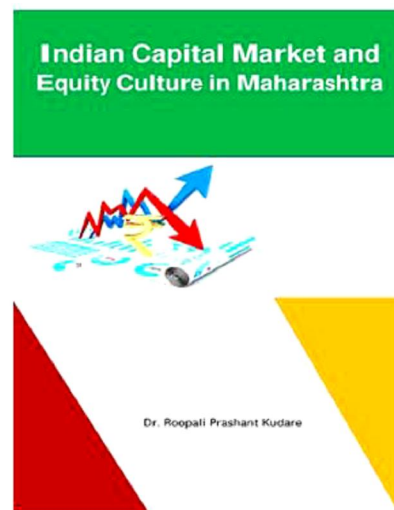
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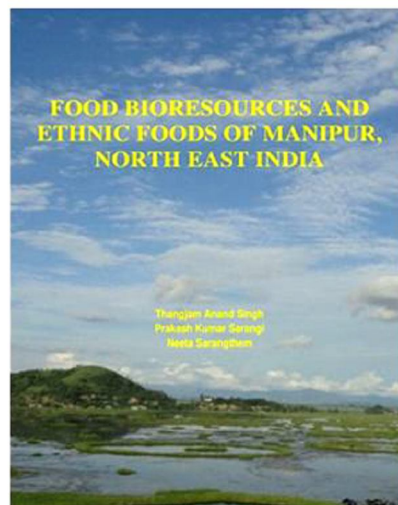




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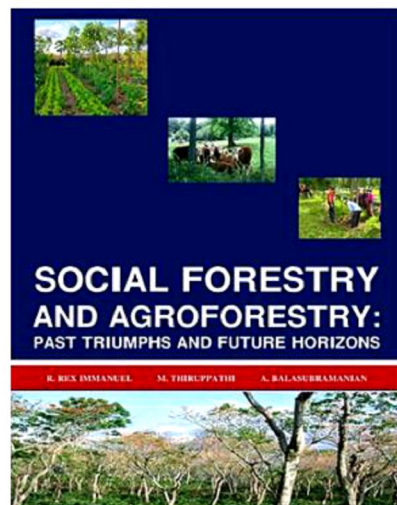
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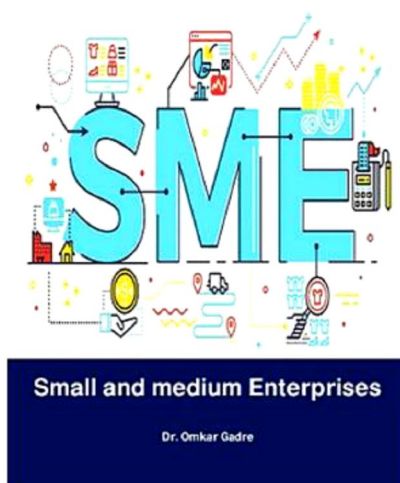
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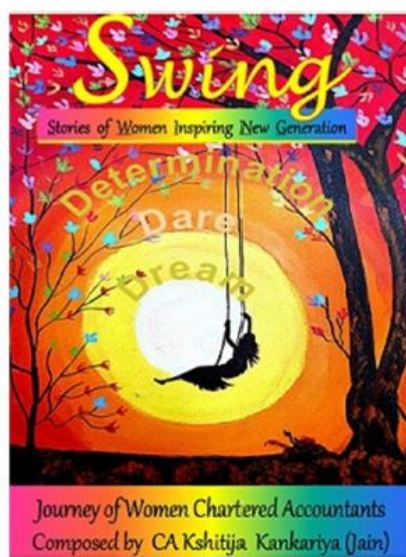
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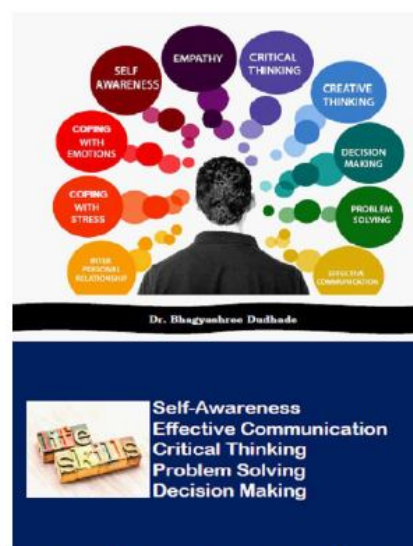


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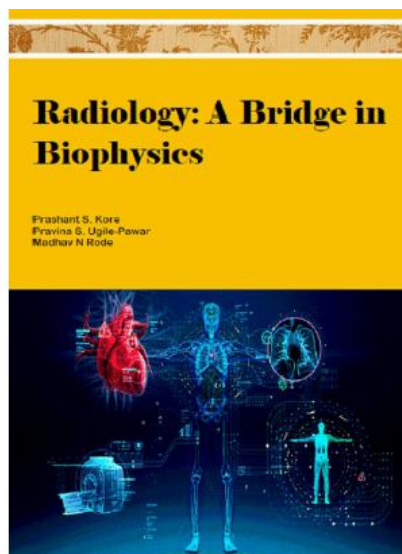




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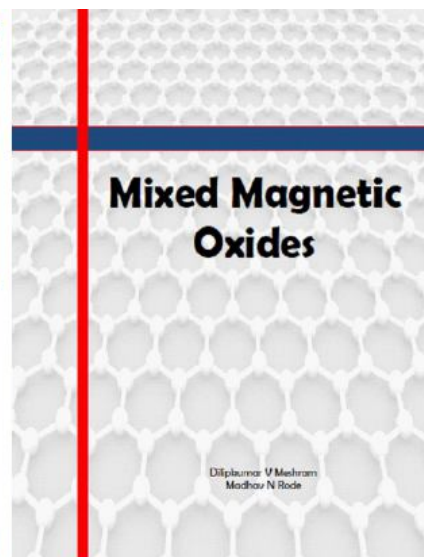


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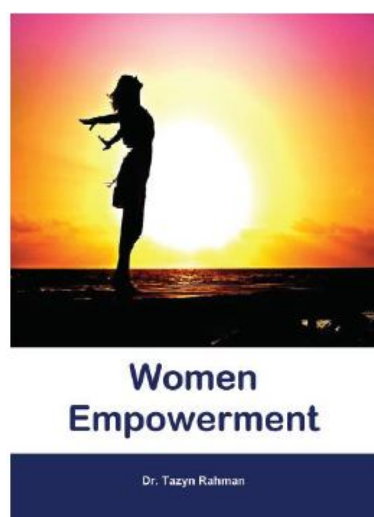
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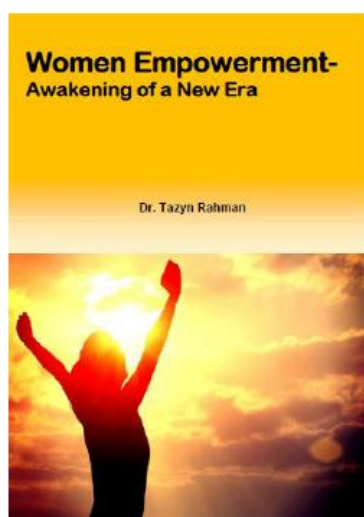


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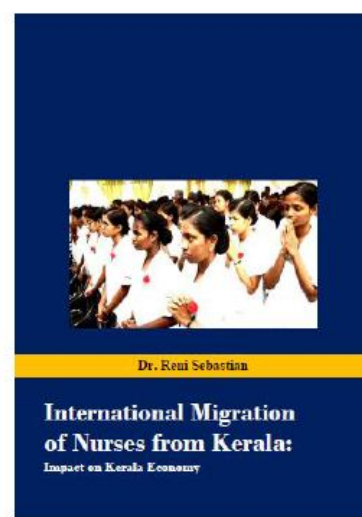
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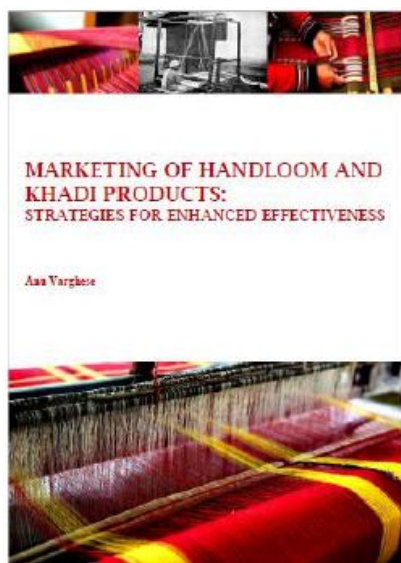
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