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DEVELOPING THE CONFLUENCE OF MANAGEMENT SKILLS AND CREATIVITY FOR THE SCHOOL HEADS

Paper ID	IJIFR/V4/ E2/ 005	Page No.	5058-5065	Subject Area	Education
Keywords	School Heads, Creativity, Management Skills, Managerial Creativity				

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Abstract

Acquiring a generalized managerial skill that is creative and constructive but not critical, proactive but not reactive, perceptual but not logical is a plausible solution for a school head as a school leader and manager. Some researchers viewed that the jobs of principals are arduous to manage due to changing school scenario in a global world nevertheless with directive to equip for competitive advantage. With the universal organizational struggle getting tougher, mere management competency or being creative, singularly often proves to be insufficient. Hence, it was pertinent to enter into the domain of 'managerial creativity', which is in fact 'finding solutions of the problems, managing physical/human/financial resources of school in creative ways furnishing a winning edge to any manager or a leader of any organization or a school. Reiterating, Turkson & Appiah (2009), that creativity add a very pertinent flavour to the practice of management by people in all forms of managerial positions and that in the absence of practical application of creativity, these mangers cannot be visionary leaders. Although, from the studies reassessed, a variable 'managerial creativity' for the sample 'school heads" were left unidentified. The need to develop the scale that measures the confluence of management skills and creativity for the school heads became imperative.

I. INTRODUCTION

The role of leadership is a critical ingredient, "second only to classroom instruction among school related factors that affect student learning in school". Thus, school leadership and student outcomes have recently come to receive greater attention in research and among policy makers in United States and England (Leithwood, et.al 2004). However, in contrast to the international emphasis, literature on importance and consequences of school

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leadership in Indian context is as sparse as the attention it receives in policies and programs is a neglect (Azim Premji Foundation, 2011).

The success of school organisation whether it be at the higher secondary level, secondary level or the elementary level depends upon the effective leadership and management of the head of the institution. In the 21st century the efforts of the head of the institution has been widely recognised as one that is very crucial in bringing about Quality Education. School being as a social organisation has a collective sets of goals and objectives (Krishnamacharyulu, 2006). The school manager's management skills can bring about coordination of work among many functioning under one roof; it competently and effectively leads to achieve the organisational objectives (Kreitner, 2004). However, today, in a world full of competition, it is not usually possible to manage the school by following stereotype routines, so the head of the school should embark upon using his/her creative ability skills to manage the school. The heads of the school needs to map out and explain more fully, the richness and complexity of skilfulness, resourcefulness, ingenuity, inventiveness, originality, fluency, flexibility, and evaluative execution of managerial responsibilities. There is a need for divergent thinking abilities in the open ended tasks of the schools as leaders. Hence, leadership traits with managerial creativity is the need of the present global humanity; schools, at present should be guided and directed by leaders who uses their management skills fused with creativity to solve problems they encounter in regular processes and operations of school management.

II. JUSTIFICATION OF THE STUDY

Nonetheless, while arriving at the most common platform of empirical understanding, a few recent research studies on "managerial creativity" were initiated in India (Jain, et.al.2011; Rashid, 2012 & Wadhwani, 2014), with samples like executives, school/ college principals and secondary school/tribal teachers. Though, a self constructed Managerial Creativity Test for higher education students by Wadhwani (2014) as well as self developed/standardized Managerial Creativity Scale (MCrS) keeping in view the organizational executives by Jain.et.al (2011) found, were not presently appropriate for the sample under study. Studies in Abroad (Duze,2011; Scratchley.et.al , 2001; Turkson & Appiah, 2009; Anderson, 2006; Mathibe,2007 and Scratchley, 1998) depicted 'managerial creativity' as a quality of managers engulf with creativity for managing an organization towards growth and development. The need to develop the Managerial Creativity Scale for the Heads of Primary Schools (MCS_{HPS}) arose. Thus, Managerial Creativity is operationally defined as the confluence of components like *getting things done, developing staff, improving self* and leading towards organisational *success* through leadership, *expertise, motivation* and *creative thinking skills*.

III. SAMPLE OF THE STUDY

The sample of the present study consists of Heads of Government primary schools located in semi-urban Garo Hills Districts of Meghalaya. The proportionate stratified

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random sampling technique was used to select. On the basis of different stages of test constructions and standardization, the initial sample strength for the three phases of try-out was divided as 10%, 20% and 10% of total population, for the proportional representation of Government Primary school heads from all the blocks of the districts under study.

IV. DEVELOPING THE MANAGERIAL CREATIVITY SCALE FOR THE HEADS OF PRIMARY SCHOOLS (MCS_{HPS})

4.1 Item Writing

The item writing for the 5 point Likert Managerial Creativity Scale for the Heads of Primary Schools (MCS_{HPS}) were framed in accordance to the learning domain of Bloom's Taxonomy of cognitive domain, affective domain and psychomotor domain. Through the confluence of components from *Management Skill Pyramid* of F.John Reh (2009) with the *Componential Theory of Creativity* of Teresa Amabile (1983), the items in accordance to the 20 dimensions of Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) were shaped in forms of favourable or unfavourable statements. The items written incorporated the views of field experiences obtained through Focus Group Discussion and/or Personal interviews. This was reflected through the item statements. Efforts were made to merge in all the 7 Confluence of Components towards the shaping of the 20 multi-dimensions of Managerial Creative Scale for Heads of Primary Schools (MCS_{HPS}) by comprehensively taking into account the role of creativity in the managerial responsibilities of school heads pertaining to management, school management, leadership, school leadership and creativity as shown in Table 1.1. Items shaped depicted the dimension under the confluence of components from Management Skills Pyramid and Componential Theory of Creativity. Positive statements were initially framed, half of it was rewritten in negative form and eventually it was edited subjected to expert's comments, suggestions and criticisms. The steps followed are shown below.

4.2 Stages of Construction and Standardization

4.2.1 Stage I: Preliminary Try-out: The statements selected for the preliminary try out were 176, containing 50% of positive polarity and 50% of negative polarity. The statements were given for 20 expert opinions views for comments, suggestions and necessary modifications to be incorporated in subsequent try-outs. Based on the 20 dimensions of MCS_{HPS}, Personal Interviews (PI) and Focus Group Discussions (FDGs) with experienced Head Teachers in the field of school management also reinforced the statements. FDGs with the Sub-Divisional School Education Officers of Government of Meghalaya added much significance to the authenticity of the determining statements of the 7 confluence of components merged from Management Skills Pyramid and Componential Theory of Creativity. Out of 176 primary statements, after meticulously incorporation and/or elimination, 146 items were found suitable for the first try-out.

4.2.2 Stage II: First Try out The first tryout MCS_{HPS} was done with 146 statements, i.e 73 negative polarity items and 73 positive polarity items. This was administered to a sample of

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165 randomly selected Heads of Primary Schools. MCS_{HPS} booklets with incomplete responses to a maximum of 3 items were to be eliminated from analysis.

4.2.3 Stage III: ItemAnalysis: After obtaining the total score for each respondent, the step for analysis was applied by following Kelly's method. The highest 27% and the lowest 27% is then taken out to provide the best compromise between the two desirable and inconsistent aims- (i) to make extreme group as large as possible and (ii) to make extreme group as different as possible. The scores obtained for each item in these two extreme groups were used for calculating the discriminating power of each item. The discriminating power was obtained by calculating the critical ration "t" by using the formula given by Edwards (1957).

4.2.4 Stage IV: Selection and Preparation of Final Items: Altogether 80 items having p-value of 2.75 and above were selected and the 66 items having p-value below 2.75 were rejected. The items of MCS_{HPS} were arranged in order of their discriminative value. Equal number of positive and negative items was selected encompassing every confluence of components and dimensions in a proportionate manner. The 80 items selected through item analysis were evaluated for language appropriateness by the experts and on the suggestion of experienced heads of primary schools and educationists, the statements were translated into Garo language in order to obtain true and correct reply from the respondents belonging to the two Garo Hills Districts of Meghalaya .

4.2.5 Stage V: Final Try-Out : Out of selected 80 items having p-value of 2.75 and above, only 42 selected items in consistent to the confluence of components and multi-dimensions of MCS_{HPS} were prepared after the item analysis for the final try out of the scale as shown. After compulsory preparation for the final try-out, the MCS_{HPS} was distributed amongst 82 primary school heads of the two districts of Garo Hills region of Meghalaya for establishing the parameters of validity, reliability, usability and norms of MCSHPS.

Table 1.1 Final number of items in consistent with dimensions of MCSHPS

Sl No	Confluence of Management Skills and Creativity	Dimensions of Managerial Creativity	Positive	Negative	Total
1	Get it done	1. Planning 2. Organising 3. Directing 4. Controlling	4	4	8
2	Develop staff	1. Motivation 2. Training and Coaching 3. Involvement	4	4	8
3	Improve self	1. Time Management 2. Self Management	2	2	4
4	Success	1. Vision 2. Mission 3. Ambition	3	3	6
5	Expertise	1. Hard skills 2. Soft skills	2	2	4
6	Motivation	1. Extrinsic Motivation	2	2	4

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		2. Intrinsic Motivation			
7	Creative thinking skills	1. Fluency 2. Flexibility 3. Originality 4. Elaboration	4	4	8
	Total	**20 Dimensions**	**21**	**21**	**42**

4.2.6 Stage IV: Standardization of MCS_{HPS}: The vital standardization procedure through establishment of validity, reliability, usability and norms was made.

4.2.7 Establishing Validity: The validity of present scale was estimated through Face validity, Content validity and internal consistency validity.

The ***face validity*** of the Managerial Creativity Scale for the Heads of Primary Schools (MCS_{HPS}) was estimated in the pre-tryout of the preliminary draft stage by a series of systematic consultations of items during the process of construction. Multiple FDGs gave an impetus to the validity of the scale through their ideas of field experiences which were much in tandem with the confluence of components and dimensions for the construction of the scale. The ***content validity*** of the Managerial Creativity Scale for Heads of Primary schools (MCS_{HPS}) was ensured through meticulous evaluation of the items by the educationists and experts, like Sansanwal, D.N (2016) ; Nongbri, C (2015); Awasthi, K (2015); Sharma, D (2014); Madhusudan, J.V (2014); Marak , F.K (2014); Momin, N.S .C (2014)& Marak, M (2014). Ambiguous statements, vague words and double barrel statements were accordingly reworked or removed after the item evaluation stage. The ***internal consistency validity*** was found during the item analysis stage.

4.2.8 Establishing Reliability : In order to determine the external consistency reliability of the Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}), final 42 items were administered to 82 subjects belonging to West and South-West Districts of Garo Hills of Meghalaya. To establish predictability or stability of the scale test-retest was conducted on the scale. After a gap of 4 weeks, the same scale was administered again to the same group of respondents. The scores obtained were calculated and the reliability index was found to be at .72 and is significant at 0.01 levels of confidence, meaning that 72% of the variance in the scores are reliable and 28% is the error variance. However, in order to determine the internal consistency reliability or the coefficient alpha reliability of the scale, the 42 items were divided into 21 odd items and 21 even items, the Cronbach's Alpha in SPSS was used and reliability coefficient obtained is .835 while Cronbach's Alpha Based on Standardized Items obtained is .891 indicating that MCS_{HPS} measures variable with extremely high reliability. The reliability of the Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) is highly reliable externally and internally.

4.2.9 Establishing Usability: The Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) can be used for individual as well as group administration. The MCS_{HPS} during individual administration can be enhanced by an open ended personal interview and Focus Group Discussions to map out and explain more fully, the richness and complexity of

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creativity in the managerial responsibilities of the school leaders with a scope shaped out for divergent thinking responses.

4.2.10 Scoring Procedure: The scoring procedure for each answer to every statement is as given in the Table 1.2. The range of scores for the Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) is 42 to 210, wherein the minimum scores could be 42 (i.e 1 x 42) and maximum scores could be 210 (i.e 5x42).

Table 1.2: Scoring Procedure Managerial Creativity Scale for Heads of Primary Schools

Degree of Favourability→	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Polarity of Items↓	(S A)	(A)	(U)	(D)	(SD)
Positive Items	5	4	3	2	1
Negative Items	1	2	3	4	5

4.2.11 Establishing Norms and Interpretation: Percentile norms for the whole scale as per quartile deviation were established on the basis of raw scores made against the sex criterion. The score under each percentile are illustrated in the table 1.2. The interpretation of percentile norm is done on the basis of quartile as given in Table 1.3. A very high score above the 76th percentile is found to have High Managerial Creativity (HMC). Moderate Managerial Creativity (MMC) is scores from P_{51} above to P_{75}. Low Managerial Creativity (LMC) is identified between percentiles P_{26} to $P_{50.}$ Scores between P_{05} to P_{25} are Very Low Managerial Creativity (VLMC).

4.2.12 Description of Managerial Creativity Level: The description of the interpretation (Table 1.4) of the various level of Managerial Creativity of the Heads of primary schools is indicative that heads of government primary schools with High Managerial Creativity levels are described as those who operationally merged in operating managerial skills with creativity in their leadership responsibilities; Moderate Managerial Creativity level scorers are those who need support through motivation, training and coaching, in hard skills & soft skills for fluency, flexibility, originality and elaboration of ideas/skills for development of Managerial Creativity Skills in their managerial positions. Low Managerial Creativity scorers are heads that needs to be sensitized, made aware and motivate about the force of creativity while getting things done, developing staff, improving self and achieving success as a leader of the school. Very Low Managerial Creativity scores are indicative of utter negligence in skills of managerial dimensions as well as creativity dimensions.

Table 1.3: Percentile Norms and Interpretation of Managerial Creativity Level

Percentile	Raw Score Of Male Head Teachers	Raw Score Of Female Head Teachers	Interpretation Of Managerial Creativity Skills Level
P_{95}	177	175	**High Managerial Creativity**
P_{90}	174	172	

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P_{85}	172	160	
P_{80}	169	168	
P_{75}	167	167	**Moderate Managerial Creativity**
P_{70}	165	166	
P_{65}	164	164	
P_{60}	163	163	
P_{55}	161	162	
P_{50}	159	160	**Low Managerial Creativity**
P_{45}	158	159	
P_{40}	156	157	
P_{35}	155	156	
P_{30}	154	155	
P_{25}	152	154	**Very Low Managerial Creativity**
P_{20}	150	153	
P_{15}	148	151	
P_{10}	144	147	
P_{05}	136	145	

Table 1.4: Interpretation and Description of Managerial Creativity Level

Managerial Creativity Level	Description Of The Managerial Creativity
High Managerial Creativity	Totally involved in Managerial Creativity Skills.
Moderate Managerial Creativity	Needs Support for Managerial Creatively Skills.
Low Managerial Creativity	Affirms attention for Creativity in Managerial skills.
Very Low Managerial Creativity	Negligent of skills for Managerial responsibilities.

V. DIRECTION OF ADMINISTRATION OF THE SCALE

The heads of the primary schools were contacted and Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) were administered either individually or in groups. Instructions were given as per as the booklet cum answer-sheet. Each of the school head were asked to answer spontaneously to the items by reading carefully and responsibly with accountability as a school manager. Alongside, on each of the dimension of the scale, Personal Interviews and Focus Group Discussions were followed to qualitatively supplement the responses obtained to understand their divergent skills of creativity in managing and leading their schools.

VI. CONCLUSION

Although the management literature has hailed managerial creatively as a necessity in current climate of rapid change and global competition, little has been done to help organisations to identify and select managers who have potential to be creative on a job more so in education in general and schools in particular. This psychological tool can help in identifying and selecting teachers into management positions in school, teacher who not

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only have teaching competency but potential to take the school in new and useful directions. This scale can help in identification of managerial creativity of individual school leaders and can be used for the purpose of recruitment, promotion, training, professional development and certification of the primary school heads irrespective of gender, training , experiences and location of school.

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ANALYZE THE MECHANICAL PROPERTIES OF ALUMINUM 6061 ALLOY USING FRICTION STIR WELDING

Paper ID	IJIFR/V4/ E2/ 007	Page No.	5066-5071	Subject Area	Mechanical Engineering
Keywords	Friction Stir Welding (FSW), Aluminium Alloy 6061, Tool Rotational				

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Abstract

The present work is the analysis of the influence shown on the process parameters like (tool speed, feed rate and shoulder diameter) on the metallurgical and mechanical properties of the joints fabricated by Friction Stir Welding. Now-a -days, in many industrial applications the steels are replaced by non-ferrous alloys, in most cases by aluminum alloy. The aluminum 6061 alloy is most commonly used in aerospace and automobile industries. Friction Stir Welding (FSW) is considerably new joining process that has exhibited many benefits over traditional arc welding process including greatly reducing distortion and eliminating solidification. The FSW joints have higher tensile strength to weight ratio and finer micro structure. The samples were taken under the tool rotational speed of 1950, 3080 and 4600 rpm. The present study is done to think about the impact of input parameters on the tensile strength. The tensile quality is mostly influenced by tool speed. The parameters taken in this examination are tool rotational speed, feed rate and shoulder diameter. The greatest tensile strength is obtained at Tool Speed- 3080 rpm, Feed Rate- 20mm/min and Shoulder Diameter across 20mm.

I. INTRODUCTION

Welding is system in which we join two or more homogenous or distinctive materials with exertion of warmth and with or without use of weight. For the welding process, the most

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essential base is heat. There are two sorts of There are two sorts of welding i.e. conventional welding and stir welding. Here we talk about the Friction Stir Welding (FSW). The concept of FSW is simple in which A non-consumable rotating tool with a specially designed pin and shoulder is inserted into the abutting edges of sheets or plates to be joined till the shoulder contact the top surface of work piece and traversed along the line of joint to produce the weld(Fig1). The tool serves primary functions:

a) heating of work piece;
b) deform the material ;
c) movement of deform material to produce the joint.

Aluminium is one of the most common alloys which is widely used in several application over the automotive and aircraft industries because of their light weight properties, better corrosion resistant and high strength to weight ratio.

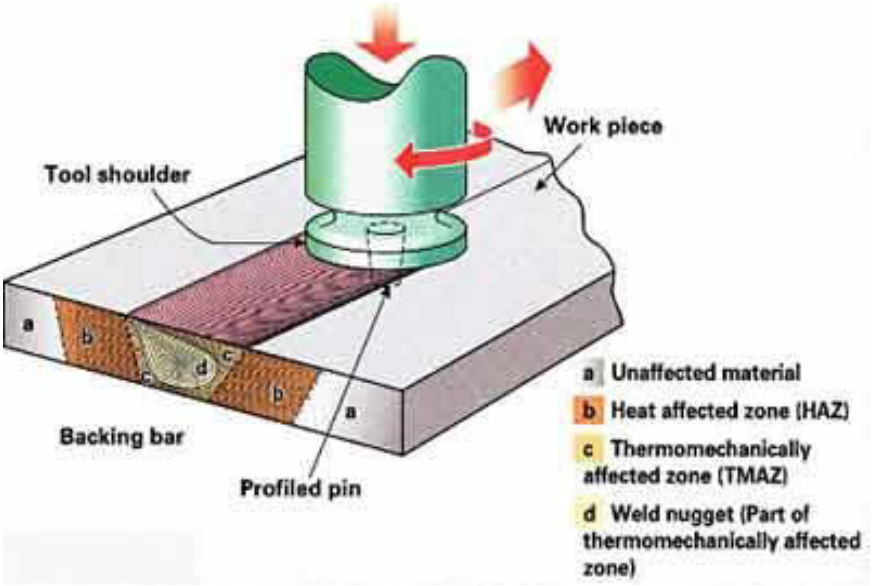

Figure 1: Friction Stir Welding

FSW have the advantages over conventional welding are:

- Strong mechanical properties
- Fine grain structure, revising power, decrease lingering hassle, pliability, and imperviousness to erosion.
- Dissimilar material can be joined.
- Guarantee 100% weld quality.

II. LITERATURE SURVEY

➢ **Jaimin B. Patel etal.(2014),** This paper introduces the demonstration of FSW devices by substitution of hardware pin profile alongside recreation of crest temperature instigated in plate material and stream hassles produced in the same for friction welding of AA6061. Results are introduced for different temperatures of aluminum compound plate and in addition stream hassles are produced in and around the instrument pin during the welding procedure.

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- **A M Khourshidetal.(2013),** In this research work, friction welding is connected with the combination of two channels, meager walled thickness variably empty glass of the gloves. The main focus of this work is studying the impact on the mechanical properties of the welding joints.
- **B.Kiran Kumar etal.(2016),** This research work is about the study of mechanical properties and micro-structure on FSW aluminum alloy. By this study we came to know that the pin diameter and shoulder diameter are increased with the increase in thickness of the plates or specimen undergoing the process of FSW.

III. EXPERIMENTAL PROCEDURE

In the welding process, we require a pivoting device with a shoulder and a stick that produces heat and encourages the stream of the diminished strong compound behind the apparatus where the welded joint structures.The Taguchi Method will be utilized to discover the three blend welding parameters. In this work three parameters will be taken and L9 orthogonal cluster will be chosen to advance parameters for quality of the welded joint.We take the different parameter to achieve the greatest tensile strength. The parameters are tool speed, feed rate and shoulder diameter. Table 1 shows the process parameters:

Table 1: Process Parameters

Level	Tool Speed(rpm)	Feed Rate(mm/min)	Shoulder Dia. (mm)
1	1950	20	17
2	3080	25	19
3	4600	30	21

Tensile Strength calculation:

$$\text{Maximum Strength} = \frac{\text{Maximum Load(KN)}}{\text{Maximum Area } (mm^2)}$$

For conversion of kgf into N/mm^2:1 kgf = 9.8 N/mm^2

Elongation calculation:

$$\text{Elongation} = \frac{\text{Change in Length} * 100}{\text{Holding Length}}$$

IV. RESULTS AND DISCUSSION

We performed nine experiments in the first run and universal testing machine is used to calculate the tensile strength. The calculated tensile strength is shown in the table-2.The tensile strength is calculated for the different parameters such as tool rotation speed, feed rate and shoulder diameter.

Table 2: Tensile strength Trial 1 of the Specimens for Single Sided Joint

Speed(r.p.m)	Sample No.	Feed (mm/min.)	Shoulder Diameter(mm)	Area (mm^2)	Load (KN)	Tensile strength Trial1 (KN/mm^2)
1950	S1	20	16	150	9	0.06

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	S2	25	18	150	11.25	0.074
	S3	30	20	150	18.5	0.124
3080	S4	20	18	150	20	0.133
	S5	25	20	150	23.9	0.17
	S6	30	16	150	17.7	0.118
4600	S7	20	20	150	17.20	0.116
	S8	25	16	150	7.6	0.054
	S9	30	18	150	8	0.048

Now we calculate the elongation for each nine specimen shown above at different parameters such as feed rate, transverse speed and shoulder diameters is shown in the table: 3.

Table 3: Change in Length& Elongation

Speed (r.p.m)	Sample No.	Holding length (mm)	Change in length (mm)	Elongation (%age)
1950	S1	50	5.5	12
	S2	50	7	15
	S3	50	8	17
3080	S4	50	6.5	14
	S5	50	7.5	16
	S6	50	5	11
4600	S7	50	3.5	8
	S8	50	3.5	6
	S9	50	3	7

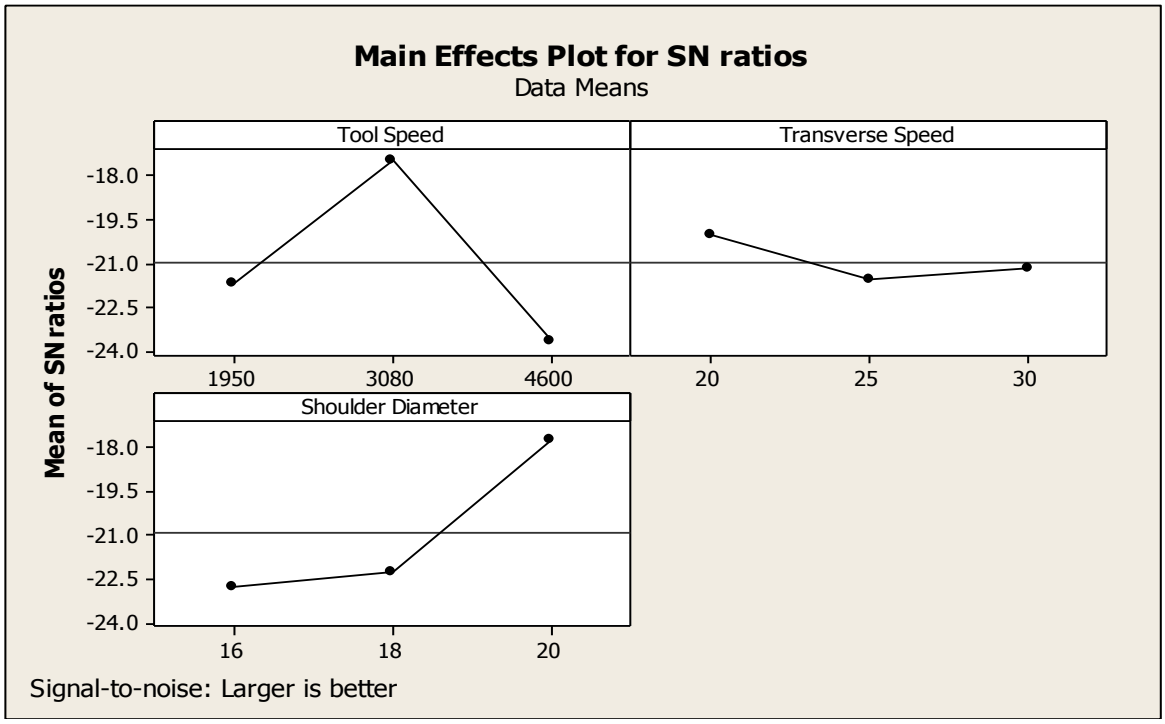

Figure 2: Effect of Welding Parameters on Tensile Strength for S/n ratio

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After using all the observation as given in table 2 and table 3 means and S/N ratio are calculated and the analysis is shown by the various graph is drawn by Minitab 15 software. The S/N ratio for Tensile Strength is calculated on Minitab 15 Software using Taguchi Method. A greater S/N value corresponds to a better performance.

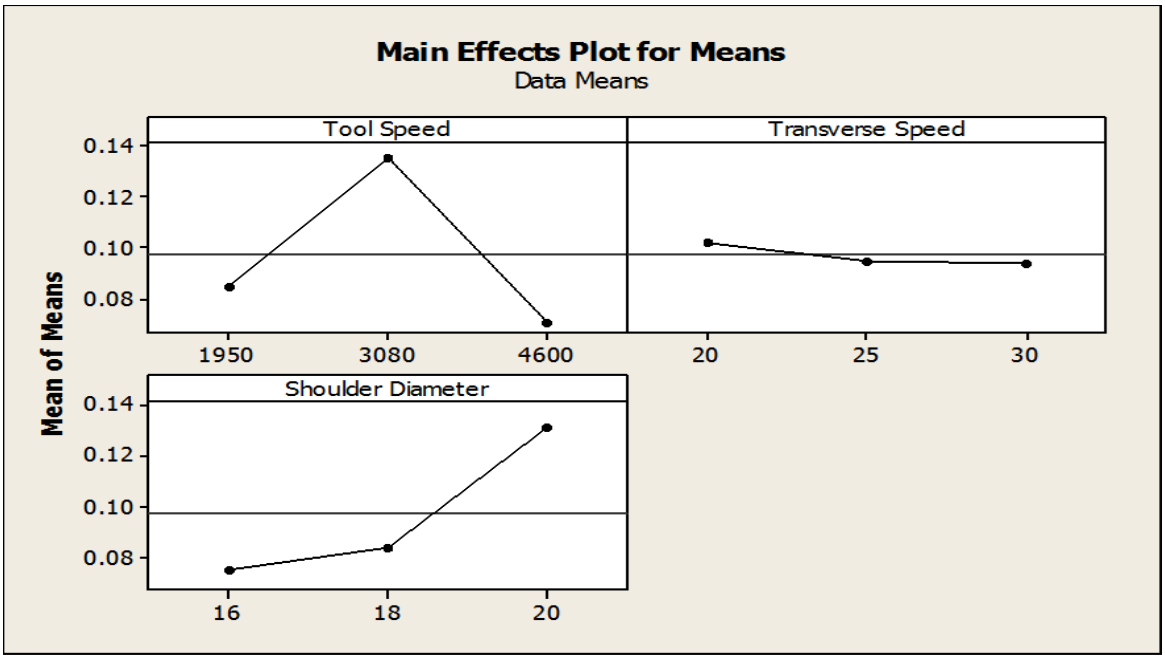

Figure 3: Effect of Welding Parameters on Tensile Strength for Means

V. DISCUSSION

Taguchi method stresses the importance of studying the response variation using the signal–to–noise (S/N) ratio, resulting in minimization of quality characteristic variation due to uncontrollable parameter. The Tensile strength was considered as the quality characteristic with the concept of "the larger-the-better".

The S/N ratio for the larger-the-better is:

$$\text{S/N} = -10log_{10}\{\frac{1}{n}\sum\frac{1}{y^2}\}$$

Finally we got the optimum value of parameters of welding process for maximum tensile strength which is given in Table 4.

Table 4: Optimum Value of Parameter According to S/N Ratio

Tool Speed (rpm)	Feed Rate (mm/min)	Shoulder Diameter (mm)	Tensile strength (KN/mm^2)
3080	20	20	0.164

VI. CONCLUSION

For better welding issues, so many different traditional strategies had been utilized in this way, yet they are not vigorous and have many limitations. To solve the above issues, Taguchi system is utilized as a part of this research. The Tensile quality is mostly influenced by Tool speed and next to it shoulder distance across & feed rate likewise influence to some

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degree. The Parameters considered in the examinations are upgraded to accomplish greatest Tensile Strength. The best setting of information procedure parameters for greatest tensile Strength is Tool speed-3080 rpm, feedrate-20 mm/min, and Shoulder diameter across 20 mm.

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A STUDY OF ICT AWARENESS, NEED AND USAGE AMONG TEACHER EDUCATORS OF B.Ed. COLLEGES OF HYDERABAD KARNATAKA REGION

Paper ID	IJIFR/V4/ E2/ 008	Page No.	5072-5081	Subject Area	Education
Keywords	ICT, Teacher Educator, B.Ed. Colleges, Professional Development, Personal Development				

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Abstract

Efforts are made in every country for a sound system of education which can cater the educational needs of all citizens. When the problem of quantity of education is being tackled, there is an urge for raising the quality of life, which is possible only if there is raise in the quality of education. The quality of life and the quality of education go together. Educationalists are of the opinion that the educational problems relating to the quality and quantity could be tackled by the development of an Educational Technology. Therefore, in recent years all over the world there has been a rapid development of Communication Technology in education at all levels with a purpose of extending educational facilities and upgrading instructional methodology. The present study tries to trace out the ICT awareness, use and need of the teacher educators of B.Ed. Colleges of Hyderabad Karnataka region. The result reveal that computer trained teacher educators were more aware and used more ICT resources for classroom teaching, professional development and personal development in comparison to the computer untrained teacher educators and teacher educators having personal computer were using ICT resources more for their classroom practice, professional development and personal development than that of teacher educators not possessing personal computer.

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I. INTRODUCTION

We live in an age of information and technology. Widespread use of computers in all walks of life has been witnessed. There have been several major trends in emerging technologies particularly in last two decades which have increased access to instructional media with the advent of microchip technology; computers are now readily accessible on desk at reasonable cost. The electronic delivery system digitalized information storage in different forms using online severs of internet. The Internet is a global network of approximately 10-12 million hosts connected to each other. Information stored, thus, traverse international boundaries satisfying the appetite of millions of users across the world. The internet acts as a medium for personal communication; information providers as well as consumers net for business, education and recreation, and store house of all types of documents and commercial resources. It is an unparalleled resource for education.

II. OBJECTIVES OF THE STUDY

Following objectives were formulated to realize the present study which are given as follows:

1) To study the ICT awareness of teacher educators B.Ed. colleges of Hyderabad Karnataka region with respect to medium of instruction.
2) To study the ICT use of teacher educators B.Ed. colleges of Hyderabad Karnataka region with respect to computer training.
3) To study the ICT need of teacher educators B.Ed. colleges of Hyderabad Karnataka region with respect to possession of personal computer.

III. HYPOTHESIS

1) There is no significant difference between the mean ICT awareness score of science and arts teacher educators
2) There is no significant difference between the mean ICT use score of science and arts teacher educators.
3) There is no significant difference between the mean ICT need score of science and arts teacher educators group.
4) There is no significant difference between the mean ICT awareness score of computer trained and computer untrained teacher educators.
5) There is no significant difference between the mean ICT use score of computer trained teacher educators and computer untrained teacher educators.
6) There is no significant difference between the mean ICT need score of computer trained teacher educators and computer untrained teacher educators.
7) There is no significant difference between the mean ICT awareness score of teacher educators having personal computer and teacher educators not having personal computer.
8) There is no significant difference between the mean ICT use score of teacher educators having personal computer and teacher educators not having personal computer.

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9) There is no significant difference between the mean ICT need score of teacher educators having personal computer and not having personal computer

IV. DEFINITION OF THE TERMS

i) **ICT :** For the present study ICT (Information and Communication Technology) means (computers for word processing, power point, spreadsheet, CAI (Computer Assisted Instruction) and related software, internet for e-mail, chat, searching, web designing, and for giving project work, LCD projector for Power Point presentation, and T.V. presentation and OHP, Television, and Radio) meant for classroom practice, professional development and personal development of teachers of Teacher educators of B.Ed. Colleges.

ii) **ICT AWARENESS:** It means the knowledge of teachers of secondary and higher secondary schools regarding the components of ICT like, computers for word processing, power point, spreadsheet, CAI (Computer Assisted Instruction) and related software, internet for e-mail, chat, searching, web designing, and for giving project work, LCD projector for PowerPoint presentation, and T.V. presentation and OHP, Television, and Radio. For present study ICT awareness is defined operationally as the awareness score secured by a teacher in the awareness scale prepared by the investigator.

iii) **ICT USE:** It means the use of the ICT components of ICT like, computers for word processing, power point, spreadsheet, CAI (Computer Assisted Instruction) and related software, internet for e-mail, chat, searching, web designing, and for giving project work, LCD projector for PowerPoint presentation, and T.V. presentation and OHP, Television, and Radio by the teachers of secondary and higher secondary schools for classroom practice, professional development and for personal development. For the present study ICT is defined operationally as the score secured by a teacher in the scale prepared by the investigator.

iv) **ICT NEED:** It means the need for skill training and ICT resources for classroom practices, professional development and for personal development of the teachers of secondary and higher secondary schools. For the present study ICT is defined operationally as the score secured by a teacher in the scale prepared by the investigator.

V. RATIONALE OF THE STUDY

ICT is one of the recent developments of the twentieth century in India. It has changed each and every system around the globe from house related systems to industrial systems. Significantly, it has influenced the educational systems in all its forms. In the educational field different types of Information and Communication media are used to impart education. Radio, T.V., Tape recorder, OHP, LCD Projector, Computer and now with advancement in these technologies has changed the scenario. Internet and advanced computers are now being used in education as an instrument of instruction. This digitization has made it

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possible to design, develop, deliver mange and assesses teaching – learning process. It increases the efficiency of the system and makes it more powerful.

The ability to use ICT effectively and appropriately is now seen as essential to allow learners to acquire and exploit information within every sphere of human activity. It can be assumed that specific forms of ICT will change with time. However, the need to be able to aware and use ICT purposefully will remain the key to full participation in an information society.The B.Ed. two year curriculums already reflect the perceived value and importance of developing ICT literacy and indeed, information literacy in all student-teachers. ICT has changed the scenario of teacher education and going to add more change in the system. It is also stated in the National Curriculum Framework for School teacher education (2000). Changes in the perception of 'learning environment' have been highlighted by National Curriculum Framework (2000), which seek to exploit the potential of ICT. The National Curriculum Framework has emphasized on the utilization of ICT in teacher education institutions. The success of ICT in teacher education depends on teacher educators, student-teachers and authorities in the institutions. Teacher-educators have a major role to play. Teachers can lead the journey forward.

Several studies conducted with this regards revealed that teachers are aware of the potentials of ICT in teacher education but only few teacher educators use ICT resources in their teaching due to lack of skill or unavailability of resources. So keeping in mind ICT awareness, use and need of teachers the investigator has decided to conduct a survey. Several variables may be linked with the ICT awareness, use and need of teachers like more education may lead to more awareness in ICT or English medium background may lead to be more aware in ICT. Hence investigator in interested to know the relationship of few background variables with ICT awareness, use and need of secondary and higher secondary teachers.Hyderabad Karnataka region is known as the educationally backward area but there are many B.Ed. colleges are therein this region. Whether the B.Ed. college teacher educators of this region are managed themselves according to the needed demand of ICT and computer Education. Hence the investigator has taken the proposed study to know ICT awareness, use and need of B.Ed. college teacher educators of Hyderabad Karnataka region. It will also help the investigator in term of feasibility of conducting the study. Further, keeping the time factor in mind, the investigator has decided to limit the study only to the B.Ed. college of Hyderabad Karnataka region. Even very few research studies have been conducted in this regard to know the ICT awareness, use and need in different dimensions, like, for academic development, professional development and personal development. The present study may through some light on these matters. Hence the present study is an attempt to know the ICT awareness, use and need of B.Ed. college teacher educators.

VI. METHODOLOGY

The present study is a survey type of work where the investigator has studied the ICT awareness, use and need of the teacher educators of B.Ed. Colleges of Hyderabad Karnataka

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region Details of the research methodology followed in this present study included population, sample, tools, data collection and method of data analysis are given as follow.

a) **Population:** The population for the present study comprise of all the B.Ed. college teacher educators of Hyderabad Karnataka region.

b) **Sample:** For the present study the sample was selected randomly. The list of all the Teacher Education Institutions (TEIs) of Hyderabad Karnataka region (prepared by NCTE) was taken and using stratified random sampling method. 100 B.Ed. colleges from four different districts of Hyderabad Karnataka region were selected. Again four teachers from each college were selected randomly. These 400 teacher educators comprise the sample for the present study.

c) **Tool for data collection:**To collect the required data according to the need of objectives, a scale on ICT awareness, use and need of B.Ed. college teacher educators was prepared by the investigator. After preparation of scale, it was given to five experts in the concern area. According to the expert's suggestions, necessary modification was done and final scale was prepared. The scale was comprised of the different components of ICT i.e. Computer (Word processing, Spreadsheet, Power Point, Access , CAI and related Software etc.), Internet (e-mail, chat, searching etc.), T.V., OHP, LCD Projector, Radio, Social Media, I-pod, Whatsapp, Play store etc. Further details of scales are given as under:

- To know the ICT awareness of B.Ed. college Teacher educators with respect to the different components of ICT, a five point scale was taken with the extent like Maximum, Average and Minimum. With the scale the maximum ICT awareness score of a teacher could be 56.
- To know the ICT use of B.Ed. college Teacher educators with respect to different components of ICT in three different areas like, Classroom Practice, Professional Development and Personal Development a three point scale was taken with the extent like, Great Extent, Some Extent and Less Extent. The index of ICT use by the B.Ed. college Teacher educators in the scale could be a maximum score of 160.
- Similarly, To know the ICT need of B.Ed. college Teacher educators with respect to different components of ICT a scale was taken with two components like, skill training, availability facilities. The index of ICT need by the B.Ed. college Teacher educators using scale could be a maximum score of 36.

d) **Data Collected:** For the present study the required data was collected from the B.Ed. college teacher educators. For this purpose the representative of investigator has personally contacted the college principals and explains the purpose of the study. After that scale was distributed among the teachers and the completed scale was collected from the respondents.

VII. DATA ANALYSIS

As it is a survey type of study, the data analysis for the present study was done quantitatively with the help of both descriptive statistics and inferential statistics. The descriptive statistical techniques like, mean, standard deviation, standard error of mean, and the inferential statistics like, t-test for independent means were used during the process of the data analysis.

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1. Subject At Post Graduate Stage:

As per the Subject at Post graduate stage of the B.Ed. college teacher educators, mainly two groups of teacher educator were found, one group with science and another group with arts subject at their Post graduate stage. 77 teachers were science post graduate and 12 teachers were arts post graduate from the taken sample. The relation of subject with their Awareness, use and need for ICT were computed. Attempt had been made to see the difference among different groups of B.Ed. college teacher educators on the basis of their subject at post graduate stage in mean ICT awareness, use and need. The t-test for independent means was used for this purpose which is given in table 1.

Table – 1: Means, Standard Deviations and t- value of Groups of science and arts teacher educators

Variable	Subject	No. of T.Es	Mean	SD	t-value	Significance
Awareness	Science	200	49.6	2.49	49.05	S
	Arts	200	31.7	4.64		
Use	Science	200	148.6	8.12	27.12	S
	Arts	200	121.6	11.59		
Need	Science	200	30.9	2.73	42.21	S
	Arts	200	20.3	2.40		

From table 1, it was observed that the means of science and arts teacher educators' awareness were 49.6 and 31.7 respectively. In terms of mean, it can be analyzed that the mean score of science teacher educators was found more than that of arts teacher educators and the arts teacher educators were less aware about ICT than that of science teacher educators. The t-value of 49.05 was found not significant at both 0.05 and 0.01 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT awareness score of science and arts teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that awareness of teacher educators about ICT is related with their post graduate subject.

From table-1, it was observed that the means ICT use of science and arts teacher educators were 148.6 and 121.6 respectively. In terms of mean, it can be analyzed that the mean score of science teacher educators was found more than that of arts teacher educators. The t-value of 27.12 was found not significant at both 0.01 and 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT use score of science and arts teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that ICT use of B.Ed. college teacher educators, ICT is related with their post graduate subject.

From table 1, it was observed that the means ICT need of science and arts teacher educators were 30.9 and 20.3 respectively. In terms of mean, it can be analyzed that the mean score of arts teacher educators group was found less than that of science teacher educators group. The t-value of 42.21 was found not significant at 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT need score of science and arts teacher educators group' is rejected and alternative hypothesis accepted. So, it can be said that ICT need of B,Ed college teacher educators is related with their post graduate

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subject. From the analysis of table 1, it can be concluded that the variable `Post graduate subject' is related significantly with the ICT awareness, use and need of teacher educators. Science and arts teacher educators stand unequally or nearly unequal in ICT awareness, use and need.

2. Computer Training:

To find out the relation between ICT awareness, use and need of teacher educators and their Computer training, mean, SD, were used and t-test was used to see the significance difference between the means score of ICT awareness, use and need of teacher educators teaching with computer training and teacher educators teaching without computer training. For this purpose, teacher educators were classified into two groups that is computer trained teacher educators and computer untrained teacher educators on the basis of their responses in scale. Analysis of t-tests is given in table below:

Table – 2: Means, Standard Deviations and t- value of Groups of Computer trained Computer untrained teacher educators

Variable	Computer training	No. of T.E.s	Mean	SD	t-value	Significance
Awareness	Trained	200	50.0	2.45	53.21	S
	Untrained	200	31.6	4.18		
Use	Trained	200	150.4	7.72	37.11	S
	Untrained	200	122.4	8.15		
Need	Trained	200	30.7	2.18	53.45	S
	Untrained	200	19.9	2.78		

From table 2, it was observed that the means awareness about ICT of Means, Standard Deviations and t- value of Groups of teacher educators teaching with computer training and teacher educators teaching without computer training were 30.9 and 20.3 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators teaching with computer training were found more than that of the teacher educators teaching without computer training, so it can be said that teacher educators teaching with computer training were more aware about ICT resources that the teacher educators without computer training. The t-value of 42.21 was found not significant at 0.05 levels. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT awareness score of computer trained and computer untrained teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that awareness of teacher educators about ICT is related with the computer training.

From table 2, it was observed that the means use about ICT of teacher educators teaching with computer training and the teacher educators teaching without computer training were 150.4 and 122.4 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators teaching with computer training were found to be using ICT resources more than that of the teacher educators teaching without computer training, so it can be said that teacher educators teaching with computer training were using ICT resources more than that the teacher educators teaching without computer training. The t-value of 37.11was found significant at both 0.05 and 0.01 level. Hence, the working hypothesis that is 'there is

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no significant difference between the mean ICT use score of computer trained teacher educators and computer untrained teacher educators' is rejected and alternative hypothesis accepted. Which indicates that the mean score of ICT use of teacher educators teaching with computer training was significantly higher than that of the teacher educators teaching without computer training? So, it can be said that use of teacher educators about ICT is related with the computer training. So, it can be said that computer training of teacher educators is related with their ICT use.

From table 2, it was observed that the means ICT need of teacher educators teaching with computer training and the teacher educators teaching without computer training were 30.7 and 19.9 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators teaching with computer training need for ICT was found to be more than that of the teacher educators teaching without computer training, so it can be said that teachers teaching with computer training ICT need was less than that the teacher educator teaching without computer training. The t-value of 53.45 was found not significant at 0.01 and 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT need score of secondary and higher secondary computer trained teacher educators and computer untrained teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that need of teacher educators for ICT is related with the computer training. So, it can be said that computer training of teacher educators is related with their ICT need. From the analysis of table 2, it can be concluded that the variable `Computer training' is related significantly with the ICT use of teacher educators. Mean score of computer trained teacher educators was higher than that of computer untrained teacher educators, which indicate that computer trained teacher educators use more ICT resources for classroom teaching, professional development and personal development in comparison to the computer untrained teacher educators, Whereas it was not found significant for the ICT awareness and need of teacher educators. So it can be said that Computer training of teacher educators is related as a variable only in case of ICT use of teacher educators whereas it was related in case of ICT awareness and need of teacher educators.

3. Possession Of Personal Computer:

To find out the relation between ICT awareness, use and need of teacher educators and their possession of personal Computer, mean, SD, were used and t-test was used to see the significance difference between the means score of ICT awareness, use and need for teacher educators having personal computer and the teacher educators not possessing personal computer. For this purpose, teacher educators were classified into two groups that is teacher educators having personal computer and the teacher educators not having personal on the basis of their responses in scale. Analysis of t-tests is given in table below:

Table – 3: Means, Standard Deviations and t- value of Groups of teacher educators having personal computer and not having personal computer

Variable	Possession of PC	No. of T.Es	Mean	SD	t-value	Significance
Awareness	Don't have PC	200	50.9	2.18	39.93	S
	Have PC	200	33.3	5.25		

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Use	Don't have PC	200	150.4	8.00	26.81	S
	Have PC	200	126.3	10.03		
Need	Don't have PC	200	30.1	2.82	54.75	S
	Have PC	200	20.0	2.92		

From table 3, it was observed that the means awareness about ICT of teacher educators having personal computer and teacher educators not possessing personal computer were 21.00 and 18.37 respectively. In terms of mean, it can be analyzed that the mean score of teachers having personal computer was found more than that of the teachers not possessing personal computer, so it can be said that teacher educators having personal computer were more aware about ICT resources that the teacher educators not possessing personal computer. The t-value of 1.3140 was found not significant at 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT awareness score of teacher educators having personal computer and teacher educators not having personal computer' is retained. So, it can be said that awareness of teacher educators about ICT is not related with the possession of personal computer. From table 3, it was observed that the means ICT use of teacher educators having personal computer and the teacher educators not possessing personal computer were 31.21 and 24.29 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators having personal computer was found to be using ICT resources than that of the teacher educators not possessing personal computer, so it can be said that teacher educators having personal computer were using ICT resources more for their classroom practice, professional development and personal development than that of teacher educators not possessing personal computer. But the t-value of 1.2787 was found not significant at 0.01 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT use score of teacher educators having personal computer and teacher educators not having personal computer' is retained. So, it can be said that ICT use of teacher educators is not related with the possession of personal computer.

From table 3, it was observed that the means ICT need of teacher educators having personal computer and the teacher educators not possessing personal computer were 8.95 and 10.88 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators having personal computer need for ICT was found to be less than that of the teacher educators not possessing personal computer, so it can be said that teacher educators having personal computer need for ICT was less than that of the teacher educators not possessing personal computer. But the t-value of 0.8153 was found not significant at 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT need score of teacher educators having personal computer and teacher educators not having personal computer' is retained. So, it can be said that ICT need of teacher educators is not related with the possession of personal computer. From the analysis of table 3, it can be concluded that the variable `Possession of Personal Computer' is not related significantly with the ICT awareness, use and need of teacher educators. Teacher educators with having personal computer and the teacher educators with not having personal computer stand equal or nearer to equal in their ICT awareness, use and need.

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VIII. CONCLUSIONS

It is observed from the above findings of the research that the computer trained teacher educators aware and use more ICT resources for classroom teaching, professional development and personal development in comparison to the computer untrained teacher educators and teacher educators having personal computer were using ICT resources more for their classroom practice, professional development and personal development than that of teacher educators not possessing personal computer. It is undeniably true that the use of ICT requires training in the proper handling of ICT facilities and their optimal use. The teachers can seek such training themselves or even seek the assistance of the University to arrange for such a training programme. Thus the findings of the study also hint at the role of teachers in the effective use of ICT.

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DEVELOPMENT AND VALIDATION OF MATHETICS STYLE OF PROGRAMMED LEARNING MATERIAL IN ARITHMETIC FOR 10TH STANDARDD

Paper ID	IJIFR/V4/ E2/ 013	Page No.	5082-5088	Subject Area	Education
Keywords	Mathetics Style Programme, Arithmetic, Self Learning Material				

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Abstract

The aim of the study is to develop and validate the mathetics style of programmed learning material and to administer the programme (Try-out on an individual and on a small group and large group of X std CBSE students).The development of the programme consist of five steps 1) Task analysis and Data collection, 2) Prescription for developing mastery of content, 3) Characterization and lesson plan, 4) Exercise design and 5) Editing. Evaluation of the programme is the final stage in the development of a programme. The researcher followed three type of testing, i) Individual testing, ii) Small group testing and iii) Field testing of validation testing. On the basis of internal and external criteria the effectiveness of programme material is evaluated. Pearson product moment correlation technique was followed, the reliability of the material is r = 0.6, hence the Mathetics style of programmed learning material is reliable and valid.

I. INTRODUCTION

"Education is the most powerful weapon which you can use to change the world." The teacher plays a prominent role in the life of the students. The modern concept of education is that the teacher should aim at the complete development of the child. For this the modern teacher is motivated by a desire to make his teaching more facile and interacting. For the complete development of the child, the main focus of teaching should be to bring out

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desirable changes in the behavior of the learner. These changes can bring out only by using appropriate teaching strategies.

In education, we use learning materials in various forms – print, audio, video, multimedia, web, etc. In order to help learners study these and learn in their own time and at their own pace, these materials are designed in such a way to have the teacher built in to facilitate the learning process. We call these the characteristics of self-learning materials. Everyone must be familiar with written technical reports, textbooks, chapters, academic results rather than self-instructional materials.

Self-instruction can be defined as the ability of one to cognitively plan, organize, direct, reinforce, and evaluate one's own independent learning without a teacher's prompting. There are three powerful influences behind self-instruction: First the learning and modeling of materials, the ability of verbalization, and finally, self-regulation (metacognition). The use of imagery, which is fundamental in the development of one's cognitive processing, is among the many connections that can be made through Education.

New techniques in education incredibly affect on the traditional approach of teaching learning process. Among all innovations in recent past the approach that have gain acceptance is Programmed Instruction. Programmed instruction has been considered as revolution in Educational Technology.

The term Programmed Instruction is probably derived from B.F.Skinner's (1954) "The Science of learning and art of teaching". Programmed Instruction sometimes referred to, as programmed learning is a process or techniques of teaching in a sequence of controlled steps. In most cases student work through Programmed material by themselves and at their own speed and after each step they test their comprehension by answering set question are fill-in missing terms. They are immediately shown their correct answers or given additional information.

1.1 Characteristics of Programmed Instruction Learning Material:

1. PI based learning material is Individual and only one person can learn by it at a time.
2. PI based learning material is divided into various small steps.
3. PI material is arranged into in a series of sequential step.
4. Each step is related with another step.
5. The learner should have made active response.
6. Learner get immediate feedback in PI based material.
7. Students learn by "Principle of self pacing".
8. PI material is Pre-tested and valid.
9. In PI based learning Error Rate and Fault rate is very less.
10. In PI based learning stimulus, Response and Reinforcement both are active.

1.2 There Are Three Types Of Programming.

1. Linear Programming.
2. Branching Programming.
3. Mathetics.

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1.3 Mathetics Programming:

The founder of Mathetics is Thomas F. Gilbert. "Mathetics is defined as a systematic application of reinforcement theory to the analysis and construction of complex repertoires which represent the mastery in subject matter." It is based on connectivist theory of learning. It is also termed as 'Retrogressive Chaining' or 'backward chaining'. It is a reverse chaining approach. It is based on Principle of chaining, Discrimination and Generalization.
The term mathetics is being evolved from the Greek word 'Mathein' which means 'to learn'. Like other programming styles, here also learning occurs by doing some activity by the learner.

- **Mathetic and Learning Process:**

The mathetical learning system is based upon S – R analysis of behavior. Basically learning process is response centered. The child learns the last step first, then goes to the next one before it and thus to the introductory part. This procedure where the tasks are connected from the last to the first is called chaining (Elias Jijish 2009). In Retrogressive chaining demonstrated, prompted, released(DPR) approach is used, in this students are first given to demonstrated exercise (Entire procedure is demonstrated to the student. The programmer supplies the student with all the steps up to the mastery step), then prompted exercise (The programmer supplies the student with all the steps leading up to mastery step and prompt him to perform the mastery step) and finally released exercise (the programmer provides all the steps, leading up to the step that immediately precedes the last sub mastery step, prompt this step and release the student to practice the mastery step). The programmer continues in this manner, each time allowing the students to perform an additional step until he/she has worked back of the first time step in the procedure and can perform the entire task (Mangal, S.K.2002).

Retrogressive chaining can be shown by the following diagramme.

(1) ……6
D
(2) ……......5 - - 6
D P
(3) ……..4 - - 5 -- 6
D P R
(4) ……...3 - - 4 - - 5 --6
D P R R
(5) ……2 - - 3 - - 4 - -5 --6
D P R R R
(6) 1 - - 2 - - 3 - - 4 - -5 - -6
D P R R R R
(7) 1 - - 2 - - 3 - - 4 - -5 - -6
D P R R R R
(8) 1 - - 2 - - 3 - - 4 - -5 - -6
R R R R R R

Where: D = Demonstration
P = Prompt
R = Release

Programmed learning is being used not only for self instructional purpose but also as mechanism of feedback for improving teaching efficiently. Mathetics style Programme is

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also best for teaching Mathematics. Thus researcher developed a programme on "Arithmetic units", which has been taken from Mathematics text book prescribed by N.C.E.R.T (National Council of Educational Research and Training) for grade X students, in English language. This programme consists of 55 frames. After the individual tryout the researcher went through small group tryout for determining whether the programme succeeds in bringing desirable change in learning. If the small group tryout reaches the standard, then the programme is ready for field testing.

II. OBJECTIVES OF THE STUDY

1) To develop and validate the mathetics style of programmed learning material.
2) To administer the programme (Try-out on an individual and on a small group and large group of X standard CBSE students).

III. SCOPE OF THE STUDY

The present study is confined to the following,

1) It is confined for 10th Standard students of CBSE.

2) Among different styles of programme instruction it is confined only mathetics style of programme instruction.

3) The study confined only Arithmetic units.

IV. DEVELOPMENT OF THE MATHETICS STYLE OF PROGRAMME

1) Task analysis and Data collection.
2) Prescription for developing mastery of content.
3) Characterization and lesson plan.
4) Exercise design and
5) Editing

V. EVALUATION AND VALIDATION OF A PROGRAMME

Evaluation of the programme is the final stage in the development of a programme. Evaluation of the programme in this sense refers to the testing of the programme material during its developmental process and to the stratergies to improve its effectiveness. Testing of a programme is a kind of trial situation for the frames and frame sequence brought out by the programmer. There are three type of testing,

1). Individual Testing:

The purpose of individual testing is to check how for the programme produced which is essentially still only a guess about how the material should be taught is, in fact, suitable for those for whom it is written. Here researcher selected 10-12 individual students of average and below average. The student is informed that he is not being tested, but that he is in fact, helping the programmer in revising, of the programme and every affort is made to put him at his case. On the basis of student's reactions, the researcher gathers some insight to improve and modified the frames.

2) Small Group Testing:

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For the present study Descriptive survey method is applied to collect the data. In small group tryout researcher selected 15 students of X Std Kenbridge English medium School Kalaburagi (Karnataka). The researcher, before testing the programme administered pre-test to determine the extent of the student's knowledge in the subject of mathematics. After pre-test, the printed exercises were presented to the student in actual classroom situation, the title of the programme was announced and specific written instructions were read out before the students.

The students were asked to take their own time while working on the programme. Investigator had given some time to the learners to discuss the difficulties faced by them while going through the programme. Immediately after the programme, a criterion test (CT) was administered as 'posttest' on all the students of small group, in order to check the competency attained by them.

After criterion test the researcher calculated reliability of the material. The reliability of the material is **r = 0.71**, hence the material is ready for field testing.

3) Field Testing Of Validation Testing:

Field-testing is more formal than development testing. The purpose of field-testing is to assess whether the programme satisfactorily achieves its stated objectives.

There are six steps in the validation of the programme or in field testing;

i) **Selection of the Sample:** The researcher selected 40 students of X Std. Aryan English medium school, Kalaburagi.

ii) **Administration of Pre-Test:** After having selected the sample, generally criterion-test is administered as pre-test in order to measure the learner's knowledge of what they are about to taught.

iii) **Administration of the Programme:** After administration of pre-test, printed copies of the programme are distributed among the students. Instructions about the working with the programme are included in the beginning of printed programme. Here researcher taken down time by each student in completion of programme.

iv) **Administration of Posttest:** After completion of the programme, a criterion test is administered as posttest on the students.

v) **Administration of Reaction Scale:** The reaction scale is administered after the posttest has been completed by learners.

vi) **Analysis of the Criteria of the Programme:** Criteria of the validation of the programme are analysed after all relevant data have been collected.

These measures classified into two groups:

A) Internal Criteria:

a) Error Rate of the Programme: The error rate in criterion test was calculated on the basis of the responses given by the students by using the formula

$$\textbf{Error rate} = \frac{\textit{Total No.of errors} \times 100}{\textit{Total No. of available responses in the programme} \times \textit{No.of individuals}}$$

[Where Total No. of errors= 764, N= 40]

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Error rate = $\frac{764 \times 100}{837 \times 40}$ = **2.281**

Table 1: Concept-Wise Error committed by the students in various exercises in percentage

Sl. No.	Units	Error in(%)	%of success
1	Real Number	2.58	97.42%
2	Arithmetic progression	1.95	98.05%
3	Probability	2.44	97.56%
4	Statistics	2.67	97.33%
5	Total	9.64	90.36%
6	Mean	2.41	97.59%

b) Density Of The Programme: Density is an in independent measure of the difficulty of a programme. To find out density of a programme by using the formula

$$\textbf{Type/ token ratio} = \frac{Total\ No.of\ Sections}{total\ No\ of\ responses\ required}$$

Where, Total No. of sections = 215 and Total No. of responses required = 837

Type/ token ratio = $\frac{215}{837}$ = 0.257 ≈ **0.3**

B) External Criteria:

The external criteria refer to learner performance after completing the programme material.

a) 90/90 Standard:

Total pretest score= 847, Total posttest score= 1739

The mean value of pre-test score is $\frac{847 \times 100}{2000}$ = 42% [where total score is 50×40= 2000]

And post-test score is $\frac{1739 \times 100}{2000}$ = 87%

Expected gain = 100 – 42 = 58

Real gain = 87 – 42 = 45

Thus, Real gain/ Expected gain is **45/58.**

b) Attitude Coefficient (Reaction Coefficient): Three point likert's reaction scale is used. Here **79%** of the students agree with all the principle and characteristics of the programme.

c) Gain Ratio: Mc-Guin and Peters (1965) suggested that best criterion of a programme effectiveness is the gain ration between amount of learned and the amount that could by possibly be learned. By using following formula we find out gain ratio;

$$\textbf{Gain ratio} = \frac{Mean\ of\ (post-test\ scores - pre-test\ scores)}{Mean\ of\ (Full\ scores - pre-test\ scores)}$$

Where, Mean of post test score = 1739, Mean of pre-test score = 847, Full mean score = 2000

Gain ratio = $\frac{1739-847}{2000-847}$ = 892/1153 = **0.773**

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d) **Level Of Performance:** The post-test scores are used and their mean value is computed. The mean value is converted into percentage. A good programme should have 75 percent average performance.

2000 → 1739

100→?

100 × 1739 / 2000 = **87%**

e) **Standardization Of Validated Material:** On the basis of internal and external criteria the effectiveness of programme material is evaluated. In the administration of both pre and post test scores/results were correlated. Pearson product moment correlation technique was followed, the reliability of the material is **r = 0.6**, hence the Mathetics style of programmed learning material is reliable and valid.

VI. CONCLUSION

The Mathetics style of programme on arithmetic units was developed and validated by researcher. The programme material has been an effective instrument for making the students of Xth standard to learn arithmetic in mathematics. Mathetics style of programme material is very useful in the field of teaching Mathematics.

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HEMICHORDATE PHYLOGENETIC RECONSTRUCTION BASED ON RIBOSOMAL RNA GENES

Paper ID	IJIFR/V4/ E2/ 018	Page No.	5089-5103	Subject Area	Zoology
Keywords	Hemichordate, Ribosomal RNA Genes, Phylogeny, Trees, Clade				

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Abstract

Hemichordate diversity and relationships within the group have been poorly investigated. The objectives of the current study were to infer multilocus phylogenetic relationship among hemichordates based on ribosomal RNA genes. Phylogenetic relationships were inferred showing similar species clustered together but did not form distinct clades as per their lineage and morphological similarities. It was noticed that some species appeared to be polyphyletic. Phylogenetic analyses using ribosomal RNA gene sequences could be a useful approach in understanding Hemichordate evolution. Some trees showed similar species remain clustered together with few alterations and this may be assumed by possible adaptive radiation or mutations. In future inclusion of secondary and tertiary structures of RNA as well as proteins may be useful in elucidating morphology, anatomy and evolution of this neglected phylum.

I. INTRODUCTION

Hemichordates though not well-known, are key organisms in early chordate evolutionary studies (Nomaksteinsky et al., 2009). The phylogenetic relationships within the phylum still remain undetermined (Cannon et al., 2009). Hemichordates form a small phylum comprising few hundred species and hypothesized to be the closest extant relative to Chordata and include animals called enteropneusts (acorn worms) and pterobranchs. Since the hemichordates are the closest living relatives to the chordates, they are of great concern to those studying the origins of chordate development. They possess a combination of both invertebrate and chordate characteristics. The hemichordates along with echinoderms and chordates belong to the group deuterostome branch of animal kingdom. Because of their close relationship to chordates these animals are called pre-chordates and have been pivotal

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for understanding the evolution of chordate-like morphological and developmental features. The hemichordate notochord is a buccal diverticulum non-homologous with the chordate notochord. Hemichordates are instrumental to understanding early deuterostome and chordate evolution, yet diversity and relationships within the group have been poorly studied. Various workers have studied morphological and molecular characterization of this phylum but few studies are being conducted on their phylogenetic relationship. The objectives of the current study were to infer multilocus phylogenetic relationship among hemichordates based on ribosomal RNA genes.

II. MATERIALS AND METHODS

2.1 Retrieval Of Sequences And Taxon Sampling

The gene sequences belonging to Hemichordata were retrieved from NCBI-GenBank database (Benson et al., 2013) using a PERL script. The sequences were filter searched and were selected referring to 5.8S, 16S and 18S ribosomal RNA genes. The sequences were sorted based on gene types using Bioedit software version 7.0.5.3 (Hall, 1999).

2.2 Multiple Sequence Alignment and Phylogenetic Analysis

The retrieved gene sequences were fasta formatted and subjected to multiple sequence alignment. The sequences were aligned using CLUSTAL W (Thompson et al, 1994). For pair wise sequence alignment the gap opening penalty and extension penalty was 15 and 6.66 respectively. For multiple sequence alignment the opening penalty and gap extension penalty was 15 and 6.66 respectively. IUB DNA weight matrix with transition weight of 0.5. The negative matrix was switched off percentage was kept at 30. The aligned file was exported for phylogenetic analysis. Five different methods (ML, NJ, ME, UPGMA and MP) were adopted to perform phylogenetic analysis using MEGA 7 software (Kumar et al., 2016). All characters were equally weighted and unordered. Alignment gaps were treated as missing data. The percentage of replicate trees in which the associated taxa clustered together in the bootstrap was 500 replicates. The evolutionary distances were computed using the maximum composite Likelihood method and are in the units of the number of base substitutions per site. The branch length and consistency, retention and composites indices are shown in table 1.

Table 1: Branch length and indices of CI, RI and CI

Sl. No.	Gene	Sum of Branch Length					Consistency Index	Retention Index	Composite Index
		ML	NJ	ME	UPGMA	MP			
1	5.8S	0.866	-364	0.869	0.883	0.969	0.777	0.666	0.646
2	16S	-336	2.820	2.820	2.740	-351	0.597	0.680	0.426
3	18S	-184	1.138	1.138	1.096	0.662	0.553	0.726	0.481

ML: Maximum Likelihood, NJ: Neighbour Joining, ME: Minimum Evolution, UPGMA: Unweighted Pair Group Method with Arithmetic Mean, MP: Maximum Parsimony.

2.3 Nucleic Acid Composition

The nucleic acid composition (sequence length, nucleotide composition and molecular weight etc. were computed using Bioedit program.

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III. RESULTS

3.1 Maximum Likelihood Trees

The evolutionary history was inferred by using the Maximum Likelihood method based on the Tamura-Nei model (Tamura and Nei, 1993). The trees with the highest log-likelihood are shown. Initial tree(s) for the heuristic search were obtained automatically by applying Neighbor-Joining and BioNJ algorithms to a matrix of pair wise distances estimated using the Maximum Composite Likelihood (MCL) approach, and then selecting the topology with superior log likelihood value. The tree is drawn to scale, with branch lengths measured in the number of substitutions per site. Codon positions included were 1st+2nd+3rd+Noncoding. All positions containing gaps and missing data were eliminated (Fig. 1-3).

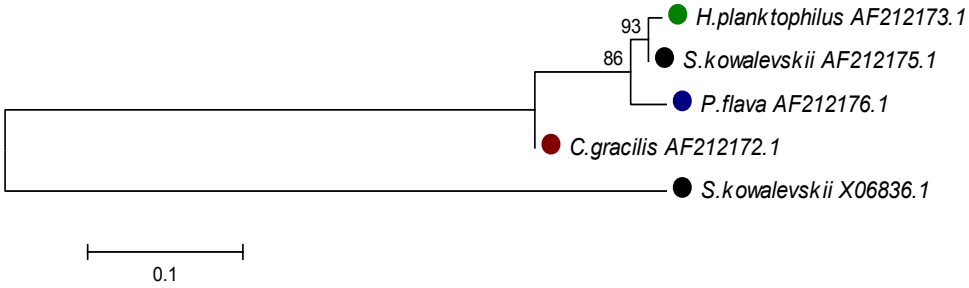

Figure 1: 5.8S rRNA based ML tree

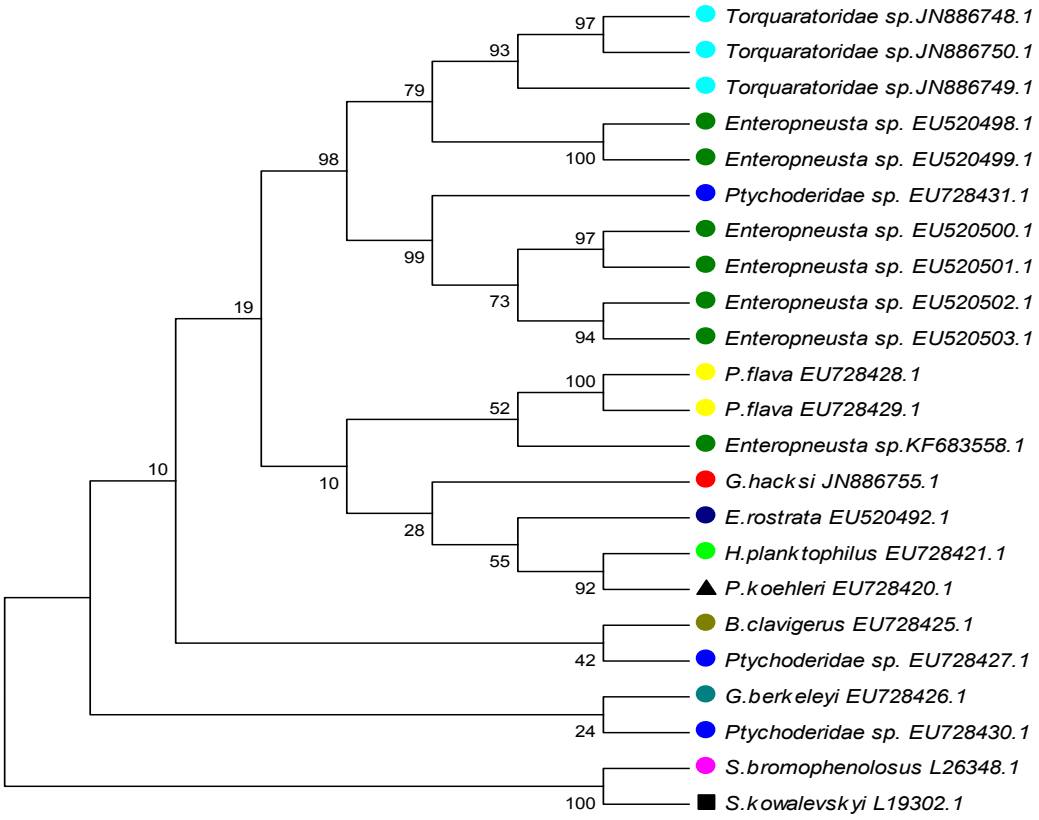

Figure 2: 16S rRNA based ML tree

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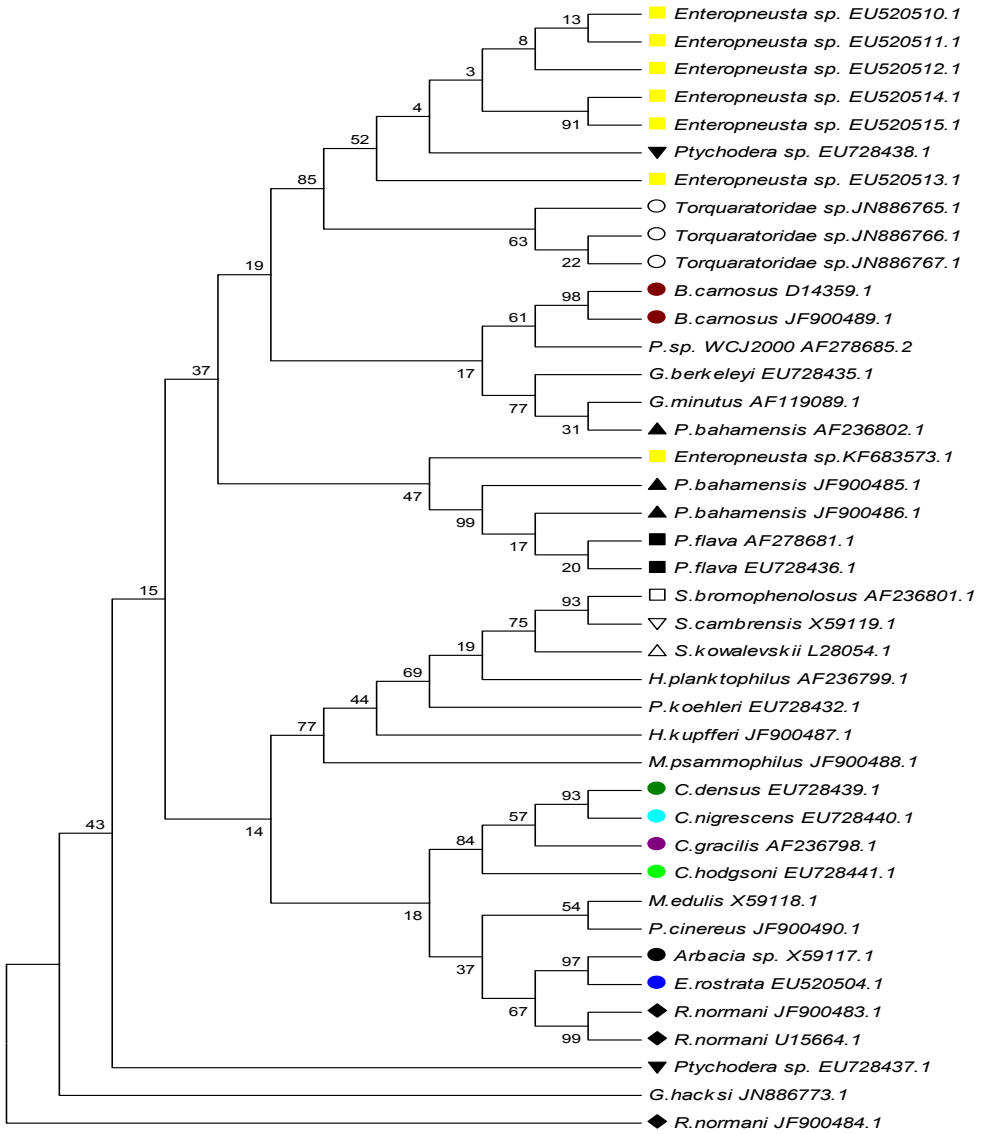

Figure 3: 18S rRNA based ML tree

3.2 Neighbor Joining Trees

The evolutionary history was inferred using the Neighbor-Joining method (Saitou and Nei, 1987). The optimal trees were drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic trees (Fig. 4-6). The evolutionary distances were computed using the Maximum Composite Likelihood method (Tamura et al., 2004) and are in the units of the number of base substitutions per site.

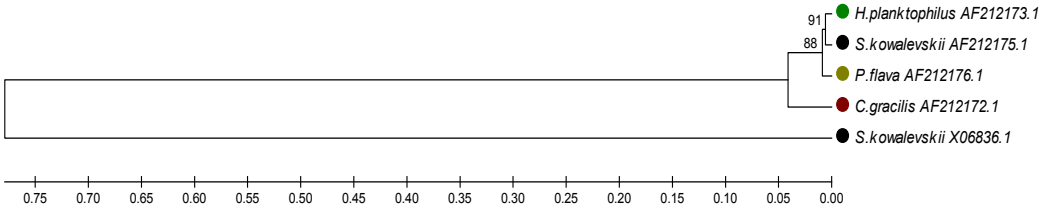

Figure 4: 5.8S rRNA based NJ tree

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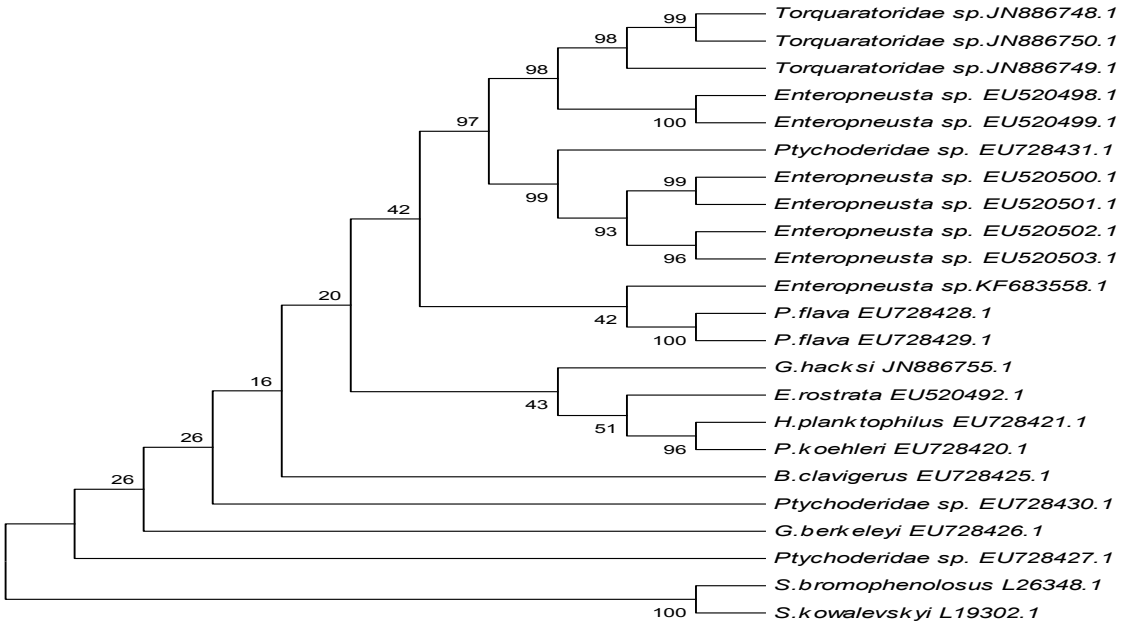

Figure 5: 16S rRNA based ML tree

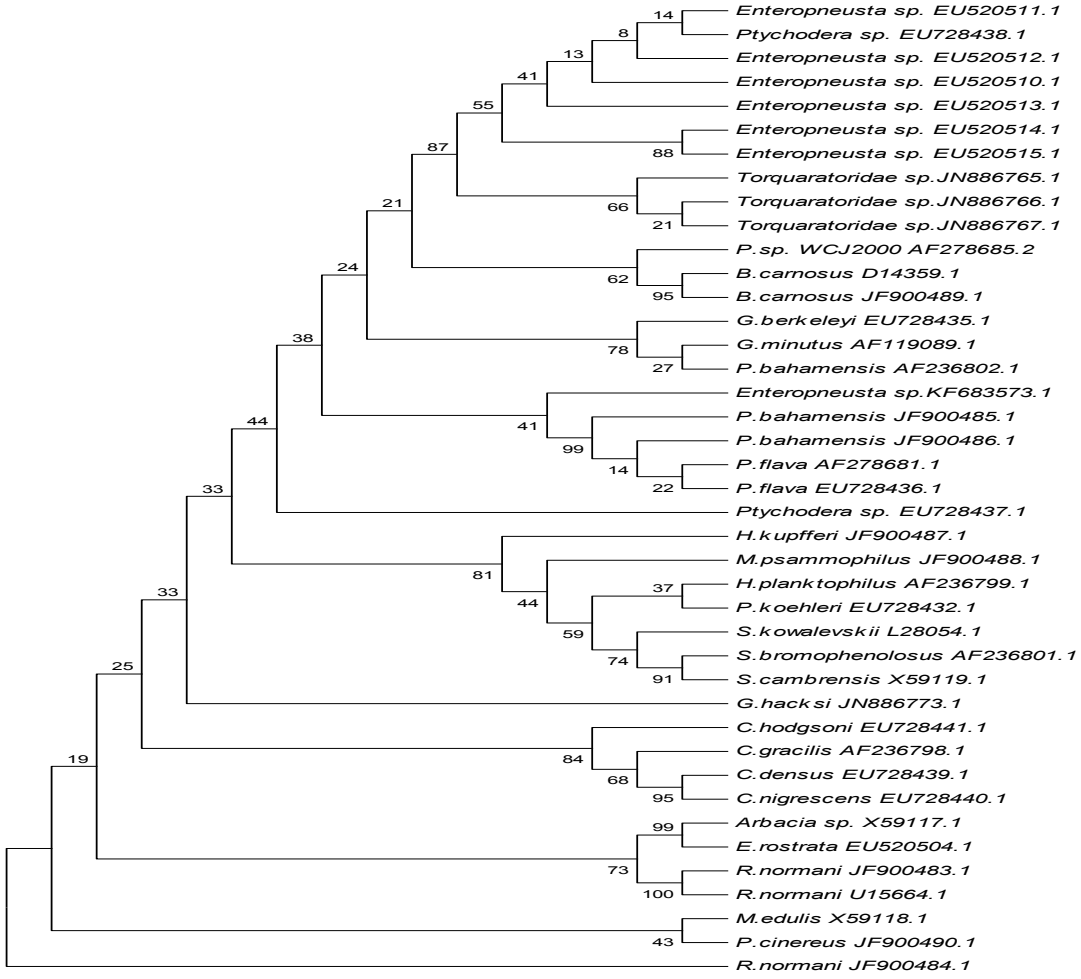

Figure 6: 18S rRNA based ML tree

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3.3 Minimum Evolution Trees

The evolutionary history was inferred using the Minimum Evolution method (Rzhetsky and Nei, 1992). The trees are drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic trees (Fig. 7-9). The evolutionary distances were computed using the Maximum Composite Likelihood method (Tamura et al., 2004) and were in the units of the number of base substitutions per site. The ME trees were searched using the Close-Neighbor-Interchange (CNI) algorithm (Nei and Kumar, 2000).

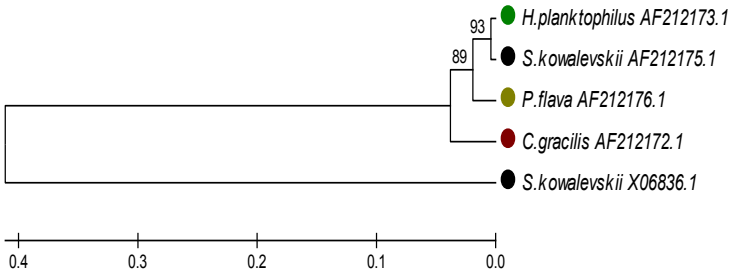

Figure 7: 5.8S rRNA based ME tree

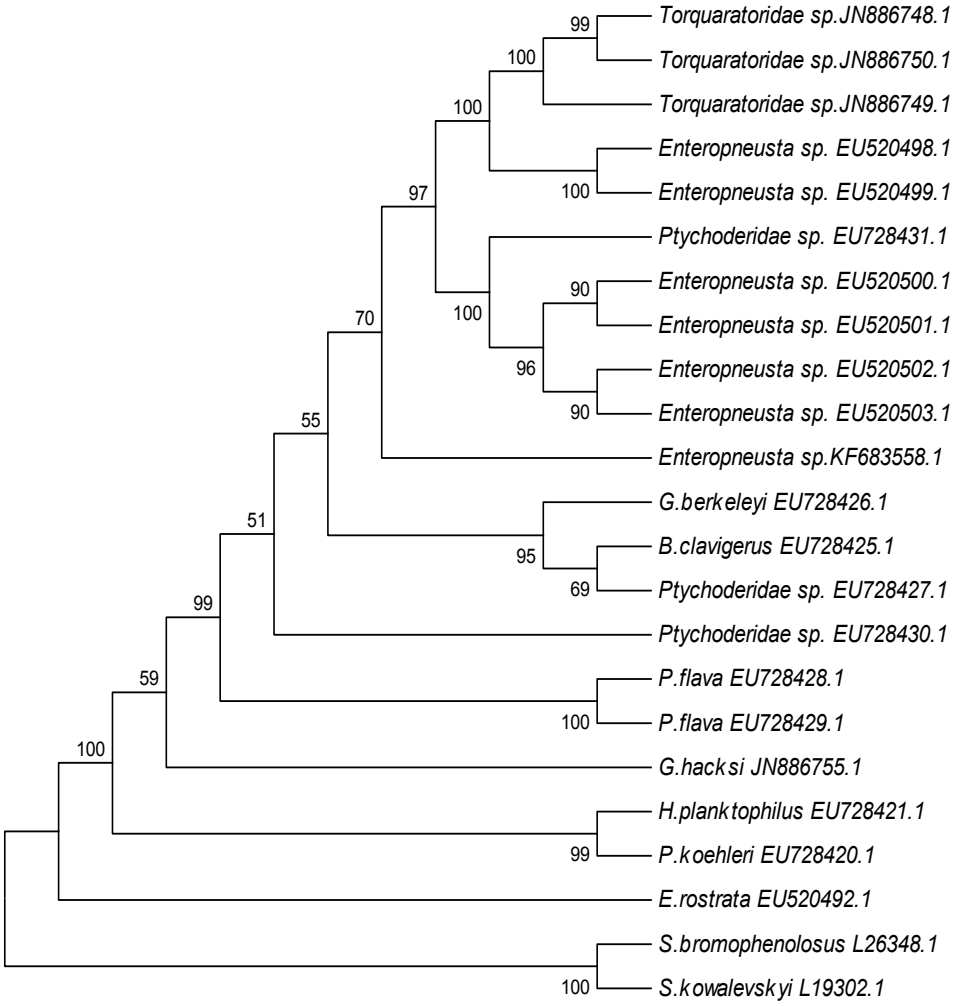

Figure 8: 16S rRNA based ME tree

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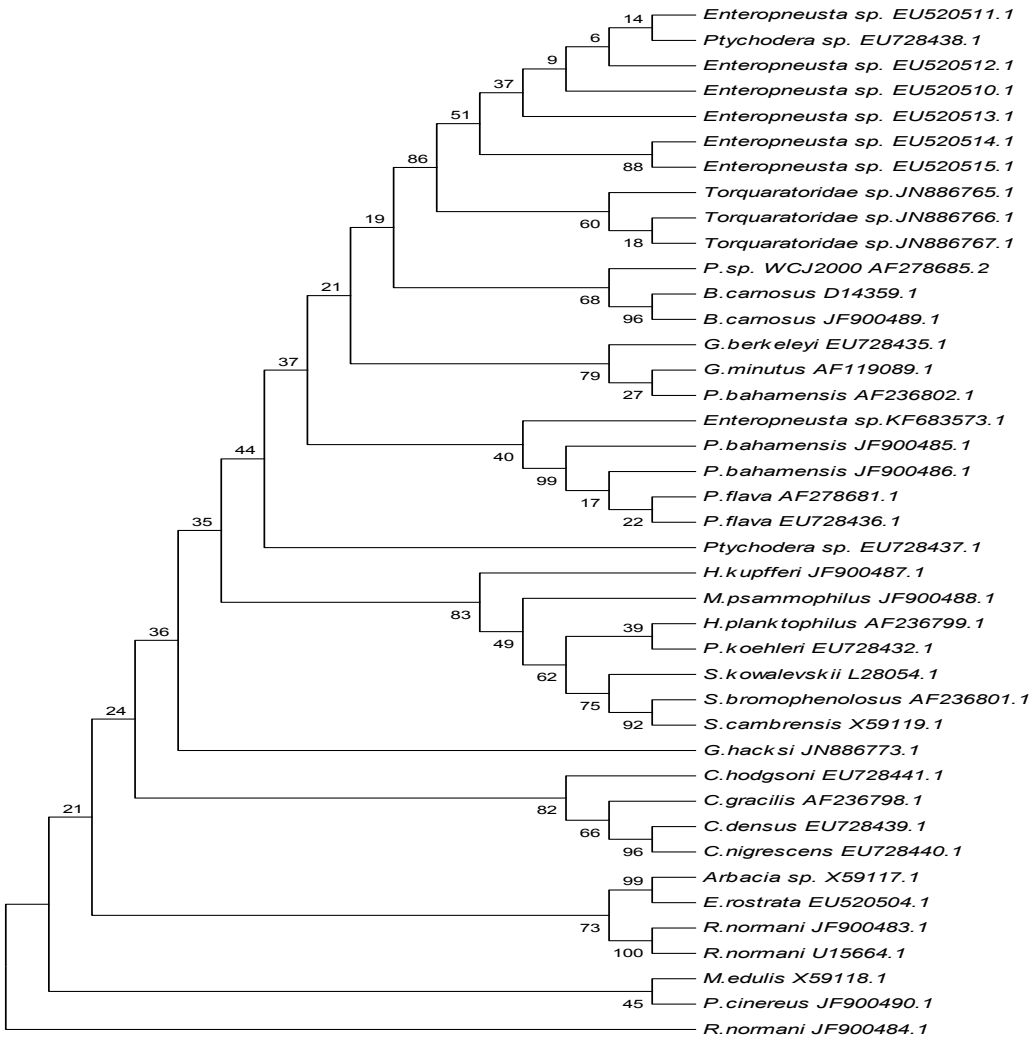

Figure 9: 18S rRNA based ME tree

3.4 UPGMA Trees

The evolutionary history was inferred using the UPGMA method (Sneath and Sokal, 1973). The optimal trees were drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic trees (Fig. 10-12). The evolutionary distances were computed using the Maximum Composite Likelihood method and were in the units of the number of base substitutions per site.

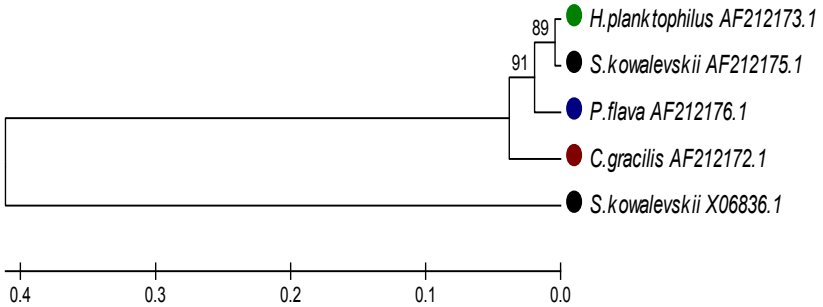

Figure 10: 5.8S rRNA based UPGMA tree

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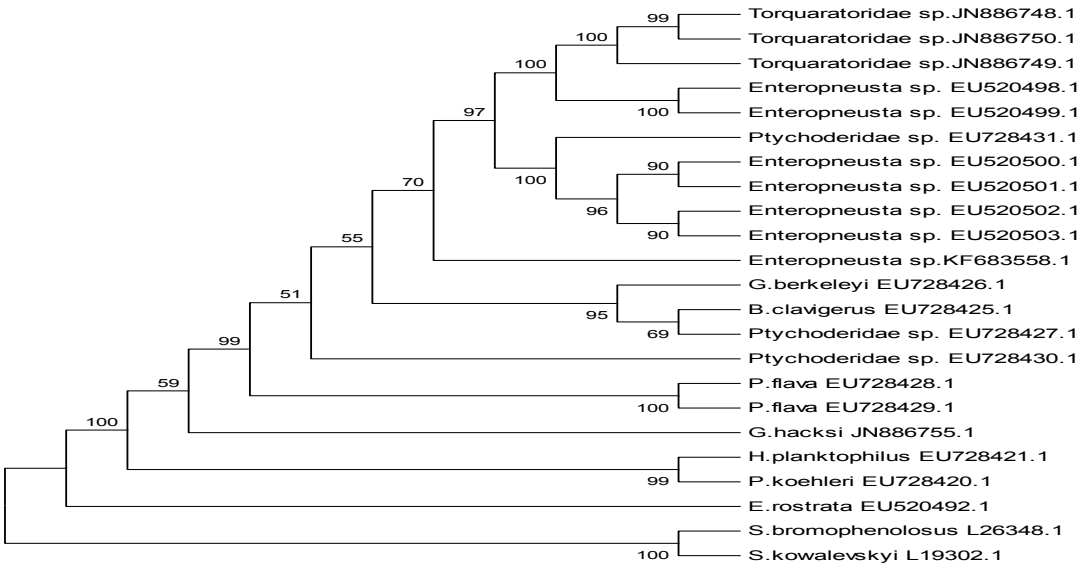

Figure 11: 16S rRNA based UPGMA tree

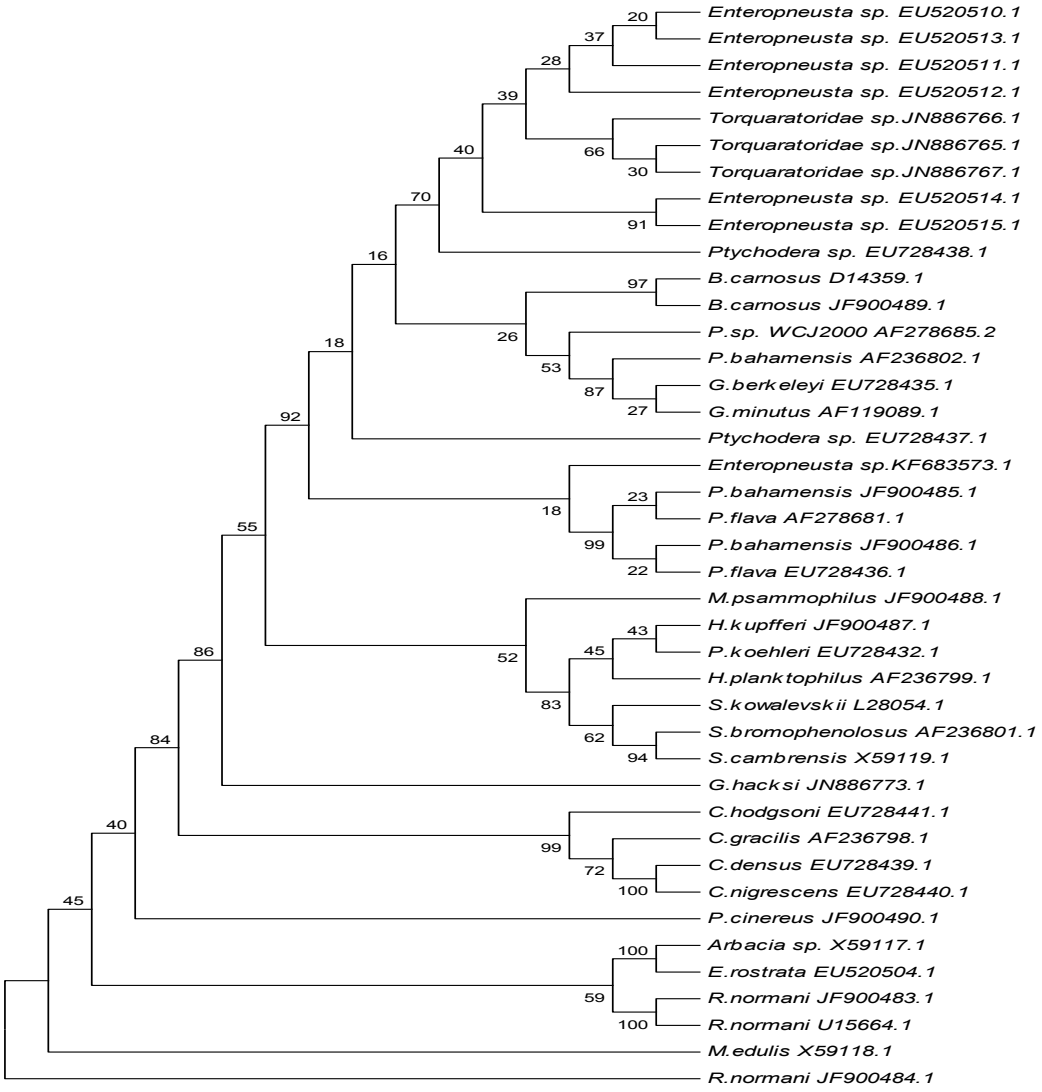

Figure 12: 18S rRNA based UPGMA tree

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3.5 MP Trees

The evolutionary history was inferred using the Maximum Parsimony method (Fig. 13-15). The MP trees were obtained using the Subtree-Pruning-Regrafting (SPR) algorithm with search level 0 in which the initial trees were obtained by the random addition of sequences (10 replicates). All positions containing gaps and missing data were eliminated.

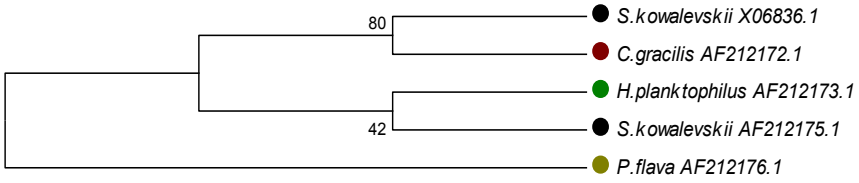

Figure 13: 5.8S rRNA based MP tree

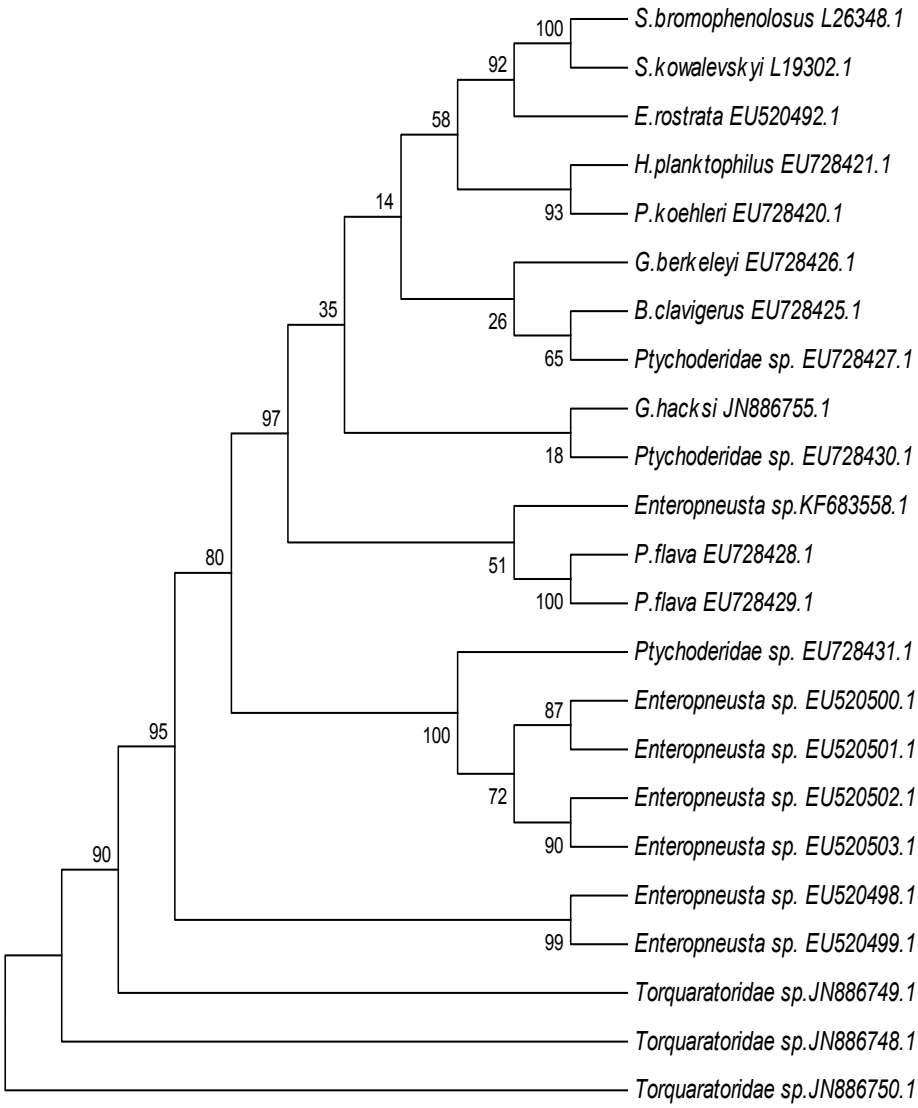

Figure 14: 16S rRNA based UPGMA tree

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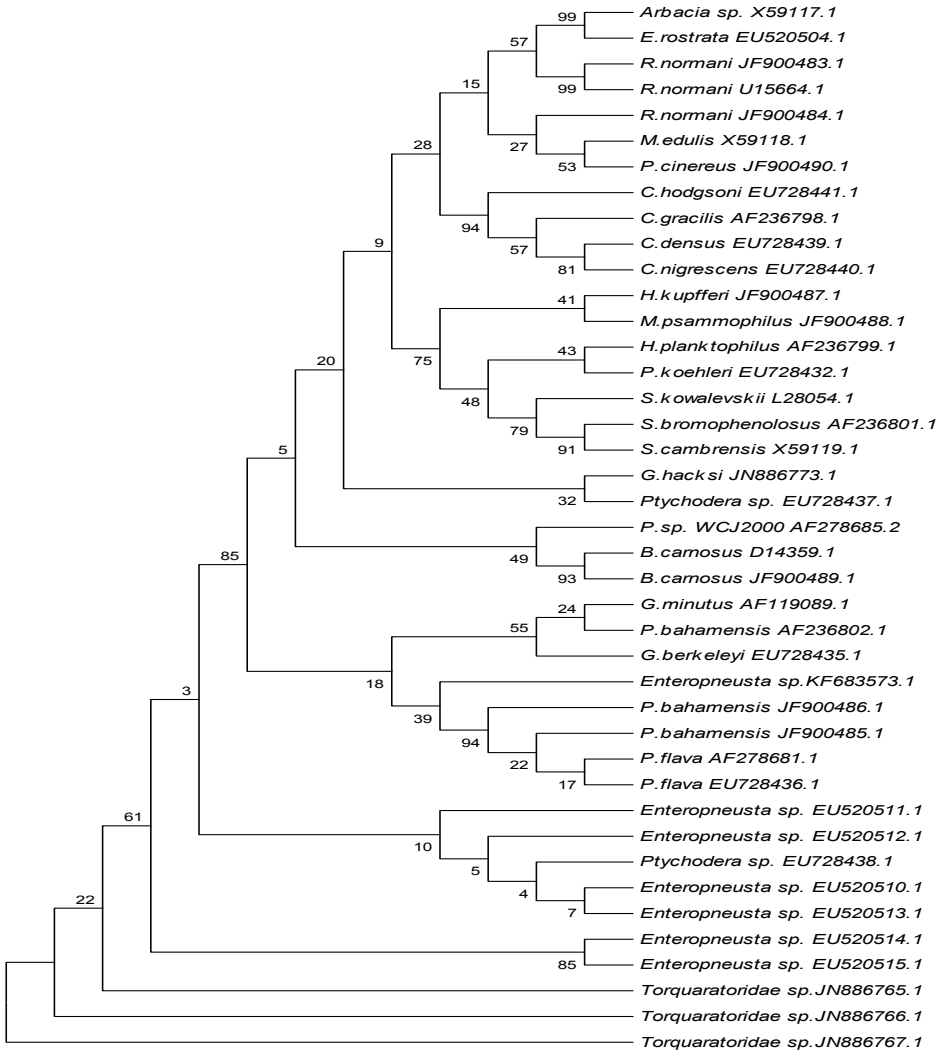

Figure 15: 18S rRNA based UPGMA tree

3.6 Nucleic Acid Composition

The computed length (base pairs), molecular weight, percentage of AU, GC, and number of adenine, uracil, guanine and cytosine were computed and given in table 2.

Table 2: Nucleic acid composition of genes of different species

Gene	Species	Length (Base pairs)	Molecular Weight (Daltons)		A+U %	G+C %	Adenine	Uracil	Guanine	Cytosine	Molecular Weight
			Single strand	Double strand							
5.8S rRNA	*C.gracilis*	4382	1334873	2675014	34.62	64.38	816	701	1514	1307	18.62(A) 29.83(C) 34.55(G) 16.00(U)
	H.planktophilus	4483	1362746	2734322	38.10	61.90	827	881	1481	1294	18.45(A) 28.86(C) 33.04(G) 19.65(U)
	P.flava	4046	1230615	2468235	37.44	62.56	807	708	1384	1147	19.95(A)

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											28.35(C) 34.21(G) 17.50(U)
16S rRNA	*B.clavigerus*	591	180620	359305	49.92	49.92	163	132	133	162	27.58(A) 27.41(C) 22.50(G) 22.34(U)
	E.rostrata	625	189592	378809	60.96	39.04	198	183	122	122	31.68(A) 19.52(C) 19.52(G) 29.28(U)
	G.berkeleyi	527	160911	320399	49.91	49.91	147	116	123	140	27.89(A) 26.57(C) 23.34(G) 22.01(U)
	G.hacksi	498	152128	302856	49.00	51.00	134	110	117	137	26.91(A) 27.51(C) 23.49(G) 22.09(U)
	H.planktophilus	517	158455	314090	52.61	47.39	158	114	101	144	30.56(A) 27.85(C) 19.54(G) 22.05(U)
	P.koehleri	574	175406	348767	52.09	47.91	164	135	121	154	28.57(A) 26.83(C) 21.08(G) 23.52(U)
	S.bromophenolosus	454	137055	275445	57.49	42.51	127	134	111	82	27.97(A) 18.06(C) 24.45(G) 29.52(U)
	S.kowalevskyi	471	142024	285838	56.48	43.52	122	144	118	87	25.90(A) 18.47(C) 25.05(G) 30.57(U)
	Enteropneusta sp.	513	156590	311490	54.58	45.42	517	123	106	127	30.60(A) 24.76(C) 20.66(G) 23.98(U)
	P.flava	485	148262	294944	49.07	50.93	137	101	115	132	28.25(A) 27.22(C) 23.71(G) 20.82(U)
	Ptychoderidae .sp	384	117079	233538	48.96	51.04	108	80	99	97	28.13(A) 25.26(C) 25.78(G) 20.83(U)
	Torquaratoridae .sp	542	165179	328973	55.90	44.10	164	139	110	129	30.26(A) 23.80(C) 20.30(G) 25.65(U)
18S rRNA	*Arbacia sp.*	505	154003	307136	48.71	51.29	138	108	128	131	27.33(A) 25.94(C) 25.35(G) 21.39(U)

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	C.densus	1694	514515	1031910	42.74	57.26	370	354	526	444	21.84(A) 26.21(C) 31.05(G) 20.90(U)
	C.gracilis	1832	557262	1116734	40.01	59.44	377	356	580	509	20.58(A) 27.78(C) 31.66(G) 19.43(U)
	C.hodgsoni	1699	515914	1034958	42.73	57.27	370	356	530	443	21.78(A) 26.07(C) 31.19(G) 20.95(U)
	C.nigrescens	1695	514827	1032509	42.77	57.23	371	354	526	444	21.89(A) 26.19(C) 31.03(G) 20.88(U)
	E.rostrata	277	84464	168653	44.77	54.51	63	61	73	78	22.74(A) 28.16(C) 26.35(G) 22.02(U)
	G.berkeleyi	1653	501322	1005414	48.15	51.85	401	395	465	392	24.26(A) 23.71(C) 28.13(G) 23.90(U)
	G.hacksi	1730	524375	1051975	49.08	50.92	428	421	483	421	24.74(A) 23.01(C) 27.92(G) 24.34(U)
	G.minutus	1776	538706	1080142	48.42	51.58	433	427	494	422	24.38(A) 23.76(C) 27.82(G) 24.04(U)
	H.kupfferi	1808	548878	1100701	44.86	55.14	405	406	535	462	22.40(A) 25.55(C) 29.59(G) 22.46(U)
	H.planktophilus	1871	567869	1139108	44.68	55.32	417	419	559	476	22.29(A) 25.44(C) 29.88(G) 22.39(U)
	M.edulis	511	155238	310511	51.86	48.14	143	122	130	116	27.98(A) 22.70(C) 25.44(G) 23.87(U)
	M.psammophilus	1813	550327	1103749	44.84	55.16	407	406	539	461	22.45(A) 25.43(C) 29.73(G) 22.39(U)
	P.cinereus	1777	539946	1081302	46.60	53.40	425	403	499	450	23.92(A) 25.32(C) 28.08(G) 22.68(U)
	P.koehleri	1820	552649	1108063	44.67	55.33	408	405	539	468	22.42(A) 25.71(C) 29.62(G) 22.25(U)

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	S.bromophenolosus	1860	564364	1132243	45.22	54.78	415	426	550	469	22.31(A) 25.22(C) 29.57(G) 22.90(U)
	S.cambrensis	534	162438	325046	45.69	54.31	125	119	149	141	23.41(A) 26.40(C) 27.90(G) 22.28(U)
	S.kowalevskii	1818	551226	1106372	46.20	53.80	412	428	533	445	22.66(A) 24.48(C) 29.32(G) 23.54(U)
	Enteropneusta sp.	674	204699	410033	47.63	52.37	163	158	186	167	24.18(A) 24.78(C) 27.60(G) 23.44(U)
	B.carnosus	1696	541996	1087587	47.70	52.30	402	407	487	400	23.70(A) 23.58(C) 28.71(G) 24.00(U)
	P.bahamensis	1713	519540	1041990	47.87	52.13	415	405	486	407	24.23(A) 23.76(C) 28.37(G) 23.64(U)
	P.flava	1669	506339	1015463	47.03	52.97	396	389	479	405	23.73(A) 24.27(C) 28.70(G) 23.31(U)
	Ptychodera	1615	489679	982398	47.80	52.20	390	382	462	381	24.15(A) 23.59(C) 28.61(G) 23.65(U)
	R.normani	144	43844	87863	38.19	61.81	20	35	42	47	13.89(A) 32.64(C) 29.17(G) 24.31(U)
	Torquaratoridae .sp	1701	515743	1034796	47.50	52.50	401	407	486	407	23.57(A) 23.93(C) 28.57(G) 23.93(U)

IV. DISCUSSION

Hemichordates consist of two subgroups, pterobranchs and acorn worms or enteropneusts. Recent phylogenetic investigations using 18S rDNA and mitochondrial codon usage (Castresana et al., 1998) suggest contradictory morphological analyses (Peterson, 1994). Molecular data, by offering a phylogenetic analysis independent of the major developmental and morphological differences between phyla, could clarify deuterostome relationships. Molecular phylogenies based on a single or a few genes often lead to apparently conflicting signals (Jeffroy et al., 2006). Shared molecular genetic characteristics could provide excellent sources of phylogenetic information, particularly if they are conserved, complex and rare and are consequently unlikely to have arisen by chance convergence (Telford et al.,

2000). However, besides the sequence itself, genome-level features have been proposed as powerful phylogenetic characters (Boore et al., 2006). There are two major classes of Hemichordata according to molecular phylogeny, the solitary Enteropneusta and the colonial Pterobranchia, but 18S rDNA analyses suggest that the Enteropneusta are paraphyletic (Cameron et al. 2000). The Pterobranchia may be a sister-group to one of the enteropneust families, the Harrimaniidae, which have direct-developing larvae (Cameron et al. 2000). In the current study 5.8S, 16S and 18S were considered to infer evolutionary relationships among Hemichordates. The trees showed similar species clustered together but did not form distinct clades as per the previous studies and morphological similarities. The result also indicated that several species appear to be polyphyletic and several unrelated species appear to share the same clade. The nucleic acid composition also supported the phylogenetic inference in terms of molecular weight, percentage of AU, GC at individual species level.

V. CONCLUSION

Identification of unknown species by means of morphology only may result in unconvinced specimen identifications resulting in to false negatives or positives. In the current study the ribosomal RNA genes were preferred to inspect comprehensive phylogeny in Hemichordates. The relative study reveals ribosomal RNA genes seem to be phylogenetically informative at the species level. Phylogenetic trees were investigated by different methods to infer evolutionary relationships. The trees showed more or less similar species clustered together but did not form distinct clades as per their lifestyles and morphological similarities. The result also indicated that several species appear to be polyphyletic and several unrelated species appear to share the same clade. But still it can be assumed here that phylogenetic analyses using ribosomal RNA genes sequences could be a productive approach in understanding Hemichordates evolution. Some trees showed similar species remain clustered together with few alterations and this may be assumed by possible adaptive radiation or mutations.

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EFFECT OF CHLOR-ALKALI SOLID WASTE EFFLUENT ON CALORIC CONTENT IN GRAIN OF A LITTLE MILLET CROP

Paper ID	IJIFR/V4/ E2/ 021	Page No.	5104-5108	Subject Area	Botany
Keywords	Chlor-Alkali Factory, Solid Waste Effluent, Little Millet, Caloric Content, Grain				

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Abstract

The little millet (Panicum sumatrense Rath ex. Roem and Schult) crop variety SS. 81-1, exposed to chlor-alkali solid waste effluent @ 100 gm^{-2} (treatment - 1), 200 gm^{-2} (treatment - 2), 300 gm^{-2} (treatment - 3) and 400 gm^{-2} (treatment - 4) was studied in vivo at the Agriculture Research Station, Ankuspur in the District of Ganjam, Odisha at an interval of 15 days starting from 30 days after sowing (DAS) till harvest of the crop following the ICAR technology proposed by Seetharam (1994) with little modification depending upon the soil condition and climate of the locality. The method and formula as proposed by Leith (1975) were employed for the determination of caloric value of the material. Caloric content of grain in control and various treatments were determined. Very little or no increase in caloric value was observed from control to treatment - 1, 2 and then to treatment-3. Treatment-4 showed less caloric content than that of treatment -3. The caloric value of grain in control and all treatments showed high order of variation ($p \leq 0.001$). However, the ANOVA test for caloric values in the control, treatments - 1, 2 and 3 in grain did not show significant variation.

I. INTRODUCTION

The degradation of environment due to industrial waste threatens the survival of living beings. Literature available revealed mostly the adverse effects of chlor-alkali solid waste on algae (Mishra **et al**. 1985, 1986), on fish (Shaw **et al.** 1985) and on rice (Nanda **et al.** 1993, 1994, 1996, Behera **et al.** 1995). So far as the little millet crop is concerned, some work has been done by Indian Council of Agricultural Research (lCAR, 1992-93, 1993-94,

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1994-95, 1995-96 and 1996-97) under All India Coordinated Small Millet Improvement Project associated with various cooperative agencies for the development of crop productivity. However, no work has been done on the effect of chlor-alkali solid waste effluent on the caloric content of little millet crop. Therefore, in this investigation an attempt has been made to study the caloric content in grain of a little millet crop exposed to various concentration of chlor-alkali solid waste effluent.

II. STUDY SITE AND ENVIRONMENT

The experiment was conducted at the Agriculture Research Station (a Research farm of Orissa University of Agriculture and Technology, Bhubanswar, Odisha), Ankuspur (l9°46'N; 94°21'E) situated at a distance of about 25 km from the Bay of Bengal Coast, Odisha.The climate of the experimental site was monsoonal with three distinct seasons i.e. rainy (July to October), winter (November to February) and summer (March to June). Out of 863.65mm of rain recorded during the experimental year, a maximum of 28.8 per cent was observed in June. The mean minimum and mean maximum atmospheric temperature recorded during the year were found to be normal. The mean minimum temperature ranged from 15.4°C (December) to 26.13°C (May) whereas mean maximum showed a range of 27.6°C (December) to 37.81 °C (May).

The soil was found to be sandy (75%) and acidic (pH = 6.58) in nature. The phosphorus and potassium contents of the soil were high (i.e., 9.0 and 46.6 ppm respectively) whereas the amount of organic carbon (%) was very low (0.35%). The solid waste of chlor-alkali factory (M/s. Jayashree Chemicals) applied in the field soil was found to be alkaline (pH=8.06). Textural analysis showed almost nil of sand, silt and clay. The waste soil exhibited a medium range of phosphorus and potassium contents. The organic carbon (%) of the waste was of very low order (Barik, 2016).

III. MATERIALS AND METHODS

Twenty-five beds were prepared following the usual agricultural practice. Solid waste collected from the chlor-alkali factory was applied at the concentration of 100 g m^{-2}, 200 g m^{-2}, 300 g m^{-2} and 400 g $m^{-2}$and marked as treatment -1, 2, 3 and 4 respectively. The soil was mixed thoroughly in each bed and leveled. Five beds for each concentration and the control were maintained. ICAR technology proposed by Seetharam (1994) was employed for cropping with little modification depending upon the soil condition and climate of the locality. The sampling was made at an interval of 15 days starting with a 30 days period after sowing till the harvest of the crop.

The harvested plant samples i.e. fodder and grain were dried and powdered in a Willy Mill separately. These fine powdered materials (about 1g) were pressed to form pellets. Five replicates were taken from each control and treatment exposed to various concentration of solid waste effluent. The caloric value of the material was determined by igniting these pellets in a "Toshniwal" make Bomb Calorimeter following the method and formula given by Leith (1975).

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$$V = \frac{W\,(\Delta t - \Delta c)}{G}$$

Where, V = Calorific value of the biological material
W = Water value of the instrument
t = Corrected temperature difference reading at the Beckmann thermometer before and after burning
c = Correction value for the ignition wire
G = Sample dry weight.

IV. RESULTS

Caloric content of grain in control, treatments - 1, 2, 3 and 4 are presented in Table –1. Very little or no increase in caloric value was observed from control to treatments – 1, treatment - 2 and then to treatment - 3. Treatment .- 4 showed less caloric content than that of treatment - 3, even the value was found to be less than that observed in the control. The trend of caloric content i.e. control < treatment - 1 < treatment - 2 < treatment - 3 was most probably due to the influence of solid waste. The decrease in caloric content in treatment - 4, was perhaps, due to the adverse effect of solid waste. The concentration of solid waste applied in treatment - 4 might have been higher than the tolerance limit of the crop.

V. DISCUSSION

Compared to rice (Parijat and Mashuri varieties), the caloric content of present study showed greater variation (Table -2). The caloric value of grain exhibited higher value than that of Mashuri and less compared to Parijat of rice. ANOVA test (Table -3) relating to grain in the control and 4 treatments showed high amount of differences (0.00lp). However, the ANOVA test for control, treatments - 1, 2 and 3 caloric values of grain did not show significant variation. The results, thus, revealed that the solid waste in treatment - 4 might be higher than the crop tolerance limit. Besides, the soil characteristics, soil amendment practices with modern improved technology, precipitation, atmospheric temperature and relative humidity do play vital role in variation of caloric content in grain.

Table – 1. Caloric values (Cal g^{-1} dry wt.) in grain of a little millet crop (*P. sumatrense*) in control and various treatments exposed to chlor-alkali solid waste at harvest (values are in mean ± SD, n = 5 each)

Variable	Grain
Control	4280.287 ± 1.959
Treatment - 1	4280.843 ± 2.209
Treatment - 2	4281.429 ± 2.245
Treatment - 3	4281.685 ± 2.035
Treatment - 4	4146.370 ± 4.890

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Table – 2: Caloric value in grain of some crop ecosystem at harvest

Sources	Crop	Variety		Grain
Patnaik(1982)	Rice	Parijat	a	4992.63
			b	5580.00
		Mashuri	a	3452.63
			b	3348.00
This study	Little millet	SS. 81-1	c	4280.29
			d	4280.84
			e	4281.43
			f	4281.68
			g	4146.37

a = without fertilizer, b = with fertilizer, c = control, d = treatment – 1, e = treatment – 2, f = treatment – 3 and g = treatment – 4 (treatment – 1,2,3, and 4 are exposed to chlor-alkali solid waste).

Table – 3: Variance analysis of caloric value in grain of a little millet crop (*P. sumatrense*) showing the variance ratio (F), the least significant differences (LSD) and the significant level (p) in control and various treatments exposed to chlor-alkali solid waste effluent.

Compartment	Contrl with treatment – 1,2,3 and 4 (n = 25)	Contrl with treatment – 1,2 and 3 (n = 20)
Grain	F = 2300.342 *** LSD = 3.766	F = 0.363 (NS)

****** ≤ 0.001, NS = Not Significant***

VI. CONCLUSION

In this investigation the caloric value in grain of little millet crop showed very little fluctuation following the trend, control < treatment-1 < treatment-2 < treatment-3 > treatment-4. The rain fall at the early stage of growth could perhaps have diluted the waste soil concentration as a result of which an increasing trend in caloric value was obtained from control to treatment-1, treatment-2 and then to treatment-3. Treatment-4 showed less caloric content compared to treatment-3. This might be due to the influence of waste soil concentration in soil. It reveled that the chlor-alkali solid waste effluent applied in treatment-4 might be higher then the tolerance limit of the crop. However, this concentration of chlor-alkali solid waste applied in the field would vary from place to place and also from crop to crop because of climatic variation of the place and also the genetic setup of the crop. Soil quality and the soil amendment practices with modern improved technology also play vital role in detoxification of the waste soil concentration applied in the field.

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VIII. REFERENCES

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ENHANCED SIGMA-DELTA MODULATOR FOR WEARABLE WIRELESS RECEIVERS

Paper ID	IJIFR/V4/ E2/ 016	Page No.	5109-5115	Subject Area	Elect. & Comm. Engineering
Keywords	Modulator, Quantizer, OSR, Wireless Body Area Network , WiMAX				

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Abstract

The demand for new bio instruments requiring higher capacities, data rates and different operating modes have motivated the development of new generation multi-standard wireless transceivers. In multi-standard design, sigma-delta based ADC is one of the most fashionable choices. A reconfigurable cascade sigma delta modulator has been presented on the system level. The modulator was based on single-bit quantizers and utilized feed-forward path to increase the dynamic range. The double-sampling technique was adopted to improve the over-sampling ratio (OSR) over a wide bandwidth range. The loop order and OSR were reconfigurable to meet the requirements of a wide range of standards. The modulator performance were modeled and analyzed in MATLAB/ SIMULINK for Global System for Mobile Communications (GSM) / Bluetooth / Wireless Body Area Network (WBAN) communication standards. The proposed modulator fulfills the performance requirements of biological devices.

I. INTRODUCTION

In the modern world, people are interested in using 4G wireless network. 4G is described as MAGIC — Mobile multimedia, anytime anywhere, Global mobility support, integrated

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wireless solution, and customized personal service. In telephony, 4G is the fourth generation of cellular wireless standards. It is a successor to 3G and 2G families of standards. A 4G system is expected to provide a comprehensive and secure all-IP based solution where facilities such as ultra-broadband (giga-bit speed such as 100+ MiB/s) Internet access, IP telephony, gaming services, and streamed multimedia may be provided to users.

In this paper, the design approach of a multi-mode sigma delta modulator for 4G mobile standard was proposed .A sigma delta modulator was presented to meet the requirements of GSM/ Bluetooth /GPS /WBAN communication standards. The topology was based on 2-1-1 cascade sigma delta modulator with feed-forward paths. The double-sampling technique was employed to improve the OSR and the resolution of quantizers. The topology improves the order programmability and decreases the circuit's complexity.

II. DELTA MODULATOR

Delta modulation (DM) is an analog-to-digital and digital-to-analog signal conversion technique used for transmission of voice information where quality is not of primary importance. DM is the simplest form of differential pulse-code modulation (DPCM) where the difference between successive samples is encoded into n-bit data streams. In delta modulation, the transmitted data is reduced to a 1-bit data stream.

To achieve high signal-to-noise ratio, delta modulation must use oversampling techniques, that is, the analog signal is sampled at a rate several times higher than the Nyquist rate. Derived forms of delta modulation are continuously variable slope delta modulation, delta-sigma modulation, and differential modulation. The Differential Pulse Code Modulation is the super set of DM.

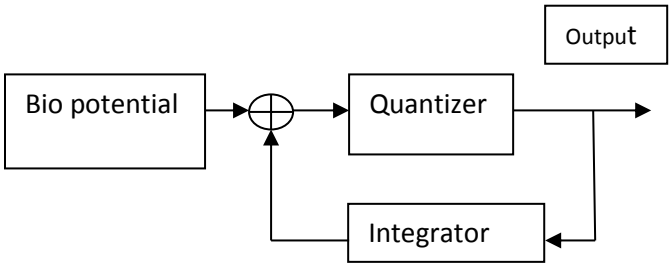

Figure 1: Delta Modulator

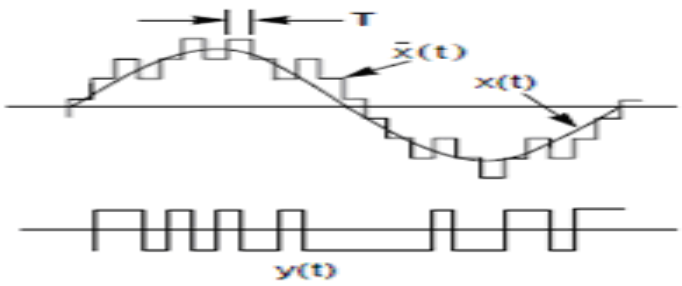

Figure 2: Modulated Signal

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The predicted signal is smoothed with a low pass filter. Delta modulators, furthermore, exhibit slope overload for rapidly rising input signals, and their performance is thus dependent on the frequency of the input signal. the spectrum of quantization noise of the prediction error is flat and the noise level is set by the 1-bit comparator. The signal-to-noise ratio can be enhanced by decimation processes.

Figure 3: Demodulator

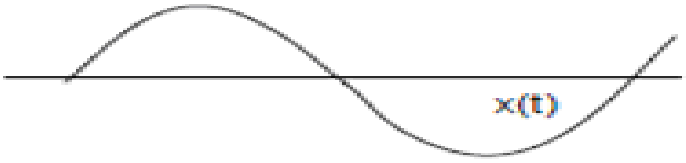

Figure 4: Demodulated Signal

In delta modulation there is no restriction on the amplitude of the signal waveform, because the number of levels is not fixed. On the other hand, there is a limitation on the slope of the signal waveform which must be observed if slope overload is to be avoided. However, if the signal waveform changes slowly, there is nominally no limit to the signal power which may be transmitted.

III. SIGMA-DELTA MODULATOR

Sigma-delta modulation (SDM) was developed in 1960s to overcome the limitations of delta modulation. Sigma-delta systems quantize the delta (difference) between the current signal and the sigma (sum) of the previous difference. An integrator is placed at the input to the quantizer; signal amplitude is constant with increasing frequency; thus SDM is also known as pulse density modulation (PDM). Like PCM, SDM quantizes the signal directly, and not its derivative as in DM. Thus the maximum quantizer range is determined by the maximum signal amplitude and is not dependent on signal spectrum.

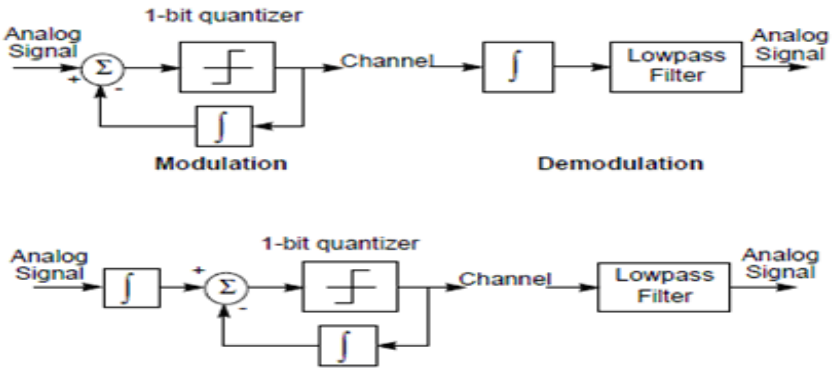

Figure 5: Sigma Delta Modulator

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A first-order (single integration) sigma-delta modulation encoder is shown in Figure.5; the input to the quantizer is the integral of the difference between the input and the quantized output. The difference between the input signal and the output signal approaches zero; the average value of the clocked output tracks the input. There is little dc error in the output signal; the frequency spectrum of the quantizing error rises with increasing frequency (6 dB/octave). The integrator forms a low pass filter on the difference signal thus providing low frequency feedback around the quantizer. This feedback results in a reduction of quantization noise at low (in-band) frequencies. Unlike PCM and DM, the noise is not white, but shaped by a first-order high pass characteristic.

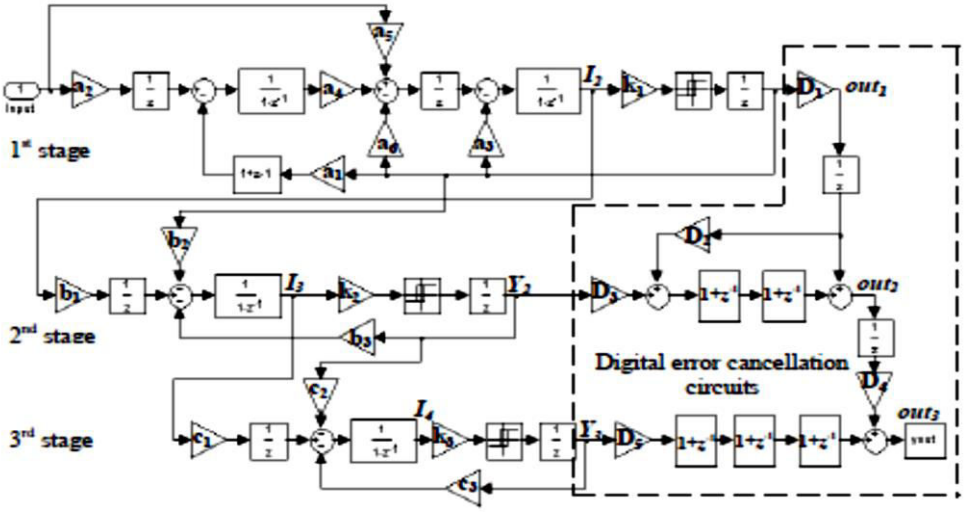

Figure 6: Proposed Multimode Sigma Delta Modulator

IV. PROPOSED MODULAR TOPOLOGY

4.1 GSM Mode:

GSM (Global System for Mobile Communications) is the most popular standard for mobile telephony systems in the world. The GSM Association, its promoting industry trade organization of mobile phone carrier. This ubiquity means that subscribers can use their phones throughout the world, enabled by international roaming arrangements between mobile network operators. GSM differs from its predecessor technologies in that both signaling and speech channels are digital. This also facilitates the wide-spread implementation of data communication applications into the system

4.2 Bluetooth Mode:

Bluetooth is an open wireless technology standard for exchanging data over short distances (using short wavelength radio transmissions) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. It was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Today Bluetooth is managed by the Bluetooth Special Interest Group. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each) in the range

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2402-2480 MHz. This range is in the globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency band.

4.3 GPS and WCDMA mode

GPS is considered a dual-use technology, meaning it has significant military and civilian applications.GPS has become a widely used and useful tool for commerce, scientific uses, tracking and surveillance. GPS's accurate timing facilitates everyday activities such as banking, mobile phone operations, and even the control of power grids. Farmers, surveyors, geologists and countless others perform their work more efficiently, safely, economically, and accurately.

WCDMA air interface, referred also as UMTS terrestrial radio access (UTRA), developed by the third-generation partnership project (3GPP). WCDMA has two modes characterized by the duplex method: FDD (frequency division duplex) and TDD (time division duplex), for operating with paired and unpaired bands, respectively. For the channel coding three options are supported: convolutional coding, turbo coding, or no channel coding. Channel coding selection is indicated by upper layers. Bit interleaving is used to randomize transmission errors. The modulation scheme is QPSK.

The output of the second quantizer is given by:

$$Y_2(z)=\frac{B}{D_1}z^{-3}V_{in}(z)+Bz^{-2}(1-z^{-1})^2Q_1(z)-\frac{2a_6b_1}{b_3}z^{-2}Q_1(z)+z^{-1}(1-z^{-1})Q_2(z)$$

$$B=\frac{2a_6b_1}{b_3}-\frac{b_2}{b_3},$$

Where,Q2 (*z*) is the quantization error of the 2nd stage.

The output of the 2nd stage is:

$$out_2(z)=STF_2(z)V_{in}(z)+p_2(z)Q_2(z)$$

$$\text{Where}\quad STF_2(z)=\frac{2a_6b_1D_3}{b_3D_1}z^{-3}$$

$$p_2(z)=D_3z^{-1}(1-z^{-1})^3$$

The output of 2nd stage can be reduced as $2a6b1D3 = b3D1$, $D2 = -D3B / D1$ are satisfied.

$$out_2(z)=z^{-3}V_{in}(z)+D_3z^{-1}(1-z^{-1})^3Q_2(z)$$

In the conventional cascade modulator structure, there is no the D2 branch. Introducing D2 branch can improve the freedom of b1 and b2 effectively, which enhances the modulator's performance.

4.4 WLAN and WiMAX mode

WLAN: IEEE 802.11 is a set of standards carrying out wireless local area network (WLAN) computer communication in the 2.4, 3.6 and 5 GHz frequency bands. They are created and maintained by the IEEE LAN/MAN Standards Committee (IEEE 802). The base current version of the standard is IEEE 802.11-2007.The 802.11 family includes over-the-air modulation techniques that use the same basic protocol. The most popular are those defined by the 802.11b and 802.11g protocols, which are amendments to the original

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standard. The segment of the radio frequency spectrum used by 802.11 varies between countries.

WiMAX (Worldwide Interoperability for Microwave Access) is a telecommunications protocol that provides fixed and fully mobile Internet access. The current WiMAX revision provides up to 40 Mbit/s with the IEEE 802.16m update expected to offer up to 1 Gbit/s fixed speeds. The name "WiMAX" was created by the WiMAX Forum, which was formed in June 2001 to promote conformity and interoperability of the standard. The forum describes WiMAX as "a standards-based technology enabling the delivery of last mile wireless broadband access as an alternative to cable and DSL".

The output of the 3rd quantizer can be denoted as:

$$Y_3(z) = STF_3(z)V_{in}(z) + p_3(z)Q_1(z) + p_4(z)Q_2(z) + p_5(z)Q_3(z)$$

Where $Q3$ (z) is the quantization error of the 3rd stage.

$$STF_3(z) = \frac{B(b_3c_1 - c_2)}{c_3D_1}z^{-4}$$

$$p_3(z) = \frac{B}{c_3}(-c_2 + b_3c_1)z^{-3}(1-z^{-1})^2 + \frac{2a_6b_1}{c_3}(\frac{c_2}{b_3} - c_1)z^{-3}$$

$$p_4(z) = -\frac{c_2}{c_3}z^{-2} + \frac{c_2 - c_1b_3}{c_3}z^{-3}$$

$$p_5(z) = z^{-1}(1-z^{-1})$$

Under the conditions $c2 = c1b3$, formula can be simplified as:

$$Y_3(z) = -\frac{c2}{c3}z^{-2}Q_2(z) + z^{-1}(1-z^{-1})Q_3(z)$$

The output of the 3rd stage can be expressed as:

$$out_3(z) = \frac{2a_6b_1D_4D_5}{b_3D_1}z^{-4}V_{in}(z) + D_5z^{-1}(1-z^{-1})^4Q_3(z)$$

where $D_4 = \frac{c_2}{c_3}$, $D_5 = D_3$.

V. ANALYTICAL RESULT

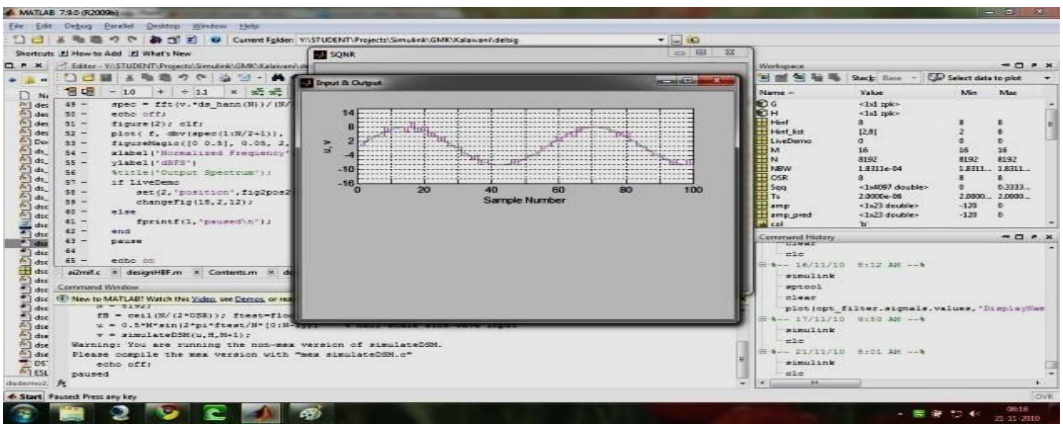

Figure 8: Sigma Delta Modulator output

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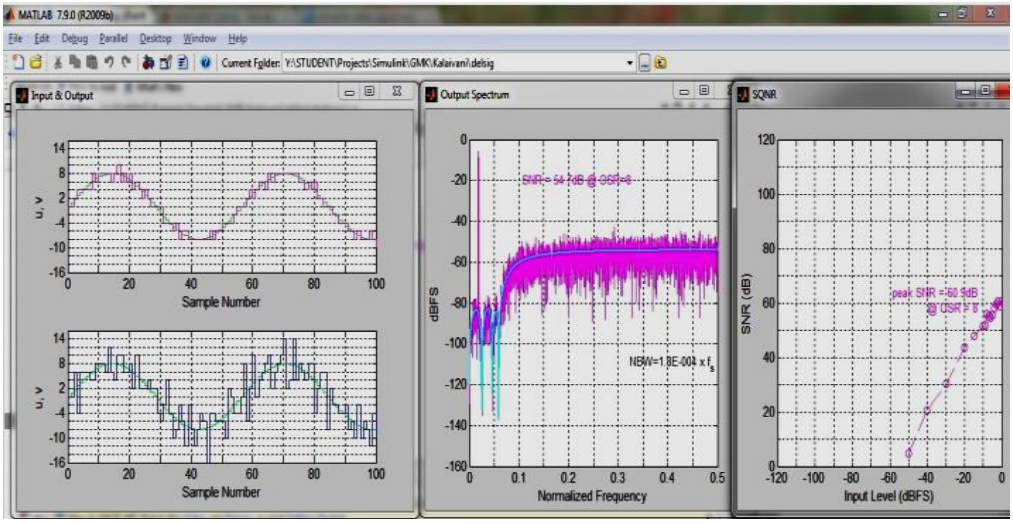

Figure 9: Sigma Delta Modulator Output

VI . CONCLUSION AND FUTURE WORK

The design approach of a multi-mode sigma delta modulator for 4G mobile terminals is proposed on the system level. The reconfigurable modulator adopts a cascade 2-1-1 double-sampling single-bit topology with a feed-forward path. The topology improves the order programmability and decreases the circuit's complexity. The non-ideality analysis validates the efficiency of the proposed topology and the feasibility of the circuit realization. The simulation results meet the requirements of 4G mobile communication standards.

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EFFECTS OF EDUCATING THE ADOLESCENT GIRLS IN THE RURAL SCHOOLS ABOUT ANAEMIA THROUGH AUDIO-VISUAL AIDS

Paper ID	IJIFR/V4/ E2/ 019	Page No.	5116-5123	Subject Area	Education
Keywords	Teaching –Learning Process, Teaching Anaemia, Communication, Audio-Visual Aids				

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3rd	Dr.S.Rjaguru	Associate Professor, SRKVidyalaya College Of Education, Coimbatore-Tamilnadu
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Abstract

the study emphasises the importance of teaching –learning process through Audio-visual aids in teaching anaemia and the importance, need to undergo treatment, medicines to the girls who have reached the adolescence. Teaching is generally known as a communication between two or more persons who influence by their ideas and learn something in the process of interaction (Philip Barker 1985).Here the investigators putforth their efforts to find out the effects of teaching anaemia through audio-visual aids rather than mere teaching by conventional method." A teacher can no more teaches unless someone learns than a seller can sell unless someone buys (Dewey1972). Actually teaching narrowly means the art of instruction in the educational institutions. It is a direct interaction between the teacher and the learners. Collectively teaching is a multiple capability of administering and executing the various techniques of being understood an idea or a concept by others.

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I. INTRODUCTION

Education is a term derived from two latin words "edu" and "carae" which mean "To bring up". Dictionary of behavioural science says "Education is a progressive change of a person affecting knowledge, attitude and behaviour as a result of formal instruction and study" John Dewey beautifully described, "Education is a constant organising or reorganising of experiences". Generally the educators felt that education is a way of development of desirable habits, skills and attitudes which create a person to be a better citizen of a nation. Education is a process by which a human being develops and enhances himself/herself from inexplicable imagination and inherent folly to enthralling and enlightening intelligence and wisdom. Diver correctly quoted, "Education is concerned with transmitting something that is worthwhile."

Life is actually involved with constant and continuous modification of experiences. Here the humans` personal ideas, changes, attitudes and skills have to meet alteration. Education is the process of helping the child to adjust to the revolving spheroid. The aim of education mainly emphasises on the psycho-physical growth and development of the individual.

II. VARIOUS INSTRUCTIONAL STRATEGIES

Considering India in rural areas, two educational methodologies are well known in schooling.i.e; (i) conventional teaching methodology viz; lecturing, chalk and talk method and (ii) Assisted instruction with audiovisual aids viz; projector, smart class room, CC TV etc.In conventional methodology the educationists feel that the teachers are usually not sure about that students psychological effect of receiving or feeling difficult in understanding the concept which is being taught. Any device that is helpful to hear and see known as audio-visual aids. By teaching audio-visual the learning is facilitated, sensed and understood effectively. This has been felt by the students usually it is felt that the 2D/3D teaching aids are highly useful in teaching-learning process. Teaching Aids help to stimulate, motivate and classify the facts, concepts which are being educated. Nowadays we can simply understand that an outstanding development in the field education especially in science is due to the increased use of audio-visual aids. Educational technology is also widely applied in the process of 'Teaching-Learning`.

(i) Need of audio-visual aids

For communicating an idea, experience on technology the teacher uses audio-visual aids as they help to communicate the concept effectively and efficiently. The visual or the screen along with the sound, make the listeners mentally free and stimulate with a situation nearest to the reality and readily gets that idea exactly. Audiovisual aids motivate highly the children.

(ii) Importance of audio-visual aids

The audio-visual aids help to make out the meaning of spoken words clear as the ideas on information put across through more than one sense.

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III. STATEMENT OF THE STUDY

To understand the value on the utilisation of the audio-visual aids in teaching anaemia, treatment and medical care regarding to the adolescent girls rather than the conventional teaching the investigators have taken up this task of exhibiting the " Effects of educating the adolescent girls in rural schools about anaemia through audio-visual aids". It focuses the valuable effects in understanding anaemia and on treatment with regard to that by the rural adolescent girls.

(i) Anaemia

Anaemia is the most common in all the groups of adolescence girls to the tune of 20-25% irrespective of the social class. Angular stomatitis and glossitis are more common in poor classes because of the poor quality of food items. It is common in poor class since the intake food is poor mainly due to the non reliability of healthy food. In higher classes personal likes, dislikes and food taboos lead to anaemic. Supplementation of iron to mothers to be is the rational way to combat anaemia.Red blood cells or RBCS are formed in the body`s bone narrow and act like boats ferrying oxygen throughout the rivers of the blood stream. The various anaemia may be classified in the following simplified fashion (i)anaemia caused by blood loss, (ii) anaemia caused by excessive destruction of erythrocytes, (iii) anaemia due to impaired production of erythrocytes.Anaemia is widespread more among females than males and higher among infants, children and adults. According to the National Institute of Nutrition (1991), anaemia is found mostly common in all the groups of adolescent girls to the tune of 25% irrespective of social class.

IV. OBJECTIVES OF THE STUDY

i) To find out the effectiveness of audiovisual aids assisted teaching anaemia to the 9 or 10th standard studying girls.

ii) To compare the effectiveness of teaching through audio-visual aids and that of conventional methodology on the achievement in teaching anaemia to the adolescent girls.

iii) To find out the difference in the post-test between the control group and the experimental group

V. HYPOTHESES OF THE STUDY

i.) There is no significant difference among the rural adolescent girls in learning about anaemia through the traditional methodology and through audio-visual aids.

ii.) There is no significant difference between the pre-test and post-test of the controlled group

iii.) There is no significant difference between the pre-test and post-test of the experimental group.

iv.) There is no significant difference between the performance of the control group in the pre-test and post-test of the control group.

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VI. METHODOLOGY

This study is an experiment. It is based on the pre-test, post-test groups design. Five units of anaemia and the food items (schedule) to rectify it were taught to the control group through conventional technology and the experimental group through audio-visual aids assisted methodology for the control group consisting of 40 girls and the experimental group 40 girls are selected for the study.

6.1 Sample

For this research work the selected sample is of two groups of adolescent girls in rural schools who are studying 9/10th standard bifurcated as control group and experimental group.

6.2 Tools used for the study

The present study needs Hb (Haenogolobin) level test, a pre-test and post-test to evaluate the students. These tests were structured and validated against a sample of adolescent girls studying 9/10th standard before.

The following tests were structured and validated by the investigators for the present study.

- Haemoglobin level test
- Pre test for five units (unit wise)
- Post test for five units (unit wise)

6.3 Administering the tests/Data Gathering Procedure

The present study is an experiment. It is based on the Pre-test, Post-test equivalent group design. Five units of anaemia and the food schedule to rectify it were taught to control group through conventional (oral) method and to the experimental group through Audio-visual assisted learning.First of all the investigators conducted the haemoglobin test and according to the Hb level, the students were in the ascending order, then they were divided into control and experimental groups alternatively. By teaching the five units one by one for one hour Pre-test and post test was conducted. The time schedule for each test was 30 minutes. Thus for 5 units both control and experimental groups underwent the test (Pre-test and Post test).

6.4 Statistical techniques adopted

In this study, the investigators calculated the mean and standard deviation to understand the distribution of the different test scores. He used differential statistics‘t’ test for studying the differences between the means of the groups considered for the study.

VII. STATISTICAL ANALYSIS AND INTERPRETATION

Pre-Test Performance

After administering the pre-test the mean scores and the standard deviations of the control and experimental groups were calculated. Applying the `t` test to calculate the significant difference between the control and experiment groups.

Table 1: `t` test to calculate the significant difference between the control and experiment groups

S.No.	Unit	N	Types of GP	Mean	S.D	‘t’ value

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1	I	40	EXP	1.05	0.98	0.14 @
		40	CONT	1.08	0.83	
2	II	40	EXP	1.31	1.17	2.19 **
		40	CONT	1.73	0.84	
3	III	40	EXP	1.31	0.96	0.13@
		40	CONT	1.29	1.11	
4	IV	40	EXP	1.16	0.92	2.08**
		40	CONT	1.54	0.97	
5	V	40	EXP	1.15	1.08	0.67 @
		40	CONT	1.29	0.98	

***** denotes significant difference at 0.01 level.***
@ denotes no significance at 0.01 level.

It is evident that there is no significant difference between the mean achievement scores of the pre-test of the two groups in units I,III and V whereas there is significant difference in units II and IV and it is also noted that the controlled group has shown better performance than the experimental group.

Here the null hypothesis" there will not be significant difference between the pre-test scores of the control and experimental groups is partly accepted.

Table-2: Experimental vs Control group-Post test

S.No.	Unit	N	Types of GP	Mean	S.D	't' value
1	I	40	EXP	8.65	0.68	24.14 **
		40	CONT	4.60	0.80	
2	II	40	EXP	8.71	0.61	32.79 **
		40	CONT	4.53	0.68	
3	III	40	EXP	8.93	0.76	33.07**
		40	CONT	4.53	0.61	
4	IV	40	EXP	8.73	0.72	25.40**
		40	CONT	4.28	0.77	
5	V	40	EXP	8.75	0.78	27.34**
		40	CONT	4.79	0.68	

** denotes significance at 0.01 level.

From the table it is understood that there is significant difference between Control group and experimental group in the mean scores in unit test at 0.01 level. It reveals that the difference falls in favour of the experimental group and it can be seen that the experimental group scores better than the control group in the post test.

Table-3:Pre-test VS Post-test(Control group)

S.No.	Unit	N	Test	Mean	S.D	't' value
1	I	40	Pre	1.05	0.83	17.41**
		40	Post	4.58	0.78	
2	II	40	Pre	1.71	0.84	14.99 **
		40	Post	4.53	0.68	
3	III	40	Pre	1.31	1.11	18.20 **
		40	Post	4.52	0.61	
4	IV	40	Pre	1.56	0.92	14.39**

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		40	Post	4.28	0.67	
5	V	40	Pre	1.25	1.02	17.72 **
		40	Post	4.72	0.63	

***** denotes significance at 0.01 level.***

From this table it is understood that there is significant difference between the pre-test and post-test scores of the control group. Here also the post-test scores show a better record than the pre-test. Here also the hypothesis "there will be no significant difference between the pre-test and post-test of the control group" is rejected.

Table-4: Pre-test VS Post-test(experimental group)

S.No.	Unit	N	Tests	Mean	S.D	't' value
1	I	40	Pre	1.05	0.99	47.70**
		40	Post	8.65	0.66	
2	II	40	Pre	1.30	1.16	35.55 **
		40	Post	8.70	0.61	
3	III	40	Pre	1.28	0.96	42.27**
		40	Post	8.93	0.73	
4	IV	40	Pre	1.15	0.92	43.29**
		40	Post	8.73	0.72	
5	V	40	Pre	1.13	1.07	36.77**
		40	Post	8.83	0.55	

***** denotes significant difference at 0.01 level.***

This table also inferred that there is a significant difference between the Pre-test and post test scores of the experimental group. The Post test scores are here also higher than the Pre-test scores. So that the null hypothesis "There will not be a significant difference between the Pre-test and Post test of the experimental group.

Table-5 Experimental vs Control (Haemoglobin)

S.No.	N	Variables	Mean	S.D	't' value
1	40	EXP	54.08	6.23	2.88 @
2	40	CONT	53.70	6.27	

@ denotes no significant difference at 0.01 level.

Here we realize that there is no significant difference between the experimental group and the control group in the pre-test examining haemoglobin level.

Table-6: Experimental vs Control (Haemoglobin)

S.No.	N	Variables	Mean	S.D	't' value
1	40	EXP	53.88	6.29	37.37 **level.
2	40	CONT	66.20	5.07	

***** denotes significant difference at 0.01***

Here we understand that there is significant difference between the experimental group and control group in the post-test examining haemoglobin level. Here the null hypothesis "There will be no significant difference between the control group and the experimental group in the post test" is rejected.

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VIII. FINDINGS

There are significant differences in the post test performance scores between the control and the experiment groups. This strongly favours the activity based teaching. The audio-visual aids assisted teaching-learning process is more effective than the conventional method of teaching in health education to the adolescent girls in the rural schools.

It comes to understand that the post test scores show better results than the pre-test scores ie; the girls understood the concept of health education and anaemia only receiving the instructions, elaborations through audio-visual aids. The education through audio-visual aids about the causes of anaemia and the precautions to be taken to prevent it received a highly positive effect among the students. When the adolescent girls were taught with pictures about it and audio-visual aids, they received better visualisation and ideas on the ways to prevent anaemia.

IX. RECOMMENDATIONS

1) Since audio-visual education has proved its effectiveness in teaching health education (especially on Anaemia) the adolescent girls should be motivated to follow the medical tips given to prevent anaemia.
2) Every school has to provide a period per week for health education through Audio-Visual aids.
3) The students should have developed a complete knowledge on vitamins and vitamin deficiencies.

X. CONCLUSION

Nowadays it is gradually proved in many fields that the innovative techniques and the technological innovations make many things easier and easily reachable to the public. Many studies have also proved that the teaching-learning process is more valuable and easier when it is through Audio-Visual aids, Smart class room, CCTV etc.

From this research it is well understood that the health education through Audio-Visual aids yielded better results than through conventional (chalk and talk) method ,logy for the adolescent people it is of vital importance to provide health education in all the schools for any diseases viz; heart attacks, diabetics,anaemia etc; National policy on education gives much importance to women's literacy. So that this kind of health education to the women has to be imported in regular intervals through Audio-visual aids.

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EFFECT OF SCIENTIFIC TEMPER, CRITICAL THINKING AND SELECTED BACKGROUND VARIABLES ON PERSONALITY OF TEACHER EDUCATORS

Paper ID	IJIFR/V4/ E2/ 020	Page No.	5124-5132	Subject Area	Education
Keywords	Personality, Critical Thinking, Scientific Temper, Effect				

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Abstract

the study emphasises the importance of teaching –learning process through Audio-visual aids in teaching anaemia and the importance, need to undergo treatment, medicines to the girls who have reached the adolescence. Teaching is generally known as a communication between two or more persons who influence by their ideas and learn something in the process of interaction (Philip Barker 1985).Here the investigators putforth their efforts to find out the effects of teaching anaemia through audio-visual aids rather than mere teaching by conventional method." A teacher can no more teaches unless someone learns than a seller can sell unless someone buys (Dewey1972). Actually teaching narrowly means the art of instruction in the educational institutions. It is a direct interaction between the teacher and the learners. Collectively teaching is a multiple capability of administering and executing the various techniques of being understood an idea or a concept by others.

I. INTRODUCTION

Psychologically, personality is all that a person is. It is the totality of his being and includes his physical, mental, emotional and temperamental make-up. His experience, perception, memory, imagination, instincts, habits, thoughts and sentiments constitute his personality. A child tends to exhibit a variety of characteristics in his relations with others, to the extent that there is unity of response he is displaying in his personality.

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Teacher has a role as an instructor, as a scholar, as a pedagogue, as a trainer, as an educator, as stimulator and as a guide for the students It is an established fact that teacher's qualities, personality, character help the pupils to become good human beings thereby, contribute in building a knowledgeable and coherent society. The personality of a teacher plays vital role in teaching-learning process. Many factors effects on personality of teacher among them Scientific Temper, critical thinking, interest, job satisfaction, good mental health In this study I mainly analyzed the effects of the factors Scientific Temper, Critical Thinking on Personality of Teacher Educators of TEIs.

1.1 Definitions of the key terms used:

a) Personality:

Personality refers to individual differences in characteristic patterns of thinking, feeling and behaving. The study of personality focuses on two broad areas: One is understanding individual differences in particular personality characteristics, such as sociability or irritability. The other understands how the various parts of a person come together as a whole. In the present study I analyzed the personality of Teacher educators of TEIs and the factors effecting on

b) Critical thinking:

We can say that critical thinking to be purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteria or contextual considerations upon which that judgment is based. Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one's personal and civic life. Critical thinking is "the reasoned judgment of information and ideas. In the present study I analysed the effect of critical thinking on personality of Teacher educators of TEIs.

c) Scientific temper:

Scientific Temper describes an attitude which involves the application of logic and the avoidance of bias and preconceived notions. Discussion, argument and analysis are vital parts of scientific temper. Scientific temper influence on the Teacher educator towards their personality because it is an attitude, way of living which would involve objective observation, rational analysis and healthy skepticism and also other attributes like honesty, truthfulness, humility, positive approach to failure are some of the essential universal human values.

d) Teacher educators:

In this study, teacher educators refer to the teachers who are teaching in Government, Government Aided and Self-financed teacher education institutions/Colleges.

II. OBJECTIVES OF THE STUDY

Keeping the above said theoretical background in view the present study was taken up to study the personality dimensions of the teacher educators of TEIs of Hyderabad Karnataka Region with the following objectives.

1. To see the relationship and difference if any, between the personality and the selected

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background variables.

2. To see the relationship and difference if any, between the personality and the critical thinking.
3. To see the relationship and difference if any, between the personality and the scientific temper.

III. HYPOTHESIS

1. $H_0$1: There is no significant difference between male and female teacher educators in their personality.
2. $H_0$2: There is no significant difference between rural and urban TEI's Teacher educators in their personality.
3. $H_0$3: There is no significant difference between Science and arts teacher educators in their personality.
4. $H_0$4: There is no significant difference between more and less experienced teacher educators in their personality.
5. $H_0$5: There is significant difference between Scientific Temper and personality of teacher educators.
6. $H_0$6: There is significant difference between critical thinking and personality of teacher educators.
7. H_o7: There is no significant difference among Scientific Temper, Critical Thinking and Personality variables of teacher educators working in teacher education institutions.
8. H_o8: There is no significant relationship among Scientific Temper, Critical Thinking and Personality variables of teacher educators working in teacher education institutions.

IV. METHODOLOGY

4.1. Population:

All the Teacher Education Institutions (B.Ed. Colleges) i.e. Government, Government aided and Self-financed institutions/colleges existing in the Hyderabad Karnataka region (Bidar, Gulbarga, Yadgir, Raichur, Koppal, and Bellary districts) constituted the population of the present study.

4.2. Sample:

The sample of the study comprised of 1000 teacher educators drawn from Government and Self-financed teacher education institutions of Hyderabad Karnataka region. A list of B. Ed. Colleges (Government/ Government Aided and Self-financed institutions) was obtained from the National Council for Teacher Education, S.R.C., Bangalore. All the Government and Government Aided colleges were included in the sample whereas the data from Self-financed colleges was collected from those colleges which were situated in the same district where the Government/Government Aided Colleges are situated. Thus, a sample of 1000 teacher educators constituted the final sample of the study. The sample from all the colleges was collected randomly in such a way that each district was given equal representation. All these colleges ware affiliated to the

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Gulbarga University, Gulbarga or Karnataka State Woman's University, Bijapur or Sri Krishnadevaraya University, Bellary.

4.3. Tools Used:

i) **General Information:** Relating to (a) Teacher educators gender, b) Subject, c) locality of college and d) experience information.

ii) **Personality:** Wide ranges of personality that relate to teacher educators were measured by using the Differential Personality Inventory (DPI) developed by Aashish Kumar Singh and Arun Kumar Singh was used for this purpose.

iii) **Scientific Temper:** To measure the Scientific Temper, Scientific Temper Scale developed by Dr. Smt. Leela Pradhan (2012) was used.

iv) **Critical Thinking:** To measure the Critical Thinking Inventory developed by Porgio and Rani, (2010) was used.

4.4. Procedure for data collection:

The Teacher educators were asked to be free and frank while giving responses clearly. All four scales were administered to the randomly selected sample of 1000 Teacher educators of TEI in six districts. The personal data of the teacher educators including their gender, locality of the college, type of college, status of college, nature of college, district and subject they are dealing, also collected.

4.5. Analysis of Data:

The data thus obtained was scored and analyzed in the following manner.

i.) The personality measures were arranged in mean distribution across gender, experience, locale and subject teacher educators dealing and discussed. Comparing each age and gender means with that of the test manual's description of their corresponding standard means for each gender, experience, locale and subject teacher educators dealing.

ii.) Simple linear correlations and F value were computed in order to understand the relationship and difference of the selected personal social variables with the teacher educator's personality.

V. RESULTS AND DISCUSSION

5.1: Analysis of personality and selected background variables of teacher educators working in teacher Education institutions.

Table – 1: Means, SD and 't' ratio of Personality and selected background variables of teacher educators working in teacher Education institutions

Background Variables	Gender	N	Mean	S.D	Calculated 't' value	Remarks
Gender (a)	Male	500	122.1	16.2	338.36	Significant
	Female	500	66.8	16.21		
Experience (b)	More exp	500	103.5	31.01	2.905	Significant
	Less exp	500	94.0	32.06		
Place of TEI (c)	Urban	500	101.4	31.22	92.47	Significant

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	Rural	500	87.5	31.4		
Subject (d)	Science	500	108.3	28.99	177.27	Significant
	Arts	500	80.5	28.83		

It is inferred from the above table that the calculated‘t’ value 338.36 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between male and female teacher educators in their personality. Hence the null hypothesis $H_0$1, is rejected and alternative hypothesis was accepted i.e. there is significant difference between male and female teacher educators in their personality. It means there is positive effect of gender on personality of teacher educators. Sugirtham (2009) made an attempt to assess personality, the results indicated that study says that Male dominate over the female in personality dimensions index, however, the level of significance is only at five percent.

It is inferred from the above table that the calculated ‘t’ value 2.905 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between more and less experienced teacher educators in their personality. Hence the null hypothesis $H_0$2, is rejected and alternative hypothesis was accepted i.e. there is significant difference between more and less experienced teacher educators in their personality. It means there is positive effect of experience on personality of teacher educators. Ozel (2007) focused on the effect of Turkish geography teacher’s personality on his teaching experiences. There was a significant difference with respect to the fact that teachers make students feel that they can always give them reinforcement, according to the length of service variance, a significant difference was determined .

It is inferred from the above table that the calculated ‘t’ value 92.47 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between rural and urban TEI’s Teacher educators in their personality. Hence the null hypothesis $H_0$3, is rejected and alternative hypothesis was accepted i.e. there is significant difference between rural and urban TEI’s Teacher educators in their personality. It means there is positive effect of Locality of TEI on personality of teacher educators. Sowmyah and Ningamma (2010) found that there was no significant difference in the means of rural & urban personality.

It is inferred from the above table that the calculated ‘t’ value 177.27 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between science and arts teacher educators in their personality. Hence the null hypothesis $H_0$4, is rejected and alternative hypothesis was accepted i.e. there is significant difference between science and arts teacher educators in their personality. It means there is positive effect of teaching subject of teacher educators on personality. Khanna (1985) examined personality patterns of effective high school teachers he found that the effective teachers in the faculties of arts and science possess relatively different traits of personality.This data has been shown graphically as follows:

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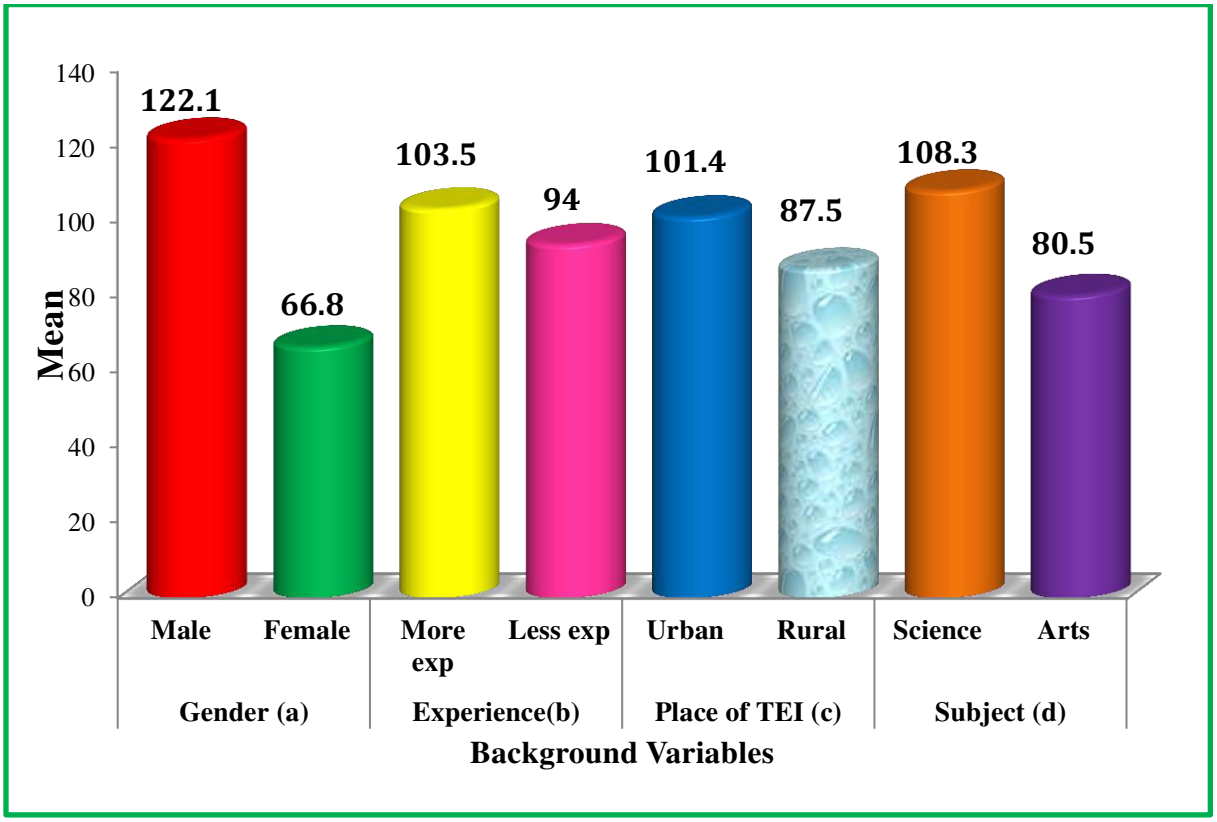

Figure 1: Effect Of Scientific Temper, Critical Thinking And Selected Background Variables On Personality Of Teacher Educators

5.2 Analysis of personality and critical thinking and scientific temper of teacher educators working in teacher Education institutions.

Table -2: Means, SD, 't' and 'r' ratio of Personality, critical thinking and scientific temper of teacher educators working in teacher Education institutions (N=1000)

Relationship	Gender	Mean	S.D	Calculated 't' value	Calculated 't' value	Remarks
A	Scientific Temper	65.1	11.54	44.68	0.985(**)	Significant
	Personality	94.4	32.06			
B	Critical Thinking	19.3	57.95	114.8	0.982(**)	Significant
	Personality	94.4	32.06			

It is inferred from the table-2 (A), that the calculated't' 44.68 value is more than the table value (1.96) for df 998, at 5% level of significance in the personality. Hence the respective null hypothesis $H_0$5 is rejected i.e. There is significant difference between Scientific Temper and personality.

The table-2 (A), also shows that the value of co-efficient of correlation between Scientific Temper and Personality development is 0.985. It represents a strong degree of positive

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relationship between two variables which is an indicative of positive correlation between the above two variables. Therefore, the null hypothesis, "There is no significant relationship between the Scientific Temper and Personality of teacher educators working in private teacher education institutions." stands rejected. Thus, we can interpret that there is strong positive correlation between Scientific Temper and Personality of the teacher educators working in teacher education institutions. On the basis of the above interpretations it is concluded that scientific temper and Critical thinking are correlated with each other. Change in the level of scientific temper is directly proportional to Personality. Hence we can say that there is positive effect of scientific temper on Personality of teacher educator.

It is inferred from the table-2 (B), that the calculated't' 114.8value is more than the table value (1.96) for df 998, at 5% level of significance. Hence the respective null hypothesis $H_0$6 is rejected i.e. There is significant difference between Critical Thinking and personality.

The above table-2 (B), shows that the value of co-efficient of correlation between Critical Thinking and Personality development is 0.985. It represents a strong degree of positive relationship between two variables which is an indicative of positive correlation between the above two variables. Therefore, the null hypothesis, "There is no significant relationship between the Critical Thinking and Personality of teacher educators working in private teacher education institutions." stands rejected. Thus, we can interpret that there is strong positive correlation between Critical Thinking and Personality of the teacher educators working in teacher education institutions.

On the basis of the above interpretations it is concluded that Critical Thinking and personality are correlated with each other. Change in the level of Critical Thinking is directly proportional to Personality. Hence we can say that there is positive effect of Critical Thinking on Personality of teacher educator.

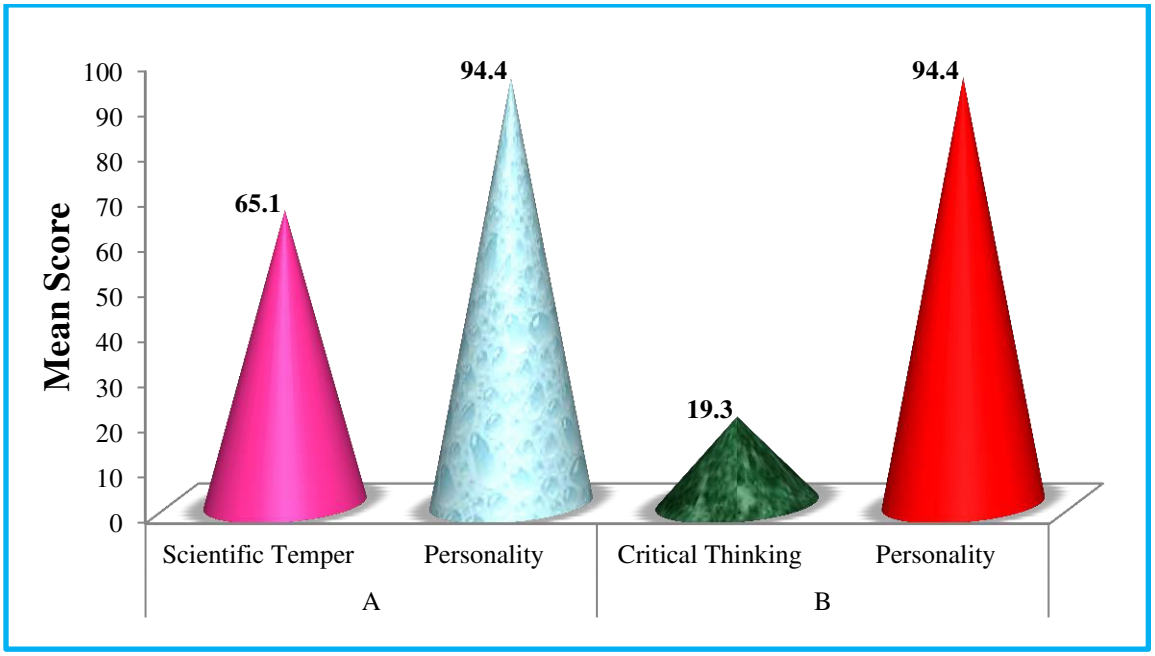

Figure 2: Means of Personality, critical thinking and scientific temper of teacher educators

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VI. MULTIPLE CORRELATION

Table – 3: Multiple correlations among Scientific Temper, Professional Development, Critical Thinking and Personality of teacher educators working in teacher education institutions (N = 1000)

Variable	Scientific Temper	Critical Thinking	Personality	Multiple correlation	Calculated 'F' value	Remarks at 5% level
Scientific Temper	1	0.987(**)	0.985(**)	0.982	2604.21	Sing
Critical Thinking	0.987(**)	1	0.982(**)			
Personality	0.985(**)	0.982(**)	1			

(At both 0.05 and 0.05 level of significance, the table value of 'F' is 2604.21, S - Significant)

It is inferred from the above table that the calculated 'F' value is greater than the table value (2.61) at both 0.05 and 0.05 level of significance. Hence the null hypothesis H_o7 is rejected. It shows that there is significant influence three variable one on another variable of teacher educators working in teacher education institutes of Hyderabad Karnataka region and also shows that there is significant relationship (r= 982) three variable one on another variable of teacher educators working in teacher education institutes of Hyderabad Karnataka region. Therefore we can say there is positive effect of scientific temper and critical thinking on personality of teacher educators.

VII. CONCLUSION

From this study it can be concluded that, there is significant difference between male and female teacher educators in their personality. It means there is positive effect of gender on personality of teacher educators.

- There is significant difference between more and less experienced teacher educators in their personality. It means there is positive effect of experience on personality of teacher educators.
- There is significant difference between rural and urban TEI's Teacher educators in their personality. It means there is positive effect of Locality of TEI on personality of teacher educators.
- There is significant difference between science and arts teacher educators in their personality. It means there is positive effect of teaching subject of teacher educators on personality.

We can interpret that there is significant difference between Scientific Temper and personality and there is strong positive correlation between Scientific Temper and Personality of the teacher educators working in teacher education institutions.

On the basis of the above interpretations it is concluded that scientific temper and Critical thinking are correlated with each other. Change in the level of scientific temper is directly proportional to Personality. Hence we can say that there is positive effect of scientific temper on Personality of teacher educator.

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CROP DIVERSIFICATION IN RELATION TO TIME AND SPACE: A STUDY FROM MALDA DISTRICT

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Abstract

Crop Diversification is one of the important dimensions of agricultural development which understood as the multiple cropping systems with an addition, replacement or substitution of more crops to the existing farmland. Growing multiple crops pays wider scope and opportunities in socio-economic transformation than crop specialization in extensive farming. District like Malda, primarily dominated by agriculture with multiple cropping patterns and patch of specialization found have limited space. Study of crop diversification also helps to know the cropping pattern, crop concentration and crop variation of a region. An attempt has been made to show crop diversification in light of spatial pattern along with temporal changes. Spatial changes noticed in due course of fast changing physical, institutional, and infrastructural factors are studied for the period 2004-05 and 2014-2015. The study has employed Singh's (1976) technique to find out crop diversification index. The block level analysis of said index determines the level and extends of diversification. Analysis finds shifts in diversification index, cropping patterns and number of crops grown over there.

I. INTRODUCTION

Productivity, specialization and diversification are the three dimensions to understand the level of agricultural development in any geographical region of the globe. Crop diversification is understood as opposite of crop specialization with an areal strength between

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crops in any region (Husain, 1996). Diversification at the cropping level often face a problem about its meaning and scope, whether it is replacement, addition or pluriactivity (Fuller, 1990), mixed farming (Shucksmith, 1989) or shift away from monoculture (Newby, 1988). A plethora of terms have emerged alongside diversification to describe agricultural activity in developed and developing countries. This is an agricultural practice in which farmer harvest varieties of crops instead one .This is the stage at which many developing countries are currently lying (Petit and Bargouti, 1993). As far as, the condition of crop diversification is concern; it is done when the farm has more than one enterprise and may produce and sell crops at different times of year (Metcalf, 1969). Although, variations and expansions in the level of cropping pattern are the result of long time standing. At spatiotemporal level unconformity in crop diversification is recorded across the continents of the globe. Crop diversification of geographical area is dully affected by physical, social and economic factors along with technological, geographical and institutional structure of that region (Todkari, 2012). Therefore, exiting conceptual difference in its long standing analysis arouse diversity of opinions.

Crop diversification patterns have great relevance in the agricultural land use studies, and are an important component of the crop geography of a region (Ratnaparkhi 2012). Crop diversification has emerged as an important alternative to attain the objectives of output growth, employment generation and natural resources sustainability in the developing countries. The recent experience in Asia, particularly southeast Asia, Middle East and North Africa indicates that policy makers and planners are increasingly focusing on crop diversification to promote agricultural development (Petit and Barghouti, 1972). Crops are generally grown in combinations (Weaver, 1954) therefore; it reduces risks unexpected to come from natural calamities or vagaries in weather. Moreover, rich farmers prefer specialization, the poor and substitute farmers are interested in diversification of crops (Barlett, 1991; Kimhi and Bollman, 1999). For commodities, which are imported and exported, there will be price risk emanating from exchange rate variability. Such variability of commodity price leads to variability in farm income, which has a positive effect on off-farm work participation (Mishra and Goodwin, 1997). It generates more income and opportunities of works on regular basis. Increase in intensity of cultivation and in yields per unit area are the only available options to meet future food needs to feed an ever increasing population (Gunasena, 2000). Opportunities of better diet preserve good nutrition thereby, farmer too leads healthy life. Crop rotation enriches soil fertility and thus, sustainability of farm land remains good.

II. SYNOPTIC VIEW OF STUDY AREA

The Malda district of West Bengal chose for the study to assess the impact of growing consumerism at farm level for a decade (2004-05 to 2014-15). The study area lies between latitudinal and longitudinal figures of 24° 40′20″ N to 25°32′08″ N and 87°45′50″ E to 88°28′10″E respectively. The district is surrounded by Bangladesh and Dakhsin Dinajpur in East, Santhal Parganas of Jharkhand in West, Uttar Dinajpur in North and Murshidabadin the South. This region is made up of the ancient alluvial humps which are remnants of old

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riverine floodplains and remained unaffected subsequently by inundation and renewed silting. The district has 15 blocks with English Bazar as an administrative centre.

Total geographical area of the district is 3733 sq. km. According to National Agricultural Research Project-2015 (NARP) the district has two main agro-climatic zones, i.e. old alluvial zone and new alluvial zone. The net sown area is 260000 hectares and gross cropped area is 474700 hectares. The cropping intensity increasingly rose up to 182.57% (NARP, 2014-15). The district has high potentiality of intense crop diversification since crop intensity is increasing.

The old and new alluvial soils are very much helpful for the production of cereals especially along river channels and area having irrigation facilities. Lowland area supports rice and jute cultivation while high land having dominance of diverse crops. During summer, along with rice vegetables are grown and in winter wheat, maize, pulses, oilseeds and varieties of vegetables gets farm land. The pace of population bomb impinged intuitional and infrastructural expansion. Each administrative unit have institutional base for famers.

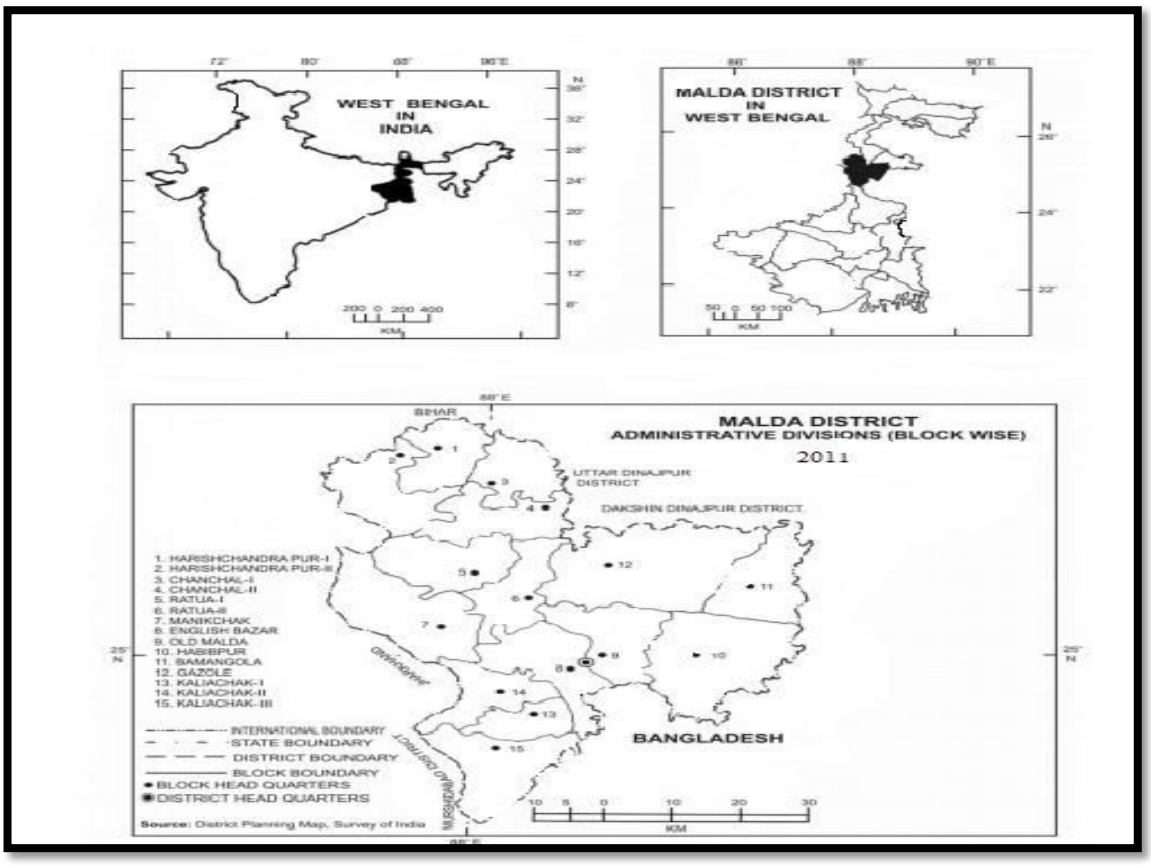

Figure -1: Administrative Division of Malda District

III. OBJECTIVES OF THE STUDY

i.) To have a comparative study of cropping pattern viz-a-viz crop diversification for the cropping year 2004-05 and 2014-2015 of Malda District.

ii.) To assess the spatio-temporal variation and changes of crop diversification in the study area.

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iii.) To formulate study based and specific suggestions for implementing the viable crop diversification.

IV. DATABASE AND METHODOLOGY

The work based on secondary sources of data obtained from the Statistical Handbook of Malda District of 2005 for the year 2004-05 and, Directorate of agriculture –Malda District, Government of West Bengal for the year of 2014-15. Quantitative technique is used to process the data. The major crops which dominate district agricultural production took for the study. Therefore, author has purposively used the statistical technique of Jasbir Singh (1976) for delineating crop diversification regions. The study includes those crops which have a share of 5% and above to the total harvested area.

$$\textbf{Index of Crop Diversification (ICD)} = \frac{\textbf{Percentage of area under 'n' crop}}{\textbf{Number of 'n' crop}}$$

Where, 'n' crops are those crops which individually occupy five percent and above to the total cultivated land. The ICD value for different blocks (2004-05 and 2014-15) has categorized into three classes, based on arbitrary chosen class interval, viz. i) high, ii) medium, and iii) low. By use GIS technique a choropleth map has been drawn succeeded by class division.

V. RESULTS AND DISCUSSION

5.1 Cropping Pattern in Malda District from 2004-05 and 2014-15

The index of diversification is inversely related to diversification (Singh, 1976). High index mean specialization and lower index show diversification. An attempt has been made to show the changes of crop diversification at block level for the periods of 2004-05 and 2014-2015 (Table-3). Analyses show that where some areas significant change is observed, some show few change; and others own negative change. The environmental limit of physical attributes, such as soil and climate constrains for diverse agro products. Jasbir Singh technique has identified three classes of crop diversification because large margin of data variation in the study area. Farmers grow numerous crops in the field rather than single crops. Rice is the main primary crop, and is seen in every combination of diversifications in the blocks of Malda.

Table-1: Cropping Pattern in Malda District from 2004-05 and 2014-15

Sl. No.	Block	Cropping Pattern		Number of Crop Occupy 5% and Above	
		2004-05	2014-15	2004-05	2014-15
1	Harishchandrapur-I	R,J,W,O,PL	R,J,W,O,PL	5	5
2	Harishchandrapur-II	R,J,W,O,PL	R,O,W,J,PL	5	5
3	Chanchal-I	R,O,W,PL,J	R,J,PL,W	5	4
4	Chanchal-II	R,O,W,PL,J	R,O,J,W	5	4
5	Ratua-I	W, R,J,O,PL,MIS.	W,R,J,O,PL	6	5

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6	Ratua-II	R,W,O,PL,J,MIS.	R,O,J,W,PL	6	5
7	Gazole	R,O,W	R,O,P,PL	3	5
8	Bamongola	R,O,W	R,O,P	3	3
9	Habibpur	R,O	R,O	2	2
10	Old Malda	R,W,O	R,O,P,W	3	4
11	English Bazar	W,R,PL,MIS.,O	W,R,PL	5	3
12	Manikchak	W,PL,J,R,O	W,PL,J,R	5	4
13	Kaliachak-I	W,J,R,O,MIS.,	W,J,O,R	5	4
14	Kaliachak-II	PL,MIS.,W,R,J	S,O,R,W,J,M	5	6
15	Kaliachak-III	W,PL,R,MIS.,J,O	W,PL,J,O,R	6	5
	District	**R,W,O,J,PL**	**R,W,O,J,PL**	**5**	**5**

Source: Directorate of Agriculture, Malda, Govt. of W.B
Note: - R- Rice, W- Wheat, M- Maize, J- Jute, O- Oilseeds, P- Potato, S- Sugarcane, PL- Pluses, MISC. – Miscellaneous, N.B: Miscellaneous crops- Tori, Linseed, Lentil, Rai, Gram, Barley and Til.

5.2 High Crops Diversity (ICD : <25)

Thirteen out of fifteen blocks have experienced high ICD value cover more than eighty per cent of total crop area of the district with reference year of 2004-05. In these blocks six to three crops are grown. Ratua-I with crop diversification index 14.17 cover significant area of wheat, rice, jute, oilseeds, pulses and miscellaneous crops (table- 1). Data found 5540 hectares of land for aman cultivation of total gross cropped area in 2004-05. Kaliachak-II having highest diversity of crops with carrying ICD of 5.74 and also cultivates five crops combination viz, pulses, miscellaneous, wheat, rice, jute. Ratua-II (19.07) and Kaliachak-III (14.27) are witness six crops combination having 5% and more area among total crop land. Mentioned three blocks having six crops combination are dominated by paddy (aman) and followed by wheat and pulses. The blocks like English Bazar (7.89), Manikchak (8.47) and Kaliachak-I (9.26) recorded five crops combination and, mostly cultivated by wheat, rice, and pulses. Harishchandrapur-I (19.00), Harishchandrapur-II (16.11), Chanchal-I (22.06), Chanchal-II (16.44) grew five crops with lower diversity index because of larger areal expansion. The crop diversification index of Bamongola with ICD value 18.73 produced only three crops having 5% and more area.

In 2014-15, six blocks of Malda have experienced high crop diversity (Table-3). The crop diversification index of 20.62 recognized Kaliachak-III which represent high diversity index for 2014-15 with five crop combination, viz., wheat, pulses, jute, oilseeds and rice. Harishchandrapur-I, (ICD-20.66, Harishchandrapur-II(ICD-20.96), Ratua-II (ICD-21.05), Gazole (ICD-21.25), and Ratua-I(ICD-21.30) maintained five crops combination and, again rice is a dominant crop.

Table-2: Crop Diversification Index at Block level, Malda (2004-05 and 2014-15)

Sl. No.	Blocks	Index of Crop Diversification		Change in ICD
		2004-05	2014-15	
1	Harishchandrapur-I	19.00	20.66	0.44
2	Harishchandrapur-II	16.11	20.96	4.85
3	Chanchal-I	22.06	25.63	3.57
4	Chanchal-II	16.44	25.72	9.28

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5	Ratua-I	14.17	21.30	7.13
6	Ratua-II	19.07	21.05	1.98
7	Gazole	25.24	21.25	-3.99
8	Bamongola	18.73	35.75	17.02
9	Habibpur	40.80	50.82	10.02
10	Old Malda	17.80	30.56	12.76
11	English Bazar	7.89	35.05	27.17
12	Manikchak	8.47	27.38	18.91
13	Kaliachak-I	9.26	26.16	16.9
14	Kaliachak-II	5.74	27.51	21.77
15	Kaliachak-III	14.27	20.62	6.35
	District	**15.02**	**21.19**	**6.17**

Source: Calculated by authors

5.3 Medium Crop Diversification (ICD: 25-35)

Gazole, lone block has been categorized in medium crop diversification with an ICD value of 25.24 and harvest three important crops. Rice, wheat and oilseeds are major crops covering an area of five per cent and more. For the cropping year of 2014-15 major shift has been recorded in medium category where, six blocks newly added to said category (Table-3). Chanchal-I reveals four crops combination with least ICD index of 25.63 among medium category of diversification while, Old Malda shows high ICD value of 30.05 in same category with similar number of crops. Kaliachak-II (ICD-27.51 has an exceptional diversification and having six crops combinations with sugarcane as a dominant crop followed by oilseeds, rice, wheat, jute and maize. Three blocks, i.e., Chanchal-II (25.72), Kaliachak-I (ICD-26.16) and Chanchal-II (ICD-25.72) are having four crops combination with rice as dominant crop.

Table-3: Levels of Crop Diversification in the Blocks of Malda (2004-05 and 2014-15)

Levels of Diversification	**2004-05**		**2014-15**	
	Block	**ICD**	**Block**	**ICD**
High <25	Kaliachak-II	5.74	Kaliachak-III	20.62
	English Bazar	7.89		
	Manikchak	8.47	Harishchandrapur-I	20.66
	Kaliachak-I	9.26		
	Ratua-I	14.17	Harishchandrapur-II	20.96
	Kaliachak-III	14.27		
	Harishchandrapur-II	16.11	Ratua-II	21.05
	Chanchal-II	16.44		
	Old Malda	17.80	Gazole	21.25
	Harishchandrapur-I	19.00		
	Bamongola	18.73	Ratua-I	21.30
	Ratua-II	19.07		
	Chanchal-I	22.06		
Medium 25-35	Gazole	25.24	Chanchal-I	25.63
			Chanchal-II	25.72

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			Kaliachak-I	26.16
			Manikchak	27.38
			Kaliachak-II	27.51
			Old Malda	30.56
Low >35	Habibpur	40.80	Bamongola	35.75
			English Bazar	35.05
			Habibpur	50.82

Source: Compiled by authors.

5.4 Low Crop Diversification (ICD : >35)

In 2004-05 again only one block listed under high category of diversification. Rice and wheat have grown in Habibpur with an ICD value of 40.80. From total geographical area of 39607 hectares, 16805 hectares devoted for cultivation of crops and, only two crops reached the level of five per cent and more area. Three blocks witness low crop diversity covering 28485, in 207185.3 hectares total cultivated area (table-4) of the district with reference 2014-15. Bamongola with ICD value 35.75 cultivating three crops, i.e., rice, oilseeds, and potato covers crop land on half of the total geographical area (Table-4). Habibpur has two major crops; rice and oilseeds and is found to have least crop diversification index. English Bazar has shown stagnation by sticking to three cereal crops i.e. wheat, rice, and pulses from five crops combination in 2004-05. Data reveals 13895 hectares of total crop land in Old Malda, 937 hectares is devoted for Potato cultivation and 1128 hectares for oilseeds, dominated by mustard.

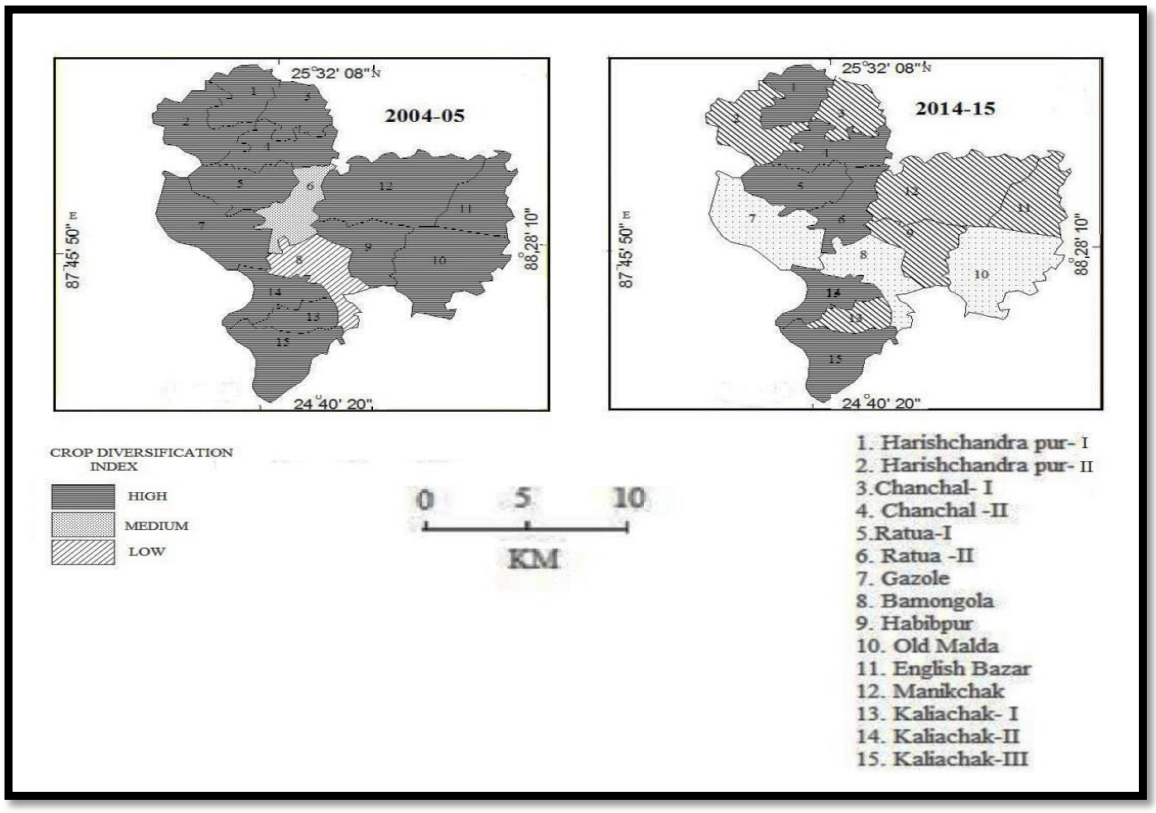

Figure 2: Crop Diversification Regions in the Malda District (2004-05 and 2014-15)

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5.5 Review of Crop Diversification Pattern in the Malda District

Result shows wide variation at both; spatial and temporal level in the block. Modernizations in agriculture along with proper infrastructural facilities have added charm to diversification. Cropping pattern and crop combination for the year of 2004-05 varies from two to six crops and crop diversification ranges from 5.74 to 40.80 on same cropping year. Eleven blocks recorded five crop combinations in 2004-05 and nine blocks for 2014-15. This indicates increase in gross cropped area with mild tends toward specialization. Rice dominated as first ranking crop for nine blocks while wheat rank top for five blocks in 2004-05 and 2014-15 respectively. Pulses find one block in 2004-05 and replaced by sugarcane in 2014-15. Both the season cropping pattern at district is same but changed notice in gross cropped area. English Bazar and Gazol record maximum shift in number crops from five to three and vise versa. Thirteen blocks get high ICD value in 2004-05 but it reduces at six in 2014-15. Bamongola and English Bazar come down from high ICD into low ICD group. Gazole which was in the medium crop diversification category in 2004-05 has changed into precede category. In 2004-05, Habibpur placed in low ICD category, remain same class for 2014-15. This happen causes flood of 2011. Here risk factor overlooked by farmer presumably lacking in institutional or infrastructural attainment. Moreover, the gap in ICD values from lower diversification 40.80 in 2004-05 to 50.82 in 2014-15 is not as much high in higher diversification, while at high diversification it is 5.74 to 20.62.

Diversification in cropping pattern in malda shows positive scope and opportunities especially, in high value crops like, potato, pulses, and oilseeds production. It is a positive sign from the farmers who are taking interest in crop diversification (Pingali and Rosegrant, 1995). Taking care of growing consumerism in a diversified food sector in the district like malda already projected a significance stage in agriculture development. A report presented in the Global Convention Food - World India 2005, organized by FICCI, the Chief Minister of West Bengal, Mr. Buddhadeb Bhattacharjee said Frito Lays of Pepsi and Dabur (in pineapple processing) are already in the state and countries like France, Italy and Japan have been taking interest in entering the food sector in west Bengal. To cope up with prevailing health problems like, malnutrition and maladjustment crop priority has been assigned to develop agriculture in our country (Vidya, 1985). To adopt more sustainable way in crop diversification, attention can be trace from the United Nations Food and Agriculture Organization (FAO) to promote crop diversification among small farmers.

VI. CONCLUSION

Changes gross cropped area in the study year adds new flavor to ICD value and cropping pattern as well. In light of growing population expected land use shall be more complex and diversified. Diversifying nature of crops, especially those occupied less than five per cent area is more complex as shown in data source book. Blocks with favorable climate of physical in general and infrastructural in particular have entertained multiple cropping slots. Food for consumption left out diversifying nature of agriculture and commercial faming

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seems important. Thereby, more blocks add in medium and low index categories. Pattern tells more scope of diversification and thus, it is necessary for food, income and livelihood and sustains use of land. Crop diversification is economically viable and therefore, intensive and well care investment to be made for institutional and infrastructural facilities. Strategy from government and private institution should be accessible to the farmers on demand. On this regard, establishment of crop diversification centre would necessary step.

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COLORING OF INTERVAL VALUED FUZZY GRAPH USING ALPHA CUT

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Abstract

In this paper, we discuss the interval valued fuzzy chromatic number, chromatic index, Total chromatic number as fuzzy numbers through the alpha cuts of the interval valued fuzzy graphs, which are the crisp graphs. Some applications will explain these concepts.

I. INTRODUCTION

To deal with the uncertainty, the concept of Fuzzy Theory was applied to Graph theory and hence interval valued fuzzy graph theory. The notion of fuzzy set was introduced by Zadeh In 1965 which is characterized by a membership function that defines a grade of membership in [0,1]. Kaufmann (1973) introduced the first definition of Fuzzy Graph, which is based on Zadeh's fuzzy relations (1971). According to M.Blue, B.Bush and J.Puckett, there are 5 types of graph Fuzzyness. They are

1. A collection of fuzzy graphs, where fuzziness is on each member of the fuzzy graphs.
2. A collection of vertices and edges, where the edge set is fuzzy
3. A collection of vertices, and edges, where the vertex set is fuzzy
4. A collection of vertices and edges, where the vertex set and edge set both are crisp but the edges have fuzzy weights.
5. A collection of vertices and edges, but the edges have fuzzy heads and fuzzy tails.

The total coloring conjecture and the total coloring were independently introduced by Behzad and Vizing between 1964 and 1968.

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Kilakos and Reed proved that the fractional chromatic number of the graph G is at most $\Delta(G)+2$ where Δ is maximum vertex degree of the graph.

In this paper we consider the Interval valued fuzzy graphs with fuzzy interval valued vertex set and fuzzy interval valued edge set. Coloring of graphs is a most important concept in which we partition the vertex (edge) set of any associated graph so that adjacent vertices (edges) receive different colors.In other words coloring problem is considered as grouping the items of interest as few groups as possible so that incompatible items are in different groups. Generally for a given graph G=(V,E) , a coloring function is a mapping : $V \rightarrow N$ such that (x) ≠ (y) where x and y are adjacent vertices in G(incompatible vertices)but if we use only k colors to color a graph we define a k-coloring

$k : V \rightarrow \{1,2,\ldots.k\}$. A graph is k-colorable if it admits a k- coloring. The chromatic number $\chi(G)$,of a graph G is the minimum number of colors 'k' for which G is k- colorable. Fuzzy graph coloring is one of the most important problems of fuzzy graph theory; it is mainly studied in combinatorial optimization like traffic light control, exam scheduling, register allocation etc.

Definition 1: "A fuzzy set A defined on a non empty set X is the family

$A=\{(x,\mu_A(x))/ x \in X\}$ where $\mu_A: X \rightarrow I$ is the membership function."

In classical fuzzy set theory the set I is usually defined on the interval [0,1] such that

$\mu_A(x) = 0$ if x does not belong to A

$\mu_A(x) = 1$ if x strictly belongs to A and any intermediate value represents the degree in which x could belong to A.

The set I could be discrete set of the form $I=\{0,1,\ldots..k\}$ where $\mu_A(x) < \mu_A(x')$ indicates that the degree of membership of x to A is lower than the degree of membership of x′"

Definition 2 :. "Fuzzy graphs with crisp vertices and fuzzy edges

The graph $\hat{G} = (V,\hat{E})$ is a fuzzy graph where V is the vertex set and the fuzzy edge set is characterized by the matrix $\mu = [\mu_{ij}]$ $i,j \in V$, $\mu_{ij} = \mu\check{E}(\{i,j\})$ for every $i,j \in V$ such that $i \neq j$ and $\mu_{\check{E}} : VXV \rightarrow I$ is the membership function. Each element $\mu_{ij} \in I$ represents the intensity level of the edge {i,j} for any $i,j \in V$ with $i \neq j$. The fuzzy graph can also denoted by $\hat{G}=(V,\mu)$"

Definition 3.:Fuzzy vertex coloring:

"A fuzzy set A defined on X can be characterized from its family of α-cuts

$A\alpha = \{x \in X/ \mu A(x) \geq \alpha\}$ $\alpha \in I$. This family of sets is monotone, i.e., for $\alpha,\beta \in I$,$\alpha \leq \beta$

we have $A_\alpha \supseteq A_\beta$ On the other hand, given a finite monotone family $\{ A\alpha\ p / p \in \{1,\ldots.m\}\}$, a fuzzy set can be defined from the membership function .

$\mu_A(x) = \sup\{ P_\alpha / x \in A_\alpha\ p \}$ for every $x \in X$.

Let $\{G\alpha = (V,E\alpha)/ \alpha \in I\}$ be the family of α-cuts of $\hat{G}$, where the α-cut of a fuzzy graph is the crisp graph $G\alpha = (V,E\alpha)$ with $E\alpha = \{\{i,j\}/i,j \in V, \mu_{ij} \geq \alpha\}$."

Definition 4 : "Chromatic Number : For a fuzzy graph $\hat{G} = (V,\mu)$, its chromatic number is the fuzzy number $\chi(\hat{G}) = \{x,\nu(x)) / x \in X\}$, where $X = \{1,...|V|\}$, $\nu(x) = \sup \{\alpha \in I / x \in A\alpha\}$ $x \in X$ and $A\alpha = \{1,\ldots \chi_\alpha\}$ $\alpha \in I$".

The chromatic number of a fuzzy graph is a normalized fuzzy number whose modal value is associated with the empty edge-set graph. It can be interpreted that for lower values of α

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there are many incompatible edges between the vertices so that more colors are needed in order to consider the incompatibilities; on the other hand, for higher values of α there are fewer incompatible edges and less colors are needed. The fuzzy coloring problem consists of determining the chromatic number of a fuzzy graph and an associated coloring function. For any level α, the minimum number of colors needed to color the crisp graph Gα will be computed. In this way the fuzzy chromatic number is defined as fuzzy number through its α-cuts"

Definition 5: "The interval-valued fuzzy set A in V is defined by

$A = \{(x, [\mu_A^-(x), \mu_A^+(x)]) : x \in V\}$,

where $\mu_A^-(x)$ and $\mu_A^+(x)$ are fuzzy subsets of V such that $\mu_A^-(x) \le \mu_A^+(x)$ for all $x \in V$."

For any two interval-valued sets $A = [\mu_A^-(x), \mu_A^+(x)]$ and $B = [\mu_B^-(x), \mu_B^+(x)]$ in V we define:

- $A \cup B = \{(x, \max(\mu_A^-(x), \mu_B^-(x)), \max(\mu_A^+(x)\mu_B^+(x))) : x \in V\}$,
- $A \cap B = \{(x, \min(\mu_A^-(x), \mu_B^-(x)), \min(\mu_A^+(x)\mu_B^+(x))) : x \in V\}$.

"Interval-valued fuzzy relation B on a set E of the graph G* = (V, E) , is such that

$$\mu_B^-(xy) \le \min(\mu_A^-(x), \mu_A^-(y))$$

$\mu_B^+(xy) \le \min(\mu_A^+(x), \mu_A^+(y))$ for all $xy \in E$."

Definition 6: α- cut of an Interval-valued fuzzy graph:

"For α = (a,b) ϵ I, $G_\alpha = (A_\alpha, B_\alpha)$ where A_α= {xϵV; ≥a and ≥b} and B_α={xy ϵ E; }"

Example 1:

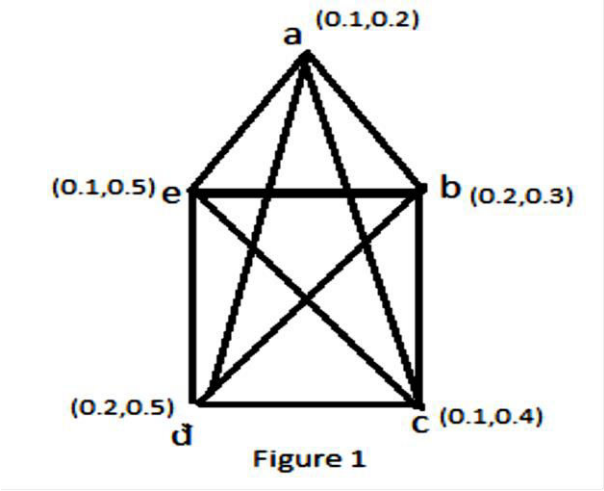

Figure 1

The memberships of the edges of the above graph are given below:

μ(ab)=(0.1,0.2), μ(bc)=(0.1,0.3), μ(cd)=(0.1,0.4), μ(de)=(0.1,0.5), μ(ea)=(0.1,0.2),μ(ad)=(0.1,0.2), μ(ac)=(0.1,0.2), μ(ce)=(0.1,0.4),μ(eb)=(0.1,0.3), μ(bd)=(0.2,0.3)

If α=(0.1,0.2) then the fuzzy graph is just like the figure 1, then the chromatic number with respect to α is χ(α)=5

If α=(0.1,0.3), then the fuzzy graph is given by figure 2 and the chromatic number is χ (α)=4

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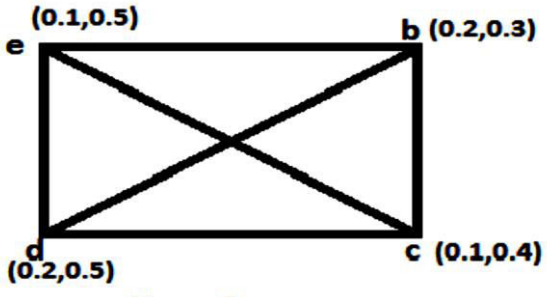

Figure 2

If α = (0.1,0.4), then the fuzzy graph is given by figure 3 and the chromatic number is $\chi(\alpha) = 3$

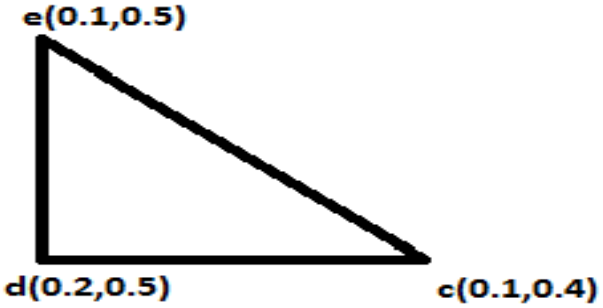

Figure 3

If α = (0.1,0.5), then the fuzzy graph is given by figure 4 and the chromatic number is $\chi(\alpha) = 2$

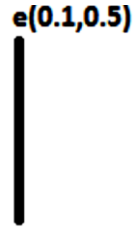

figure 4

If α = (0.2,0.7), then the fuzzy graph does not contain any vertices and edges. Hence the chromatic number is 0. Hence the interval valued fuzzy chromatic number is given by
$\chi(G) = \{\alpha, \chi(G_\alpha)\}$ =The set of ordered pairs consisting of α (the interval)
and the corresponding chromatic number of the graph = {((0.1,0.2),5), ((0.1,0.3),4), ((0.1,0.4),3),((0.1,0.5),2),((0.2,0.7),0)}

II. RESULT:

For lower values of the length of the interval α, there are many incompatible edges between the vertices so that more colors are needed in order to consider the incompatibilities. On the other hand, for higher values of the lenth of the interval α , there are fewer incompatible

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edges and less colors are needed. The fuzzy coloring problem consists of determining the chromatic number of a fuzzy graph and an associated coloring function. Hence as the length of 'α' increases, the chromatic number decreases.

Definition 7: "Total coloring: Total coloring of a graph is a kind of graph coloring on the vertices and edges of a graph, in the sense that no adjacent edges and no edge and its end vertices are assigned the same color."

"Fuzzy Total coloring: If $\{G_\alpha = (V,E_\alpha)/\ \alpha \epsilon I\}$ be the family of α-cuts of G, where the α-cut of a fuzzy graph is the crisp graph $G_\alpha = (V, E_\alpha)$ with $E_\alpha = \{(i,j): i,j \epsilon V, \mu_{ij} \geq \alpha\}$"

"The total chromatic number $\chi''(G)$ is the least number of colors needed in any Total coloring of the graph G and is at most Δ+2, where Δ is the max vertex degree."

"**Total chromatic number properties:**

1) $\chi''(G) \geq \Delta+1$
2) $\chi''(G) \leq \Delta(G)+10^{26}$ (According to MOLLOY<REED in 1998)"

The total chromatic number of the graph given in example -1 by considering different α-cuts in the interval (0,1) is given the following table

Table 1: Total chromatic number of the graph

				Colors (Ci)of vertices and edges													
α	Width of α	E_α	X_T	a	b	c	d	e	ab	ac	ad	ae	bc	bd	be	cd	ce	ed
(0.1, 0.2)	0.1	ab,ac,ad,ae,bc,bd,be,cd,ce,de,	7	C1	C2	C3	C4	C5	C3	C2	C5	C4	C1	C6	C7	C7	C6	C1
(0.1, 0.3)	0.2	bc,bd,be,cd,ce, de	7	C1	C2	C3	C4	C5	0	0	0	0	C4	C3	C1	C2	C6	C7
(0.1, 0.4)	0.3	Cd,ce,de	3	C3	C3	C3	C4	C5	0	0	0	0	0	0	0	C5	C4	C3
(0.1, 0.5)	0.4	de	3	C4	C4	C4	C4	C5	0	0	0	0	0	0	0	0	0	C3
(0.2, 0.7)	0.5	∅	1	C4	C4	C4	C4	C4	0	0	0	0	0	0	0	0	0	0

Since Δ=4 for the given graph the interval valued fuzzy total chromatic number of$\hat{G}$ is given by

$\mathbf{X^T}$ = **{((0.1,0.2),7), ((0.1,0.3),7), ((0.1,0.4),3),((0.1,0.5),3),((0.2,0.7),1)}**

Conclusion : In this paper we defined the fuzzy chromatic number, fuzzy total chromatic number and interval valued fuzzy total chromatic number as interval valued fuzzy numbers through the α- cuts of the interval valued fuzzy graph which are crisp graphs. We can also de-fuzzify this number using any of methods available if we want these numbers in crisp form.

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IMPROVED ANTIFILARIAL EFFICACY OF AZITHROMYCIN BY ACACIASIDES ON MICROFILARIA OF *D. IMMITIS IN VIVO*

Paper ID	IJIFR/V4/ E2/ 024	Page No.	5149-5158	Subject Area	ZOOLOGY
Keywords	Lymphatic Filariasis, Azithromycin, Saponins, *Wolbachia*				

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Abstract

Lymphatic filariasis is a major cause of clinical morbidity. Lymphatic filariasis is a major public health problem throughout the tropics and subtropics. The prevalence of infection is increasing worldwide with more than 120 million people infected with lymphatic filarial worm. The drugs used for lymphatic filariasis are diethylcarbamazine (DEC), ivermectin and albendazole. None of these is effective in killing the long-lived adult worms and the treatments are therefore aimed at reducing transmission and pathology. In the present study a 40-day treatment of azithromycin at 10 mg/kg body weight/day resulted in a maximum 70% reduction in mf count compared to untreated control on 40 day post-treatment. However, the Wolbachia population was not reduced significantly as evident from the PCR using Wolbachia 16S rRNA primers. But a 40-day regimen of azithromycin at 10 mg/kg body weight/day followed by a 7-day regimen of acaciasides at the same dose reduced the mf count (90% clearance) at a faster rate on 45 day post-treatment with no effect on Wolbachia population.

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I. INTRODUCTION

Lymphatic filariasis is a major tropical disease and one of the major common causes of clinical morbidity and global disability. Approximately 40% of the world's 120 million cases of lymphatic filariasis occur in sub-Saharan Africa (approximately 46–51 million cases) (Michael and Bundy, 1997; Zagaria and Savioli, 2002; Fenwick, *et al.*, 2005; Global alliance, 2005; Molyneux, *et al.*, 2005; Global alliance, 2009), with an estimated 382–394 million people at risk of infection, including 176 million children (Ottesen, 2006; WHO, 2008). India contributes about 40% of the total global burden and accounts for about 50% of the people at the risk of infection. Of the people exposed to the risk of infection, individuals with microfilaraemia, suffering from lymphoedema and hydrocele cases in the globe; India alone accounts for 39.0, 37.9, 46.4 and 48.1%, respectively (Michael *et al.*, 1996). Present day antimicrofilarial or macrofilaricidal treatment regimens do have certain well documented limitations. The first line choice of drugs are diethylcarbamazine (DEC), ivermectin and albendazole. Diethylcarbamazine and ivermectin are effective at killing microfilariae but are associated with systemic and inflammatory adverse reactions. Albendazole increases the efficacy of DEC and ivermectin and is used in combination with either of the drugs as the basis of long-term intervention programme. Thus, the present day requirement for filarial chemotherapy is a cheap, non-toxic and novel antifilarial drug with long term antimicrofilarial or macrofilaricidal activity. Ivermectin has been used as standard antifilarial drug for comparing the results.

A recent breakthrough in the filarial research is the discovery that *Wolbachia* plays an important role in the biology of filarial nematodes (Taylor and Hoerauf, 1999). The discovery of *Wolbachia* has fostered a new initiative in the development of suitable antifilarial drugs. One potential target is to use anti-rickettsial antibiotics to deplete *Wolbachia* endosymbionts that exist in the lateral cords of adult female and microfilaria of most filarial nematodes including *D. immitis*, *Litomosoides sigmodontis*, *O. volvulus, W. bancrofti* and *B. malayi* (Bandi *et al.*, 1999; Taylor *et al.*, 1999). In recent years, studies have linked tetracycline treatment of filaria infected animals with reduced worm burdens and decreased level of microfilaremia. This has been demonstrated in animal models with *L. sigmodontis, D. immitis* and recently confirmed in patients with *O. volvulus* (Hoerauf *et al.*, 1999; 2000b; Taylor *et al.*, 1999; 2000b). We have earlier reported that tetracycline at 10mg/kg/day for 40 days followed by 7 day treatment with acaciasides at 10mg/kg/day causes total depletion (100%) in mf count in the blood of treated dogs on day 75 post-treatment and this was maintained even 120 days after the last dose (Datta *et al.*, 2009).

The antifilarial activity of two triterpenoid saponins acaciaside A and acaciaside B, originally isolated from the funicles of *A. auriculiformis* were observed earlier (Mahato *et al.*, 1992). The saponins were found effective against both microfilaria and the adult worm of *S. cervi* in rats (Ghosh *et al.*, 1993). An ethanol extract obtained from the funicles of the plant proved effective against both microfilaria and the adult worm of *D. immitis* in dogs (Chakraborty *et al.*, 1995). The crude ethanol extract at the effective dose did not show any apparent toxicity in the treated dogs in terms of lethargy, food intake and change in body

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temperature; however serological tests revealed some mild transient effects in liver function (Sarkar, 1997). Recently we have reported absence of *Wolbachia* in *S. cervi* collected from local abattoirs (Datta *et al*., 2007). Since this cattle parasite does not harbour *Wolbachia,* it is likely that the filaricidal activity of saponins may be mediated through a different target altogether. These two saponins are known to interact with the membrane, thus inflicting membrane damage (Sinha Babu *et al*., 1997). Our findings on the mechanism of action of saponins further revealed that super oxide anion is probably involved in the expression of membrane damaging effect of saponins (Nandi *et al*., 2004). In the present study, the mixture of acaciaside A and acaciaside B was used for testing its effects on the antifilarial efficacy of azithromycin and to study the effect of azithromycin and acaciasides and their combination on *D. immitis in vivo.* Our primary aim is to assess the impact of azithromycin on *Wolbachia* loads within microfilaria and of the combination of azithromycin + acaciasides on microfilaria level over the observation period.

II. MATERIALS AND METHODS

2.1 Preparation of Acaciaside A and Acaciaside B

Acaciaside A and B are triterpeniod saponins originally isolated from the funicles of *Acacia auriculiformis* were respectively defined to be 3-0- [β-D-glucopyranosyl (1→6){α-L-arabinopyranosyl (1→2)}-β-D-glucopyranosyl]-21-0-{(6′ S)-2′-trans-2′,6 – dimethyl-6′-0- β-D-glucopyranosyl-2′,7′-octadienoyl} acacic acid 28-0- α-L-rhamnopyranosyl (1→6)[β-D-xylopyranosyl (1→2)]- β-D-glucopyranoside **(1)** and 3-0-[β-D-glucopyranosyl (1→6){ α-L-arabinopyranosyl (1→2)}- β-D-glucopyranosyl]-21-0-[(6′S)-2′-trans-2′, 6′-dimethyl-6′-0-{ β-D-xylopyranosyl (1→2)- β-D-glucopyranosyl}-2′,7′ -octadienoyl] acacic acid 28-0- α-L-rhamnopyranosyl (1→6) [β-D-xylopyranosyl (1→2)]- β-D-glucopyranoside **(2).** The structural details were elucidated by a combination of fast-atom-bombardment mass spectrometry, ^{1}H-, and ^{13}C NMR spectroscopy, and some chemical transformations (Mahato *et al*.1992; Fig. 1). The mixture of acaciaside A and acaciaside B, which is water soluble, was used for testing its effects on *D. immitis* in dogs.

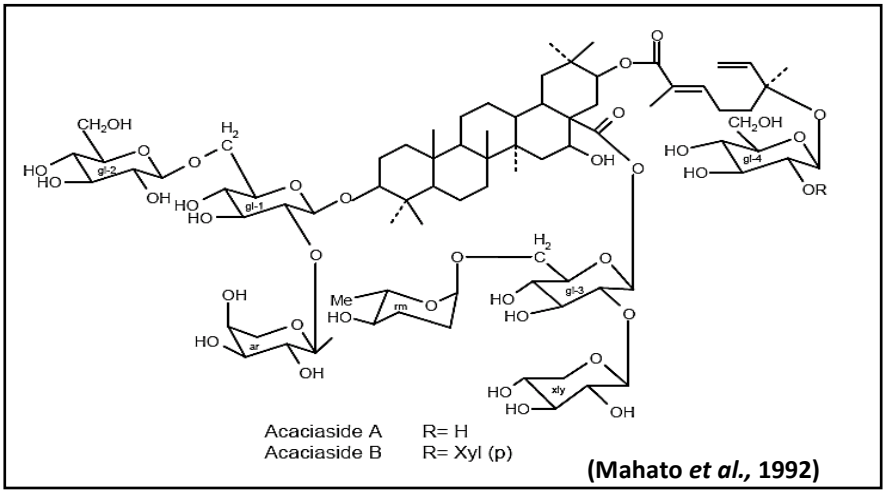

Figure 1: Chemical structure of acaciasides A and acaciasides B

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2.2 Drugs used for the experiment:

Azithromycin was obtained from Alembic Limited. The antibiotics were given orally. Ivermectin was obtained from Ochoa Laboratoy Limited and injected subcutaneously in a single shot.

2.3 Experimental animal and study design

Fifteen stray dogs (9 males and 6 females) naturally infected with *D. immitis* were used in the present experiment. Blood samples from all the dogs were collected every week for a period of ten weeks and mf density per 0.25 ml of blood was determined in each sample.Six mf dogs (males) were administered orally with azithromycin at 10 mg/kg/day for 40 days. Three male azithromycin treated (for 40 days) dogs were given saponins of *A. auriculiformis* at 10mg/kg/day orally for 7 consecutive days and the other three received the placebo. Among the remaining nine mf dogs, three females received no treatment, three males were treated orally with acaciasides at 10mg/kg/day for 7days (day 41- day 47) only and three females were given ivermectin at 2 mg/ kg body weight (single subcutaneous injection).

2.4 Collection of microfilaria from blood

Animal trials were duly approved by the institutional animal ethics committee of the University. Blood samples were obtained separately from each dog with the help of 5ml heparinised disposable syringe. Blood was drawn on day 15, 30, 40 and 47 from the commencement of treatment. Additional samples were taken at quarterly intervals up to day 75 and last sampling was done at 120 day post-treatment. From all the experimental dogs, 5 ml of blood was taken in heparinised tubes and immediately diluted (1:1) with pre-chilled PBS (0.01 M phosphate buffer, 0.15 M sodium chloride, pH 7.4) and was filtered through a 5µm filter membrane (Millipore, USA). Microfilariae were separated as per standard protocol (Datta *et al*., 2009).

2.5 Extraction of DNA and PCR

Total genomic DNA was extracted from *D. immitis* microfilariae, collected from blood drawn from naturally infected stray dogs following the method by Smith and Rajan (2000), with slight modifications. The mf pellet was resuspended in 500 µl of lysis buffer, pH 8.0 containing 20 mM Tris-HCl, 50 mM EDTA, 0.5% SDS, 100 mM NaCl, 1%(v/v) β-mercaptoethanol and proteinase-K 0.1 mg/ ml. Then the mixture was incubated at 55°C for 3 h. To inactivate proteinase-K, samples were heated at 95°C for 10 min. After phenol-chloroform-isoamyl alcohol (25:24:1) extraction and ethanol precipitation, the pellet was washed with cold ethanol (70%) and then resuspended in sterile 25 µl 10 mM TE buffer (pH 8.0). Total genomic DNA was also extracted from adult worms of *S. cervi* collected from the peritoneal cavity of freshly slaughtered cows at local abattoirs (Kashipur, Birbhum), washed briefly with modified Ringers medium at 37°C and stored immediately in 1 ml of TEN buffer (100 mM Tris, 5 mM EDTA, 200 mM sodium chloride, pH 7.5) at –20°C. Finally DNA was isolated as described above. In both treated and untreated dogs PCR was

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performed to check DNA integrity and to assay for the presence of *Wolbachia* in *D. immitis*. PCR was performed in 50µl of reaction mixture having 1× PCR buffer containing $(NH_4)_2SO_4$, 2 mM dNTP mix, 2 mM $MgCl_2$, 20 ng/ml each of forward and reverse primers and 1.5 units *Taq* polymerase (Fermentas). PCR products were visualized by running 5 µl of reaction mixture in 1% agarose (SRL, India) gel followed by staining with ethidium bromide (SRL, India). To confirm filarial DNA, 28S rRNA primers (BD1A-F and BD1A-R) were used (Smith and Rajan, 2000). Presence and integrity of *Wolbachia* DNA was confirmed by using *Wolbachia* 16S rRNA primers FIL-5 and FIL-6 (Smith *et al*., 2000). Annealing was done at 51°C for all three sets of primers. As negative control, sterile distilled water or DNA extracted from *Setaria cervi*, which does not have *Wolbachia* endosymbionts (Datta *et al*., 2007) was used.

Table 1: Primer sequences

Filaria 28S rRNA primers	
BD1A-F **BD1A-R**	**5′-ATGAAAGGCGTTGATATATAG-3′** **5′-GCAAGCCATGCAAGCGTTGAG-3′**
***Wolbachia* 16S rRNA primers**	
FIL-5 **FIL-6**	**5′-TGAGGAAGATAATGACGG-3′** **5′-CCTCTATCCTCTTTCAACC-3′**

2.6 Side effects of drugs

Following treatment with the test drugs the animals were kept under observation and their body weight, food intake and movement was recorded at regular intervals. The treated animals did not show any toxic effects in terms of change in body weight, food intake and movement. Serological tests were applied to pariah dogs naturally infected with *D. immitis* before and after azithromycin, acaciasides and their combination treatment. The same serological tests were performed for control dogs. Blood was analysed before and after treatment with respect to the following parameters: SGOT, SGPT and % haemoglobin.

III. RESULTS

3.1 Parasitological findings

The mf count per 0.25ml of blood did not vary appreciably during the 10 week period of observation before the commencement of treatment (data not shown). Treatment with azithromycin or azithromycin + acaciasides or acaciasides alone at the effective dose levels did not produce any apparent side effects in the treated dogs in terms of lethargy, food intake and serological tests including SGPT SGOT and % Hb (data not shown). The percent occurrence of mf/ 0.25ml of blood following treatment with azithromycin or azithromycin + acaciasides or acaciasides alone in comparison to placebo at various time intervals are shown in Figure 2.

Treatment of microfilaremic adult dogs (body weight range 8-12 kg) with azithromycin at 10 mg/kg/day for 40 days resulted in 54% ($P< 0.05$, one way ANOVA) and 57% (P<

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0.05, one way ANOVA) reduction in mf count on day 15 and 30, respectively, and the maximum reduction in mf count (70%, P< 0.01) was achieved on 40 day treatment (Fig. 18). However, treatment with azithromycin (10 mg/kg/day for 40 days) followed by acaciasides (10 mg/kg/day for 7 days) resulted in 90% clearance of mf at a faster rate on 45 day post-treatment (Fig.2).

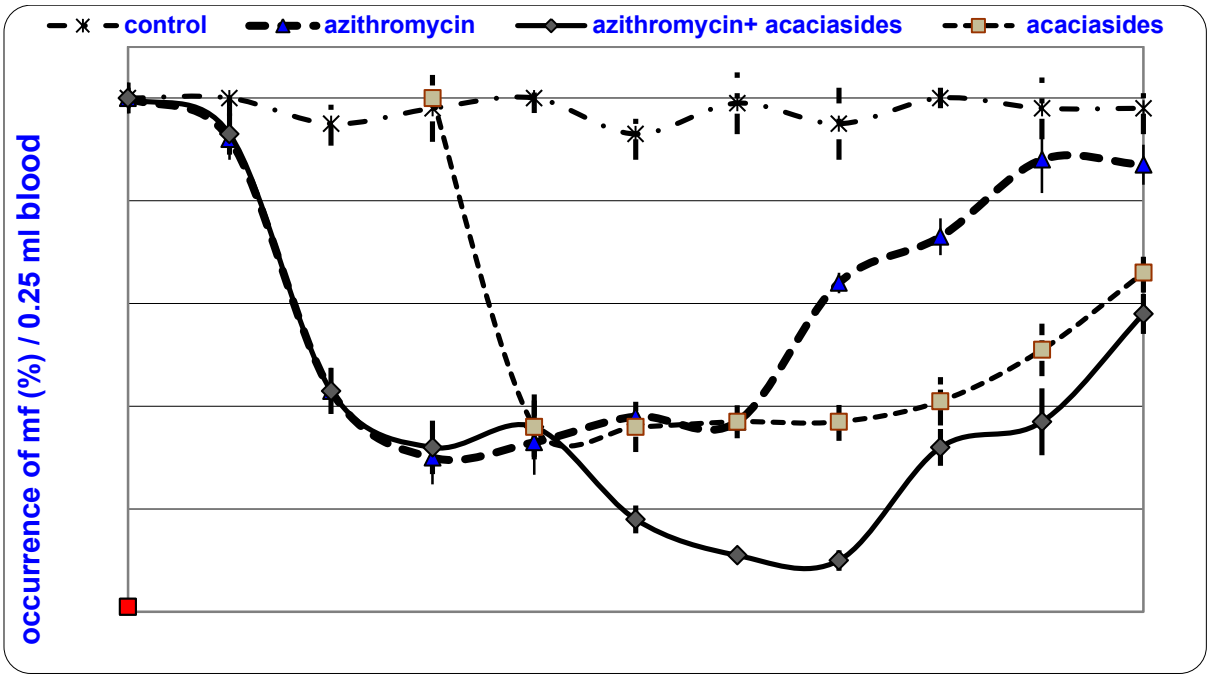

Figure 2: Percentage of microfilaria (*D. immitis*) per 0.25 ml of blood in control and treated dogs. Three dogs were kept as control and three were treated orally with azithromycin (40 days, at 10 mg/kg/day) followed by 7-day placebo treatment. Another three were treated orally with aziothromycin (40 days, at 10 mg/kg/day) followed by 7-day acaciasides (10 mg/kg/day) treatment. The remaining three were treated orally with acaciasides (7 days, at 10 mg/kg/day). Each bar represents the mean±S.D. Data were analysed by one way ANOVA. There was a significant difference between control and treated groups and among the treated groups (P<0.05). Treatment period is 0d to 47d. Post-treatment period is 15d to 120d.

In dogs treated with acaciasides only for seven days, the mf count was reduced by more than 64% (P< 0.05) on day 7 (the last day of treatment), thereafter, the mf density increased gradually to 34% reduction level on day 120 post-treatment (Fig. 2). In dogs treated with single dose ivermectin at 2 mg/kg body weight the mf population in blood disappeared totally as observed on day 15 post-treatment.

3.2 PCR of microfilaria samples

PCR amplification of *D. immitis* mf DNA using filaria specific primers, from both pre-treated (0 day, lane 2; Fig. 3) and azithromycin treated (sampling on 30 and 45 days) dogs yielded distinctive bands at 150 bp (lanes 3 and 4; Fig. 3). A comparison between pre-treated and treated dogs reveals that there was a trace of filarial specific amplified product in both treated dogs on 45 day post-treatment but the band intensity was higher in

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azithromycin treated dogs (lane 4; Fig. 3) than azithromycin + acaciasides treated dogs (lane 5; Fig. 3).

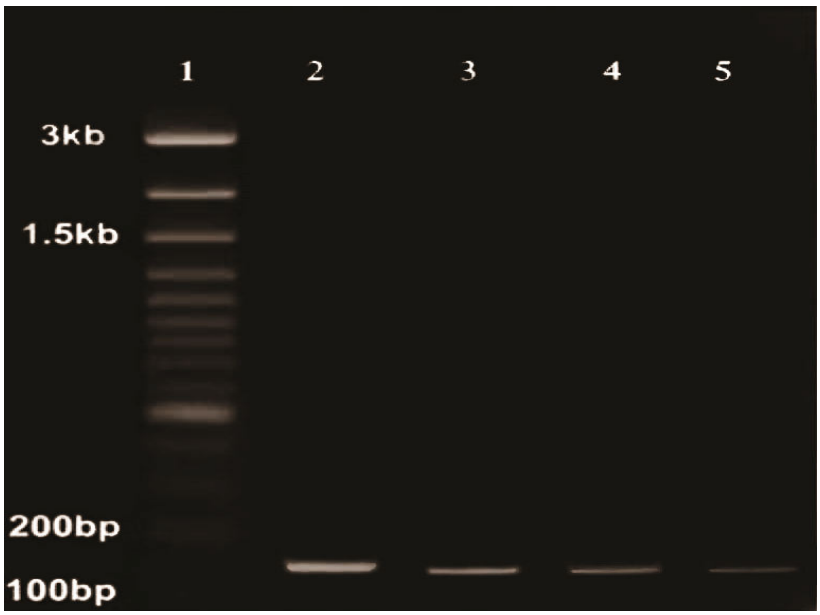

Fig. 3: PCR of mf of *D. immitis* total genomic DNA using primers (BD1A-F and BD1A-R) specific for filarial 28S rRNA before (lane 2) and after azithromycin treatment (sampling as on 30 day treatment and 45 day post-treatment; lanes 3, 4 respectively). Lane 5 is 45 day post-treatment with the azithromycin+acaciasides and yielded products of 150 bp. Electrophoretic migration pattern of DNA ladder (lane 1) is shown.

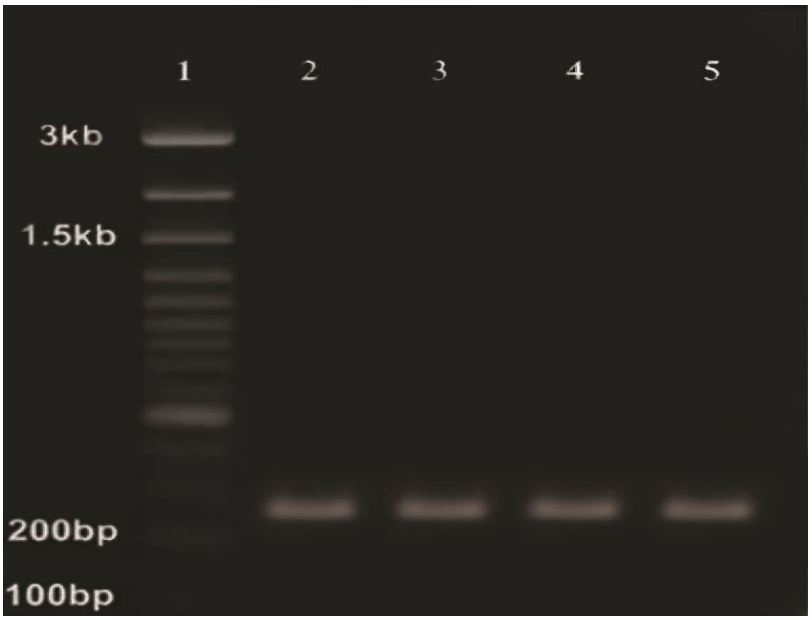

Fig. 4: PCR of mf of *D. immitis* total genomic DNA using primers (FIL-5 and FIL-6) specific for *Wolbachia* 16S rRNA before (lane 2) and after azithromycin treatment (sampling as on 30 day treatment and 45 day post-treatment; lanes 3, 4 respectively). Lane 5 is 45 day post-treatment with the azithromycin+acaciasides. Presence of a distinct band of approximately 207 bp size confirms the presence of *Wolbachia* in all the lanes. Migration pattern of DNA ladder (lane1) is shown at extreme left.

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The template DNA prepared from a calculated number of 300-1200 mf was used to determine the presence of *Wolbachia* by PCR. The data obtained were normalized against filarial 28s rRNA gene. The *Wolbachia* 16S rRNA primers produced amplified product at 207 bp after 35 cycles of amplification (Fig. 4). No depletion was found in *Wolbachia* population on day 30 (lane 3, Fig. 4) and 45 day post-treatment compared to 0 day samples (lane 2; Fig. 4) from both azithromycin (lane 4; Fig. 4) and azithromycin + acaciasides (lane 5; Fig. 4) treated groups.

IV. DISCUSSION

The principal of anti-wolbachial chemotherapy of filariasis relies on either depletion or a significant reduction of the *Wolbachia* endobacteria in the adult worms leading to sterility and eventually death of female worms (Debrah *et al*., 2006; 2007; Hoerauf *et al*., 2007). The ability to provide riboflavin, flavin adenine dinucleotide, heme and nucleotides is likely to be *Wolbachia*'s principal contribution to the mutualistic relationship, whereas the host nematode likely supplies amino acids required for *Wolbachia* growth (Foster *et al*., 2005). The lack of nucleotide synthesis would particularly affect cell division during oogenesis and embryogenesis, and this is the first parasitological feature that can be observed after *Wolbachia* depletion (Hoerauf *et al*., 2003a).

It is safe to administer azithromycin to the children indicating the rationale for including azithromycin in the anti-wolbachial chemotherapy. Treatment of onchocerciasis patients with a 5-day course of rifampicin or azithromycin or both did not cause depletion of *Wolbachia,* reduction of microfilariae in the skin or degeneration of adult worms even after 9 months of treatment indicating that a short term course with these antibiotics will not clear *Wolbachia* (Richards *et al*., 2007). A 6-week regimen of azithromycin at 250 mg/day significantly reduced the worm's burden in onchocerciasis patients but there was no change in the *Wolbachia* population in the treated worms (Hoerauf *et al*., 2008). In the present study a 40-day treatment of azithromycin at 10 mg/kg body weight/day resulted in a maximum 70% reduction in mf count compared to untreated control on 40 day post-treatment. However, the *Wolbachia* population was not reduced significantly as evident from the PCR using *Wolbachia* 16S rRNA primers. But a 40-day regimen of azithromycin at 10 mg/kg body weight/day followed by a 7-day regimen of acaciasides at the same dose reduced the mf count (90% clearance) at a faster rate on 45 day post-treatment with no effect on *Wolbachia* population.

V. CONCLUSION

A 40-day treatment of azithromycin at 10 mg/kg body weight/day resulted in a maximum 70% reduction in mf count on 40 day post-treatment but *Wolbachia* population was not reduced as shown from PCR . But the combination of azithromycin and acaciasides have a significant effect on mf count with less effect on *Wolbachia* indicating that azithromycin has effect on a minority of worms and the reduction of *Wolbachia* is not enough to play any role on the parasites. Present study supports that saponins are good as

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microfilaricide. But further work need to be done increasing the dose of saponins and duration of treatment regimen to decrease the load of *Wolbachia.*

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ANTHROPOMETRIC MEASUREMENTS AND PHYSICAL FITNESS OF BOYS ENGAGED IN GYMNASTICS

Paper ID	IJIFR/V4/ E2/ 026	Page No.	5159-5165	Subject Area	Food Science & Nutrition
Keywords	Standing Height, Body Weight, BMI, Flexibility, Physical Fitness, Anthropometric Measurements				

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Abstract

The study aims to assess anthropometric measurements and physical fitness of boys engaged in gymnastics. The subjects selected were from the age group 10- 12 years and 13-15 years. Under anthropometric measurements, standing height & body weight were measured. Body mass index (BMI) was derived. Flexibility was tested by conducting sit and reach test to assess physical fitness of the gymnasts. Significant difference at both 5% & 1% levels ($p<0.01$) was found between mean height of subjects from both the age groups 10-12 years & 13-15 years and the standards for age. Body weight of boys from the age group 10-12 years was 7.11% excess than the standard whereas a deficit of 8.15% was observed in boys from the age group 13-15 years. With reference to BMI, a significant difference was found ($z= 8.97$, $p<0.01$)for the age group 10-12 years whereas among gymnasts from age group 13-15 years, insignificant difference was found ($z=1.68$, $p>0.05$. 61% boys (10-12 years) and 62% boys (13-15 years) graded "excellent" for flexibility.

I. INTRODUCTION

The science of measuring size, shape and proportions of human body is known as anthropometry. Standing height, body weight, BMI, body circumferences like head circumference, neck circumference, chest circumference, elbow width, arm length, hip to waist ratio etc. are some of the anthropometric measurements which are widely used in the

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field of sports to assess physical dimensions of players. Anthropometry is not only a tool to monitor growth of children and general health condition of an adult but it has a vital role in an athlete's performance as well. Height, weight, arm length, BMI etc. have definite advantage in many games. (A. Thirumagal, Challenges of Academic Library Management in Developing Countries)

In each sport, certain body standards are required for excellence. Thus, it becomes a crucial factor in selection process of players. (Khasawneh Aman, 2015). A player or an athlete will surely perform well in the sport if his anthropometry matches with the required standards for the sport.

In gymnastics along with skills like flexibility and strength, specific body size and low level of body fat is important. This sport demands lot of body lifting and body rotation (Anthropometry and Gymnastics). So, a small stature and less of body fat is beneficial to perform these acts freely, accurately and gracefully (Fitness Testing for Gymnastics). Low body weight helps the gymnast to achieve a high strength- to- weight ratio (Are You a Born Gymnast?). The small stature of a gymnast gives him / her lower center of gravity, which is especially important for balancing skills (Morris Ivy, 2015).

Assessment of body composition becomes necessary in order to monitor and improve performance of a gymnast. Body mass index (BMI) has traditionally been used to measure body composition. BMI can be considered to provide the most useful, albeit crude, population level measure of obesity. Once the BMI is calculated the person is categorised as underweight, normal weight, overweight, or obese based on that value (Body Mass Index (BMI), Nande Prajakta, 2015). Thus, in sports where performance of the player fully depends on weight management, calculation of BMI becomes a necessity.

Like any other sport, physical fitness is of upmost importance in Gymnastics as well. Specific components of fitness for a gymnast include body composition, flexibility, muscular strength, muscular endurance and cardiorespiratory endurance (Allen S).

Gymnast has to be flexible enough to perform acts like splits and backbends. Flexibility is the ability to move or bend joints in a wide and complete range of motion with ease and without injury. It may also be an asset to improving coordination and balance (T. Marice Huggins, 2014). Flexibility of a gymnast can be tested from time to time and can be improved by working on it (Howard J, 2005). Sit and Reach test is one of the test for the assessment of flexibility. It measures the flexibility of the lower back and hamstring muscles (Sit and Reach Test, Jonathan K. et.al.).

Present study was undertaken to assess anthropometric measurements and physical fitness of boys engaged in gymnastics.

II. METHODOLOGY

Assessment of the gymnasts in terms of anthropometric measurements and physical fitness was the aim of this research. For this study, boys (10-12 and 13-15 years of age) engaged in gymnastics were purposively selected as sample population. 200 male gymnasts from various gymnastic clubs from Nagpur, Mumbai and Pune cities of Maharashtra were

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selected for the assessment. Injury free subjects who were practicing gymnastics regularly and have participated in competitive events were chosen.

Anthropometric Measurements: Considering the importance of body stature for excellence in the sport, anthropometric measurements like standing height and body weight of the gymnasts were recorded. The values of height and weight were recorded in cm and kg, respectively. An elastic measuring tape was used to measure height of the subjects whereas digital weighing machine was used to record body weight. BMI was calculated using the formula: Weight (kg) ÷ Height (meter)^2.

Physical Fitness: Sit and reach test was conducted to monitor the development of the gymnast's lower back and hamstring flexibility. Gymnasts were instructed to sit on the floor with shoes removed, feet flat against the table, and legs straight. In this position, gymnasts tried to reach forward and push the fingers along the table as far as possible. The distance from the finger tips to the edge of the table was measured and recorded as the score of that gymnast. The same procedure was repeated thrice and the longest distance measured was considered for analysis.

Statistical Analysis: Data was gathered, compiled and classified on the basis of age group. Mean, standard deviation, range & percentage were calculated. Data was then compared with reference values of respective age group using z test. Difference was tested at both 5% & 1% levels of significance.

III. RESULTS AND DISCUSSION

Anthropometric measurements like height, weight and BMI of gymnasts are represented in Table 1. Mean height of boys from the groups 10-12 years & 13-15 years was recorded as 140.25cm and 157.43cm, respectively. Boys from both age groups showed significantly shorter height than the standards for age ($z=7.46$ & $z=6.39$ males for age groups 10-12 &13-15, respectively, $p<0.01$). The % deficit was calculated as -3.48% and -2.88%, respectively for 10-12 years & 13-15 years. Older boys were found to be significantly taller than younger boys ($z=17.2$, $p<0.01$). **Erlandson, M. C. et al. (2008)** reported that gymnasts were significantly shorter than tennis players and swimmers at all chronological ages during adolescence. For the present study, height showed significantly positive correlation with body weight ($r= 0.5668$ & 0.4471, respectively for 10-12 & 13-15 years, $p<0.01$).

Mean values of body weights of gymnasts from age groups 10-12 years and 13-15 years were 26.74 kg and 43.72 kg, respectively. In comparison with the standards for age, younger gymnasts (10-12 years) were found to be significantly heavier ($z=3.73$, % excess: +7.11) & older gymnasts (13-15 years) were found to be significantly lighter ($z=5.13$, % deficit: -8.15). Greater variation was found in the body weights within the groups. The observed range for body weight was 25.00 - 52.00 kg for 10-12 years of boys and 35.00- 64.00 kg for 13-15 years of boys (Table 1).

BMI was calculated and gymnasts were categorised accordingly. Mean BMI values of boys aged 10-12 years& 13-15 years were 18.63 kg/m^2 and 17.63 kg/m^2, respectively. Between age group difference was found to be significant at 5% level ($0.01<p<0.05$). Gymnasts from

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age group 13-15 years possessed lower mean BMI than gymnasts from age group 10-12 years (z=2.57) which could be attributed to larger increment in height of older subjects. Younger group of gymnasts showed significantly greater mean value of BMI than the standard for age (z=8.97, p<0.01) with %excess calculated as 15. In contrast, older age group of gymnasts showed lower mean BMI value than the standard for age, however, the difference was insignificant (z=1.68, p>0.05). % deficit for this age group was recorded as 2.59 (Table 1). BMI showed direct relationship with body weight among boys aged 10-12 & 13-15 years (r=0.8430 & 0.8419, respectively, p>0.05).

Table 1: Data on Height, Weight & BMI (Body Mass Index) of Subjects

Sr. No.	PARAMETERS	10-12 Yrs (n=100)	13-15 Yrs (n=100)	z Values#
HEIGHT (cm)				
I	**M±SD**	**140.25±6.77**	**157.43±7.31**	**17.2***
Ii	**Range**	129.00-161.00	146.00-174.00	
Iii	**Standard**	145.30	162.10	
Iv	**z Values§**	**7.46***	**6.39***	
V	**%Deficit**	-3.48	-2.88	
WEIGHT (kg)				
i	**M±SD**	**36.74±6.55**	**43.72±7.56**	**6.98***
ii	**Range**	25.00-52.00	35.00-64.00	
iii	**Standard**	34.30	47.60	
iv	**z Values§**	**3.73***	**5.13***	
v	**%Excess/Deficit**	+7.11	-8.15	
BMI (kg/m^2)				
i	**M±SD**	**18.63±2.71**	**17.63±2.79**	**2.57****
ii	**Range**	14.13-27.71	13.55-26.64	
iii	**Standard**	16.2	18.1	
iv	**z Values§**	**8.97***	**1.68**	
v	**%Excess/Deficit**	+15.00	-2.59	

 # - z values are for between group comparison (i.e. comparison between age groups 10-12 yrs & 13-15 yrs); § - z values are for comparison between data of subjects & standards;* - Significant at both 5 % and 1% levels (p<0.01); ** - Significant at 5 % level but insignificant at 1 % level (0.01<p<0.05); Values without any mark indicate insignificant difference at both 5% & 1% levels (p>0.05).

Percentage wise distribution of subjects based on BMI grades is shown in Fig.1. Majority of the subjects were categorised as normal weight (5^{th} percentile to less than the 85^{th} percentile). All the boys (100%) from 15 years of age were categorised under "normal weight" followed by boys of 11+ years of age (91.18%). None of the boys were "underweight" in the age group 11+ years. 29. 27% boys aged 10+ & 16% boys aged 12+ were "overweight" for their BMI. Very few gymnasts from 10+, 11+, 12+ & 13+ were categorised as "obese" which could be due to growing age weight gain.

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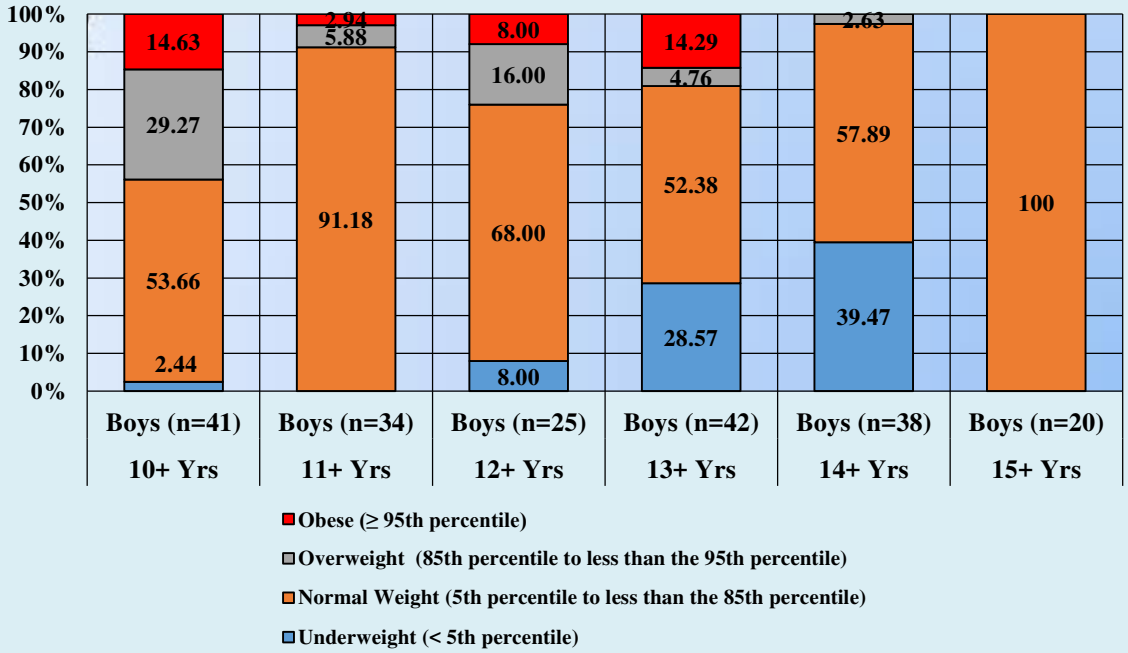
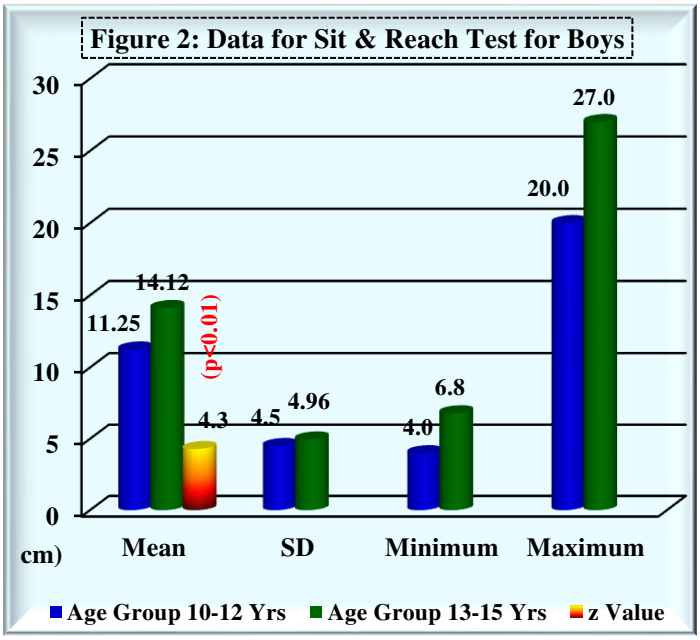
Figure 1: Percentage Wise Distribution of Boys Based on BMI Grades



Sit & reach test was conducted to assess physical fitness in terms of flexibility of gymnasts. The results of this test are presented in Fig. 2. Mean of the distance reached by boys 10-12 years and 13-15 years were 11.25 cm & 14.12 cm, respectively. Between age group comparison revealed significant difference ($z=4.3$, $p<0.01$). Age correlated positively with age ($r=0.0900$ & 0.0921, respectively for age groups 10-12 & 13-15 years, $p>0.05$). Minimum & maximum distance reached by male gymnasts of 10-12 years of age was 4.0 cm and 20.0 cm, respectively whereas in the age group 13-15 years, minimum & maximum distance reached was 6.8 cm and 27.0 cm, respectively. Heavier the body weight lower was the flexibility of gymnasts. Here, results of flexibility correlated negatively with weight & BMI among younger gymnasts ($r=-0.1583$ & -01963, respectively, $p>0.05$). However, weight & BMI showed positive correlation with the performance of sit & reach test among boys from age group 13-15 years ($r=0.3886$ & 0.4838, respectively, $p<0.01$), hence, showed positive effect of longer engagement in this game.

Figure 2: Data for Sit & Reach Test for Boys



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Percentagewise distribution (Fig.3) showed majority of boys from both the age groups had excellent flexibility (61% from age group 10-12 years and 62% from 13-15 years of age). None of the subjects from 13-15 years group were categorised for "below average" or "poor flexibility". Thus, it can be said that 13-15 years of boys demonstrated superior flexibility when compared to 10-12 years of boys which showed regular effect of engagement in the game of gymnastics.

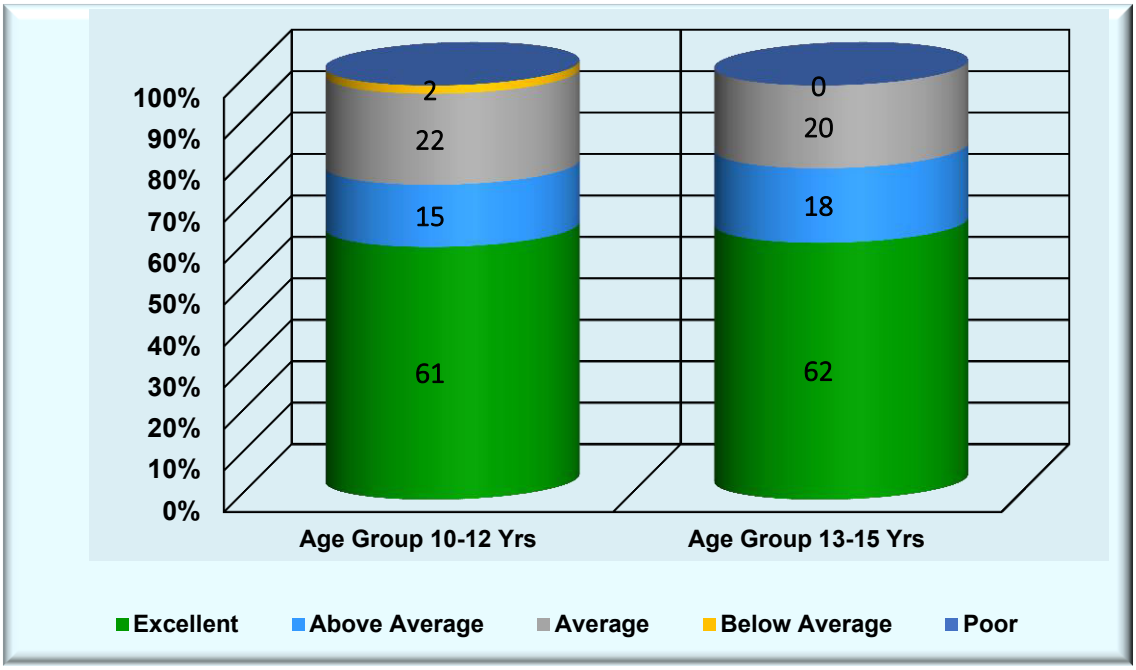

Figure 3: Percentage Wise Distribution of Boys Based on Performance Assessment for Distance Reached

IV. CONCLUSION

From the results of the study, it can be said that there found positive effect of regular engagement in the sports of gymnastics as majority of subjects demonstrated excellent results for sit & reach test. Height is genetically inherited & also, height & weight are influenced by nutritional intake. Subjects can achieve new heights in this game which can be coupled with regular appropriate training& sound nutrition.

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COMMODITY MARKET ANALYSIS WITH SPECIAL REFERENCE TO GOLD

Paper ID	IJIFR/V4/ E2/ 014	Page No.	5166-5175	Subject Area	Financial Analysis
Keywords	Risk, Diversified Portfolio, Margin, Safety, Commodity Market				

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Abstract

The commodities markets are one of the fastest growing areas in the investment world. A commodity market is an exchange for buying and selling of commodities for future delivery. Commodity trading in India started much before it started in many other countries. However, years of foreign rule, draughts and periods of scarcity and government policies, caused the commodity trading in India to diminish. Commodity trading was however restarted in India recently, but a lot more developments and initiatives needs to be taken in this avenue. Investing on commodities offers protection against risk, diversified portfolio, trading on lower margin and safety. The study focuses on understanding the concepts and mechanism of commodity trading with special reference to Gold. It also aims to analyze the factors that influence the prices of gold and analyze the gold trend in the commodity market.

I. INTRODUCTION

Commodity markets are markets where raw or primary products are exchanged. These raw commodities are traded on regulated commodities exchanges, in which they are bought and sold in standardized contracts. The commodities market consists of the trading of forward contracts or futures contracts; forward contracts are contractual agreements to buy/sell any commodity bet there in two entities; futures contracts are market agreements to buy/sell very specific commodities bet there in two entities over a recognized commodities

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exchange. It is a physical virtual market place for buying and selling of raw or primary products. For investors' purposes there are currently about 50 major commodity markets worldwide that facilitate investment trade in nearly 100 primary commodities. Commodities are split into two types: hard and soft commodities. Hard commodities are typically natural resistless that must be mined or extracted (gold, rubber, oil, etc.), whereas soft commodities are agricultural products or livestock (corn, wheat, coffee, sugar, soybeans, pork, etc.)

1.1 GOLD

Gold is a natural resource available all over the world but not in abundant. In science it has atomic number 79 and symbolized as AU. It is highly Precious metal and is invested in coins, jewels, bars, certificates, accounts etc. It is attracted by all the human beings as source of prestigious thing or the source of investment to make maximum returns. In India gold has become very prestigious metal from the ancient days itself, it stands for its unique property and it is treated a asset and core wealth by the people According to the investors owning gold is very much safe because all over the globe gold is same there is no difference in production and people think it will help in difficult situation as there is high liquidity power. Investing in gold is safe because it doesn't include the crop rotation fluctuation in the market. All over the world gold is accepted and traded as a commodity.

1.2 FEATURES OF GOLD

- It can be source of investment
- It is treated as safe haven
- It is an asset diversifier
- It has high liquidity power
- It acts an insurance

1.3 GOLD AS AN INVESTMENT AVENUE

Investing in gold is booming from the past two decades. The investors will invest in this to protect themselves from the political, economical, inflation, social disaster. However it is subjected to risk in the market especially in futures contracts and derivatives. Even the government will invest in this product to secure from the inflation and gold has become more like currency rather than commodity.

1.4 INVESTMENT SOURCES

1. Gold Bars
2. Gold Coins
3. Gold Exchange –Traded Products(ETPs)
4. Gold Certificates
5. Gold Accounts
6. Gold Mining companies
7. Derivatives

1.5 FACTORS AFFECTING GOLD PRICE

The major factors impacting the gold price can be summarized as under:

- Demand for the product

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- Inflation rate
- Value of dollar
- Gold reserve
- Monetary policy
- Speculation in the market
- Supply of the product
- Growth in demand for exchange traded paper backed products

II. REVIEW OF LITERATURE

Technical analysts argue that their methods take advantage of market psychology as illustrated by the quotation from Pring (1991) above. In particular, technical textbooks such as Murphy (1986) and Pring (1991) outline three principles that guide the behavior of technical analysts. The first is that market action (prices and transactions volume) "discounts" everything. In other words, an asset's price history incorporates all relevant information, so there is no need to forecast or research asset "fundamentals." Indeed, technical purists don't even look at fundamentals, except through the prism of prices, which reflect fundamentals before those variables are fully observable.

Commodity markets are asset markets where market players buy for use and sell for gain. Commodity markets are complex because many factors play a role in relation to their costs. Such factors include the weather, inventories, supply, demand, and technology (Baffes, 2013). Over the recent decade, commodity markets have often been in the spotlight due to a high amount of volatility in the markets, but as mentioned the interest is not new. Ludwell Moore (1921) examined the existence of cycles through history, and did find some evidence of cycles. However, he did not find anything that could predict either the length or depth of those cycles in commodity markets. As other following studies have shown, commodity markets have been volatile and appearing to be random. Nevertheless, that has not prevented the popularization of technical analysis tools that are thought to be able to predict future movements in commodity prices (Bundgaard, 2013), which is what any procurement function would like to be able to do as argued above. Consequently, this paper aims at helping companies at least understand whether they can use technical analysis as a reliable predictor of future movements or if commodity markets truly do behave in a random fashion.It is relatively easy to highlight situations where arbitrage cannot be traded away in commodity markets. First of all, national policies and regulations may create such high transaction costs for certain commodities (Zapoleon, 1931; Caine, 1958). there may not be any open market where a commodity is traded. If the commodity is not traded, it is obviously impossible to trade away arbitrage opportunities. Nevertheless, there are commodities which are somewhat freely and openly traded across the globe (Baffes & Haniotis, 2010; Baffes, 2013). By choosing those commodities, and avoiding commodities that are prone to non-random shocks, e.g. oil and its dependence on OPEC policies, it can plausibly be considered that arbitrage opportunities should be traded away in the market data.

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III. RESEARCH METHODOLOGY

3.1 STATEMENT OF THE PROBLEM

When investing for a long and a short term there may be differences in fundamental analysis and technical analysis. Because calculation of fundamental analysis in commodity market is difficult this depends upon the supply and demand for the resources. The highlight of the study is to appropriate use of technical analysis in order to facilitate the investors in decision making.

3.2 NEED FOR THE STUDY

Commodity markets are where raw or primary products are exchanged. Commodity market is of two types i.e., Hard (Non-Agricultural) and Soft (Agricultural) commodities here Hard commodities are typically Nonagricultural or natural resources (Gold, Silver, Copper, Natural Gas) and Soft Commodities are the agricultural commodities(Coffee, Corn, Wheat, Sugar). The problem faced by the participants in the market is to predict the price movement of the commodity and to take the right decision when to entry and exit the market to make a maximum profit. As Gold Commodities are more sensitive in the market, their price prediction is rigorous job. Thus, there is a need to study the present scenario of the performance of the non-agricultural commodities in Indian stock market.

3.3 OBJECTIVES OF THE STUDY

- To study and analyze the commodity market of selected non-agricultural product i.e., Gold
- To study the price volatility among commodity market of selected non-agricultural product i.e., Gold
- To identify the co-relationship between Gold price and Dollar exchange rate.

3.4 SCOPE OF THE STUDY

- Studying the commodity price movements in the market.
- Analysis of the relationship of gold with the exchange rates.
- Helps in buying and selling strategy by recognizing the trend reversals in a formerly stage.
- To help investors in decision making.

3.5 METHODOLOGY ADOPTED

Research methodology stands a way to systematically resolve the research problem. It is a scientific way of studying how research is done scientifically approved by the researcher in reviewing research problem alongside with the reason behind study. It is essential for the researcher to distinguish not only the research methods and procedures but also the methodology.

- **Sample size**

The sample consists of one commodity – from MCX market, on the basis of the research objectives. This study is mainly based on the Gold prices in Indian commodity market.

- **Data Collection**

The research is purely based on secondary data.

- Secondary Data

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Secondary data was collected by referring to following sources:
Alpha Commodities Private Ltd Online publication, BSE websites, Text books & Research Journals

- **Study Period**

The study includes a period of 5 years covering from 2011-2015.

- **Source of Data**

The main source of data is collected through websites of BSE, MCX to obtain the historical prices. Also the other relevant data required for the purpose of the study was gathered from the various websites, publications, magazines and reports prepared by research scholars.

➢ **Statistical tools and indicators used**

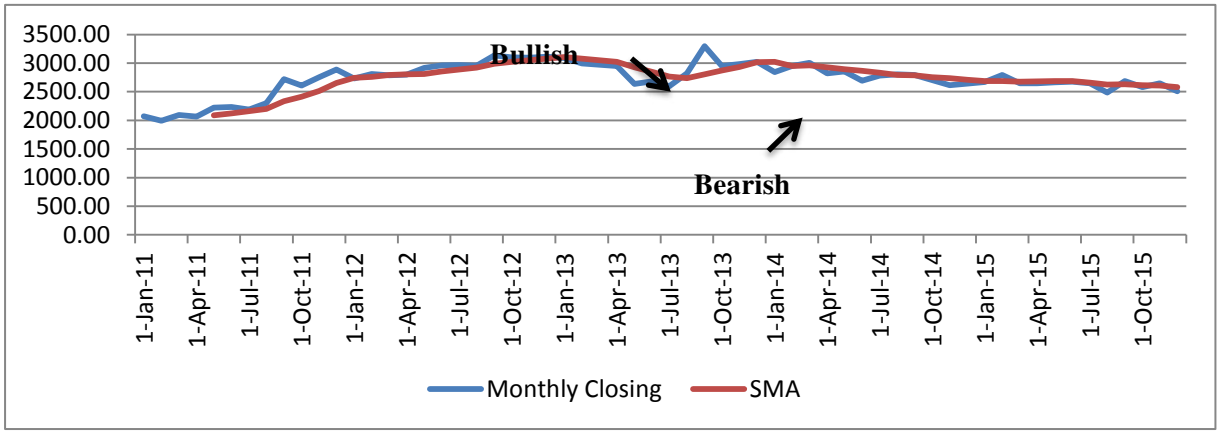
- Simple Moving Averages
- Moving Average Convergence Divergence
- Bollinger Band Width
- Relative Strength Index
- Correlation

3.6 LIMITATIONS OF THE STUDY

- Study is confined only to the commodity market in Indian context.
- The study of this analysis was mainly based on historical data.
- The study is considered a period of five years (20011-2015).

IV. DATA ANALYSIS AND INTERPRETATION

4.1: SIMPLE MOVING AVERAGES (SMA)



Graph 1: Simple Moving Averages

Interpretation:

The SMA is plotted using last 5 years data of gold. Here 5 months moving average has been taken to construct the Simple Moving Averages. The 5 years chart of Simple Moving Averages shows that on many occasions monthly moving average line cuts the 5 months Simple Moving Averages line from top to bottom which signals bearish market and it is right time to go out of the market and some time the monthly moving average line cuts the 5 months Simple Moving Averages line from bottom to top which signals bullish market and

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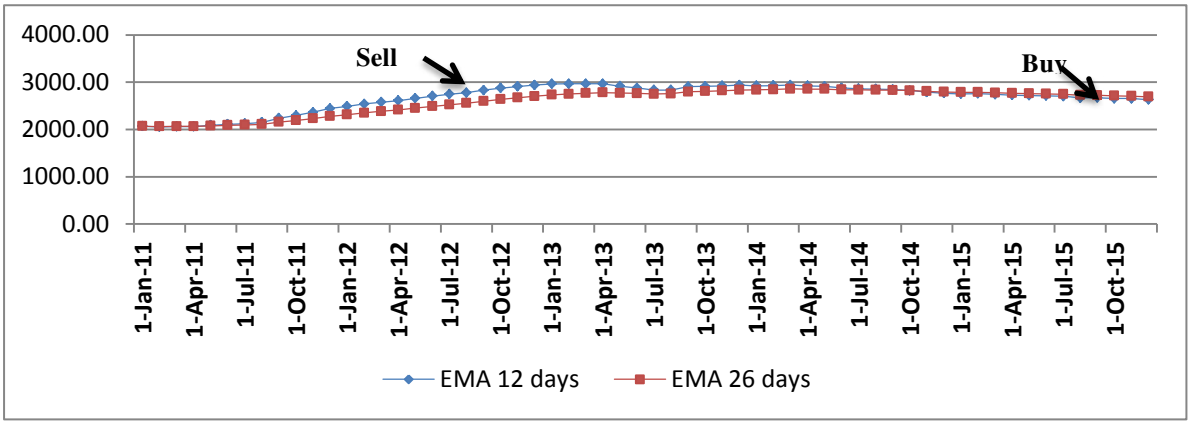
it is right time to invest in the market. For example, in December 2015 the Simple Moving Averages and monthly moving averages are closely equal hence it is not a buying signal to the investors.

4.2: MOVING AVERAGE CONVERGENCE DIVERGENCE (MACD)

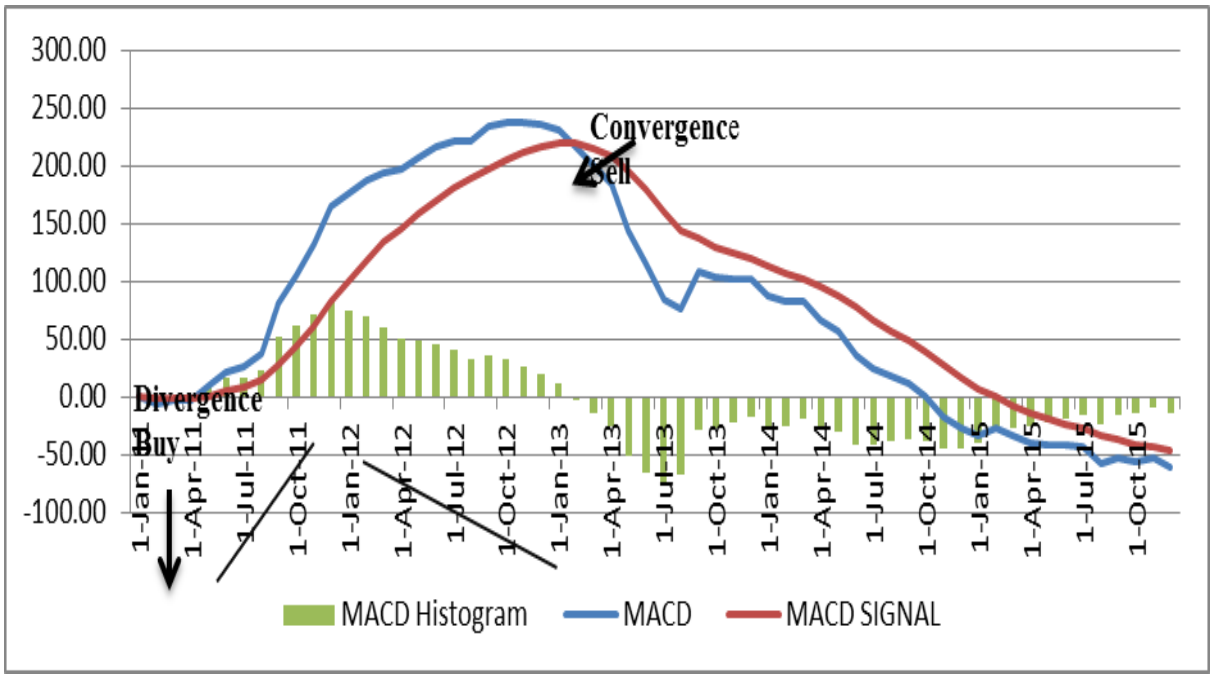


Graph 2: Moving Average Convergence Divergence (MACD)

Interpretation:

The Moving Average Convergence Divergence is plotted using last 5years data of gold. Here, MACD is calculated through Exponential moving average (EMA) 12 and EMA 26 period. If EMA 26 line is above the EMA 12 line then it is bearish signal vice versa if the EMA 12 line is above the EMA 26 line then it is bullish market signal. The average closing price of EMA 12 in December 2015 is 2632 which is less than the EMA 26 in December 2015, 2692 thus it is advisable to buy the commodity in the market.

4.3: MOVING AVERAGE CONVERGENCE DIVERGENCE HISTOGRAM



Graph 3: Moving Average Convergence Divergence Histogram

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Interpretation:

The histogram is calculated to identify the Convergence and Divergence. If the MACD Histogram is shrinking in height then it leads to the Convergence then it is potential sell signal and if the MACD Histogram is increasing in height then it leads to the Divergence then it is potential Buy signal to the investors. If the MACD crosses the MACD Signal then it is advisable to buy the commodity or if the MACD signal crosses the MACD line then it is advisable to sell the commodity. In the year April 2011 the market is in divergence hence it is to be bought and in the year April 2012 the market is turning to convergence hence it is to be sold in the market.

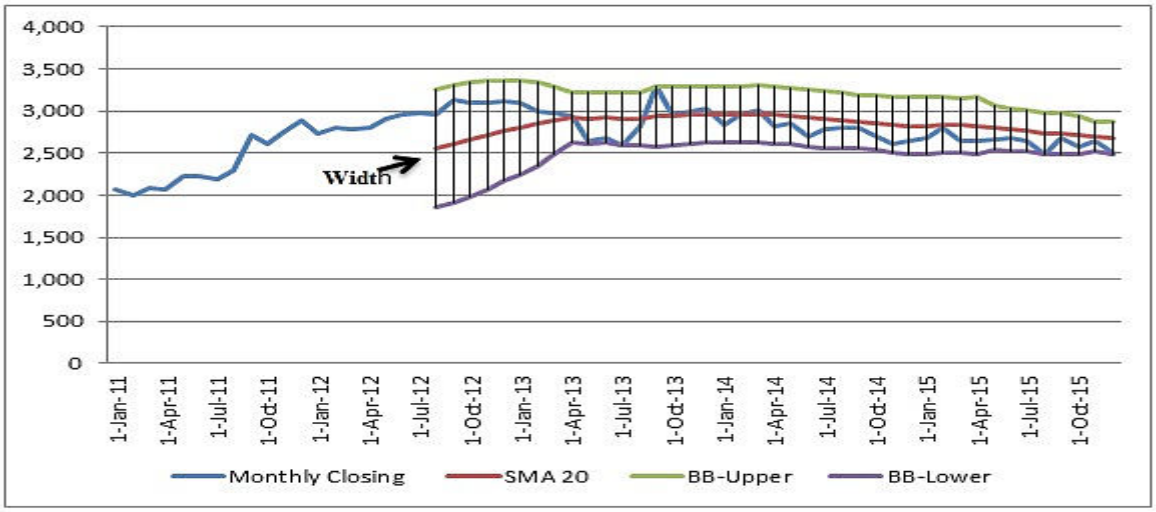
4.4: RELATIVE STRENGTH INDEX (RSI)

Graph 4: Relative Strength Index

Interpretation:

The RSI graph shows the overbought and oversold areas. The RSI values from 30 and below indicates a good opportunity to buy the commodity and the RSI values from 70 and above indicates a good opportunity to sell the commodity. But as it is clear in above graph in the year 2015 there is no signal to buy or to sell thus it is recommended to hold the commodity still for a long term.

4.5: BOLLINGER BAND WIDTH (BBW)



Graph 5: BOLLINGER BAND WIDTH

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Interpretation:

The width between Upper and Lower band refers to the volatility of the prices of the commodity, the higher the width the greater the volatility in this time it is advisable to sell the commodity and when there is low volatility the investor either buy or retain the commodity. . If the closing prices touch the Upper Bollinger Band then the commodity is overbought and if the prices touch the lower Bollinger Band then the commodity is over sold in the market. It is advisable to buy the commodity when the stocks prices hits the lower band and to sell when the prices hits the upper band.

4.6: CORRELATION BETWEEN GOLD AND DOLLARS EXCHANGE RATE

H0: There is no significant relationship between gold price and dollar exchange rate.

H1: There is significant relationship between gold price and dollar exchange rate.

Table 1: Correlation between Gold and Dollars Exchange Rate

	Gold	Dollars
Pearson Correlation	**1**	**-.838****
Sig. (2-tailed)		**.000**
N	**60**	**60**

****. Correlation is significant at the 0.01 level (2-tailed).***

From the above table it is found that the correlation value is 0.000 that is below 0.05. So, it is significant, hence reject null hypothesis (H0) and accept alternative hypothesis (H1).

Inference

As the correlation value is -0.838 it indicates that the inverse relationship exist between the gold price and dollar exchange rate in India. That shows there inverse effect among variables where if the dollar price increases then the gold price will decrease and if dollar price decreases then the gold price will increase.

V. SUMMARY OF FINDINGS

- Analyzing the commodity market helped to find out the gold price volatility.
- Technical analysis was more helpful in decision making about the commodity market and reduced the errors in forecasting. The various tools in technical analysis were complicated but it has given the realistic results.
- The performance of gold in the year 2015 was in bearish. It has been fluctuating from Rs.3298 to Rs.2509 by the end of the year.
- The overall performance of gold indicates the low returns for short term investment and the high returns for long term investments.
- SMA shows the price fluctuations in the market. The gold price is too sensitive in the market.
- MACD shows the relationship between the MACD histogram and the MACD signal line which helps in taking decisions regarding the entry period and exit period.

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- Bollinger band is helpful to analyze the market when they are over bought and over sold in the market and it is also helpful to analyze the price volatility of the gold prices which are dependent on their band width.
- According to Relative Strength Index when it is above 70 it is advised to sell the commodity and if it is below 30 it is usually recommended to buy the commodity.
- The gold and dollar exchange rate share the inverse relationship where if dollar increases the prices of gold decreases and if the dollar price decreases then gold prices increases in the market.

VI. SUGGESTIONS

- Gold is a precious metal; its value cannot not be diminished in a shorter time. But even then there are some investment rules:
- Before investing, an investor should have clear and adequate knowledge of stock market so that they can earn maximum returns.
- The commodity i.e., gold is a very complex financial instrument. Thus the traders must analyze the trend of the market.
- Investing for short term gains in current scenario will not be helpful as both commodity markets are in bearish market, the investor can go for long term investment to maximize the returns.
- The traders should not enter into the market in bullish period they need to wait till the bearish market ends and then they need to invest when market gives positive signal to buy the commodity.
- Investors should not buy in bulk volume because of high price fluctuations. If the investors invest in one shot then they cannot buy when the prices goes down. So it is advisable to buy in small quantities.

VII. CONCLUSION

The analysis emphasized on the commodity market which gave a real time experience in this field and thereby the study could reflect positive from the investor's perspective. The last five years price movements of gold shows that the investors are satisfied by the reasonable returns from commodity market. Investors can make substantial returns only if investments are made in disciplined manner. The blind investments have always let too many blunders; an investor should always analyze the market by using the analytical tools for investments purpose. Investors can succeed in their investment only when they are able to select the right commodity at right time. The investors should closely watch the situation like market price, economy, returns and risk associated with the commodity before taking the decision to invest. Thus, by utilizing the investment opportunities available in the commodity market will help in maximizing the returns. Finally, as per the present trend and the analysis it can be concluded that, in commodity market there is high possibility of getting good returns, therefore it can be suggested that the investors can invest in gold market without any hesitation.

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HEDGING THE RISK OF FUTURES – A COMPARITIVE STUDY IN IT AND FMCG SECTOR

Paper ID	IJIFR/V4/ E2/ 015	Page No.	5176-5183	Subject Area	Financial Analysis
Keywords	Risk, Hedging, Beta, Sensitivity, Index				

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Abstract

Many of the participants in futures markets are hedgers. This risk might relate to fluctuations in the price of oil, a foreign exchange rate, the level of the stock market, or some other variable. A perfect hedge is one that completely eliminates the risk.For the most part, therefore, a study of hedging using futures contracts is a study of the ways in which hedges can be constructed so that they perform as close toperfect as possible.This comparative study is on hedging the risk of futures in IT Sector (Infosys, TCS, Wipro, Tech Mahindra and HCL Technologies) and FMCG sector (Hindustan Uniliver, Pidilite Limited, Godrej, Dabur, Britannia). Data of each company has been analysed with the help of Beta which reflects the sensitivity of the movement of scrip relative to the movement of the index.

I. INTRODUCTION

A derivative instrument, broadly, is a financial contract whose payoff structure is determined by the value of an underlying commodity, security, interest rate, share price index, exchange rate, oil price, and the like. Derivatives are specialized contracts which are employed for a variety of purposes including reduction of funding costs by borrowers, enhancing the yield on assets, modifying the payment structure of assets to correspond to

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the investor's market view, etc. However, the most important use of derivatives is in transferring market risk, called hedging, which a protection against losses is resulting from unforeseen price or volatility changes.

A future contract is a standardized contract between two parties commits to sell, and the other to buy, a stipulated quantity(and quantity, where applicable)of a commodity, currency, security, index or some other specified item at an agreed price on a given date in the future.

Hedging is the prime reason for development of future contracts. Stock index futures can be effectively used for hedging purposes. They can be used while taking a long or short position on a stock and for portfolio hedging against unfavourable price movements.

A short hedge is a hedge that involves a short position in futures contract. It is appropriate when the hedger already owns an asset and expects to sell it at some time in the future.

Hedges that involve taking a long position in a futures contract are known as long hedges. A long hedge is appropriate when a company knows it will have to purchase a certain asset in the future and wants to lock in a price now.

II. REVIEW OF LITERATURE

In the Indian context, Naik and Jain (2002) examine prices from the older regional exchanges, and show that information flows from the futures market to the spot markets. Kumar et al. (2008) analysed the hedging properties of the Indian commodity futures using data for both agricultural and non-agricultural commodities for the period from 2004 to 2008. They find that the effectiveness of the futures contracts to hedge risk was low. They also find that hedging effectiveness is lower for non-agricultural commodity futures compared to agricultural commodity futures.

Hedging in the spot market is particularly useful in case of any long-term requirement for which the prices have to be confirmed to quote a sale price but to avoid buying the physical commodity immediately to prevent blocking of funds and incurring large holding costs (Tomek and Peterson, 2001). Switzer and El-Khoury (2007) investigate the efficiency of the New York Mercantile Exchange (NYMEX) Division light sweet crude oil futures contract market for the recent periods of extreme conditional volatility. Crude oil futures contract prices are found to be unbiased predictors of future spot prices. Both futures and spot prices exhibit asymmetric volatility characteristics. Hedging performance is improved when asymmetries are accounted for.

In financial parlance, risk is any variation from an expected outcome. So, for an investor, risk includes an outcome when one may not receive the expected return (Stein, 1961). Traditionally, hedging has been motivated by the desire to reduce risk by taking a position opposite to the exposure. The quest for better hedge has been the motive for sophisticated risk management and hedging techniques. Derivatives are used as a tool to transfer risk, i.e., for hedgers (Bodla and Jindal, 2006) and, therefore, they are extensively used as hedging instruments worldwide, including emerging markets like Malaysian, Italian and Portuguese equity markets. However, hedging one's stock position through futures and options is still the road less travelled in India. Even when it is done, the techniques used have been too

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naïve and primitive. Lack of suitable hedging models for the Indian market is a challenge to the risk management system of participants and regulators. It is also a deterrent for attaining greater market depth, and may severely affect the stability of Indian markets. Further, availability of high frequency data in the recent past will help validate such models empirically.

III. STUDY DESIGN

3.1 STATEMENT OF PROBLEM

- To what extent the existing futures contract are suitable for hedging?
- What is the extent of risk involved in FMCG and IT sector?

3.2 NEED FOR THE STUDY

Stock index futures contracts can be used to manage investment exposure and control the risk related to movements in equity market in a well-diversified portfolio of stocks through the use of hedging strategies, thus the study is based on hedging the risk of futures in IT sector and FMCG sector, which would in turn enable the investors in the futures market to be aware of the risk involved in these sectors and mitigate the same.

3.3 OBJECTIVES OF THE STUDY

- To analyse the hedging effectiveness of futures market.
- To examine the market efficiency of futures market.
- To hedge the risk involved in the future market.

3.4 SCOPE

The study is confined to FMCG and IT sector. The study uses hedge ratio model. The study is done in order to minimize the risk involved in futures market. Further the study could explore the relationship between future returns and volume of trade.

IV. RESEARCH METHODOLOGY

4.1 TYPE OF RESEARCH

The study is based on the analytical research method.

4.2 TYPE OF DATA COLLECTION

Data required for hedging the risk of futures study is secondary data which are collected from various resources from official website of NSE, Wikipedia and textbooks to collect information.

4.3 SAMPLE USED IN THE STUDY

The sample used for the study are FMCG Future price and Index price of Hindustan Uniliver, Pidilite Limited, Godrej, Dabur, Britannia. Samples of IT sector Future price and Index price areInfosys, TCS, Wipro, Tech Mahindra and HCL Technologies, for the period of 1 month that is 25th July 2016 to 19th August 2016.

4.4 LIMITATIONS OF THE STUDY

The analysis is limited to 1month that is 25 July 2016 to 19th August 2016. It would have been better if the analysis is based on various hedge ratio models.

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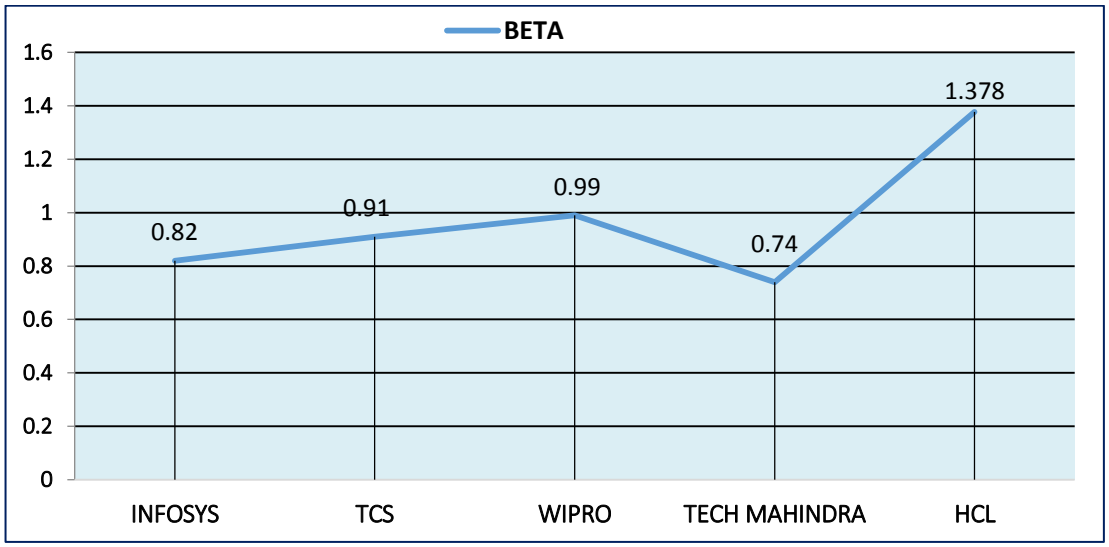
V. DATA ANALYSIS & INTERPRETATIONS

5.1 IT SECTOR

Table 1: The Value Of Beta And Alpha

COMPANY	BETA	ALPHA	REGRESSION
INFOSYS	0.82	0.12	Y=0.12+0.82X
TCS	0.91	-0.01	Y=-0.01+0.91X
WIPRO	0.99	0.26	Y=0.26+0.99X
TECH MAHINDRA	0.74	0.34	Y=0.34+0.74X
HCL	1.38	2.48	Y=2.48+1.38X
PORTFOLIO	0.97	0.64	Y=0.64+0.97X



Graph 1: Chart Showing The Changes In Beta Value Of IT Sector

INTERPRETATION:

- The systematic risk of Infosys is 0.82, the stock and the market move in the same direction; however, the stock is relatively less risky. A move of 1% in the market influences the stock to move up by 0.82%. In order to hedge the risk, for an instance of 100 contracts, 82 contracts must be hedged. The unsystematic risk of INFOSYS is 0.12. The regression of the company is Y= 0.12+0.82X, for instance if the investor gets a return of 2% in the market then the investor would earn a return of 1.76% in the futures market.
- The systematic risk of TCS is 0.91, the stock and the market move in the same direction; however, the stock is relatively less risky. A move of 1% in the market influences the stock to move up by 0.91%. In order to hedge the risk of TCS, for an instance of 100 contracts 91 contracts must be hedged. The regression of the company is Y= -0.01+0.91X, for instance if the investor gets a return of 2% in the market then the investor would earn a return of 1.81% in the futures market.

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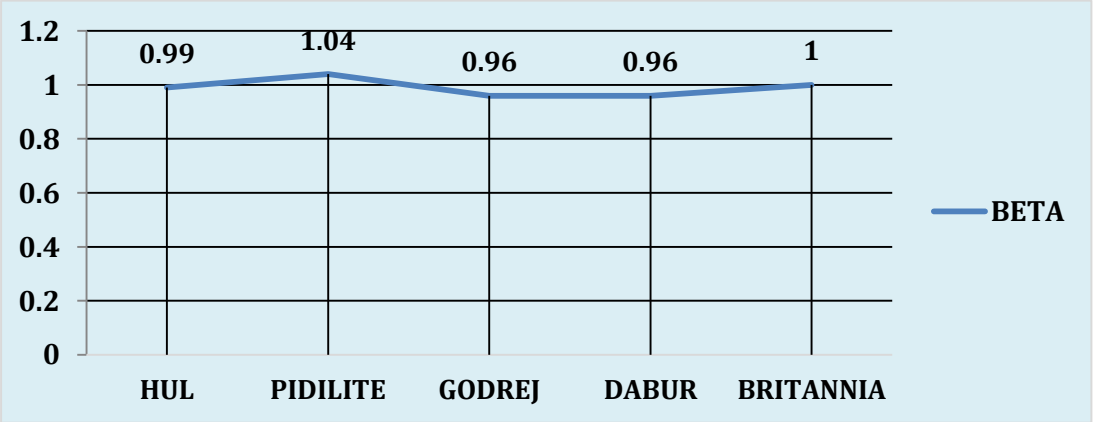
- The systematic risk of WIPRO is 0.99 which is very close to the standard condition of β=1, which moves according to the market. A move of 1% in the market influences the stock to move up by 0.99%. In order to hedge the risk, for an instance of 100 contracts, 99 contracts must be hedged. The unsystematic risk of WIPRO is 0.26. The regression of the company is Y=0.26+0.99X, for instance if the investor gets 2% returns in the market then the investor would earn a return of 2.24% in the futures market.
- The systematic risk of TECH MAHINDRA is 0.74, which is relatively less risky. A move of 1% in the market influences the stock to move up by 0.74%. In order to hedge the risk, for an instance of 100 contracts, 74 contracts must be hedged. The unsystematic risk of TECH MAHINDRA is 0.34. The regression of the company is Y=0.34+0.74X, for instance if the investor gets 2% returns in the market then the investor would earn a return of 1.4 %in the futures market.
- The systematic risk of HCL is 1.38 it means the stock moves in the same direction as the markets; however, the stock tends to move 38% more than the market. In order to reduce the risk of HCL, for an instance of 100 contracts 138 contracts must be hedged. The unsystematic risk of HCL is 2.48. The regression of the company is Y=2.48+1.38X, for instance if the investor gets 2% returns in the market then the investor would earn a return of 5.24% in the futures market

5.2 FMCG SECTOR

Table 2: Value Of Beta And Alpha

COMPANY	BETA	ALPHA	REGRESSION
HUL	0.99	0.02	Y=0.02+0.99X
PIDILITE	1.04	0.02	Y=0.02+1.04X
GODREJ	0.96	0.01	Y=0.01+0.96X
DABUR	0.96	0.02	Y=0.02+0.96X
BRITANNIA	1	-0.01	Y=-0.01+X
PORTFOLIO	0.99	0.06	Y=0.06+0.99X



Graph 2: The Changes In Beta Of FMCG Sector

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The systematic risk of HUL is 0.99 which is very close to the standard condition of β=1, which moves according to the market. A move of 1% in the market influences the stock to move up by 0.99%. In order to hedge the risk, for an instance of 100 contracts, 99 contracts must be hedged. The unsystematic risk of HUL is 0.02. The regression of the company is Y=0.02+0.99X, for instance if the investor gets 2% returns in the market then the investor would earn a return of 2 % in the futures market.

- The systematic risk of PIDILITE is 1.04 it means the stock moves in the same direction as the markets; however, the stock tends to move 40% more than the market. In order to hedge the risk, for an instance of 100 contracts, 104 contracts must be hedged. The unsystematic risk of PIDILITE is 0.02. The regression of the company is Y=0.02+1.04X, for instance if the investor gets 2% returns in the market then the investor would earn a return of 2.1% in the futures market.
- The systematic risk of GODREJ is 0.96 it means the stock and the market move in the same direction; however, the stock is relatively less risky. A move of 1% in the market influences the stock to move up by 0.96%. In order to hedge the risk, for an instance of 100 contracts, the investor has to hedge 96 contracts. The unsystematic risk of GODREJ is 0.01. The regression of the company is Y=0.01+0.96X, for instance if the investor gets 2% returns in the market then the investor would earn a return of 1.93% in the futures market.
- The systematic risk of DABUR is 0.96 it means a move of 1% in the market influences the stock to move up by 0.96%. In order to hedge the risk, for an instance of 100 contracts, the investor has to hedge 96 contracts. The unsystematic risk of the company is 0.02. The regression equation of the company is Y=0.02+0.96X, for an instance if the investor gets 2% returns in the market then the investor would earn a return of 1.94% in the future market.
- The systematic risk of BRITANNIA is 1 that means it moving according to the market, 1% in the market influences the stock to move up by 1%. In order to hedge the risk, for an instance of 100 contracts, the investor has to hedge 100 contracts. The unsystematic risk of the company is -0.01. The regression equation of the company is y=-0.01+X for an instance if the investor gets 2% return in the market then the investor would earn a return of 1.99% in the future market

Table 3: Comparison Of Beta In IT And FMCG Sector With The Help Of t-Test

PARTICULARS	BETA(IT)	BETA(FMCG)
Mean	0.968333	0.99
Variance	0.049497	0.00088
Observations	6	6
Hypothesis Mean	0	
Degrees of freedom	5	
t stat	-0.23646	
P(T<=t)	0.822459	
T critical two-tail	2.570582	

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H0: There is no significant difference in the beta value of IT and FMCG sector
H1: There is significant difference in the beta value of IT and FMCG sector.

The calculated value= -0.23646 and the critical value =2.570582.

Since, the calculated value is less than the critical value we accept the null hypothesis that is H0 and we infer that there is no significant difference between the beta values of IT and FMCG sector.

VI. FINDINGS

- The risk involved in IT sector is moderate, except HUL which is highly risky,since the beta is greater than 1.
- In the FMCG sector the risk is more towards PIDILITE and BRITANNIA companies, since their beta value is much higher than the standard norm which is 1.
- In order to mitigate the risk, the investor has to hedge only 97 contracts against 100 contracts in IT sector,whereas in FMCG sector the investor has to hedge 99contracts over 100 contracts, thus IT sector would be optimal to reduce the risk.
- After calculating t-test, we infer that the portfolio beta has no significant difference between the IT and FMCG sector.

VII. SUGGESTIONS

- If the investor is a risk taker and wants a higher return, then it is optimal to invest in FMCG sector rather than investing in IT sector and in turn hedge the risk involved in the futures market.
- The investor of futures market has to hedge the risk involved in HCL, HUL, PIDILITE companies where the systematic risk is relatively high.

VIII. CONCLUSION

This study enables the investors to analyse the risk involved and the volume of contracts to be hedged in the IT and FMCG sector. It facilitates the investors to have an optimal portfolio, considering the systematic and unsystematic risk prevailing in these sectors. The analysis shows that there is high risk involved in HUL, HCL, PIDILITE companies which equally give high returns.Since, there is no significant difference in beta of IT and FMCG sector, the investor has to analyse the individual performance of the companies in these sectors.

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A STUDY ON HONNALLI TALUKA SECONDARY SCHOOL STUDENTS' ENVIRONMENTAL AWARENESS AND PRACTICES

Paper ID	IJIFR/V4/ E2/ 011	Page No.	5184-5190	Subject Area	Education
Keywords	Secondary School Students, Environmental Awareness & Environmental Practices				

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Abstract

Today, the environmental problems are matter of great concerns. The very survival of man depends on the solution of these problems. Education can play a vital role in this direction. Awareness and practices are essentials for action. It is education, which makes man aware, conscious of and knowledge about environment and environmental problems. The present study was intended to investigate the environmental awareness and practices among Secondary school students.

I. INTRODUCTION

The students, on whom the present study is conducted, might have been exposed to a variety of environmental related concepts, besides their exposure to mass media. Therefore, they might have acquired some level of environmental knowledge during their student hood. The present study therefore makes an attempt to estimate the level of awareness and practices. Environmental awareness is defined as factual information (for knowledge) possessed by a student about environmental issues, facts and events in the content areas of ecological concepts, pollution, wildlife, natural resources population and persons organization involved in the environmental movement. The environmental awareness test (EAT) which assesses the student's awareness (Knowledge) in area of ecology concepts, pollution, wild life, natural resources, population and person's organizations involved in the environmental movement.Environmental practice is defined as the day today practices of an individual as related to the conservation and preservation of his/her immediate environment in a

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particular situations or give social group and individuals as an opportunity. So as to be actively involved at all levels in working towards the solution of environment problems.

II. RESEARCH DESIGN

2.1 STATEMENT OF THE PROBLEM:

The problem for the present study is entitled, "A study on environmental awareness and practices among Secondary school students of Honnalli taluka".

2.2 OBJECTIVES OF THE STUDY:

1. To study the level of environmental awareness of Secondary school students of Honnalli taluka.
2. To study the level of environmental practices of Secondary school students of Honnalli taluka.
3. To study the significance of the difference in respect of Secondary school students' environmental awareness if any between the subsamples with regard to
   a. Gender
   b. Location of the school
   c. Subject group
   d. Type of management
4. To study the significance of the difference in respect of Secondary school students' environmental practices if any between the subsamples with regard to
   a. Gender
   b. Location of the school
   c. Subject group
   d. Type of management
5. To study the significant relationship if any between environmental awareness and environmental practices of Secondary school students.

2.3 HYPOTHESES OF THE STUDY:

1. The level of environmental awareness of Secondary school students of Honnalli taluka is low.
2. The level of environmental practices of Secondary school students of Honnalli taluka is low.
3. There is no significant difference in the environmental awareness of Secondary school students of Honnalli taluka between the following subsamples
   a. Gender
   b. Location of the school
   c. Subject group
   d. Type of management
4. There is no significant difference in the involvement environmental movements of secondary students of Honnalli taluka between the following subsamples
   a. Gender

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b. Location of the school
c. Type of School
d. Type of management

5. There is no significant relationship between environmental awareness and environmental practices of Secondary school students of Honnalli taluka.

III. RESEARCH METHODOLOGY

Normative Survey Method has been used in the study.

3.1 Tools used

1. Environmental practice test for Secondary school students was constructed and validated by the investigator.
2. Environmental Awareness Scale constructed and validated by Dr. S. Kulasekara Perumal Pillai.

3.2 Sample

Using random selection, 1000 Secondary school students from Honnalli taluka of Karnataka were selected for the present study.

3.3 Statistical Technique Used

Descriptive analysis, Differential analysis and Correlation analysis were used in the present study to test the hypotheses and interpret the data.

IV. STATISTICAL ANALYSIS AND INTERPRETATION OF DATA

4.1 Descriptive Analysis

4.1.1 Comparison of Environmental Awareness and Environmental practices

Table-1: Mean and Standard Deviation of Environmental Awareness and Environmental practices Scores of the Entire

Variables	N	Mean	SD
Environmental awareness	1000	63.51	6.31
Environmental practices	1000	65.61	5.91

It could be observed from Table-1 that Mean and standard deviation values of Secondary school students environmental awareness of the entire sample is found to be 63.51and 6.31 respectively. The Mean value of the entire sample is higher than the mid value 48. Therefore, it is found that the Secondary school students have high environmental awareness. The hypothesis no.1 is rejected. The calculated Mean and standard deviation values of Secondary school students' environmental practices of the entire sample are found to be 65.61 and 5.91 respectively. The Mean value of the entire sample is higher than the mid value 50.11. Therefore, it is found that the Secondary school students of Honnalli taluka have higher level of environmental practices. The hypothesis no. 2 is rejected.

4.2 Differential Analysis:

4.2.1 Significance Difference in the Sub-samples (Gender and Location) of Secondary

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school Students' Environmental Awareness and Environmental practices:

Table-2: Significance Difference in the Sub-samples of Secondary School Students' Environmental Awareness and Involvement in Environmental practices -Gender and Location of the school

Variables		N	Environmental Awareness				Environmental practices			
			Mean	SD	t-value	Sig*	Mean	SD	t-value	Sig*
Gender	Male	500	65.91	6.21	14.2*	NS (0.05 level)	67.15	6.91	8.29	S (0.01 level)
	Female	500	62.36	6.1			65.16	6.34		
Location of the school	Urban	500	63.51	6.31	5.70*	S (0.05 level)	65.61	5.91	4.00	NS (0.05 level)
	Rural	500	62.14	6.21			64.91	5.60		

Significant, NS - Not significant, S - Significant

A. Environmental Awareness:

In order to check the null hypothesis with respect to gender (Table 2), the t- test was employed. The Mean of male Secondary school students (N= 500) is found to be 65.91 with an SD of 6.21. The Mean of female Secondary school students (N=500) is found to be 62.37 with an SD of 6.10. The computed t value is 14.2 which is significant at 0.05 level. Since the calculated t- value is greater than the tabulated t- value, the hypothesis no.3 (a) is rejected and alternate hypothesis accepted. In order to check the null hypothesis with respect to location of the school, the t- test was employed. The Mean of urban school Secondary school students (N=500) is found to be 65.51 with an SD of 6.31. The Mean of rural school Secondary school students (N=500) is found to be 62.14 with an SD of 6.21. The computed t value is 5.70 which is significant at 0.05 level. Since the calculated t- value is greater than the tabulated t- value, the hypothesis 3(b) is rejected.

B. Environmental practices:

In order to check the null hypothesis with respect to gender, the t- test was employed. The Mean of male Secondary school students (N=500) is found to be 67.15 with an SD of 6.91. The Mean of female Secondary school students (N=500) is found to be 65.16 with an SD of 6.34. The computed t value is 8.29 which is significant at 0.01 level. Since the calculated t- value is higher than the tabulated t- value, the hypothesis 4(a) is rejected. In order to check the null hypothesis with respect to location of the school, the t- test was employed. The Mean of urban school Secondary school students (N=500) is found to be 65.61 with an SD of 5.91. The Mean of rural school Secondary school students (N=500) is found to be 64.91 with an SD of 5.60. The computed t value is 4.00 which is significant at 0.05 level. Since the calculated t- value is greater than the tabulated t- value, the hypothesis 4(b) is accepted

4.2.2 Significance Difference in the Sub-samples (type of school group and Type of management) of Secondary school Students' Environmental Awareness:

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Table-3: Significance Difference in the Sub-samples of Secondary School Students' Environmental Awareness –type of school group and Type of management group

Variables	Sources of Variation	Sum of Squares	df	Mean Square	F - Value	Level of Significance
Subject group	Between groups	420.30	2	210.15	9.15	Significant at 0.01 level
	Within groups	22888.8	997	22.96		
	Total	23316.34	999			
Type of Management	Between groups	142.68	2	71.34	3.07	Significant at 0.05 level
	Within groups	23190.59	997	23.260		
	Total	233316.34	999			

As seen from Table 3, to check the null hypothesis with respect to subject group, the F test was made. The F value is found to be 9.15 which is significant at 0.01 level for 997 degree of freedom. It denotes that there is significant difference among the Secondary school students who belong to different type of school groups with respect to their environmental awareness. The null hypothesis 3(c) is rejected.

In order to check the null hypothesis with respect to the type of management, the F test was made. The F value is found to be 3.07 which is significant at 0.05 level for 997 degree of freedom. It denotes that there is no significant difference among the Secondary school students who belong to different types of management with respect to their environmental awareness. The null hypothesis 3(d) is rejected.

4.2.3 Significance Difference in the Sub-samples (type of school group and Type of management) of Secondary school Students' Environmental practices:

Table- 4: Significance Difference in the Sub-samples of Secondary School Students' Environmental practices - type of school group and Type of management

Variables	Sources of Variation	Sum of Squares	df	Mean Square	F - Value	Level of Significance
Subject group	Between groups	219.18	2	109.59	5.03	Significant at 0.01 level
	Within groups	21717.58	997	21.78		
	Total	21936.76	999			
Type of Management	Between groups	353.51	2	176.75	8.17	Significant at 0.05 level
	Within groups	21583.25	997	21.65		
	Total	21936.76	999			

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As seen from Table 4, to check the null hypothesis with respect to subject group, the F test was made. The F value is found to be 5.03 which is significant at 0.01 level for 997 degree of freedom. It denotes that there is significant difference among the Secondary school students who belong to different subject groups with respect to their environmental practices. The null hypothesis 4(c) is rejected.

In order to check the null hypothesis with respect to the types of management, the F test was made. The F value is found to be 8.17 which is significant at 0.01 level for 997 degree of freedom. It denotes that there is significant difference among the Secondary school students who belong to different types of management with respect to their environmental practices. The null hypothesis 4(d) is rejected.

4.3 Correlation Analysis

Table-5: Correlation of Co – efficient between Environmental Awareness and Environmental practices of Secondary school Students

Variables	N	`r' Value	SD
Environmental awareness Environmental practices	1000	0.378	Significant 0.01 level

As seen from Table 5 the correlation co-efficient (r) between environmental awareness and environmental practices is found to be 0.378 for the sample of 1000 of Secondary school students. It is higher than the table value of 0.081 at 0.01 level. It is concluded that there is significant relationship between environmental awareness and environmental practices of Secondary school students of Honnalli taluka. Hence the null hypothesis 5 is rejected.

V. MAJOR FINDINGS OF THE STUDY

1. The Secondary school students of Honnalli taluka have high environmental awareness.
2. The Secondary school students of Honnalli taluka have higher level of environmental practices.
3. The male and female Secondary school students of Honnalli taluka do differ significantly with respect to their environmental awareness.
4. The urban and rural school Secondary school students of Honnalli taluka differ significantly in their environmental awareness.
5. There is significant difference among the Secondary school students who belong to different subject groups with respect to their environmental awareness.
6. There is no significant difference among the Secondary school students who belong to different types of school management with respect to their environmental awareness.
7. The male and female Secondary school students differ significantly in their environmental practices.
8. The urban and rural school Secondary school students do not differ significantly in their environmental practices.
9. There is significant difference among the Secondary school students who belong to different subject groups with respect to their environmental practices.
10. There is significant difference among the Secondary school students who belong to

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different types of school management with respect to their environmental practices.

11. There is significant relationship between environmental awareness and environmental practices of Secondary school students of Honnalli taluka.

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SENSE OF HUMOUR AMONG THE PARTICIPANTS OF RC-295 IN RELATION TO THEIR GENDER

Paper ID	IJIFR/V4/ E2/ 025	Page No.	5191-5196	Subject Area	Education
Keywords	Sense Of Humour, RC-295 Participation, Gender				

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Abstract

Humour is social phenomenon that had been extensively explored throughout centuries, whereas sense of humour is aspects of personality that was hardly explored and defined around 1970. It is ability to create joyful moment or laughter in the situation of despair, sadness, anxiety, tension and even in all situations for shedding the clouds of sadness or for dreaming away the panic moments. Now days, the quality of teacher education is a burning topic in the society and teaching learning is going downwards. Keeping this in view, the present study was carried out on among the participations of RC-295. The population of the study was 31 participants. Descriptive survey method was used in the study. The study revealed that gender plays an important role on the sense of humour of the participation. Females were having less sense of humour as compare to male..

I. INTRODUCTION

Sense of Humour is defined as a sort of catch-all term to refer to habitual individual differences in all sorts of behaviors, experiences, affects, attitudes, and abilities relating to amusement, laughter, jocularity and so on (Martin, 1998). Sense of humour is define as a sort of terminology used to refer the habitual individual differences in all sorts of behaviours, experiences, affects, attitudes and abilities relating to amusement, laughter and so on. Humour is social phenomenon that had been extensively explored throughout

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centuries, whereas sense of humour is aspects of personality that was hardly explored and defined around 1970. It is the ability to experience humour, a quality which all people share, although the extent to which an individual will personally find something humourous, depends on a host of absolute and relative variable including geographical location, culture, maturity, level of education, intelligence. It is ability to create joyful moment or laughter in the situation of despair, sadness, anxiety, tension and even in all situations for shedding the clouds of sadness or for dreaming away the panic moments. Many types of behaviour can be leveled as attributes of good sense of humour. A person has good sense of humour means, that the person has an excellent repertoire of good jokes that he has memorise a large number of funny stories and that he is skilled at repeating them for the amusement of others. In this sense, he is able to make others laugh at his stories and /or actions.

Eysenck (1972) pointed out three different possible meanings of humour—conformist, quantitative and productive. In conformist meaning of humour, the person laughs at the same things that we do. In quantitative sense, humour means that the person's laughs a great deal and easily amused. Third, productive meaning that the person is the "life and soul of the party", telling funny stories and amusing other people.

The present study helps the people to understand better about the role of sense of humour in an individual's life both personal as well as social.

II. RESEARCH DESIGN

2.1 Significance Of The Study

Humour, used well, is a mark of self-confidence, intelligence and an ability to connect effectively with others" (Schwab, 2005). Individuals with a greater sense of humour are thought to be more socially competent (Bell, McGhee, & Duffey, 1986); in turn, it may be easier for such persons to attract and maintain friendships and develop a rich social support network, and consequently to obtain the mental and physical health benefits of social support (Cohen & Wills, 1985).

2.2 Statement of the Problem

Sense of Humour Among the Participants of RC-295 in relation to their gender

2.3 Operational Definitions of the Term Used

- **Sense of Humour**

  Sense of Humour is defined as a sort of catch-all term to refer to habitual individual differences in all sorts of behaviors, experiences, affects, attitudes, and abilities relating to amusement, laughter, jocularity, and so on (Martin, 1998).In the present study sense of humour refers to the total score obtained by the RC – 295 participants in teacher sense of humour scale.

- **Gender**

  According to Oxford school of dictionary the word **gender** has been used since the 14thcentury as a grammatical term, referring to classes of noun designated as masculine or feminine. The sense 'the state of being male or female' has also been used since the 14th century, but this did not become common until the mid 20th century. Although the

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words **gender** and sex both have the sense 'the state of being male or female', they are typically used in slightly different ways: sex tends to refer to biological differences, while **gender** refers to cultural or social ones.

In the present study gender refers to the male & female RC – 295 participants.

- **RC – 295 Participants**

In the present study RC -295 participants refers to the teachers who has come at HRDC, H. P. University, Shimla to attend the refresher course on Research and Teaching Methodology from 22.08.2016 to 10.09.2016 from different colleges and universities of the country.

2.4 Objective

- To study the sense of humour of RC – 295 participants in relation to their gender.

2.5 Hypothesis

- There is no significant difference in the sense of humour of RC-295 participants in relation to their gender (Male / Female).

2.6 Delimitations

- The study was delimited to the RC – 295 participants only.
- Only sense of humour and gender were taken as variables of the study.

III. REVIEW OF LITERATURE

Narula et al. (2011) studied humor as a learning aid in medical education. Finding revealed in group A there was no significant difference in marks obtained by students in class 1 and class 4, however in group B in which humor was used it was observed that in class 4 percentage of students getting marks above 50% increased as compared to class 1. They concluded that humor not only increases interest but also promotes learning.

Makewa et al. (2011) studied teachers' use of humor in teaching and students' rating of their effectiveness. The results indicate that the use of humour in teaching is generally good and that there is a significant, moderate relationship between the use of humour and students' rating of teachers' effectiveness. The results also indicate that the most commonly used styles of humour among the students are the positive styles of humour.

Dange & Jagannath (2012) investigated the association of sense of humour with job stress among the primary school teachers. The study found that, there was no significant difference in mean scores of sense of humour and job stress in relation to Gender and Type of the school. But significance difference was found between Rural and Urban primary school teachers sense of humour. There was negative high correlation between sense of humour and job stress among the primary school teachers. The topic of incorporating humor into higher education classrooms has been studied extensively in the past 20 years. The position most, if not all, researchers and 71 authors have taken is that the appropriate use of humor in the classroom makes the environment not only fun, but conducive to learning. These authors argue that appropriate reduces stress, anxiety, and uncertainty in the classroom. The reduced level of negative factors creates a classroom environment that is comfortable, safe, and supportive for the students and the teacher.

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Umender M. & Sarita (2015) investigated teaching effectiveness of secondary school teachers in relation to their sense of humour. There they found that found that the sense of humour of male and female secondary school teachers differ significantly.

Umender M. & Anju (2015) in their study of occupational stress among secondary school teachers in relation to their sense of humour found that occupational stress of secondary school teachers with high or low sense of humour differ significantly.

IV. PROCEDURE OF THE STUDY

The present study aims at finding out the relation between sense of humour and gender of RC- 295 participants.

4.1 Variables of the Study

- Dependent Variable : Sense of Humour
- Independent Variable: Gender.

4.2 Population

The population is any group of individuals that has one or more characteristics in common and that are of interest to the researchers (Best and Khan 2010). The accessible population of the present study consisted of male and female participants of RC- 295.

4.3 Tools Used

Teachers Sense of Humour Scale (TSHS) by Malik and Kapoor (2014).

4.4 Statistical Analysis

The mean, S.D. and 't' test were used to analysis the data.

4.5 Method Of The Research

Descriptive survey method was used.

V. RESULTS

The collected data was analyzed both quantitatively as well as qualitatively. In order to verify the objective and to test the null hypotheses, the present study has been analysed as given below:

Objective: To study the sense of humour of RC-295 participants in relation to their gender.

Hypothesis: There is no significant difference in the sense of humour of RC-295 participants in relation to their gender (Male / Female).

Table-1: Sense of humour among RC – 295 participants

Sr. No.	Groups	N	Mean	S.D.	t-value	Level of Significance
1.	Male	21	165.28	15.10	4.644*	Significant
2.	Female	10	146.1	7.93		

- ***Significant at 0.01 level of significance***
- ***Table Value = 2.04 (at 0.05 level), 2.76 (at 0.01 level)***

Table no 1shows mean of sense of humour of male and female RC-295 participants. The study of the mean score of sense of humour of male and female RC – 295 participants shows that there is a difference among them in sense of humour. The table shows that male RC – 295 participants have more sense of humour (i.e 165.28) as compared to female

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participants of RC- 295 (i.e, 146.). Thus, the hypothesis i.e. there is no significant difference in sense of humour of male and female RC – 295 participants is rejected.

VI. DISCUSSION OF RESULTS

The study reveals that sense of humour of male participants was more as compared female participants. It has further been supported by Gorham (1999) i.e, gender shows its effect on sense of humour and further effects the teaching process.. Generally it is observed that mind works better in lighter mood than in tense mood. Many a time's humour is required to change the monotonous situations of the classroom. Dange and Jagannath (2012) found significant difference between male and female primary school teacher sense of humour. It is further supported by Malik and Sarita (2015) that male and female teachers differ significantly in relation to their sense of humour. Males are generally extrovert in nature and outspoken where as females may be introverts or ambivert and have low risk taking behavior due to which they are a bit reserved. Due to these reasons female have less sense of humour as compared to their male counterparts?

VII. RECOMMENDATIONS FOR FURTHER STUDY

Based on the current study some of the suggestions are identified as below:

- The present study can be conducted on large scale.
- Similar type of studies can be conducted in other HRDC of India rather than Shimla.
- The study can be conducted using other methodology.

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CUSTOMS AND CULTURE OF IRULA TRIBES IN COIMBATORE DISTRICT, TAMIL NADU

Paper ID	IJIFR/V4/ E2/ 031	Page No.	5197-5201	Subject Area	Economics
Keywords	Irulas Customs & Culture, Blind Faith, Absence Of Education, Lack Of Contact, Pastoral & Agrarian Economy				

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Abstract

Irular tribes are one of the second largest groups of Tamil Nadu after the Badgas. They are situated at the base of the western ghat. In the family of the tribes in this region, male members exercise dominant authority over the family members while women occupy a subordinate position. Wedding ceremonies vary from one tribe to the other. By and large all these tribes permit the wedding at an early age for the principal reason that the source of happiness consists of the solace of a domestic life. But many of the rites and formalities are similar among the tribes. The life of these tribes revolves around the pastoral and agrarian economy. No fundamental innovations were introduced in the agricultural work by them inspite of advancement in science and technology of the present day. Blind faith, absence of education and lack of contact with the rest of the society seem to be the reasons for the unchanging belief and practices. Irulas culture is one of the different ways. They are considered marriage function is not an important ritual in the community. But death ceremonies are considered is an important ritual in this community. This paper focuses on customs and culture of the Irula tribes of Coimbatore District, Tamil Nadu.

I. INTRODUCTION

According to Census 2011, India has a population of 1.21 billion. More than 800 million Indians live in rural areas and 400 million live in urban areas. Scheduled Tribes (STs) constitute 8.6 percent of the country's population. Scheduled Tribes in India are Adivasis with 622 Adivasi Communities still speaking 325 Languages, living in 645 Districts in

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105295 Villages. Over 57% of them are living out of Forest and less than 40% are still in Forest areas. Tribes are distributed all over India, viz. Central zone, Western zone, North Eastern zones, Southern zone and Andaman & Nicobar and Lakshadweep Islands but mostly concentrated in Central, Eastern and North-Eastern India. About 75 Tribal groups in India are PVTGs (Particularly Vulnerable Tribal Groups). Their primitive traits, geographical isolation, distinct culture with traditions, language, shy of contact with community at large are causes for economical backwardness.

2. PROFILE OF THE DISTRICTS

The study was undertaken in Coimbatore district. Coimbatore District is situated in the East of Tamil Nadu. It is one of the small districts of Tamil Nadu. The district has an area of 4723 sq.kms of the state's geographical area, with a scheduled tribe population of 28342 as per the 2011 census.

3. TERM OF TRIBES

The tribal people constitute 8 percent of the total population of India. The term "tribe" means, a group of people who live at a particular place from time immemorial. Anthropologically the tribe is a system of social organization which includes several local groups- villages, districts on lineage and normally includes a common territory, a common language and a common culture, a common name, political system, simple economy, religion and belief, primitive law and own education system (India tribal belt, en.Wikipedia.org).

4. HISTORY OF IRULA TRIBES

The Irula inhabit the northern districts of Tamil Nadu, a state in north eastern India. Located not far from the city of Madras, they live in a tropical area subject to monsoon rains. Their language, Irula, is related to Tamil and Kannada, which are southern Dravidian languages. In the Tamil language, the name Irula means "people of darkness." This could refer to their dark-colored skin or to the fact that all important events traditionally took place in the darkness of night.

5. CUSTOMS AND CULTURE OF IRULA TRIBES

5.1 Dress Code

The tribal men wear cotton dhoti and shirts, women wear saree with blouse and adult women wear sarees only without blouse. Adolescent girls residing in the tribal schools wear salwars and half sarees. Middle age women wear nighties in the full time.

5.2 Puberty

When a girl attains puberty, she is confined to a seclusion hut for seven days, where she is assisted by a few girls of her settlement who have not yet attained puberty. Every day, the girl is given bath after applying turmeric paste and coconut oil on the body. After the

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seventh day, the girl is taken to the river, accompanied only by women. Once at the river, her bloody clothes will be burned, and the girl will be bathed. Then, if the girl's family has enough money, a function will be held. In this function, the girl will be ritually bathed again. The the girls mothers sisters daughter will drip oil from her left hand onto the back of the girls hand. Then the mother's sister's daughter with very large rings on her finger will tell the girl to bring her hand up and put the oil on top of her own head. When the girl tries to lift her hand, her mother's sister's daughter with the large rings on her right hand will slap the girls hand down. Then she will tell the girl to do it again, and again she will slap the girls hand down. This happens several times. All the members of the settlement assemble and give presents of money to her.

5.3 Marriage Ceremonies

Marriage is considered as a sacred and an important event in the life of any individual. Among the irula tribes, men or women were allowed to marry according to their wish and marrying more than one man or woman was not considered as a crime. The marriage is fixed for girls within age limit of 12-18 whereas boy's age is form 14-24. People from the same clan within the irula tribe do not intermarry. Marriages are fixed within family by the parents. Dowry system (money given to the bride groom during the time of marriage by the bride's parents) was common among the irular tribes from the ancient times. Prize has to be bride's house in the form of cash (Rs.1000 – 2000) or cattle. Marriage ceremony takes place in the front of the home or in village temple. The conformation of the marriage is called the groom tie the yellow rope of thali (marital necklace) along with two black beeds as the bride. The married women were not allowed to participate in any of their community function if they were not wearing mangal sutras and along with the family members these women will be thrown out of their community and village. The customs and habits of the irulas are very crude. Irulas are accepted child marriage. Divorces are not permitted for irular tribes.

5.4 Delivery Pattern

Normally, delivery is considered to be the second birth for any woman. But as far as irular tribes were considered, deliveries were conducted at home with the help of a local old lady who had attended the delivery. After the birth, the child is bathed in warm water. The mother confines herself to the seclusion hut for 10 days during which she takes hot water bath after applying a turmeric paste and coconut oil on the body. On the 10th day, she is removed to another seclusion hut, where she remains for 80 days during which she is prohibited from doing any manual work even in the kitchen. The Irular thus observes 91 days birth pollution. The naming ceremony is performed on that day. On the other hand, if the labor pain develops she would pour little amount of castor oil in her left palm and touch it with the right hand fingers, at the same time uttering some words of prayers. The old lady delivery attendant would drop the castor oil and they have a superstitious belief that if the oil drops continuously, the delivery would be very easy for the expectant mother. On the other side, if the oil drops down in separate drops, the delivery would be very difficult.

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5.5 Death Ceremony

One's death will be proclaimed to everyone. These communities followed the death ceremonies are the body will be kept in a typical tent on a bamboo platform in a posture where both the legs had to be drawn backwards and tied. The closest relatives bring water from the tap. Water is drawn after uttering the name of the dead person three times without looking left or right. Ground saffron or turmeric liquid mixture is sprinkled over the body. Visitors spread white dhoti (cloth) over the body if the death is male and colour cloth in case of female. If the dead is a married man, seven persons from seven clan remove the thali (marital necklace) from his wife. If the husband dead, his wife is called widow. The women should not attend any functions and should not remarry.

6. CONCLUSION

In the family of the tribes in this region, male members exercise dominant authority over the family members while women occupy a subordinate position. Wedding ceremonies vary from one tribe to the other. By and large all these tribes permit the wedding at an early age for the principal reason that the source of happiness consists of the solace of a domestic life. But many of the rites and formalities are similar among the tribes. The life of these tribes revolves around the pastoral and agrarian economy. No fundamental innovations were introduced in the agricultural work by them inspite of advancement in science and technology of the present day. Blind faith, absence of education and lack of contact with the rest of the society seem to be the reasons for the unchanging belief and practices.

The tribes are also the citizens of India and hence the promotion of their welfare is of equal importance. Both the governments, individuals and service organizations must jointly formulate certain plans and programmes to improve the economic conditions of the tribes and bring them to a state of secured living. To realize this, the housing, educational, medical, and agricultural, trade, communication and banking facilities can be provided by the said agencies generously. The tribes want improvement without being disturbed. Their age old customs should be respected and their local rights should be protected. The government should consider their basic requirements and demands.

The tasks that can be imposed on our government and non-government organizations are as follows: The first is to preserve, strengthen and develop all that is best in the tribal society, culture, art and language. The tribes like to strengthen themselves from the contaminating influences of modern civilization and like to protect themselves not only economically, but culturally, from outside exploitation. The second is to protect the tribal economic rights. The government of India should help the tribal people to develop according to their own culture and tradition.

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CHARACTERIZATION OF BIODIESEL ON VCR ENGINE

Paper ID	IJIFR/V4/ E2/ 030	Page No.	5202-5210	Subject Area	Automobile Engineering
Keywords	Biodiesel, Blend, Variable Compression Ratio, Brake Power, Brake Thermal Efficiency				

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Abstract

This paper present a research work on biodiesel to find out the optimum compression ratios, better performance blend & lesser exhaust gas temperature at different blends of laxmitaru oil on C.I. engine. In this project test were carried out with the diesel & blend of Laxmitaru oil in proportion 10, 20, 30,40,50,70 and 100%. The engine performances were tested on Variable Compression Ratio (VCR) Diesel Engine as per ASTM standard. The performance parameters were tested like Brake specific fuel consumption, Brake power, Brake thermal efficiency at different load & variable compression ratio.

I. INTRODUCTION

The energy is the prime entity for the world. The energy is consumed for various systems functioning in day to day life can be categories as consumption of fuel used for those system and their subsystems. The energy sources available in present days are in non renewable and renewable form as the non renewable sources are in limited quantity which includes fossil fuels and natural gases are going to exhaust one day, may be after some years. The relief for these consequences is the use of alternative energy sources like alternative fuels. Diesel is one of the most used fuels for Transportation and power sectors also coal is the major fuel used by these sectors, as coal and diesel are the non renewable source the alternative fuel that is biodiesel can replace diesel partially [1].

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The first use of vegetable oil in a compression ignition engine was first demonstrated through Rudolph Diesel who used peanut oil in his diesel engine. The use of oils from coconut, soy bean, sunflower, safflower, peanut, linseed, rape seed and palm oil amongst others have been attempted. The long term use of vegetable oils led to injector coking and the thickening of crankcase oil which resulted in piston ring sticking. Therefore, vegetable oils are not used in diesel engines because of endurance issues. To overcome this problem, various modifications of vegetable oils have been employed such as transesterification biodiesel is made through a chemical process called transeterification whereby the glycerin is separated from the fat or vegetable oil. The process leaves behind two products-methyl esters (the chemical name for biodiesel) and glycerin (a valuable byproduct usually sold to be used in soaps and other products). The transesterification is achieved with monohydric alcohols like methanol and ethanol in the presence of an alkali catalyst [2].

Biodiesel and its blends with petroleum-based diesel fuel can be used in diesel engines without any significant modifications to the engines. The advantages of biodiesel are that it displaces petroleum thereby reducing global warming gas emissions, tail pipe particulate matter, hydrocarbons, carbon monoxide, and other air toxics [3].

In this research work, brake power, brake specific fuel consumption, brake thermal efficiency have been tested at different blend, load on variable compression ratio engine. For the present work of experimental investigation of engine performance parameters the Laxmitaru oil has been selected. Laxmitaru is a plant as the tree has been christened here, is being promoted by horticulturists, agro-scientist, holistic health hub and practitioners of traditional Indian medicines across the country as the latest wonder tree whose edible, therapeutic and other utility values may outweigh those of common medicinal and edible herbs found in India. The tree, which first came to India from central (Latin) America in 1960, can be grown anywhere from the sea coast to elevations of 1500 feet in tropical climatic conditions. At the village level, the plant is cost effective as its farming is nearly zero-budget and completely organic.

II. BIODIESEL PRODUCTION

For production of biodiesel following steps are implemented.

2.1 Oil extraction

In oil extraction process, the oil seeds are first crushed and then with the help of soxhelt apparatus the oil is extracted from crush. In this process, polar solvent (petroleum ether, hexane, diethyl ether) is used with given seed sample with the ratio 1:5.

2.2 Transesterification Reaction

This reaction is also called as alcoholysis which is the displacement of alcohol from an ester by another in a process similar to hydrolysis, except an alcohol is used in water. The reaction can be represented as follows; the general equation will be.

$$RCOOR' + R''OH \longrightarrow RCOOR'' + R'OH$$

For transesterification process the feedstock should not have more than 5% of free fatty acid content. The major components of vegetable oils and animal fats are

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Triglycerides. To obtain biodiesel, the vegetable oil or animal fat is subjected to a chemical reaction termed transesterification. Following fig 1.1 shows the transesterfication process.

$$\begin{array}{l} CH_2OCOR''' \\ | \\ CH_2OCOR'' \\ | \\ CH_2OCOR' \\ \text{(Oil or Fat)} \end{array} + 3ROH \xrightarrow{\text{Catalyst}} \begin{array}{l} CH_2OH \\ | \\ CH_2OH \\ | \\ CH_2OH \\ \text{(Glycerin)} \end{array} + \begin{array}{l} R'''COOR \\ \\ R''COOR \\ \\ R'COOR \\ \text{(Biodiesel)} \end{array}$$

Figure 1: Transesterification Process

2.3 Filtering

Filter the vegetable oil to remove solid particles from it. You may have to warm it up a bit first to get it to run freely; 35°C should be enough. A Cartridge filter is used for the same.

2.4 Removing the Water

Heat the oil for to remove the water content. Vegetable oil will probably contain water, which can slow down the reaction and causes saponification (soap formation). Raise the temperature up to 100°C, hold it there and allow water contents to boil off. Run the agitator to avoid steam pockets forming below the oil and exploding, splashing hot oil or drain water puddles out from the bottom as they form, you can save oil that comes out with the water later. When boiling slows, raise the temperature to 130°C for 10 minutes and allow it to cool [2].

III. EXPERIMENTAL TEST RIG

A single cylinder, four stroke, vertical, water cooled, constant speed, variable compression ratio engine was used for tests. The compression ratio of the engine was varied by raising the bore and head of the engine. Different blends of biodiesel were prepared as B10, B20, B30, B40, B50, B70, & B100 so that they can be conveniently used during the experiment.fig 2 shows photograph of experimental setup.

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Figure 2: Photograph of VCR experimental test rig.

Table 1: Engine Specification

Parameters	Specification
Engine manufacturer	Kirloskar oil engines Pvt.
Engine type	VCR Diesel Engine
Number of cylinders	1
Number of Strokes	4
Fuel	H.S. Diesel
Rated power	3.5 kW @1500 RPM
Cylinder Diameter	87.5 mm
Stroke Length	110 mm
Connecting Rod Length	234 mm
Compression ratio	12-18.1

3.1 Experimental procedure

Before the actual tests were carried out the engine was checked for lubrication and fuel supply. During this trial the speed of engine was kept almost constant at 1500 rpm and the load on the engine is given as3kg, 6kg, 9kg & 12kg. During test the fuel consumption, exhaust gas temperature, engine speed, calorimeter inlet and outlet temperature measured. All the tests were carried out in same way at different compression ratios for diesel, and biodiesel blended fuels. The performance parameter measured during these provided in the table no. 2

Table 2: Set of experiments

SR. NO.	FUEL	COMPRESSION RATIO		LOAD STEPS (kg)
		16:1	17.5:1	
1	Diesel	√	√	3, 6, 9, 12.
2	B10	√	√	
3	B20	√	√	
4	B30	√	√	
5	B40	√	√	
6	B50	√	√	
7	B70	√	√	
8	B100	√	√	

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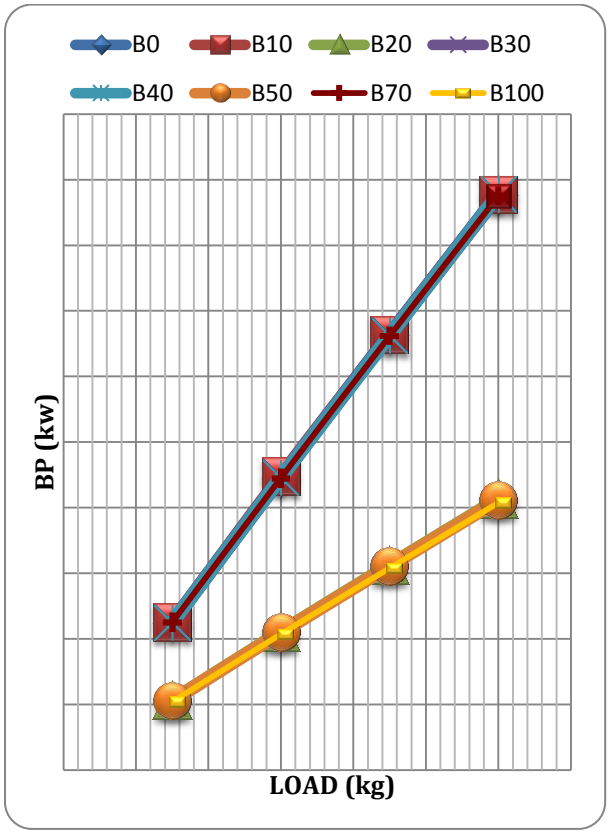
IV. RESULT & DISCUSSION

For each test the engine was run for fifteen minutes. During test the speed of the engine was kept almost constant at 1500 rpm. The parameters were measured during these tests at steady state working condition. From the measured parameters the performance parameters evaluated and they were compared with pure diesel. The performance parameters like Brake Power. Brake Specific Fuel Consumption, Brake Thermal Efficiency, Exhaust Gas Temperature

4.1 Effect of load on brake power

From fig. 3 & 4 it has been observed that the as load increases there is brake power is also increases at blends of B10, B30, B40,B70 BP & it is almost same as B00 for entire load range, but we also found that at CR 17.5 for blend B50 & B100 brake power is much lower than other blends and diesel.



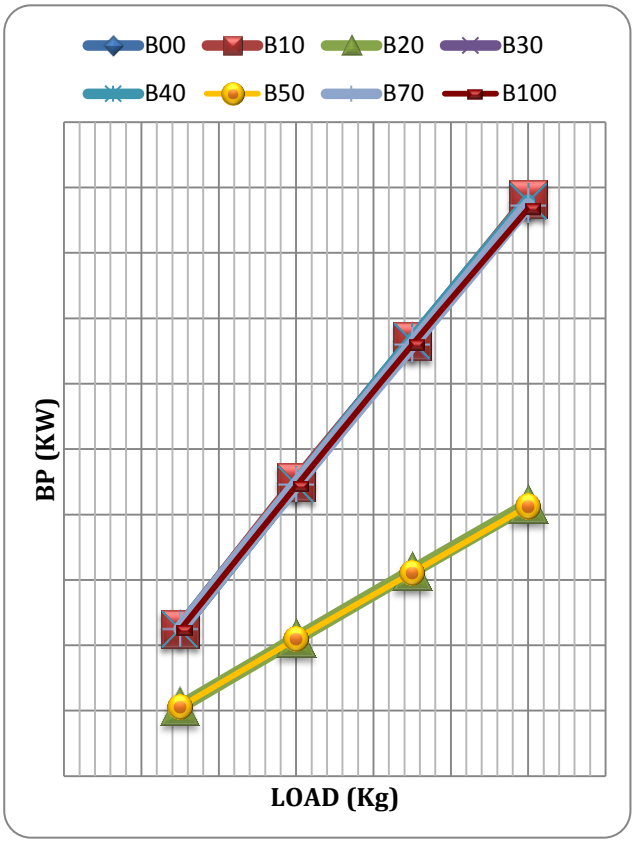


Figure 3: Effect of Load on Brake Power at CR 16 **Figure 4: Effect of Load on Brake Power at CR 17.5**

4.2 Effect of load on Brake Specific Fuel Consumption

As shown in fig.1.5 & 1.6 it has been observed that as load increases there is brake specific fuel consumption (BSFC) is increases. But we also found that at CR 16 for blend of B10, B20, B30 & B40 brake specific fuel consumption is lower that other blend & for CR 17.5 for blend of B30, B40 & B70 brake specific fuel consumption is lower.

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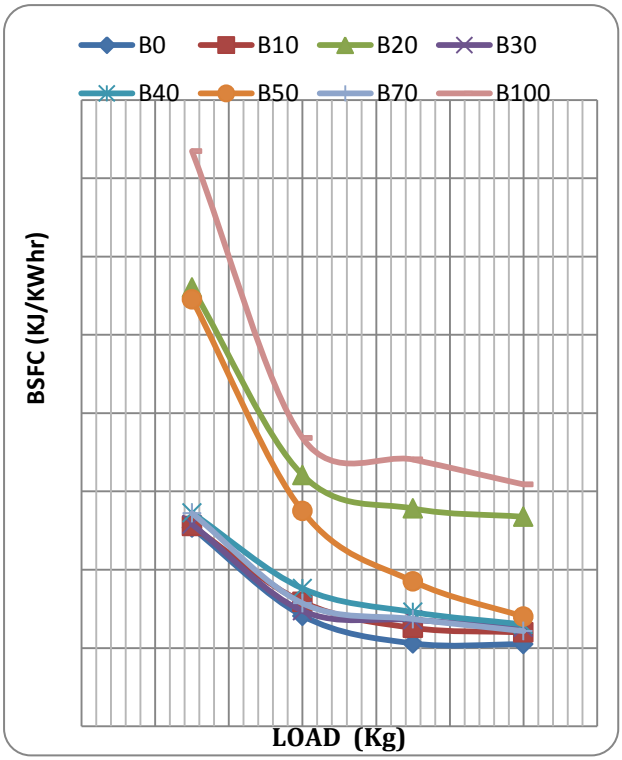

Figure 5: Effect of load on BSFC at CR 16

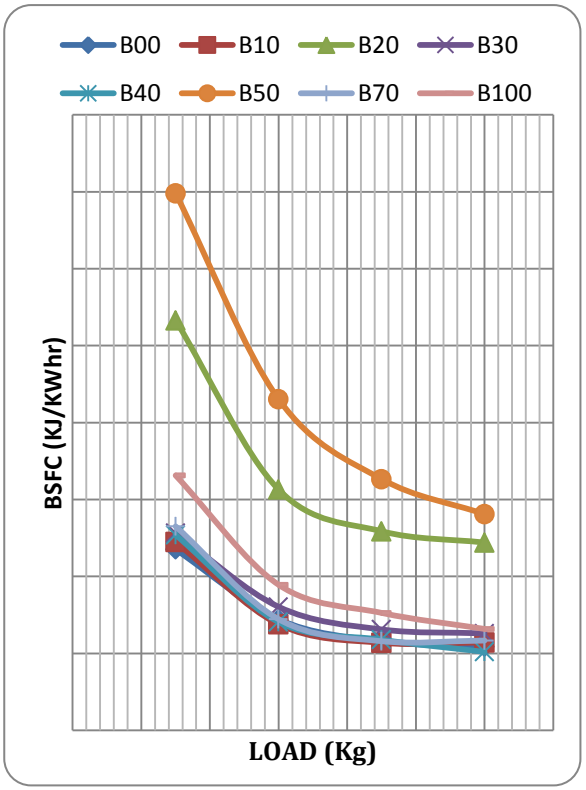

Figure 6: Effect of load on BSFC at CR 17.5

4.3 Effect of load on brake thermal efficiency

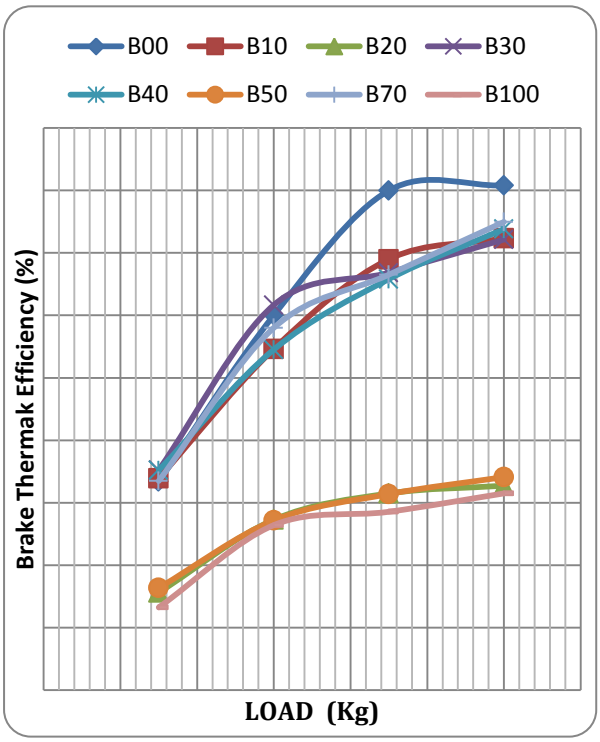

Figure 7: Effect of Load on BTE at CR 16

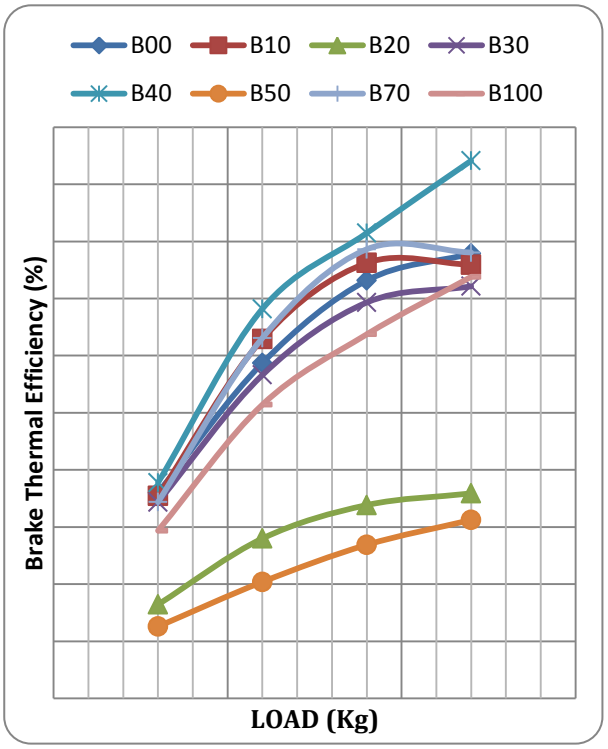

Figure 8: Effect of Load on BTE at CR 17.5

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As shown in fig. 7 & 8, it has been observed that as load increases there is a brake thermal efficiency increase. But we also found that at CR 16 for blend B10, B30, B40 brake thermal efficiency is higher than other blend & also it is found that at CR 17.5 for B 10, B30, B40, B70, and B100 brake thermal efficiency is higher.

4.4 Effect of Load on Exhaust Gas Temperature.

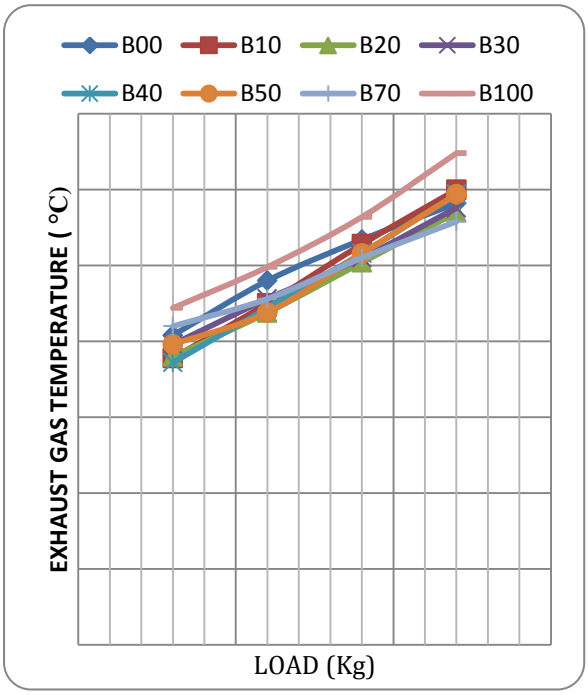

Figure 9: Effect Load on EGT at CR 16

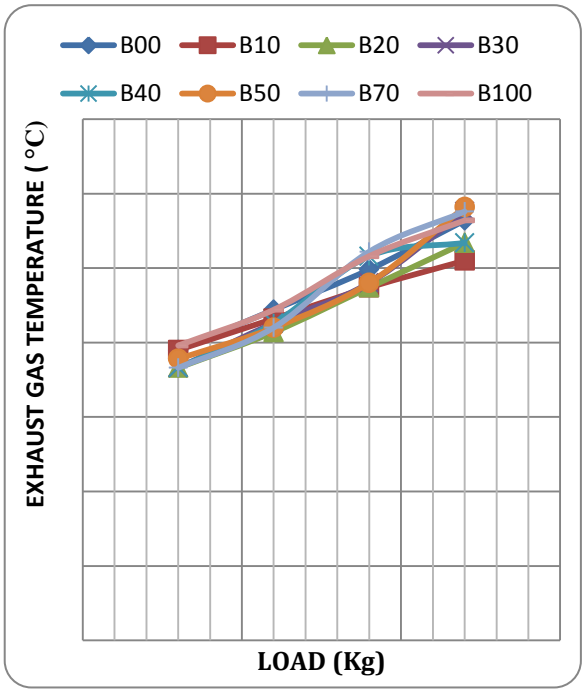

Figure 10: Effect Of Load on EGT at CR 17.5

As shown in fig. 9 & 10, it has been observed that as load increases there is exhaust gas temperature is increases. But we also found that at CR 16 for blend B40 exhaust gas temperature obtained is much lower than other blends & also we found that at CR 17.5 for B10 EGT obtained is lower than diesel.

V. CONCLUSION

1. After use of biodiesel we found that as increases of load & compression ratio there is increases of brake thermal efficiency, brake specific fuel consumption & exhaust gas temperature.
2. As compression ratio increases brake power also increases, we found that at CR 17.5 has high Brake Power for all blends than CR 16 at full load condition.
3. As load increases the exhaust gas temperature increases, for CR 17.5 has lower exhaust temperature for almost all blends than CR 16. We found maximum temperature at CR 17.5 is 270^0c & CR 16 is 300^0c at maximum load.
4. As load increases the brake specific fuel consumption increases, for CR 17.5 gives lower brake specific consumption at lower load than CR 16.
5. As compression ratio increases the brake thermal efficiency increases, for CR 17.5 has higher brake thermal efficiency than CR 16.

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6. After all observations we can conclude that blend B60 can be recommended for use in diesel engine without making any engine modification.

VI. ABBREVIATIONS AND ACRONYMS

BTE	Brake Thermal Efficiency
EGT	Exhaust Gas Temperature
BSFC	Brake specific fuel consumption
CR	Compression Ratio

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A STUDY ON LABOUR INVOLVEMENT WITH SPECIAL REFERENCE TO SEA FOOD INDUSTRY ERNAKULAM DISTRICT, KERALA

Paper ID	IJIFR/V4/ E2/ 032	Page No.	5211-5215	Subject Area	Management Studies
Keywords	Labour involvement, Involvement, Commitment, Seafood				

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Abstract

Labour involvement is level of involvement and commitment on behalf of an employee's level of participation in their organization and its values. An involved employee is aware of business context, and works with colleagues for the benefit of the organization to improve performance within the job. This is a positive attitude towards the organization and its values held by employees. This research study is an effort to understand how labour involvement is associated with job satisfaction and how employee loyalty leads to better work force. The results show that majority of employees are in compliance with the organization which brings maximum involvement of the employees and in turn retaining the employees.

I. INTRODUCTION

Labour involvement is the level of commitment and involvement an employee has towards their organization and its values. An involved employee is aware of business context, and works with colleagues to improve performance within the job for the benefit of the organization. The organization must work to develop and nurture Labour involvement, which requires a two-way relationship between employer and employee. Thus Labour

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involvement is a barometer that determines the association of a person with the organization.

Engagement at work was conceptualized by Kahn, (1990) as the 'harnessing of organizational members' selves to their work roles. In engagement, people employ and express themselves physically, cognitively, and emotionally during role performances. The second related construct to engagement in organizational behaviour is the notion of flow advanced by Csikszentmihalyi (1975, 1990). Csikszentmihalyi (1975) defines flow as the 'holistic sensation' that, people feel when they act with total involvement. Flow is the state in which there is little distinction between the self and environment.

When individuals are in Flow State little conscious control is necessary for their actions.Engagement is most closely associated with the existing construction of job involvement (Brown 1996) and flow (Csikszentmihalyi, 1990). Job involvement is defined as,, the degree to which the job situation is central to the person and his or her identity (Lawler & Hall, 1970). Kanungo (1982) maintained that job involvement is a „Cognitive or belief state of Psychological identification. Job involvement is thought to depend on both need saliency and the potential of a job to satisfy these needs. Thus job involvement results form a cognitive judgment about the need satisfying abilities of the job. 'Jobs' in this view are tied to one's self image. Engagement differs from job as it is concerned more with how the individual employees his/her self during the performance of his / her job. Furthermore engagement entails the active use of emotions. Finally engagement may be thought of as an antecedent to job involvement in that individuals who experience deep engagement in their roles should come to identify with their jobs. When Kahn talked about labour involvement he has given important to all three aspects physically, cognitively and emotionally. Whereas in job satisfaction more importance has been given to cognitive side.

HR practitioners believe that the engagement challenge has a lot to do with how employee feels about the about work experience and how he or she is treated in the organization. It has a lot to do with emotions which are fundamentally related to drive bottom line success in a company. There will always be people who never give their best efforts no matter how hard HR and line managers try to engage them. "But for the most part employees want to commit to companies because doing so satisfies a powerful and a basic need in connect with and contribute to something significant".

II. REVIEW OF LITERATURE ON LABOUR INVOLVEMENT

- **Fred Luthansed (2001)-** A study an "employee engagement and manager self-efficacy". According to this study, first examine the theoretical understanding of the employee engagement. Then an empirical investigation is made of the role that a wide variety of the managers psychological a state of self – efficacy play in the relationship between the employees measured engagement and multiple measure of the manager effectiveness. Results of the statistical analysis indicate that the manager's self-efficacy is a partial mediator relationship between his and her employer's engagement and the manager rated effectiveness. Over all the finding and suggestion that the both employee engagement and

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self-efficacy are important antecedents that together may more positively influence manager effectiveness then either predictor by itself.

- **Alan M. Saks (2006)** A study on "Antecedents and consequences of employee engagement" he conducted a survey among by 102 employees working in a variety of jobs and organizations. The average age was 34 and 60 percent were female. Participants had been in their current job for an average of four years, in their organization for an average of five years, and had on average 12 years of work experience. The survey included measures of job and organization engagement as well as the antecedents and consequences of engagement. Results indicate that there is a meaningful difference between job and organization engagements and that perceived organizational support predicts both job and organization engagement; job characteristics predicts job engagement; and procedural justice predicts organization engagement. In addition, job and organization engagement mediated the relationships between the antecedents and job satisfaction, organizational commitment, intentions to quit, and organizational citizenship behaviour.
- **Patricia Soldati (2008)** A study on "employee engagement". According to this report, twelve major studies on employee engagement had been published over the prior four years by top research firms such as Gallup, Towers Perrin, Blessing White, the Corporate Leadership Council and others. Each of the studies used different definitions and, collectively, came up with 26 key drivers of engagement. For example, some studies emphasized the underlying cognitive issues, others on the underlying emotional issues. Finally, there is some evidence that companies are responding to this employee engagement challenge - by flattening their chains of command, providing training for first-line managers and with better internal communications. Changes won't happen overnight, but with such significant upside to the bottom line - they might happen more quickly than you think
- **Dow Scott (2010)** A study on "The impact of reward programs on employee engagement" According to this study world at work is a global is a human resource association focused on compensation ,benefit ,work life and integrated total reward to attract, motivate and retain a talent workforce ,Founded in 1955 world at work provided network of nearly 30000 members in more than 100 countries with training certification , research, conference, and community .
- **Dr. P. Vaijayanthi (2011)** A study on " Employee Engagement predictors: A study at GE Power & Water " The findings of the study confirm infrastructure , cross functional discussions , communication & interaction with the corporate office employees , reflection on the feedbacks and proper support and orientation through induction programs, to foster employee engagement, and inadequate interaction with peers from other locations/offices, lack of accountable response from the corporate office for issues including dearth of personnel, employee facilities , deficient communication regarding seminars, workshops, and other training sessions from the corporate office , and inadequate visits by the business team to be the stumbling blocks to better employee engagement.

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III. OBJECTIVES OF THE STUDY

- To study the various factors that determines labour involvement in the seafood industry.
- To provide suitable suggestions for improving labour involvement in the seafood industry.

IV. METHODOLOGY

The study is conducted at Sea Food Industry at Ernakulam District, Kerala**.** The sample size is 50 selected using simple random sampling. The data is collected through questionnaire, and has been tabulated and analyzed by using simple Percentage and correlation.

V. ANALYSIS, FINDINGS AND INTERPRETATION

1. 30% of the respondents belong to the age group between 36-40 years.
2. 32% of the respondents are Diploma holders.
3. 24% of the respondents are having more than 10-25 years of experience.
4. 54% of the respondents are getting remuneration of above 10000.
5. 28% of the respondents are satisfied with the infrastructure in their company.
6. 38% of the respondents are neither satisfied nor dissatisfied about recognition in their company.
7. 56% of the respondents opine that their suggestions are considered in decision making.
8. 32% of the respondents opine that frequently chance has been given to improve skill and knowledge.
9. 60% of the respondents agreed that training programs are conducted in their company.
10. 86% of the respondents agree to adequate information in their company.
11. 76% of the respondents opine that they are happy with the co-workers.
12. 82% of the respondents are feeling happy to come to workplace.
13. 79% of the respondents are highly satisfied with the overall functioning of the organization.

Table 1: The Relationship between Remuneration and the Recognition given by the Management.

Correlation		Remuneration	what is your suggestion about the recognition given by the management
Remuneration	Pearson Correlation	1	.139
	Sig. (2-tailed)		.335
	N	50	50
what is your suggestion about the recognition given by the management	Pearson Correlation	.139	1
	Sig. (2-tailed)	.335	
	N	50	50

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Interpretation

The above table shows the result of the correlation calculated to find whether significant relationship between Remuneration and the recognition given by the management is. As the p=0.139, greater than level of significance of 0.05 There is no relationship between Remuneration and recognition of the respondents.

VI. RECOMMENDATIONS

- ✓ The management provides sufficient training to employees. A few measures can be taken to develop and organize the training program.
- ✓ The employee's works are being recognized by the management and appreciated. It can be maintained in such a way that the employees morale will be improved.
- ✓ Need to improve the working environment
- ✓ A few measures can be taken to revise regarding pay and benefits.
- ✓ Team performance must be highly encouraged and recognized.

VII. CONCLUSION

Labour involvement is the buzz word term for employee communication. It is a positive attitude held by the employees towards the organization and its values. It is rapidly gaining popularity, use and importance in the workplace and impacts organization in many ways. Labour involvement emphasizes the importance of the communication on the success of the business. An organization should thus recognize employees more than any other variable, as powerful contributors to a company's competitive position. Therefore labour involvement should be a continuous process of learning, improvement, measurement and action.

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HANDLING LARGE MEDICAL IMAGES WITH COMPRESSIVE SENSING AND PEGASIS PROTOCOL FOR ENERGY OPTIMIZATION

Paper ID	IJIFR/V4/ E2/ 036	Page No.	5216-5222	Subject Area	Information Technology
Keywords	Gateway, LEACH, PEGASIS, Sensors, WBAN				

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Abstract

This paper highlights on the issue or the major limitations of Wireless Sensor Networks that are battery operated with limited battery powers. This study deals with overcoming this limited battery using Compressive Sensing and PEGASIS protocol. The study concentrates on Wireless Body Area Networks (WBAN) where wireless sensors are used to capture potential data from human body and sends it to the medical room in case of emergency. These captured data are huge and complex images like ECG, Scanning etc., and these data has to be exchanged across the network efficiently without any break in the network that operates with limited battery power. To overcome the problem of battery power limitation this study proposes a compressive sensing PEGASIS based algorithm for efficient handling of the network without network breakages.

I. INTRODUCTION

There is a vast growth of technological advances recently in the area of wireless sensor networks and in particular with wireless body area networks which has become a mandatory part of the medical science that helps doctors to provide emergency services to their patients

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instantly from remote locations. For this remote monitoring of patients to happen real time the entire network requires uninterrupted data exchange that are complex data objects in terms of text, images and videos that needs to be exchanged across the network efficiently. One such area in WBAN is the long-term and ubiquitous real-time ECG monitoring that is becoming increasingly popular [1]. Though these areas have started gaining momentum, such systems face a large number of constraints, such as limited memory, limited energy, and limited computation and communication capabilities. In WBAN energy requirement is necessary for sensing, wireless communication and data processing. The actual limitation of this body area network is the cost to wirelessly transmit data which is on the higher side and demands some data reduction strategy at the sensor node. Compressed sensing (CS) is one suitable approach to lower energy consumption and complexity in WBAN. Their results show that CS outperforms state-of-the-art wavelet transform-based compression methods in terms of energy efficiency. This paper discusses on employing combination of compressed sensing and energy efficient PEGASIS protocol for efficient data handling in WBAN.

II. WBAN AND ITS LIMITATIONS

Wireless body area networks (WBANs) are a subset of Wireless Sensor Networks and provide support for telemedicine or remote healthcare monitoring. WBANs are biomedical carriers capable of carrying biomedical data to facilitate early diagnosis and treatment in a continuous health monitoring system by using various biomedical wireless sensors used for the human body. A remote data center operates in co-ordination with these sensors to process the bio-medical signals through cellular network. Some of the major limitations posed by this WBAN are its power consumption and sampling rate. Compressed sensing (CS) is a signal acquisition/compression methodology which gives an alternative to traditional signal acquisition along with PEGASIS protocol for improving on the factor of minimizing energy utilization.

III. COMPRESSIVE SENSING

The traditional method of reconstructing images from the measured data follows Shannon sampling theorem. The sampling rate must be twice as that of the highest frequency [2]. Similarly, the fundamental theorem of linear algebra suggests that the number of collected measurements or samples of a discrete finite-dimensional signal should be at least as large as its dimension for reconstruction. This underlying principle was followed to most of the recent technology such as medical imaging, analog to digital conversion, audio and video. Compressive sampling or Compressive sensing or parse recovery provides a new approach to data acquisition that overcomes this common thinking. Compressive sensing is a new type of sampling theory which predicts certain signals or images which can be recovered from what was previously believed to be highly incomplete information.

Algorithms such as $\ell 1$-minimization can be used for recovery. Compressive sensing has many potential applications in signal processing and imaging. Compressive sensing is a new framework for sensor design and signal acquisition [3]. It also performs sensing with

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image compression thereby helps in image size reduction with improved quality.

The major advantage of Compressive Sensing is that it enables a large reduction in the computation costs and sampling for sensing signals which has a compressible representation. Nyquist Shannon sampling theorem states that in order to capture an arbitrary band limited signal, certain minimum number of samples are required. Using compressive sensing it is possible to gradually reduce the number of samplings to be stored, when the signal is sparse in a known basis. In other words using compressive sensing one can recover certain images and signals from fewer measurements or samples using traditional methods. Compressive Sensing relies on two principles sparsity that pertains to the signals of interest and incoherence that pertains to the sensing modality.

Sparsity provides the idea that in the continuous time signal, information rate may be much smaller than its bandwidth, or that a discrete-time signal depends on a number of degrees of freedom that is comparably much smaller than its finite length. Incoherence expresses the idea that the objects having a sparse representation must be spread out in the domain they are acquired and extends the duality between time and frequency [4]. In recent years, compressed sensing has been widely used in the areas of computer science, applied mathematics, and electrical engineering.

IV. ENERGY EFFICIENT ALGORITHM

Energy conservation has become a major concern that needs to be addressed by many sectors over the world. There are many Federal programs that provide incentives to save energy and promote the use of renewable energy resources. There is a high time demand from Individuals, companies, and organizations seeking energy efficient products as the energy cost to run equipment has grown to be a major factor that overruns the total setup cost. Energy consumption is very critical to all electronic gadgets in terms of both cost and availability. Electricity costs impose a substantial strain on the budget of data and computing centers. Google engineers, maintaining thousands of servers, warned that if power consumption continues to grow, power costs can easily overtake hardware costs by a large margin. Energy has become a leading design constraint for computing and digital devices. Hardware engineers and system designers explore new directions to reduce the energy consumption of their products. Energy efficiency is one of the easiest and most cost effective ways to combat climate change clean the air we breathe, improve the competitiveness of our businesses and reduce energy costs for consumers. The Department of Energy is working with universities, businesses and the National Labs to develop new, energy-efficient technologies while boosting the efficiency of current technologies on the market [5].

V. IMPORTANCE OF ENERGY OPTIMIZATION IN WBAN

WBAN consist of miniature sensors that are able to sense and communicate with other devices. These wireless sensors will be in the form of wearables like rings and watches. These wireless sensors will detect changes in human body and passes information to the

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measuring device. These measurements can be displayed in the monitor as like scanning machine and even this reading can be transmitted to a mobile app with the help of Bluetooth and the patient with high risk can be monitored frequently and the results can be stored in other device for future references. When more devices are involved in WBAN, there should not be any interruption between the communications of nodes. To avoid interruption and network traffic, energy saving of the resources is must.

VI. PEGASIS PROTOCOL

Power-Efficient Gathering in Sensor Information Systems (PEGASIS) is a clustering and chaining protocol that is focused around the chain structure formation for efficient data exchange. Each node communicates only with a close neighboring node and takes turns by transmitting to the base station, thus the amount of energy spent per round get reduced. The main aim of this protocol is to extend the lifetime of a network by achieving a high level of energy efficiency and uniform consumption of energy across all network nodes. PEGASIS reduce the delay that data incur on their way to the sink. The PEGASIS protocol achieves about 90-100% to improvement when compared to the LEACH protocol [6].

6.1 Working of PEGASIS Protocol

PEGASIS, convention is focused around the chain structure. Chain is a collection of nodes belonging to a cluster and each chain can have one and only group head. The group head takes the complete control of nodes in the chain through accepting and sending messages between nodes that fit in with the chain. The bunch head devour expansive vitality as the chain keeps expanding. In PEGASIS, information exchange takes place with the nearest neighbor policy thereby transmission across the chain to base station is taken care by the group head thereby spare the battery for WSN and expanding the lifetime of the system [7].

6.2 Application Of Pegasis Protocol With Compressive Sensing

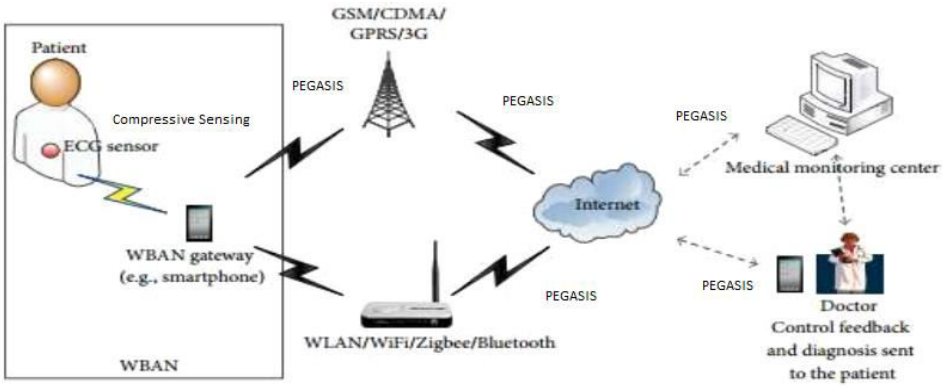

Figure1. Application of PEGASIS Protocol with Compressive Sensing

6.2.1 WBAN

WBAN is the Wireless Body Area Network. In today's technological world with technology developments on the verge and technological gadgets thronging the market, health issues and concerns have become a greater mystique. In such a prevailing situation it is necessary

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that the technology world should come out with a better or improved health monitoring system that is capable of handling the monitoring gadgets and the communication gadgets with minimum resource utilization and that has led to the development of WBAN, a health monitoring system. The wireless body sensors sense the body and pass the signals to the personal devices.

6.2.2 Personal devices (WBAN Gateway)

The personal devices or otherwise called the gateway of WBAN. Personal devices are the components that are use to receive signals from body sensors. The personal devices are then connected to internet through which signals are passed to medical network. It can be anything like computer, watches that are connected internally with WBAN. The signals provided by Body sensors are internally stored in personal networks and the networks transfer the signals to medical network that is external network through internet.

6.2.3 Medical Monitoring Center

Medical networks are nothing but doctors, emergency vehicle or the medical case history storage device. When the signals from WBAN are normal then they are stored in case history storage. If any abnormalities found in WBAN then alert signals are passed to doctors or to the emergency vehicle.

Along with this basic setup the compressive sensing and PEGASIS algorithm can be implemented over the wireless area network to improve upon faster and effective data transmission and energy efficiency and this architecture could offer better performance than any other system that solely works with either compressive sensing or PEGASIS protocol.

VII. PERFORMANCE OF PEGASIS PROTOCOLS

In the given Figure 2, where communication overhead is measured in joules, the overhead incurred by LEACH is significant with the increase in number of nodes and thereby affects the energy consumption, security, communication stability and the quality of service in large networks. On the other hand, the overheads are very small. Therefore the performance of PEGASIS is better than LEACH.

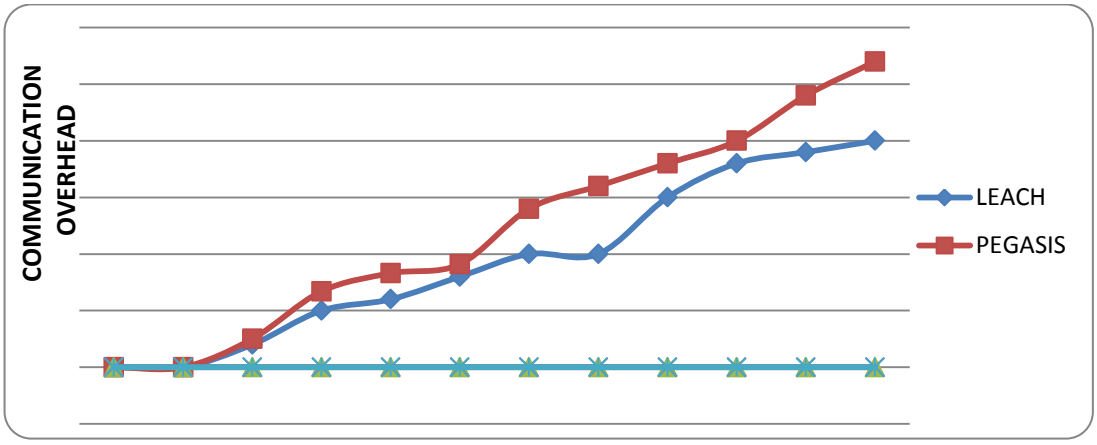

Figure 2. Performance of PEGASIS is better than LEACH.

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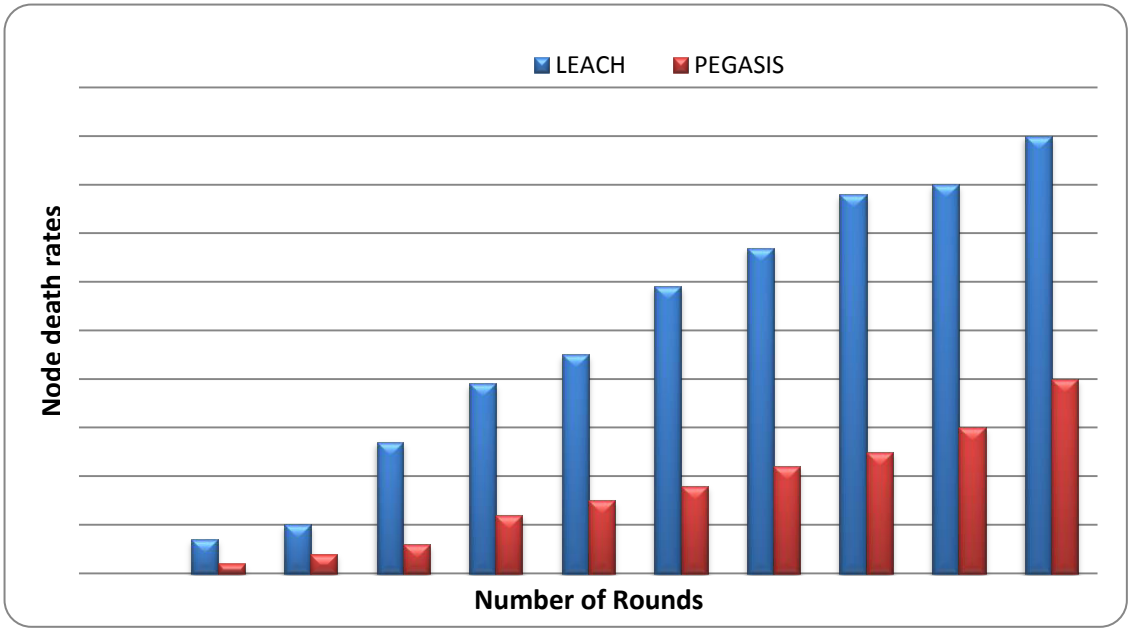

Figure 3: Stability and Lifetime in large networks of LEACH, PEGASIS

As shown in the Fig. 3 PEGASIS achieves around 2x the number of rounds compared to LEACH at all values of number of nodes deployed in the network. This shows that as compared to LEACH, PEGASIS offers better stability and lifetime in large networks.

VIII. CONCLUSION

This paper makes a detailed study on the WBAN architecture and the implementation of compressive sensing and PEGAIS protocol for enhanced data delivery with the available battery power. The paper also makes a comparative study of LEACH and PEGASIS protocol and the study proves that the PEGASIS protocol performs better in handling energy factor and sets the network work for longer hours without any network failure. In future this work can be extended to implement the model of WBAN with compressive sensing and PEGASIS protocol.

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A STUDY ON IMPACT OF DEMOGRAPHIC AND PSYCHO-SOCIAL FACTORS ON IMPULSIVE AND COMPULSIVE BUYING BEHAVIOR IN ORGANIZED RETAIL ENVIRONMENT

Paper ID	IJIFR/V4/ E2/ 038	Page No.	5223-5227	Subject Area	Business Administration
Keywords	Impulsive Buying, Compulsive Buying, Factors Influencing Buying Behavior				

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Abstract

This paper highlights on the issue or the major limitations of Wireless Sensor Networks that are battery operated with limited battery powers. This study deals with overcoming this limited battery using Compressive Sensing and PEGASIS protocol. The study concentrates on Wireless Body Area Networks (WBAN) where wireless sensors are used to capture potential data from human body and sends it to the medical room in case of emergency. These captured data are huge and complex images like ECG, Scanning etc., and these data has to be exchanged across the network efficiently without any break in the network that operates with limited battery power. To overcome the problem of battery power limitation this study proposes a compressive sensing PEGASIS based algorithm for efficient handling of the network without network breakages.

I. INTRODUCTION

An impulse buying is an unplanned or spontaneous purchase, where the consumer gets a sudden persistent urge to buy something on the spur of moment. The typical characteristic of impulse buying is an unplanned purchase made by a spontaneous decision and a subjective bias in favour of immediate possession (Kacen and Lee, 2002). Compulsive

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buying is characterized as repetitive, time consuming, excessive and uncontrolled buying (Faber & O'Guinn, 1992). The factors influencing consumer's compulsive buying behavior can be categorized into two wide categories i.e. external (environmental) influences and internal (psychological) influences (Aboujaoude, 2013).

It is difficult to distinguish between impulsive buying behavior and compulsive buying behavior based on their consequences (Callesen et al., 2014). Impulsive buying behavior may further become a cause of impulse control disorder and ultimately turn into compulsive buying behavior (Kwak et al., 2006). Planning and control mechanism is the only difference between both these behaviors (Xiao & Nicholson, 2013).

II. REVIEW OF LITREATURE

- **Ahmed et al., (2015)** analysed the core self-evaluation (CSE) personality traits model in impulsive and compulsive buying behavior among 641 fashion shoppers using Structural Equation Modelling. The results of the study concluded that compulsive buying is generated by impulsive buying behavior. Moreover the study also provided evidence that consumers with low score on CSE exhibited more impulsive buying behavior than compulsive buying behavior.
- **Anant and Anshul (2014)** examined the effect of five intrinsic factors (personality, culture, materialism, shopping enjoyment tendency, and impulsive buying tendency) on impulsive buying behaviour among 508 consumers in different parts of India. The results of the study showed that materialism, shopping enjoyment tendency, and impulsive buying tendency had significant positive relationship with impulsive buying behaviour, and the cultural construct of collectivism and two personality constructs of extraversion and conscientiousness also showed significant relationship.
- **Li et al., (2014)** investigated the prevalence of compulsive buying tendencies among 659 Chinese students. The results of the study identified three important factorial dimensions of compulsive buying behavior they are: impairment of impulse control and reactive or compensatory aspects, reduced rationality according to money spending, and post-purchase guilt. The findings revealed that majority of female shows compulsive buying pattern.
- **Flight and Scherle (2013)** analysed the interaction of shopping context (online or offline) in relation to impulsive and compulsive buying behaviors among 353 respondents in USA. The results of the study concluded that the impulsive and compulsive behavior vary significantly across store and product type, shopping intent (planned or spontaneous), affective state, and store location (online versus offline).

III. OBJECTIVES OF THE STUDY

- To analyse the impact of demographic factors on impulsive and compulsive buying behavior.
- To analyse the impact of psycho-social factors on impulsive and compulsive buying behavior.

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IV. RESEARCH DESIGN

Primary data collection was done through survey method using a well-structured questionnaire. The Sample Size of 403 respondents from the urban and rural areas in Coimbatore was chosen through simple random sampling method.

Tools used for analysis: Percentage analysis is used to explore the distribution in the demographic and psycho-social factors of the respondents, One-way ANOVA is used to analyze the impact of demographic and psycho-social factors on impulsive and compulsive buying behavior.

V. DATA ANALYSIS AND INTERPRETATION

Demographic profile of the respondents

Among 403 respondents 54.6% are female, 32.8% are in the age group of 18-25 years, 60% are married, 56.3% are undergraduates, 46.4% are employed, 33.5% have a monthly income above Rs.50001, 66.3% are from nuclear family, 66.7% have 3-5 members in their family and 49.1% are from urban area. The percentage analysis on psycho - social factors presented that majority 84.6% follow creative lifestyle, 47.4% are emotional and 61.3% have a positive attitude.

5.1 Impact of Demographic factors on impulsive and compulsive buying behavior

Table 1: ANOVA: Demographic factors on impulsive and compulsive buying behavior

Demographic factors	Impulsive Buying Behavior		Compulsive Buying behavior	
	F	Sign.	F	Sign.
Gender	-.403	.039	-.965	.111
Age	4.983	.001	3.855	.004
Marital status	-4.24	.105	-3.11	.750
Educational Qualification	.790	.500	.155	.926
Occupation	3.601	.003	2.251	.049
Monthly Income	2.251	.049	.514	.765
Nature of family	2.91	.291	3.12	.952
Family size	2.784	.063	3.573	.029
Area of residence	1.577	.208	5.410	.005

From the above table it is inferred that gender, age, and occupation have a significant influence on impulsive buying behavior. Whereas there is no significant difference between marital statuses, educational qualification, monthly income, nature of family, family size and impulsive buying behavior.

There exists a significant influence of age, occupation, family size and area of residence on compulsive buying behavior. Whereas there is no significant difference between genders,

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marital status, educational qualification, monthly income, nature of family and compulsive buying behavior.

5.2 Impact of Psycho-social factors on impulsive and compulsive buying behavior

Table: ANOVA: Psycho-social factors on impulsive and compulsive buying behavior

Psycho-social factors	Impulsive Buying Behavior		Compulsive Buying behavior	
	F	Sign.	F	Sign.
Lifestyle	1.645	.162	1.412	.229
Personality	7.617	.001	5.200	.006
Attitude	.831	.436	.465	.628

From the above table it is inferred that personality of the consumers has a significant influence on impulsive and compulsive buying behavior. Whereas there is no significant difference between lifestyle, attitude and impulsive and compulsive buying behavior.

VI. FINDINGS

- The present study has identified a positive relationship between impulsive and compulsive buying behavior. Since majority of the respondents are between the age group of 18-25 years, it is evident that young consumers tend to possess impulsive and compulsive buying behavior when compared with other age groups.
- Occupation of the consumers also found to have a significant influence on impulsive and compulsive buying behavior. Which implies that the type of job a person is engaged in also contributes in formation of their buying behavior. The tendency may a result of perceptions formed at their workplace.
- The result shows that monthly income of the respondents has a significant influence on impulsive buying behavior. Majority of the respondents have an income above Rs.50, 000 which makes it evident that income also forms a base for impulsive buying behavior that is generally explained as making unplanned purchase.
- The current research provides strong empirical evidence that personality of a person influences the compulsive buying and compulsive behavior. The personality of individuals differs from each other and so does their impulsive and compulsive tendency is also different. It is important to realize that the consumers' personality plays a key role in their purchase pattern and decisions.

VII. CONCLUSION

The present study has attempted to develop our understanding of the impact of demographic and psycho-social factors on impulse and compulsive buying behaviors. This behavior may well stem from several different causes that include personality and few other demographic factor as the most important among it. The relationship of the underlying personality and demographic factor on impulse and compulsive buying behaviors is both logical, useful, and is deserving of further exploration.

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ONLINE SHOPPING BEHAVIOUR AMONG COLLEGE STUDENTS IN ERNAKULAM DISTRICT

Paper ID	IJIFR/V4/ E2/ 043	Page No.	5228-5234	Research Area	E-Commerce
Keywords	Consumer Attitude, Online Shopping, Virtual Store, e-Tailware				

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Abstract

In the era of globalization electronic marketing is a great revolution. Over the last decade maximum business organizations are running with technological change. Online shopping or marketing is the use of technology (i.e., computer) for better marketing performance. Online shopping/e-shopping is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the internet using a web browser. Evaluating the customer's attitude towards online shopping and the factors affecting it can assist the marketers and managers to plan appropriate strategies in order to make more profit. The current study is based on online shopping behavior among students in various colleges in Ernakulum district. The study focuses on the area of internet usage pattern of the respondents, type of product they purchase, factors stimulating online sales, loopholes in online shopping and suggestions for the improvement of online shopping.

I. INTRODUCTION

Electronic commerce has witnessed an exponential growth resulting in greater use of this tool by the traders. Also the competition in e-commerce is intensified. Therefore it becomes more important for online retailers to understand the antecedents of consumer acceptance of online shopping. Such knowledge is essential to customer relationship management, which has been recognized as an effective business strategy to achieve success in the electronic market.English entrepreneur Michael Aldrich invented online shopping in 1979. Online shopping (sometimes known as e-tail from "electronic retail" or e-shopping) is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the Internet using a web browser. Alternative names are: e-web-store, e-shop, e-store,

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Internet shop, web-shop, web-store, online store, online storefront and virtual store. When people buy things, they will engage in a decision making process. One of the major problems of E- commerce web sites is that they fail in supporting the customers in this process. By understanding the customer's needs and concerns the marketer can provide better products and services. According to UCLA Centre for Communication Policy (2001), online shopping has become the third most popular Internet activity, immediately following e-mail using/instant messaging and web browsing. It is even more popular than seeking out entertainment information and news, two commonly thought of activities when considering what Internet users do when online.

Online shopping behaviour (also called online buying behaviour and Internet shopping/buying behaviour) refers to the process of purchasing products or services via the Internet. The process consists of five steps similar to those associated with traditional shopping behaviour (Liang and Lai 2000). In the typical online shopping process, when potential consumers recognize a need for some merchandise or service, they go to the Internet and search for need-related information. However, rather than searching actively, at times potential consumers are attracted by information about products or services associated with the felt need. They then evaluate alternatives and choose the one that best fits their criteria for meeting the felt need. Finally, a transaction is conducted and post-sales services provided. Online shopping attitude refers to consumer's psychological state in terms of making purchases on the Internet e-Commerce is a general concept covering any form of business transaction or information exchange executed using Information And Communication Technology (ICT's). E-Commerce takes place between companies and their consumers, or between companies & Government. E-Commerce includes buying and selling of goods and services and doing business over electronic- computer networks. The following Chart illustrates the broad divisions of e-commerce.

1.1 **Divisions of e-Commerce**

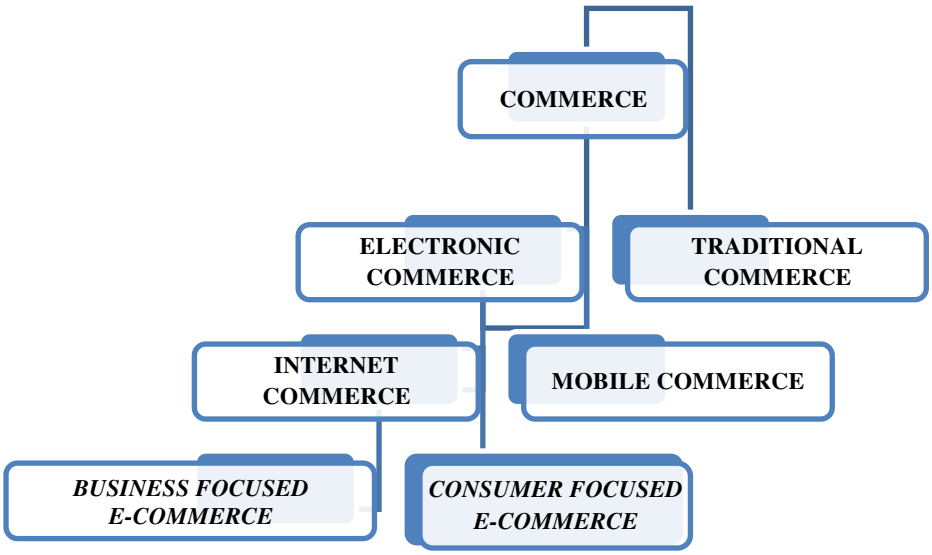

Figure 1: e commerce divisions

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1.2 Types of e-Commerce

i) Business to Business
ii) Business to Consumer
iii) Consumer to Business
iv) Consumer to Consumer

Table 1: Types of e-Commerce

Types	Description	Examples
B2B	Sells products or services to other businesses or brings multiple buyers and sellers together in a central place	*alibaba.com* *tradeindia.com* *tolexo.com*
B2C	Producers or brands sells products or services directly to consumers	*amazon.com* *myntra.com* *flipkart.com*
C2C	Consumers sell directly to other consumers by posting their advertisements on online market places.	*ebay.com* *quicker.com* *olx.in*
C2B	Consumers fix price on their own, which businesses accept or decline.	*priceline.com* *atyourprice.in*

1.3 Popular e –commerce websites in India

i) www.flipkart.com
ii) www.jabong.com
iii) www.myntra.com
iv) www.snapdeal.com
v) www.amazon.

II. LITERATURE REVIEW

- **Wang, Liu and Cheng (2008)** conducted a study on the Influencing Factors of Online Shopping and documented that consumers think it to be risky to make online payments. The consumers were also expecting a higher level of privacy in online shopping. This study was conducted in China and the Chinese consumer's experience with the internet and computer skill was also found a factor influencing the consumer behaviour.
- **Norazah Suki and Norbayah Suki (2009)** conducted a study on 'Cellular Phone Users' Willingness to Shop Online'. The study suggested that marketers should propose more on attractive promotion such as advertisements or discounts through the web.
- **Chowdhury and Ahmad (2011)** conducted a study on 'factors affecting consumer participation in online shopping in Malaysia'. The major focus of the study was to describe the relationship between independent variables and dependent variable using Pearson's correlation method. The limitation of this study was that it only used four variables (ability, benevolence, integrity, and trust) in explaining the consumer participation but did not take other important variables into account (e.g., cost switching vendors and the presence of third party. The study provides a useful insight on the significant role of trust in students for

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online shopping.

- **Yulihasri, Islam and Daud (2011)** conducted a study on 'Factors that Influence Custom er's Buying Intention on Shopping Online'. The variables that were tested included usefu lness of internet shopping, ease of use, compatibility, privacy, security, normative beliefs, self-efficacy, attitude and student's buying intention. Pearson correlation analysis provide d statistical information about the relationship of each independent variablewith depende nt variables. It was studied that web advertising favourably influences the purchasing of a company's products.
- **Karim (2013)** conducted a study on online shopping behaviour of customers and docume nted that online vendors can assure their consumers for transaction security and avoid lon g delays in completing online orders and the hassle of returning goods for better online sh opping experience.
- **Morris (2013)** conducted a study on 'More Consumers Prefer Online Shopping' Shopper s increasingly want what's called a "seamless omnichannel experience," meaning one in which retailers allow them to combine online and brick and mortar browsing, shopping, o rdering and returning in whatever combo they would like.

III. NEED AND SIGNIFICANCE OF THE STUDY

The study is basically descriptive in nature. .Online shopping is considered to be a very help ful way of buying products through the internet especially during the holidays and clearance seasons. The e-commerce market has a great potential for youth segment. It allows customer s to enjoy a wide variety of products and items not only from a specific store, but from a div erse storage that includes all kinds of items. Online shopping also provides customers with a good customer service that also occurs online. Specially understanding the consumer's attitu des towards online shopping , making improvement in the factors that influence consumers t o shop online and working on factors that affect consumers to shop online will help markete rs to gain the competitive edge over others.

Many people around the world prefer to shop online and buy products from several brands a nd companies that they cannot find or are not available for purchase in their home countries. Nowadays, and with the help of the new technology and the support of the internet, people f rom all around the world started to purchase items online by simply sitting in their homes.

Purchasing items and products through the Web is a very easy task to do. It is now playing a very important role in everybody's life especially elderly people, as well as people with a ve ry busy life schedule. It provides a very comfortable service for its customers, by being able to save the item in the personal shopping bag, and buy it later on. But the statistics available has shown that Indian market is still not a fully developed market for e-tail stores. There is h uge scope of web-stores in various areas and in almost all the segments. The young populati on is the biggest attraction of this industry and they may contribute substantially to the grow th of online shopping in India. The majority of internet users are youngsters, the majority of goods and services demanded are related to only this segment.

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IV. OBJECTIVES OF THE STUDY

1. To understand the internet usage patern among college students.
2. To give an idea regarding on line shopping
3. To review studies on online shopping
4. To analyse the type of products the respondents' shop online
5. To discover the factors stimulating online sales.
6. To discover the loopholes in online shopping.
7. To find out the most and least popular categories purchased online.
8. To offer suitable suggestions for the present study

IV. RESEARCH METHODOLOGY

- **Methodology**
- The study includes respondents various colleges in Ernakulam district
- **Sources of Data**: This study uses both Primary Data and Secondary Data. The prima ry data are collected from 100 students in 5 colleges in Ernakulum district. For conv enience the researcher selected 20 students from St. Albert's college, Maharajas Coll ege, St. Teresa's College, Aquinas College and Cochin College. The Secondary Data has been collected from books, articles, magazines and from websites.
- **Sampling Technique:** For the purpose of study 100 respondents were chosen. Conv enience sampling has been adopted.
- **Tools for Analysis:**
- Percentage analysis is the tool used for the study.
- **Limitation:** Due to paucity of time only limited samples were taken for study.

V. DATA ANALYSIS & INTERPRETATION

5.1Gender wise classification of on-line Shoppers

Sl. No.		Name of the College	Gender	
			Boys	Girls
1	Maharaja's College	96%	4%	
2	St. Albert's College	80%	20%	
3	St.Teresa's College	0%	100%	
4	Cochin College	55%	45%	
5	Aquinas College	60%	40%	
	Total	**58.2%**	**41.8%**	

In Ernakulam City boys are used online shopping fac ilities for purchasing products except St. Teresa's Co llege.

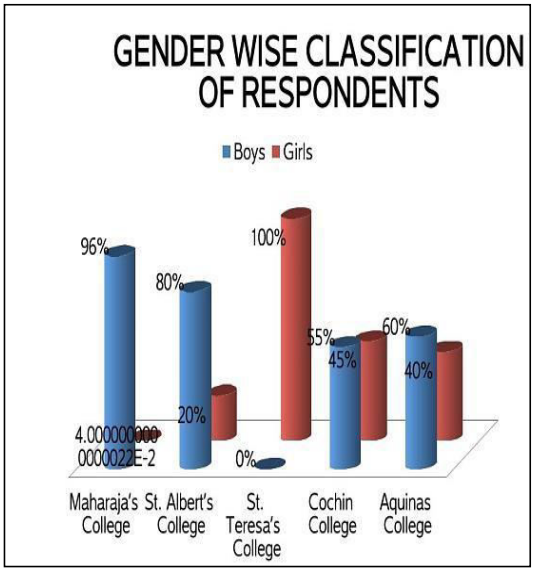

Figure 1: Genderwise Classification Of Respondents

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5.2 .Internet Usage Patern of the Respondents

Sl. No.	Name of the College	Usage Pattern			No Users
		Mobile Networks	Broadband connection	WiFi data connection	
1	Maharaja's College	73%	12%	4%	11%
2	St. Albert's College	72%	20%	2%	6%
3	St.Theresas College	57%	40%	2%	1%
4	Cochin College	71%	8%	0%	21%
5	Aquinas College	41%	7%	0%	52%
	Total	62.8%	17.4%	1.6%	18.2%

In Ernakulam city 73% students of Maharaja's college owns mobile phones & have internet connections. Aquinas College students are lesser in mobile network using community.

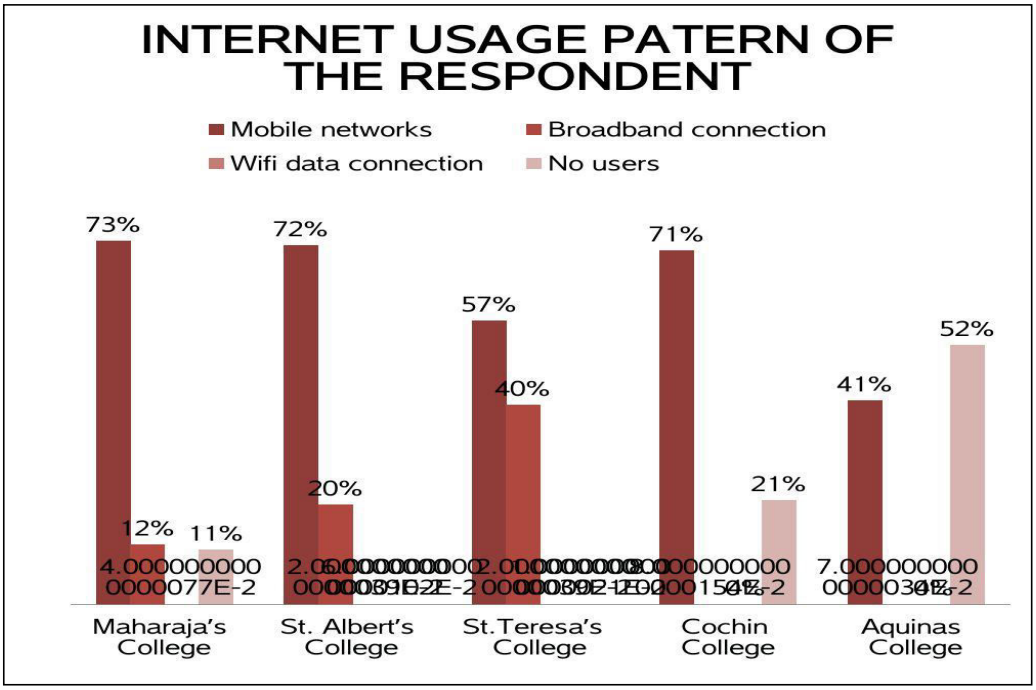

Figure 2: Internet usage pattern of respondents

5.3. Frequency of Online shopping preferences

Sl No	Name of the College	Online shopping habit	Traditional shopping habit	Both online & Traditional
1	Maharaja's College	57%	40%	3%
2	St. Albert's College	60%	10%	30%
3	St.Teresa's College	70%	5%	25%
4	Cochin College	40%	55%	5%
5	Aquinas College	32%	60%	8%
	Total	51.8%	34%	14.2%

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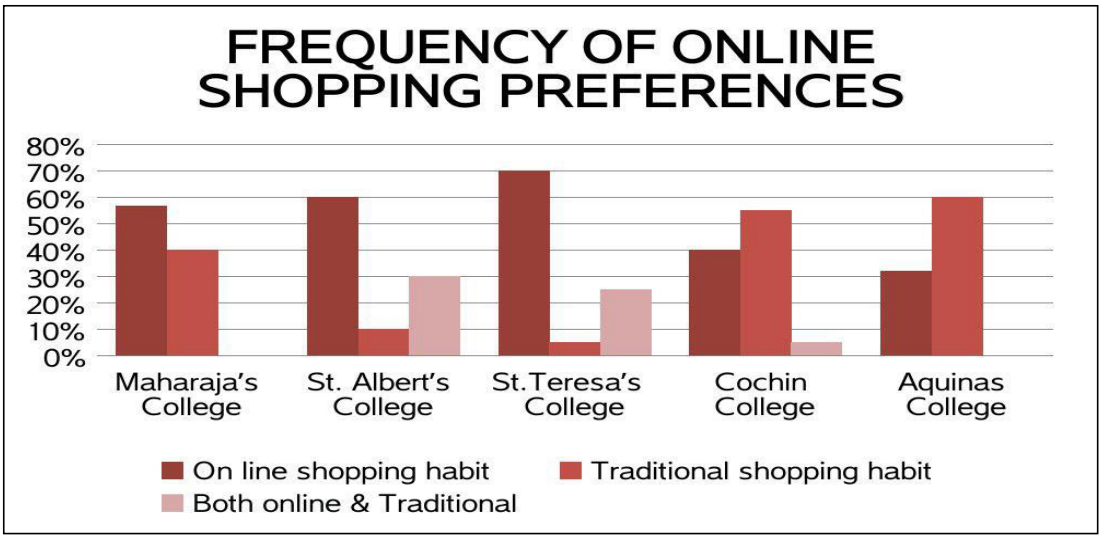

Figure 3: Frequency of Online shopping preferences

In Ernakulam City 51.8% students are engaged in online shopping habit & 14.2% students li kes both online & off line shopping. Among 5 Colleges St.Teresa's Students prefers on line shopping more compared to others.

5.4. The Type of Products the Respondents' Shop Online

Sl. No.	Name of the College	Items		
		Beauty , Wellness & Medicines	Sports Items	Life Style Products
1	Maharaja's College	54%	45%	1%
2	St. Albert's College	40%	60%	0%
3	St.Teresa's College	75%	0%	25%
4	Cochin College	32%	62%	6%
5	Aquinas College	45%	35%	20%
	Total	49.2%	40.4%	10.4%

In Ernakulam City most of the students are doing online shopping for purchasing sports & b eauty products. (40.4% & 49.2%)

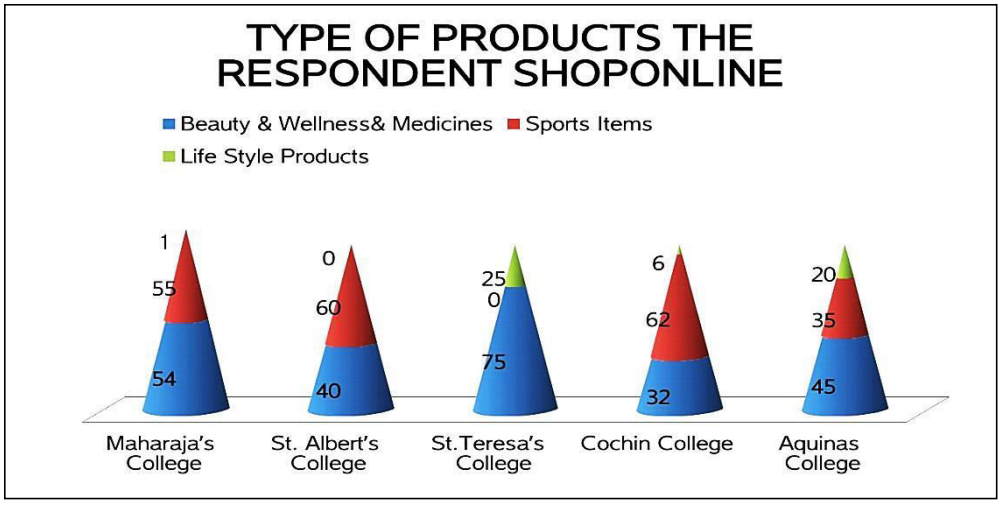

Figure 4: Type of Products the Respondents' Shop Online

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5.5. Payment system

Sl. No.	Name of the College	Payment Systems		
		Credit Cards	Debit Cards	Cash on Delivery
1	Maharaja's College	96%	4%	0%
2	St. Albert's College	80%	10%	10%
3	St.Teresa's College	84%	16%	0%
4	Cochin College	54%	20%	26%
5	Aquinas College	60%	20%	20%
	Total	74.8%	14%	11.2%

Most of the college students are commonly used credit cards of their parents in order to make payments (74.8%).

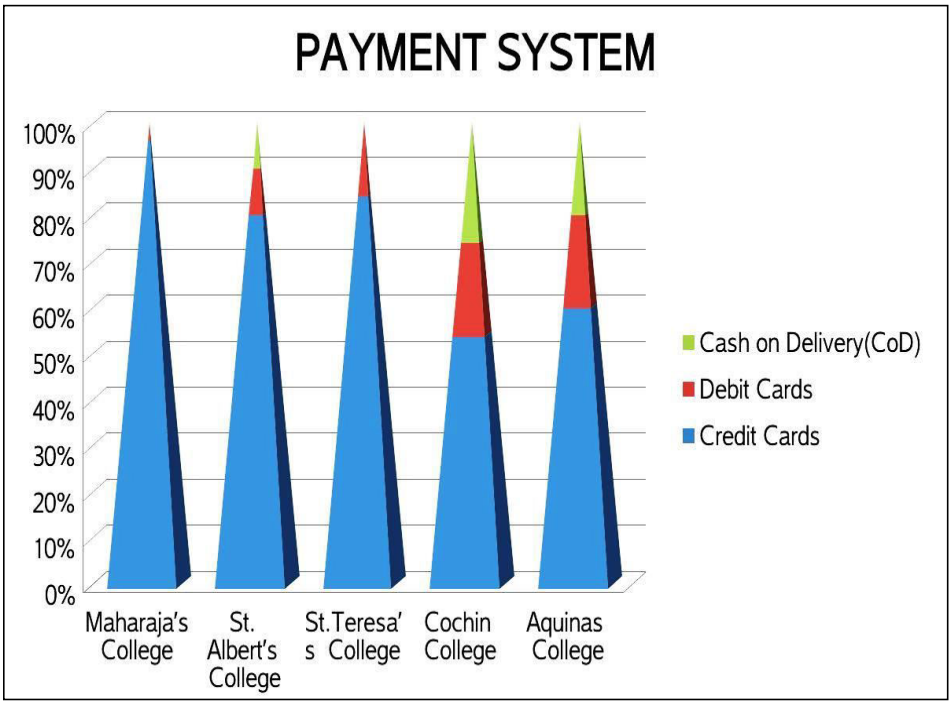

Figure 5: Payment System Adopted

Majority of students (74.8%) prefer credit card for their online purchasing. Cash on delivery is the least method for online payment system.

5.6. Most frequently visited & used e- Commerce sites

Sl. No.	Name of the College	E- Commerce sites			
		Myntra	Flipkart	Amazon	Others
1	Maharaja's College	10%	20%	50%	20%
2	St. Albert's College	12%	18%	40%	30%
3	St.Teresa's College	40%	20%	30%	10%
4	Cochin College	20%	20%	20%	40%
5	Aquinas College	15%	18%	32%	35%
	Total	19.4%	19.2%	34.4%	27%

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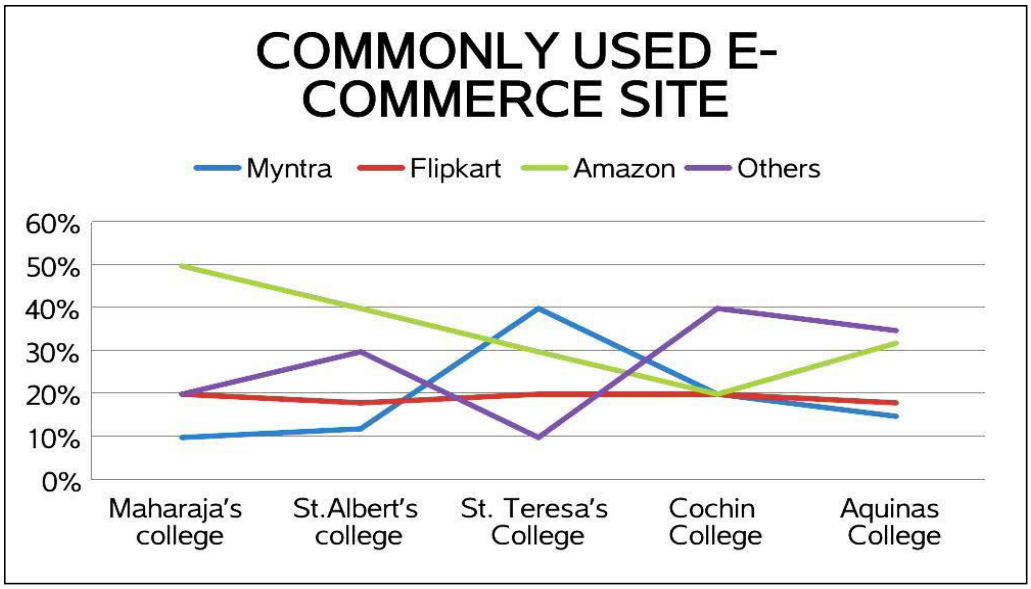

Figure 6: Frequently visited & used e- Commerce sites

In Ernakulam City most preferably used e-commerce site among college students is Amazon.

5.7. Factors promoting online sales

Sl.No.	Name of the college	Factors promoting online sales			
		Convenience	Heavy discount&deals	Variety	Others
1.	Maharaja's College	50%	35%	10%	5%
2.	St.Alberts College	40%	40%	10%	10%
3.	St.Teresa'sCollege	50%	35%	15%	0%
4.	Cochin College	45%	35%	10%	10%
5.	Aquinas College	45%	30%	20%	5%
	Total	46%	35%	13%	6%

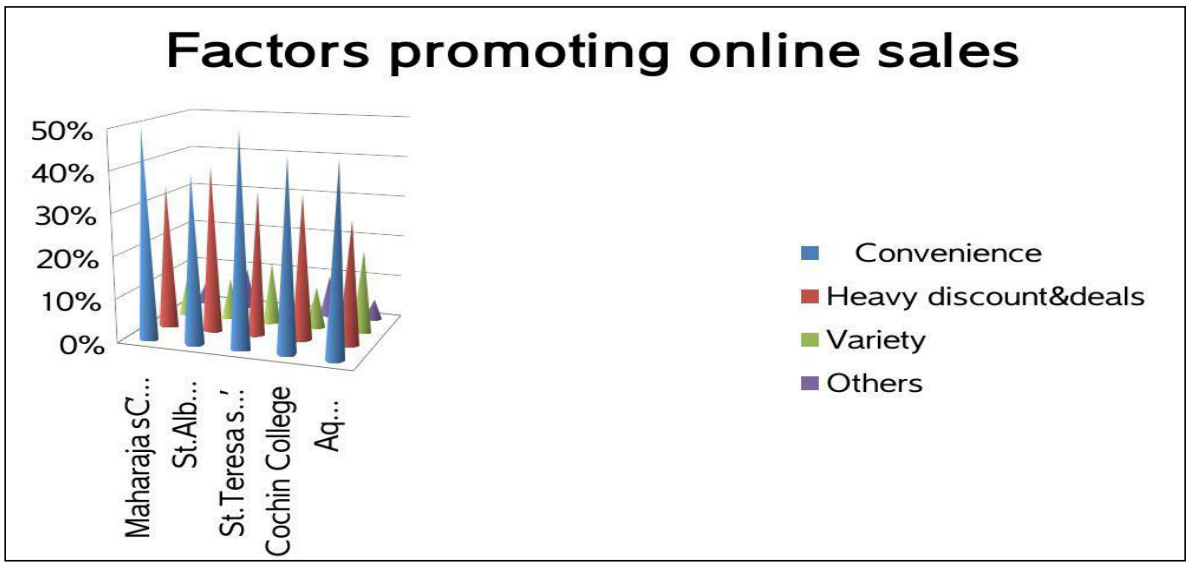

Figure 7: Factors promoting online sales

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46% of students are of the opinion that convenience is the major factors promoting online sh opping & heavy discount and deals also have a major impact on promoting on line sales.

5.8. Issues in online shopping

Sl. No.	Name of colleges	Return issues	Lack of touch & feel	Delay in delivery time	Online security issues
1.	Maharaja's College	12	60	18	10
2.	St.Alberts College	13	60	12	15
3.	St.Teresa'sCollege	20	45	20	15
4.	Cochin College	15	30	15	20
5.	Aquinas College	30	58	5	7
	Total	18%	50.6%	14%	13.4%

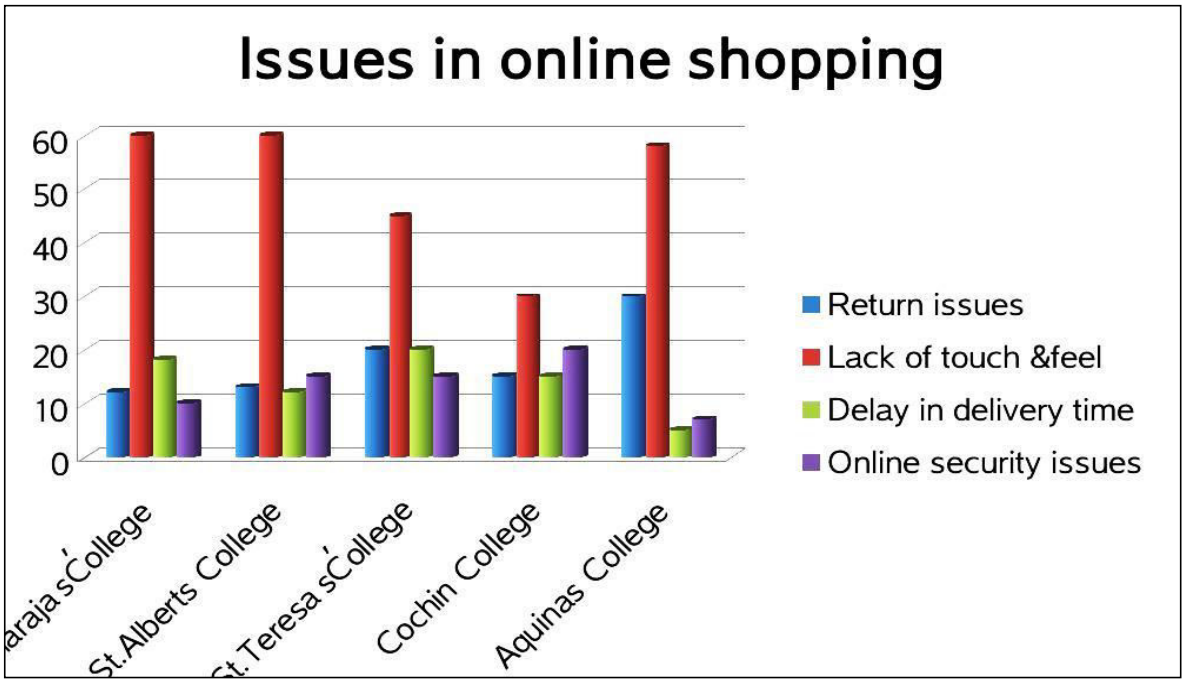

Figure 8: Issues in online shopping

Lack of touch and feel is the major issue in online shopping

VI. FINDINGS OF THE STUDY

1) In Ernakulam city, 85 % of students have internet usage facility.
2) Boys are more actively involved in online shopping than girls.
3) 49.2 % of students buy beauty and wellness, medicines in their online purchase.
4) 34.4% of students selects amazon for their online shopping.
5) Majority of students make their online shopping transactions through credit cards.
6) In Ernakulam city, 51.8 % of students having online buying habits
7) Convenience is the major factor which influence the students to select online shopping

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8) The ease and convenience provided by these stores for 24x7 has made very easy shopping for consumers.

VII. SUGGESTIONS

1. The online shoppers secure their PC from viruses and other attacks by using a good anti-malware program.
2. Online shoppers indicate that they would not even buy electronics without consulting online reviews first.
3. The e-stores specifically mention about the security of transactions of their e-stores which will increase the faith of customers for online shopping
4. Government should play a pivotal role in encouraging online shopping.
5. Online retailers should focus on better home page presentation to appeal the prospects and sustain the existing buyers.
6. Use credit card instead of debit card for online purchases.
7. E-marketers must give a thought to secure, time saving, information about product and services factors when they design their product strategy.
8. Payment through PayPal account

VIII. CONCLUSION

Online shopping is becoming more popular day by day with the increase in the usage of Wo rld Wide Web known as www. Understanding customer's need for online selling has becom e challenge for marketers. .The e-commerce market has a great potential for youth segment. If the demographic features are considered carefully then it can be easily identified that max imum number of respondents of online shopping are lying in age group of 18- 25 years. Spe cially understanding the consumer's attitudes towards online shopping , making improveme nt in the factors that influence consumers to shop online and working on factors that affect c onsumers to shop online will help marketers to gain the competitive edge over others. The b uying behaviour of youth can be elaborated through findings obtained through survey. By fo cussing on various factors identified in this study, the corporate can make their marketing str ategies in better way.

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SOCIO-ECONOMIC STATUS AND EXPOSURE TO RADIO IN RURAL AREA OF MANIPUR

Paper ID	IJIFR/V4/ E2/ 044	Page No.	5235-5242	Subject Area	Mass Communication
Keywords	Radio, Socio- Economic, Exposure to Media				

Thokchom Vidyarani Devi	Research Scholar Department of Mass Communication Assam University, Silchar-Assam

Abstract

Radio is a medium of ear. Its listenership encompasses from young to old aged people. It is because of this reason that radio broadcast in every region do always have children's programme. As different from print media, the medium of radio is not a medium of elites. It is listened and understood as well by the illiterates also. Therefore, the program composition of radio is done in such as comprehensive way so that it can serve the intellectuals and illiterates peasants, young and old, men and women, rural and urban people. It is considered as a cheap medium compared to the other medium. Radio can cover a vast area and it can also be broadcast for a specific area of coverage. While the AM radio broadcast covers only a particular range of distance. Newly, emerged community radio also covers only a small range of distance. Radio is a powerful medium of imparting information of what is happening around the globe, far and near. Radio is considered as a medium for poor and illiterates. But the socio-economic status of the rural masses is also important in exposure to various media. The article brings a brief about the socio-economic status of rural mass and exposure to radio in Manipur.

I. INTRODUCTION

As radio is ear cleansing medium of communication, most of the rural people who are more illiterates prefer radio medium. Through the medium of radio the social related issues can be highlighted and maximum information can be disseminated, hence on framing or bringing certain changes in social related issues, radio plays a vital role. The medium of radio is also

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a powerful tool imparting information and entertainment for the rural masses. Rural programs catering the needs of agriculture and allied activities, rural women and rural children are remain as important components of the radio programme composition down the years.

In India, the print media took roots first in the major provincial capitals of British India, Calcutta and later Bombay. These cities with their surrounding areas accounted for the bulk of their newspaper circulations. Later in some other cities also published newspapers and also had their own radio stations. But newspaper readership continued to remain in urban areas. The broadcasting media (TV and Radio), though under government control, have the capacity to reach out to the people in every nook and corner of the country. While both are highly capital- intensive, it is their capacity to reach out to millions that makes them a people's medium. Radio has a much wider reach and access. Radio is supposed to be highly popular medium since it has no geographical and literacy barriers. It can educate as well as entertain people belonging to different strata of population. For the rural masses also radio is a pleasing medium. But the socio- economic status of the rural masses is also important exposure to various media.

II. LITERATURE REVIEW

- The mass communication tools broadly follow the outlines perspective of the social learning theory. In India, where most of the rural people are illiterate, radio is applying the theory while framing the programmes for social development. In India, radio plays an important role in development communication through circulation of knowledge, providing forum for discussion of issues, teach ideas, skills for a better life and create a base of consensus for stability of the state.
- Broadcasting was introduced in India by amateur radio clubs in Calcutta, Bombay, Madras and Lahore, though even before the clubs launched their ventures, several experimental broadcasts were conducted in Bombay and other cities. The times of India records that a broadcast was transmitted from the roof of its building on August 20, 1921. However, the first license granted for transmitting a broadcast was given only on February 23, 1922.
- The Radio club of Calcutta was perhaps the first amateur club to start functioning (in November 1923), followed by the Madras Presidency Radio club which was formed on May 16, 1924 and began broadcasting on July 31. Financial difficulties forced the clubs to come together in 1927 to form the Indian Broadcasting Company Limited (IBC).
- The government –run broadcasting, set up was called the Indian State Broadcasting (ISBS) with Lionel Fielden from BBC as its first controller. Initially placed under the department of Industries and Labour, All India Radio was transferred to the Department of Communication, the administration of broadcasting was ultimately entrusted to the department of Information and Broadcasting in 1941. It remained with the Ministry until September 1997 when the Prasar Bharati, an autonomous statutory body, was constituted under the Prasar Bharati (1990).

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- The persuasive power of radio is more than that of print. Again Klapper goes on reporting that among the less educated and intelligent people, radio also shows greater retention power (Klapper, 1960).
- Menefee and Menefee opine that in any area where illiteracy predominates, the radio must be relied upon for day-to-day communication with people (Menefee and Menefee, 1964).
- Radio Listening Habits among Rural Audiences: An Ethnographic Study of Kieni West Division in Central Kenya, A dissertation presented to the faculty of the Scripps College of Communication of Ohio University, George W. Gathigi August 2009. This is a research on the role of radio in rural listeners' everyday lives within a liberalized media environment. Using the media ethnography method, he examined the radio consumption habits of rural people of the Kieni West Division, Nyeri District, Kenya. How do they choose content from the stations that are available? What type of content do they seek and how does this relate to their daily lives?
- To explore this, an ethnographic study was undertaken of the Kothmale Community Radio and Internet Project (KCRIP) in Central Province, Sri Lanka. The Kothmale community radio station had been operating since the 1980s, while the Internet centre was a fairly recent addition (since 2000). KCRIP provided an interesting example of a 'community multimedia centre' that was anecdotally having a lot of positive outcomes, but little rigorous research and no regular monitoring and evaluation was taking place to back up this impression. The combination of the Internet centre and the radio station was of particular interest in this area where most people had access to radio, but very few to other communication technologies such as telephones, computers and the Internet.
- All India Radio took up the task of aiding overall development in the country and designed programmes to contribute to the process of socio-economic development. During the Green Revolution and the White Revolution in the country the radio was used successfully for disseminating information to farmers (Maru, 2003).

III. OBJECTIVE OF THE STUDY

To find out whether there is any difference in the extend of interconnection between the exposure to radio of the rural people on account of the difference in the people's socio-economic status.

IV. RESEARCH METHODOLOGY

For the proposed study, one village (Pungdongbam village) from the Imphal East district of the Manipur will be taken for case study.

Empirical, qualitative as well as quantitative data will be collected from the selected areas of the study through ethnographic field work.

- Observation- participant, non- participant observation
- Interview schedule- open and closed ended question, diaries, feedback mechanisms and other 'self-documentation'.

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4.1 Variables/ Parameters of the study

Socio-economic status: The socio-economic status of the respondents is studied in terms of their educational attainment, occupation, income and monthly savings.

4.2 Population and Sample

The field work for the study was conducted in one of the rural areas of Imphal –east districts of Manipur. The heads of households of the area constituted the Universe for the study. 300 heads of households constituted the sample for the study. The households were selected according to the list of the electoral roll.

4.3 Analyses of Data

The collected data were carried out through statistical analysis. Association between attributes and variables was found out by applying chi-square test. 0.05 level is used for testing significance.

4.4 Testing

The chi-square test also called Pearson's chi-square test or the chi-square test of association is used to discover if there is relationship between two categorical variables.

V. ANALYTICAL INTERPRETATION OF DATA

5.1 Socio Economic Status of the Respondents

Table 1: Distribution of Persons by Age, Sex and Educational Attainment

Age (in Years)	Educational Qualification														
	Illiterate			Primary			Up to High School			Up to Higher Secondary			Total		
	Sex		Total	Sex		Total	Sex		Total	Sex		Total	Sex		Total
	Male	Female		Male	Female		Male	Female		Male	Female		Male	Female	
Under 30	0	0	0	4	2	6	24	4	28	4	2	6	32	8	40
31 - 40	0	2	2	7	4	11	40	20	60	10	4	14	57	30	87
41 -50	4	2	6	8	4	12	44	12	56	12	2	14	68	20	88
Above 50	4	2	6	11	18	29	28	6	34	14	2	16	57	28	85
Total	8	6	14	30	28	58	136	42	178	40	10	50	214	86	300
Percentage	2.7	2	4.7	10	9.3	19.3	45.3	14	59.3	13.33	3.33	16.7			100

Table 1 shows that, 4.7 per cent illiterate, 19.3 per cent primary educated, 59.3 per cent high school educated and 16.7 higher secondary educated respondents recorded in the sample of

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the survey. No graduate and post graduate respondents found in the sample of survey, so it is excluded from the table.

Table 2: Socio- economic status of the respondents

Age (in Years)	Educational Qualification	Occupation			Annual Income (in Rs.)				
		White- Collar Employment	Agriculture	Total	Below Rs.30000	Rs.30000 to Rs.50000	Rs.50000 to Rs.100000	Above Rs.100000	Total
Under 30	Illiterate	0	0	0	0	0	0	0	0
	Primary	0	6	6	6	0	0	0	6
	Up to High School	6	22	28	10	8	2	8	28
	Up to Higher Secondary	2	4	6	0	2	2	2	6
	Total	8	32	40	16	10	4	10	40
31 - 40	Illiterate	0	2	2	2	0	0	0	2
	Primary	0	11	11	9	2	0	0	11
	Up to High School	2	58	60	38	14	6	2	60
	Up to Higher Secondary	0	14	14	8	6	0	0	14
	Total	2	85	87	57	22	6	2	87
41 -50	Illiterate	0	6	6	4	2	0	0	6
	Primary	0	12	12	6	2	4	0	12
	Up to High School	8	48	56	16	24	8	8	56
	Up to Higher Secondary	3	11	14	0	10	4	0	14
	Total	11	77	88	26	38	16	8	88
Above 50	Illiterate	0	6	6	2	0	2	2	6
	Primary	0	29	29	23	4	0	2	29
	Up to High School	6	28	34	16	6	10	2	34
	Up to Higher Secondary	7	9	16	0	8	6	2	16
	Total	13	72	85	41	18	18	8	85
Total		34	266	300	140	88	44	28	300

Table 2 shows that, 34 out of 300 respondents are white-collar employees with 11.3 per cent and 266 are agriculturists with 88.7 per cent. This indicates the occupation of the village is mainly on agriculture and their source of income depends on it. Occupation and income depends on each other and the average rate of the income of the respondents is low as their annual income is below Rs 30000-50000.

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5.2 Listening Radio

Table 3: Radio listener

Age	Sex								
	Male			Female			Total		
	Listening Radio		Total	Listening Radio		Total	Listening Radio		Total
	Yes	No		Yes	No		Yes	No	
Under 30 Years	28	4	32	8	0	8	36	4	40
31 - 40 Years	48	9	57	28	2	30	76	11	87
41 -50	56	12	68	18	2	20	74	14	88
Above 50	46	11	57	14	14	28	60	25	85
Total	178	36	214	68	18	86	246	54	300
Percentage	59.3	12	71.3	22.6	6	28.7	82	18	100

Table 3 shows that, 246 out of 300 respondents were listening to radio daily with 82.0 per cent. It can be recorded that listening to radio is high in the area. Gender wise both male and female have higher listening to radio. Again age-wise, above 30 years of age group have higher listening to radio. This is because the older age groups have more free time and can adjust their working time to suit the broadcasting time of the radio. But the younger age groups were busy with their vocation.

5.3 Education and Extent of Exposure to the Radio

There is significant relationship between education and exposure to radio.

Table 4: Education and exposure to radio

Educational Attainment	Exposure to the Radio		Total
	Yes	No	
Illiterate	4	10	14
Primary	42	16	58
Up to High School	154	24	178
Up to Higher Secondary	46	4	50
Total	246	54	300

Chi-square value = 36.535 with p-value = 0.000.The test is significant.

The radio is also used more by the better educated sections of the community. Table 4 gives the details of the exposure of the respondents to the radio.

The access to the radio is not barred to the illiterates since most of the broadcast are in local language. The low economic status of the lower educated might be one of the reasons for the low exposure of the group to this medium. Another reason will be their attitude towards the medium itself. The less educated people perceive the radio as a medium for entertainment

5.4 Occupation and Exposure to the Mass Media

The level of exposure of the people to the radio is associated with their occupation.

Occupation and Exposure to the Radio

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Table 5: Occupation and Exposure to the Radio

Occupation	Exposure to the Radio		Total
	Yes	No	
White-collar employment	32	2	34
Agriculture	214	52	266
Total	246	54	300

Chi-square value = 3.815 with p-value = 0.051.The test is significant.

Table 5 gives a significant result of exposure of the agriculturists to the medium is very high and also white-collar employees too. The agriculturists can adjust their work according to the broadcast time of the radio. The 'rural programme' which has been emphasized by the radio may be attracting the agriculturists highly and this shows that the effectiveness of the medium to bring about agricultural development is fairly high.

5.5 Income and Exposure to the Mass Media

The extent of exposure of the rural people to the radio is associated with their income status.

Table 6: Income and Exposure to the Radio

Income Groups (Annual)	Exposure to the Radio		Total
	Yes	No	
Below 30000	114	26	140
30000 to 50000	70	18	88
50000 to 100000	38	6	44
Above 100000	24	4	28
Total	246	54	300

Chi-square value = 1.220 with p-value = 0.748.The test is not significant.

Table 6 shows that, there is no association between income and exposure to the radio. As compare to the other medium, radio have low investment, absence of literacy barrier and also entertaining ability. And these characteristics have attractive to all income groups.

5.6 Monthly Savings and Exposure to the Media

The extent of exposure of the rural people to the radio is associated with their monthly savings.

Table 7: Monthly Savings and Exposure to the Radio

Monthly saving (in Rs.)	Exposure to Radio		Total
	Yes	No	
Nil	18	2	20
500 to 1000	100	26	126
1000 to 5000	78	26	104
5000 to 10000	26	0	26
Above 10000	24	0	24
Total	246	54	300

Chi-square value = 15.888 with p-value = 0.003. The test is significant.

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Table 7 shows the association between the monthly savings and exposure to the radio. Respondents who have more monthly savings have greater exposure to the medium.

6. CONCLUSION

Exposure to the media is found to increase with increase in educational attainment. It is found that radio which is not barred to the illiterates section, but the educated are more exposed to it. Occupation and exposure to the media are also related factors. The agriculturists have expose to the medium very highly. The agriculturists can adjust their work according to the broadcast time of the radio. Also the white-collar employees also have high exposure.The income and exposure to the mass media is also related factor. Since income is found to influence many of the human behaviours. Increase in mass media exposure of the respondents is very consistent with their increase in income status. But, radio is the cheapest medium; the analysis also revealed that all income groups have greater exposure to it. Monthly savings is also another factor which influences the exposure to the mass media. Radio have greater exposed to the higher monthly savings group.Thus, the study revealed that the socio-economic status is highly positively associated with exposure to the radio.

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RELATIVE EFFECT OF YOGA PRACTICE AND PHYSICAL EXERCISES ON VITAL CAPACITY OF MIDDLE AGED MEN

Paper ID	IJIFR/V4/ E2/ 046	Page No.	5243-5248	Subject Area	Physical Education
Keywords	Yoga Practice, Physical Exercises, Vital Capacity				

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Abstract

The purpose of the study was to find out the effect of yoga practice and physical exercises on vital capacity of middle aged men. To achieve the purpose of the study the investigator selected forty five middle aged men as subject in the age group of 18 years to 23 years. They were divided into three equal groups of fifteen each (n=15) at random. Group-I performed yoga practice, group-II performed physical exercises and group-III acted as control. ANCOVA was used to find out the adjusted mean difference between the groups. The result of the study reveals that due to the effect of yoga practices and physical exercises the vital capacity of the subjects was significantly improved. It is also concluded that yogic practices significantly better than physical exercises in improving vital capacity of middle aged men.

I. INTRODUCTION

Good health means that all organs of the body are working efficiently. The important proverb is, 'Health is wealth', 'if health is lost everything is lost', and is realized more in its absence than by its presence. Middle age is not a time of life it is a state of mind. The importance of health is more than education, money and other material comforts. Happiness is intimately

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concerned more with good physical and mental health than other outside factors. At this stage, we need to know the essential conditions to keep ourselves healthy (Dev, 1999).

Physical exercises are repetitive movements whereas yoga exercise involves very little movement and only postures maintained for a period of time. Physical exercises lay emphasis on strong movements of muscles whereas yoga opposes violent movements. Yogic postures tone up the body and the mind whereas physical exercise affects mainly the body. The caloric requirement in yogic asanas varies from 0.8 to 3calories per minute while the caloric requirement of a physical exercise varies from 3 to 20 calories per minute. The main purpose of physical exercise is to increase the circulation of the blood and the intake of oxygen. This can be done by yoga's simple movements of the spine and various joints of the body with deep breathing, but without violent movements and asanas, the various blood vessels are pulled and stretched and blood is equally distributed to every part of the body. The stretched and blood is equally distributed to every part of the body. The stretched muscles and ligaments during yoga practices are immediately relaxed muscles. Fatigue appears after doing physical exercises.

Fatigue disappears if yoga and pranayama is practiced. Tension increases and nerves are more tightened through physical exercise. Nerves and body muscles are relaxed by yoga. Yogic exercise aims at both prevention and treatment of various diseases. Breathing exercise aims at both prevention and treatment of various diseases. Breathing exercises like pranayama including Kapalabhati is very effective for keeping the lungs healthy and prevent lung infections. With deep breathing air circulates to every part of the lungs whereas with most other physical exercises, there is mainly an increase in the respiratory rate. However, physical exercise wastes more energy due to quick movements and more lactic acids are formed in the muscle fibres. But energy is not wasted in yoga practices. Yoga postures and breathing exercises unlike physical exercises do not strain the cardio vascular system, and they improve one's physical fitness and endurance.

Physiological functions of the body may be improved by exercise. In order to assess the training impact on vital capacity among middle aged men, the investigator selected yoga practice and physical exercises as the independent variable. Information related to the impact of yoga practice and physical exercises among middle aged men is scanty. So the present study is planned.

II. METHODOLOGY

2.1 Selection of Subject

To achieve the purpose of the study the investigator proposed to select forty five male middle aged men from the inhabitants of Ongole, a small town in the southern state of Andhra Pradesh, India as subject in the age group of 18 years to 23 years. They were divided into three equal groups of fifteen each (n=15) at random. Group-I performed yoga practice, group-II performed physical exercises and group-III acted as control. All the subjects selected for the experimental treatment was subjected to medical evaluation and certification from a doctor ensuring their health capacities to undergo the training program.

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2.2 Training Programme

The training program was scheduled for one session a day each session lasted between forty five minutes to one hour approximately. Training programme was administered to the middle aged men for twelve weeks with six training units per week. The experimental group-I performed yoga practice and group-II performed physical exercises.

2.3 Collection of the Data

The pretest data was collected prior to the training programme and posttest data was collected immediately after the twelve weeks of yoga practice and physical exercises, from the experimental groups and a control group.

2.4 Experimental Design and Statistical Technique

The data collected from the three groups prior to and post experimentation on selected dependent variable was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups are involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 for significance.

III. DATA ANALYSI & RESULTS

The pre and post test data collected from the experimental and control groups on vital capacity is statistically analyzed by ANCOVA and the results are presented in table-I.

Table-1: Analysis of Covariance on Vital Capacity of Experimental and Control Groups

	Yogic Practice Group	Physical Exercise Group	Control Group	S o V	Sum of Squares	Df	Mean Squares	'F' ratio
Pre test Mean	2810.66	2810.06	2821.33	B	2316.48	2	1158.24	0.12
SD	77.36	83.36	78.61	W	256506.51	27	9500.24	
Post test Mean	3055.01	2902.66	2811.73	B	455497.37	2	227748.68	15.98*
SD	88.05	111.62	47.98	W	384702.26	27	14248.23	
Adjusted Post test Mean	3056.01	2903.86	2808.85	B	465091.74	2	232545.87	16.78*
				W	360288.13	26	13857.24	

(The required table value for significance at 0.05 level of confidence with degrees of freedom 2 and 27 is 3.35 and degree of freedom 2 and 26 is 3.37)
****Significant at .05 level of confidence***

Table-I shows that the pre test mean and standard deviation on vital capacity of yogic practices, physical exercise and control groups are 2810.66 ± 77.36, 2810.06 ± 83.36 and 2821.33 ± 78.61 respectively. The obtained 'F' ratio value of 0.12 for pre test means on vital capacity of yogic practices, physical exercise and control groups are less than the required table value of 3.35 for the degrees of freedom 2 and 27 at 0.05 level of confidence.

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It revealed that there is statistically insignificant difference exist among the yogic practices, physical exercise and control groups during pre test period. The post test mean and standard deviation on vital capacity of yogic practices, physical exercise and control groups are 3055.01 ± 88.05, 2902.66 ± 111.62 and 2811.73 ± 47.98 respectively. The obtained 'F' ratio value of 15.98 for post test means on vital capacity of yogic practices, physical exercise and control groups are greater than the required table value of 3.35 for the degrees of freedom 2 and 27 at 0.05 level of confidence.

The adjusted post test means on vital capacity of yogic practices, physical exercise and control groups are 3056.01, 2903.86 and 2808.85 respectively. The obtained 'F' ratio value of 16.78 on vital capacity are greater than the required table value of 3.22 for the degrees of freedom 2 and 26 at 0.05 level of confidence. It was observed from this finding that significant differences existed among the adjusted post test means of experimental and control groups on vital capacity.Since, the adjusted post test 'F' ratio value was found to be significant the Scheffe's test is applied as post-hoc-test to determine the paired mean differences, and it is presented in table-II.

Table-2: Scheffe's Test for the Difference between the Adjusted Post Test Paired Means of Vital Capacity

Adjusted Post Test Means			Difference between Means	Confidence Interval
Yogic Practice Group	Physical Exercise Group	Control Group		
3056.01	2903.86		152.15*	61.42
3056.01		2808.85	247.16*	61.42
2903.86	2808.85	95.01*		61.42

**Significant*

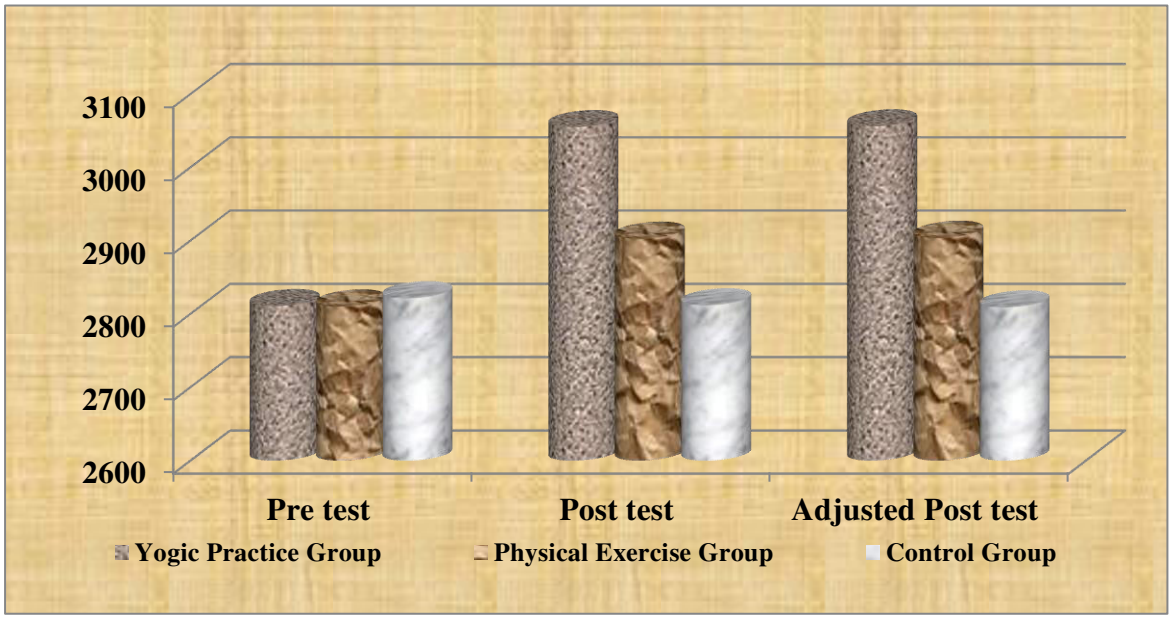

Figure – I: Pre Post and Adjusted Post Test Mean Scores of Experimental and Control Groups on Vital Capacity

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Table-II shows that there was significant difference existed between yogic practices and physical exercise groups, yogic practices and control groups, physical exercise and control groups on vital capacity. Since, the mean differences 152.15, 247.16 and 95.01 are higher than the confidence interval value of 61.42; it reveals that both experimental groups had significantly improved the vital capacity. However, yogic practices were significantly better than physical exercise in altering the vital capacity.The pre, post and adjusted post test mean values on vital capacity of the experimental and control groups is graphically represented in figure- I for better understanding.

IV. DISCUSSION

Yoga helps to tone up the entire body to regularize blood compositions and improve blood circulations, tones up glands and visceral muscles. Robson states that "yoga develops flexibility and vital capacity". Regular practice of yoga helps to keep our body fit, controls cholesterol level, reduces weight, normalizes blood pressure and improves heart performances. Further, preliminary studies in the United States and India suggest that yoga may be helpful for specific conditions, such as asthma, epilepsy, anxiety, stress and others. Regular exercise results in an increase in the blood flow and improves oxygen carrying and waste removal capacity and further increases work load capacity (Vitale, 1973). Exercise increases the volume of hemoglobin and erythrocyte of the blood. Also blood vessels are seen to maintain elasticity and suppleness when stressed systematically probably by the beneficial effect of the heart. Yogic practices demonstrated a significant difference in heart rate, with breathing practices and asanas lowering heart rate significantly so yogic practices into a lower-impact workout may be beneficial. Chaya *et al.,* (2008) reported that long-term practice of yogic asanas along with pranayama and meditation causes reduced sympathetic activity resulting in reduced metabolic rate and greater metabolic efficiency in yoga practitioners. Hagins *et al., (2007)* suggested that yoga is a mind-body practice where practice of physical postures is combined with control of breathing, meditation along with stretching exercise, isometric exercise, and dynamic exercises of skeletal muscles. Raub (2002) find that Practice of hatha yoga may help control such physiological variables as blood pressure, respiration, HR and metabolic rate to improve overall exercise capacity.

V. CONCLUSION

The result of the study reveals that due to the effect of yoga practice and physical exercises the vital capacity of the subjects was significantly improved. It is also concluded that yogic practices significantly better than physical exercises in improving vital capacity of middle aged men.

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A NEW GREEN SYNTHETIC PROTOCOL FOR THE SYNTHESIS OF N-SUBSTITUTED BETA AMINO KETONE DERIVATIVES USING AMMONIUM FLUORIDE AS CATALYST

Paper ID	IJIFR/V4/ E2/ 040	Page No.	5249-5255	Subject Area	Chemistry
Keywords	Multicomponent Synthesis, Amino Ketones, Ammonium Fluoride				

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Abstract

We report an efficient, mild and rapid approach for the synthesis of β-amino ketone dervatives via three component coupling of aromatic aldehydes, enolizable ketones and nitriles in presence of acetyl chloride by using ammonium fluoride as a new and highly effective catalyst under solvent free conditions. Our continuing interest in developing this methodology as a novel route to access highly functionalized structural scaffolds in a cost-effective, environmentally friendly and more importantly, a process requires less operational skill and conditions.

I. INTRODUCTION

Multicomponent reactions (MCRs) have great contribution in convergent synthesis of complex and important organic molecules from simple and readily available starting materials, and have emerged as powerful tools for drug discovery.[1] Today, the chemical industry demands from chemists the development of new reaction methodologies to obtain novel compounds in a fast, clean and efficient way.[1] In this scenario, multicomponent reactions (MCRs) offer an alternative to the traditional synthesis mainly because it is based

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on available starting materials, operationally simple, easily automatable, resource effective, atom economical and ecologically benign.[1b] Mannich-Type products, specifically β-amino carbonyl compounds are useful chiral building blocks for the synthesis of β-amino acids, β-lactams, β-amino alcohols, and so forth.[2] These class of compounds are generally synthesized by chiral Lewis acids assisted catalytic asymmetric reactions of imines derived from aldehydes and amines with enolate compounds.

Several efficient Lewis acids have been reported over the years[3] and a recent attraction in this field is the development of the concept of bifunctional catalysis, wherein both partners of a bimolecular reaction are simultaneously activated, is very powerful for developing efficient asymmetric catalysts.[4] Even though these chiral Lewis acids have proven to be efficient for many reactions, a major drawback is that most Lewis acids are unstable in presence of water and some of them are even moisture sensitive and also based on multi-step programme demands high synthetic skill. As an efficient alternative to the synthesis of Mannich-Type products, we and other groups have developed a one pot multicomponent protocol based on the coupling between an aldehyde, an enolizable ketone, and a nitrile molecule in the presence of an acid chloride and an acid catalyst.[5] Several efficient catalysts have been reported by various research groups which includes $SnCl_4/SiO_2$, [6a] $Cu(OTf)_2$[6b] and $Sc(OTf)_3$,[6c] $Mn(bpdo)_2Cl_2$/MCM-41,[6d] $CeCl_3 \cdot 7H_2O$,[6e] iron (III) chloride [6f] etc. Until recently, the scope of this three component process was limited to the synthesis of β-acetamido carbonyl compounds. Recent developments in this area, particularly from our laboratory,[7] revealed that this process is highly useful for the one step synthesis of highly functionalized organic intermediates.

Our interest in developing this methodology as a novel route to access highly functionalized structural scaffolds in a cost-effective, environmentally friendly and more importantly, a process requires less operational skill and conditions; we considered the possibility of performing this reaction in very mild conditions for the incorporation of a large variety of substrates. For this, we decided to follow this reaction in the presence of ammonium fluride.

II. EXPERIMENTAL PROCEDURE

- **Materials**

Chemical reagents were purchased from the Merck Chemical Company in high purity. All the materials were of commercial grade reagent.

Typical Experimental Procedure for One Pot Three Component Coupling Reactions of Aldehydes with α-Substituted Ketones and Acetonitrile with ammonium fluoride as Catalyst.

A 100 mL Rb flask was charged with a solution of the aryl aldehyde (1.25 mmol), aryl ketone (1.25 mmol), acetyl chloride (3 mL) and acetonitrile (5 mL) in the presence of ammonium fluoride (30mol%). The resulting mixture was then set to stirr continuously for 4 hours at room temperature. After the completion of the reaction as indicated by TLC, the reaction mixture was diluted with distilled water and stirred well. The precipitate obtained

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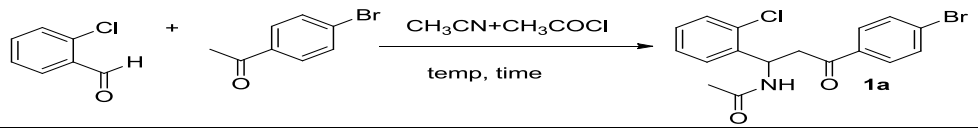
was collected by filtration, washed with distilled water (3 x 20 mL) and dried under vacuum. The dried solid was then washed with diethyl ether (3 x 15 mL) and air-dried to yield the pure β-amino ketone derivative. The product was identified by comparing its NMR and IR values.

III. RESULTS AND DISCUSSION

We have initiated our studies with the synthesis of the β-amino ketone derivatives using ammonium fluoride and optimization of the reaction conditions (Table 1). In the first round optimizations, the reaction between 2-chlorobenzaldehyde and 4-bromo acetophenone was selected as the model reaction for the screening purpose. Optimizations were carried out in terms of the amount of catalyst, reaction time and temperature while keeping acetonitrile as solvent in all the cases. Taking into account of our previous experiences with Mont K10 and SelectfluorTM , we decided to carry out the screening experiments at room temperature and at the boiling point of acetonitrile. We found that a room temperature reaction with 30 mol% of the catalyst gives the maximum yield- 88% (Table 1, entry 6).

Table 1. Optimization of reaction conditions



Entry	Loading(mol%)	T/^{0}C	Time	Yield(%)
1	5	rt	4h	62
2	10	rt	4h	65
3	15	rt	4h	72
4	20	rt	4h	75
5	25	rt	4h	76
6	30	rt	4h	88
7	30	70	4h	84

After the optimization reactions, the substrate scope studies were carried out with catalyst (Table 2). Sequential addition of aldehyde, ketone and acetyl chloride in the presence of ammonium fluoride in acetonitrile resulted in the rapid formation of the product. With a very low amount of the catalyst (30 mol %), the reaction reached completion in 4 hours as indicated by TLC. Here the nitrile source acted as both reagent and solvent. FT-IR spectroscopy is very useful for following the reaction. In the FT-IR spectrum, the disappearance of the aldehyde peak followed by the appearance of amide peak at 1650 cm^{-1} is a clear indication about the commencement of the reaction. The structure of the product was confirmed via ^{1}H NMR, FT-IR and mass spectral studies. All the reactions yielded clean products that can be directly used for analysis. The reaction conditions were mild and avoided the use of environmentally hazardous chemicals.

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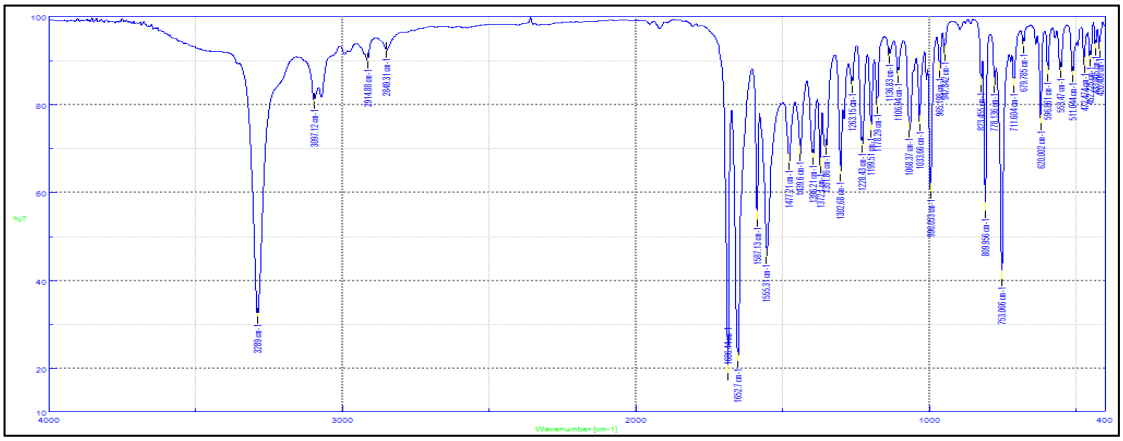
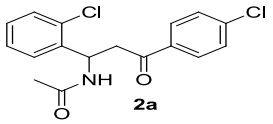
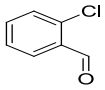
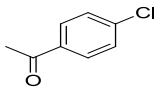
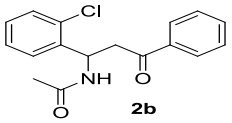
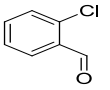
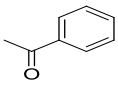
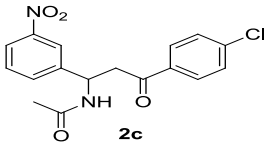
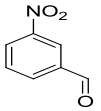
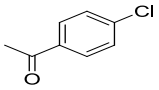
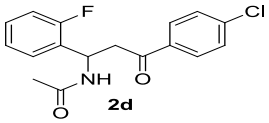
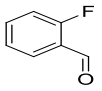
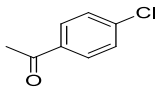
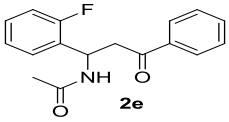
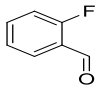
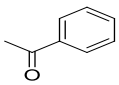
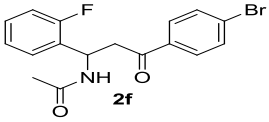
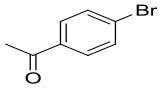
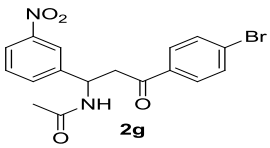
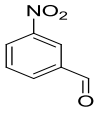
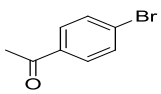
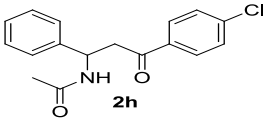
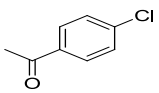


Figure 1: FTIR spectrum of compound 1a

Table 2. Ammonium fluoride catalyzed three component reactions of aldehydes, enolizable ketones and acetonitrile[a]

Entry	Product	%yield obtained using Ammonium fluoride as catalyst[b]	Components			
			A	B	C	D
1.	 **2a**	83				
2	 **2b**	79				
3	 **2c**	73				
4	 **2d**	82				
5	 **2e**	80				
6	 **2f**	83				
7	 **2g**	82				
8	 **2h**	79				

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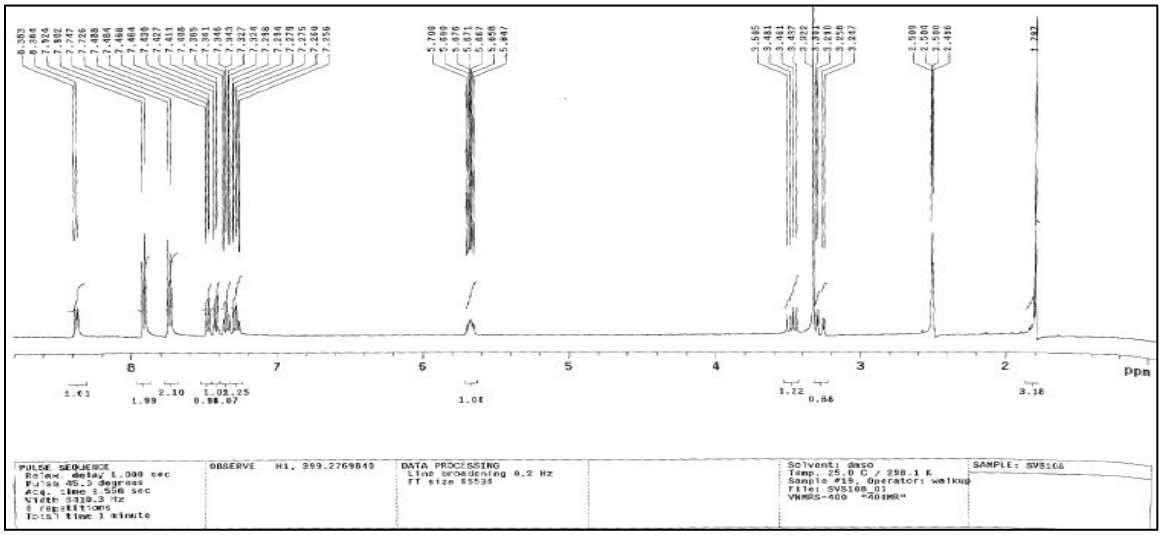


Figure 2: ^{1}H NMR spectrum of compound 1a

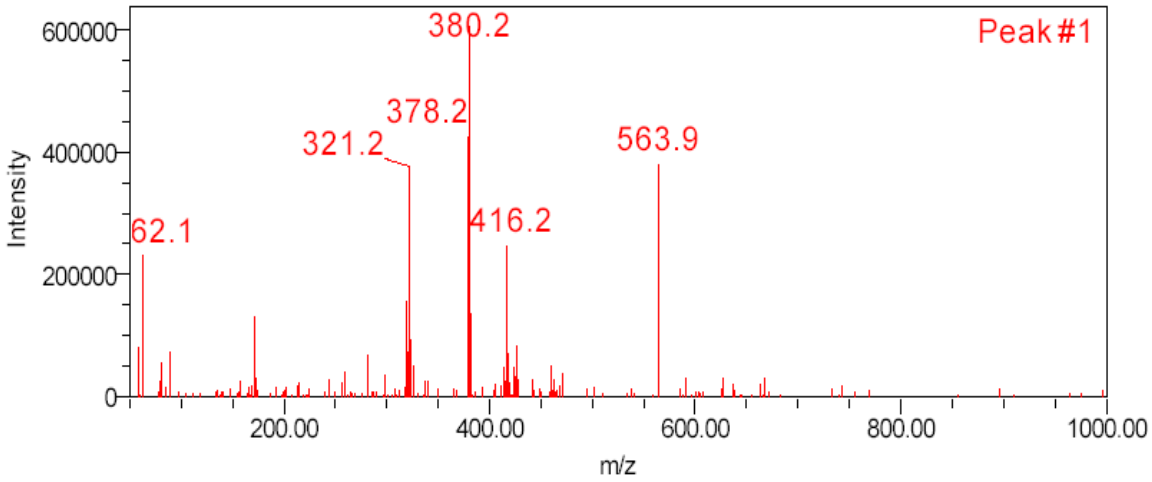
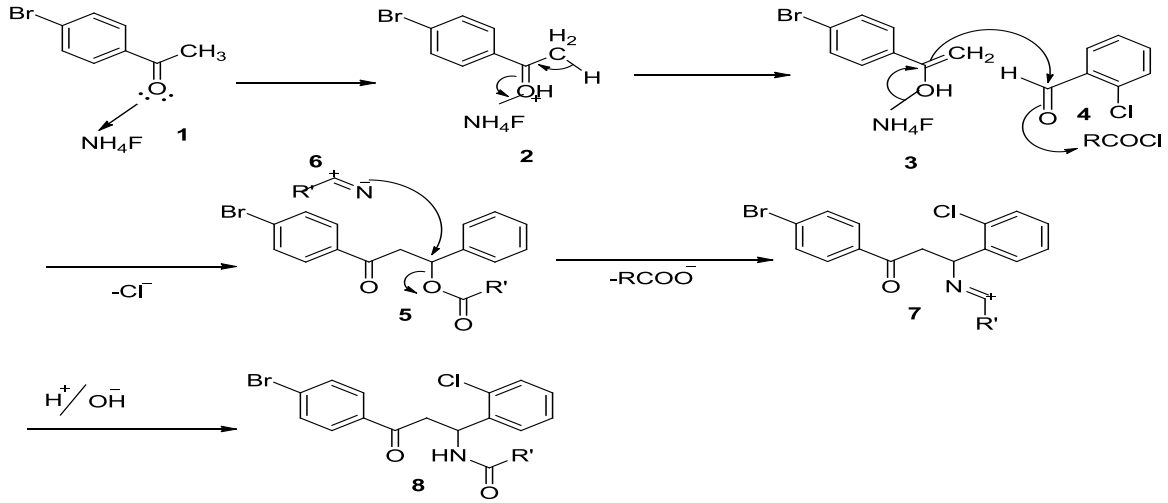


Figure 3: Mass spectrum of compound 1a



Scheme 1*:* Proposed mecanism for the formation of *β*-amido carbonyl scaffolds using ammonium fluoride as catalyst

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The suggested Mechanism of the reaction is shown in Scheme 1. The reaction is initiated by the co-ordination of the carbonyl oxygen of the ketone moiety with catalyst. Ammonium fluoride acts as a Lewis acid and thus activates the enol **3** formation. The addition of aldehyde moiety **4** followed by acid chloride to this complex resulted in the carbon-carbon bond formation to produce a *β*-acyloxy ketone derivative **5.** The acyloxy group in **5** is then displaced by the more nucleophilic nitrogen of the nitrile to produce a stable cation intermediate **7**. Addition of water leads to the formation of the *β*-amino ketone derivative **8**.

IV. CONCLUSION

In summary, we have reported the efficiency of ammonium fluoride catalyst for the synthesis of *β*-amino ketone derivatives via four-component coupling reaction. The study reveals that the catalyst is more efficient in catalyzing the reaction. The method offers several advantages such as high yields, short reaction times, mild reaction conditions, simple experimental procedures, cost effectiveness and tolerance to a wide variety of reactants. The catalysts used are also environmentally friendly, inexpensive and highly efficient.

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RELATIVISTIC TIME CORRECTION ON MOVEMENT OF DISTANT GALAXIES MAKES THE PRESENT AGE OF THE UNIVERSE AS 28.2 BILLION YEARS

Paper ID	IJIFR/V4/ E2/ 048	Page No.	5256-5260	Research Area	Astrophysics
Keywords	Hubble Constant, Age of the Universe, Relativistic Time				

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Abstract

The relativistic approach gives us the apparent time of the events happening on a fast moving object away from us. It is called scale factor. It is given by ***Scale factor = 1+z,*** *where* ***z = v/c****, v= velocity of moving object and c= speed of light in vacuum. This paper aims to illustrate that the above relativistic time correction when applied to Hubble's law, gives us the age of the universe as* $2/H_0$ *and not* $1/H_0$*, where* H_0 *is the present Hubble constant. This makes the age of the universe to a value double that of the present estimate. That is from* ***14.1*** *billion light years to* ***28.2*** *billion light years. Linear expansion of the universe is assumed.*

I. INTRODUCTION

According to big bang theory, universe is expanding. Hubble's law gives us the distances of galaxies from us and also their velocities of recession from the observer. The Hubble constant at present is about 70 km/sec/M Parsec. That means a galaxy at a distance of one mega parsec is moving at 70km/sec. one mega parsec is approximately equal to 3.3 light years. So, for a galaxy appearing at one billion light

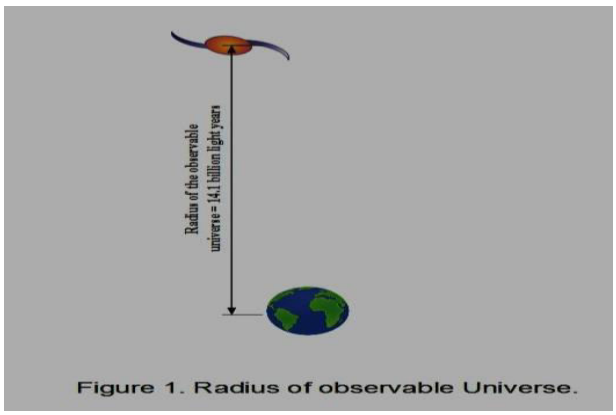

Figure 1. Radius of observable Universe.

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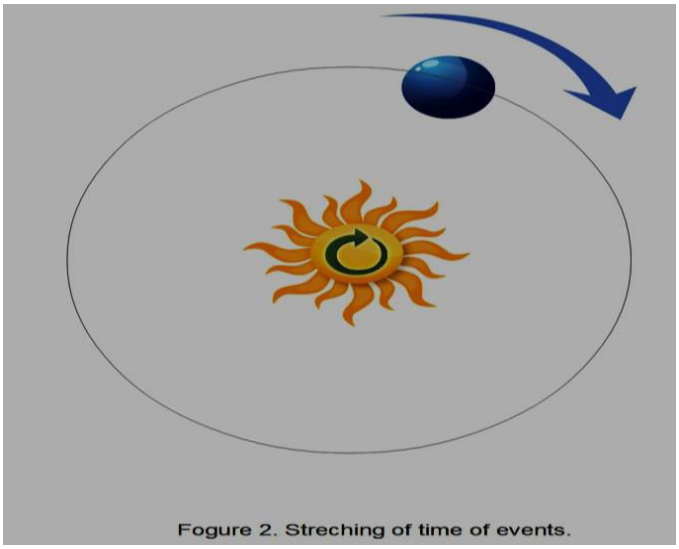
years from us, the recession velocity is 21000km/sec. But maximum possible velocity is equal to velocity of light. So, this puts the limit on the most distant galaxy that we can see as **14.1** billion light years away from us. This is called the radius of the observable universe, as shown in figure 1. This is given by $1/H_0$. It is calculated from the simple logic that:
Time= distance / velocity.

II. CONTRADICTION IN ABOVE METHOD

The latest information of the farthest galaxy is GN z11, having red shift 11. It is at apparent distance of 13.4 billion light years from Earth. That means, light that we have just received is giving information about 13.4 billion years old. This galaxy is reported to be containing stars. Suppose there is a Sun like star of about 5 billion years old, then that star was formed at about 13.4+5=18.4 billion years ago. (In fact, present age of this star is to be multiplied by 1+z =1.98. So it is 5x1.98= 9.9 billion light years.
But we have just received light from that galaxy and hence cannot see the past life of star).
But 18.4 billion years is greater than the present estimated age of the universe. It means that star was formed even before big bang! This is happening because; we are not applying relativistic time correction to galaxies.

III. APPLYING RELATIVISTIC TIME CORRECTION

According to Einstein's theory of relativity, apparent time of objects moving away at constant velocity is stretched by a factor (1+z), as said above. If a galaxy is travelling at say 0.5c, then z=0.5 and scale factor = 1+z = 1+0.5 = 1.5.
This means every one second of time on that galaxy appears as 1.5 seconds for us. This happens to every event happening in that galaxy. If a planet in that galaxy is revolving around a star in that galaxy taking one year, we see it as 1.5 years (figure 2.). The most important part is that this is applicable to the movement of the galaxy itself. That means, the apparent velocity of galaxy will be 1.5 times less than the actual velocity as estimated by Hubble's law. Then how can Hubble's law gives the actual velocity? This is because the important fact from theory of relativity that there will be no change in the velocity of light emitted irrespective of the velocity of the moving object from which it is coming out. Illustration of the concept: As shown in figure 3, let us consider a galaxy just started from us. Let it moving away from us at velocity z=0.5. To reach one light year actual distance, it takes two years. We see it as taking 2x1.5= 3 years.



Fogure 2. Streching of time of events.

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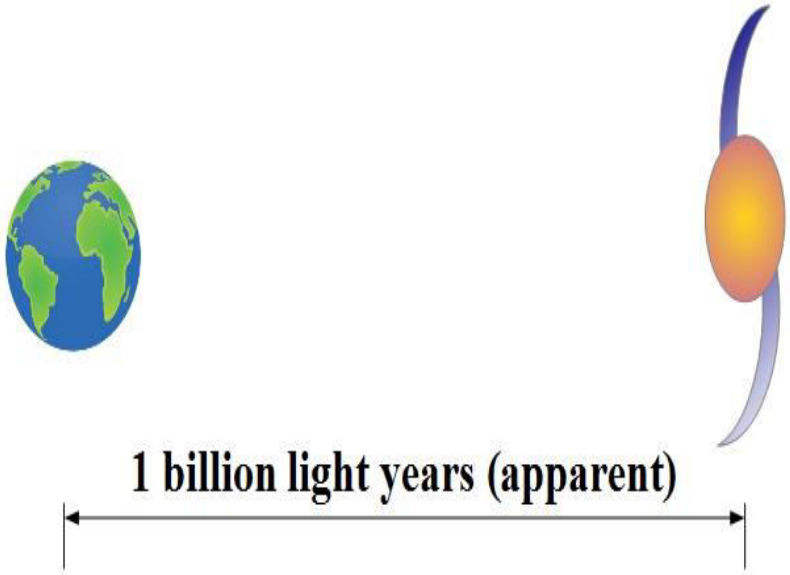

Figure 3: Example of a galaxy moving away

That means, it will appear at 1 light year after 3 years. So, its apparent speed is 0.3333. In case of the farthest known galaxy at present, GN z11, we have z = 0.98. So, for every one hour on that galaxy, we feel 1.98 hours on Earth, as shown in figure 4.

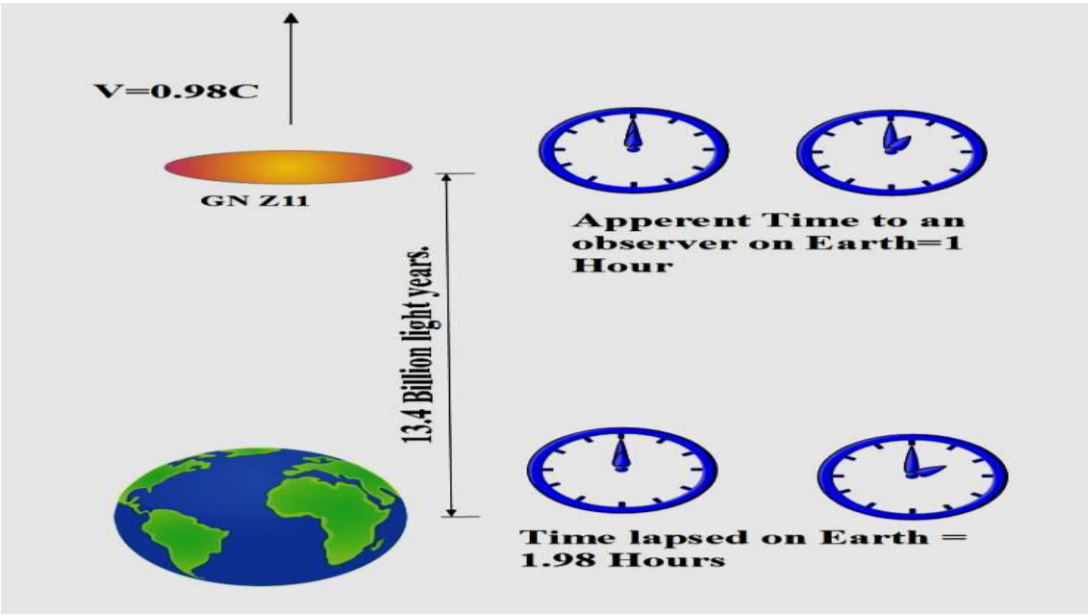

Figure 4: Relative Time Concept

IV. SOLUTION TO ABOVE CONTRADICTION AFTER APPLYING RELATIVISTIC TIME CORRECTION

Now, in case of GN z11, we are seeing 5 billion years star of 13.4 billion years old information. So it is 5x1.98= 9.9 billion light years old. Then it is 13.4 +9.9 =23.3 billion light yrs.Subtracting from corrected age of 28.2, we get 28.2-23.3=4.9 billion light yr. Hence there is no contradiction at all.

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V. RESULTS AND DISCUSSIONS

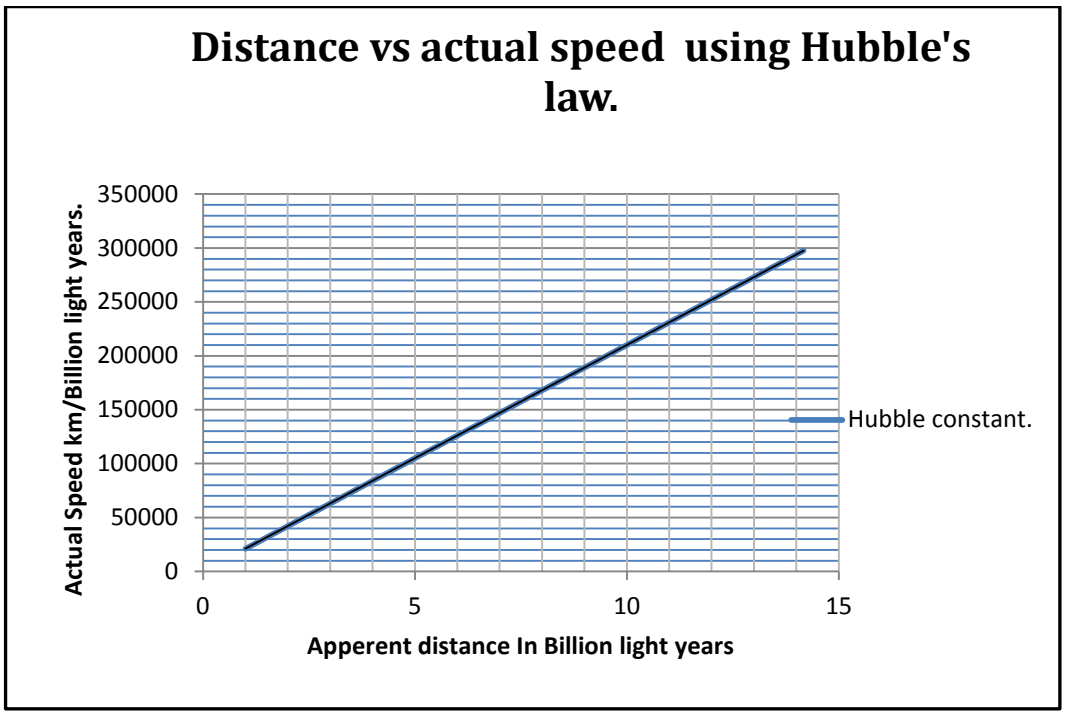

Figure 5: Illustration of Hubble's law.

Figure 5: Illustrates the linear correlation between distance and speed of galaxies.

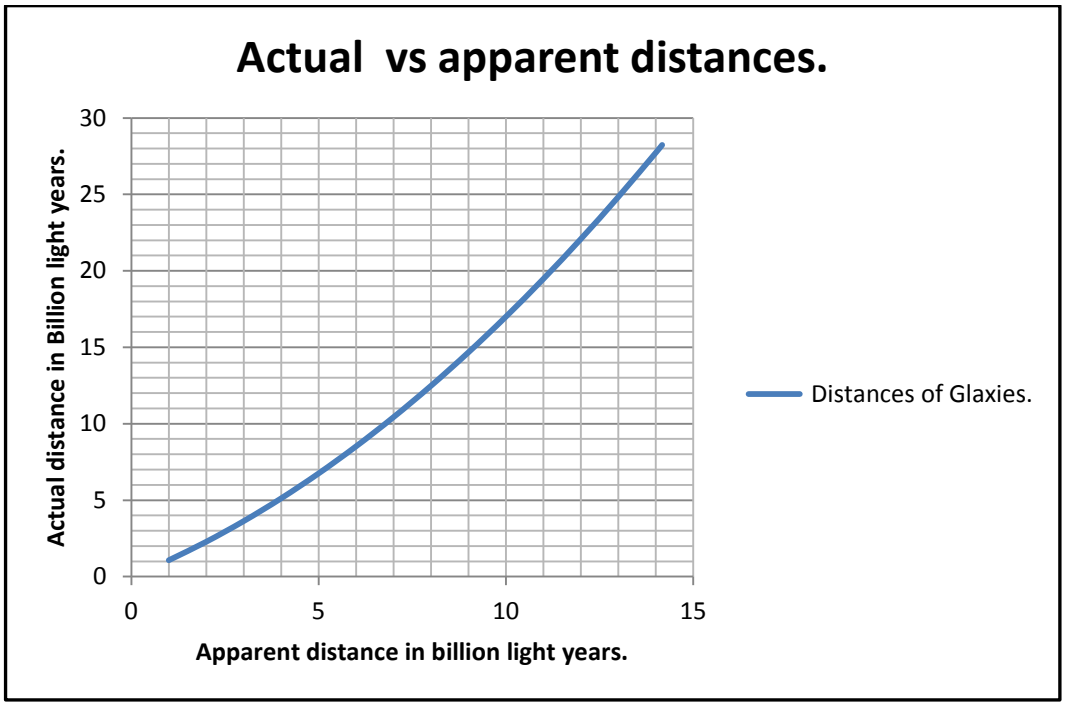

Figure 6: Actual distance v/s apparent distances

Figure 6 shows the real factor causing the error. In the relation Time = distance/ velocity, it was apparent distance / actual velocity was used. Actually, it should be
Time = apparent distance/ apparent speed.

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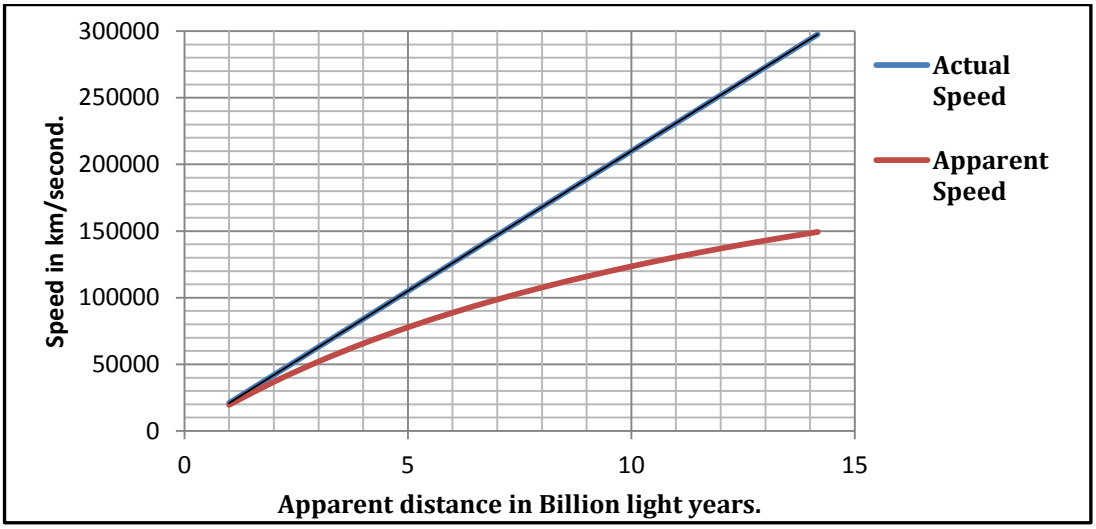

Figure 7: Actual speed and Apparent speed against apparent distances.

Figure 7 shows the degree of error between two speeds with respect to apparent distances of galaxies.

VI. CONCLUSION

The maximum value of z=1, when v=c. So, if a galaxy at the edge of the observable universe is moving at z=1, apparent speed= 0.5c as, the scale factor =1+z=2. That means in travelling 14.1 billion light years of apparent distance, it must have taken 2x14.1=**28.2 billion years.** That means, actual age of the universe = twice the apparent age = $\mathbf{2/H_0}$. This result is obtained after applying relativistic time correction to the speed of galaxies.

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A STUDY ON TIME VALUE OF MONEY

Paper ID	IJIFR/V4/ E2/ 049	Page No.	5261-5267	Subject Area	Business Administration
Keywords	Compounding Techniques, Compound Interest, Discounting Techniques				

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Abstract

Time value of money is an important concept in financial management, It plays a crucial role in Banking and Non-Banking sector, generally it refers to the value of money is different in different time periods; it is called time value of money. It is one of the Limitation of Profit maximization. At the same time it does not consider the magnitude and timing of earnings. The time value of money impacts business finance, consumer finance, and government finance. Time value of money results from the concept of interest.

I. INTRODUCTION

Most of the financial decisions depend on time value of money such as financing decision, investment decision and dividend decision. For example if invested Rs.10, 000 @ 8% interest in any nationalized bank, how much amount would get after one year (10,000+ 10,000×0.08=10,800). Beginning of the year the value of money is Rs.10, 000 at the end of the year the value of money is 10,800, so end of the year the value of money is greater than beginning of the year. So the value of money is different in different time periods.

The value of Money is depends on two techniques, such as

- Compounding Technique
- Discounting Technique

II. OBJECTIVES OF THE STUDY

- To Understand the Time value of Money
- To Know How it Calculate the Time value of money
- To Know how it influence the Investment decision

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III. COMPOUNDING TECHNIQUE

Compounding Technique is one of the Ingredients of time value of money. It is a Method of estimating the future value of a present investment by applying compound interest rates. This technique can be useful to know the future value of present cash out flow. Future value is depends on Size of investment, market rate of interest and maturity period. Generally compounding is refers to the process of accumulating the time value of money forward in time. For example interest earned in one period earns additional interest during each subsequent period. Before going to know the compounding technique first of all to know the simple interest.

Simple Interest:

Simple interest is one of the topic that most of the people cover in elementary school in their education. Interest may be thought of as rent paid on borrowed money. Simple interest is calculated only on the beginning principal. For instance, if one were to receive 5% interest on a beginning value of Rs.100, the first year interest would be:

Interest **=P×I**

Whereas,

P= Principal amount, **I**= Rate of interest

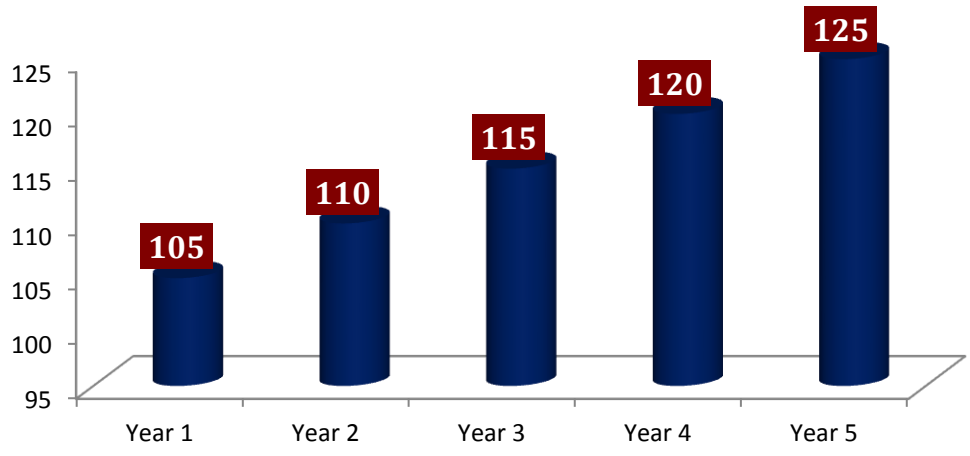
Here, P=Rs. 100 I= 5% (0.05)

Interest =100×0.05=5

Continuing to receive 5% interest on the original amount, Rs.100, over five years the growth of the original investment would look like:

Year 1	**5% of Rs.100**	**=Rs. 5 + Rs.100**	**= 105**
Year 2	**5% of Rs.100**	**=Rs. 5 +Rs.105**	**=110**
Year 3	**5% of Rs.100**	**=Rs.5 + Rs.110**	**=115**
Year 4	**5% of Rs.100**	**=Rs.5 + Rs.115**	**=120**
Year 5	**5% of Rs.100**	**=Rs.5 + Rs.120**	**=125**

Graph I: The value of money is different in different timeperiods



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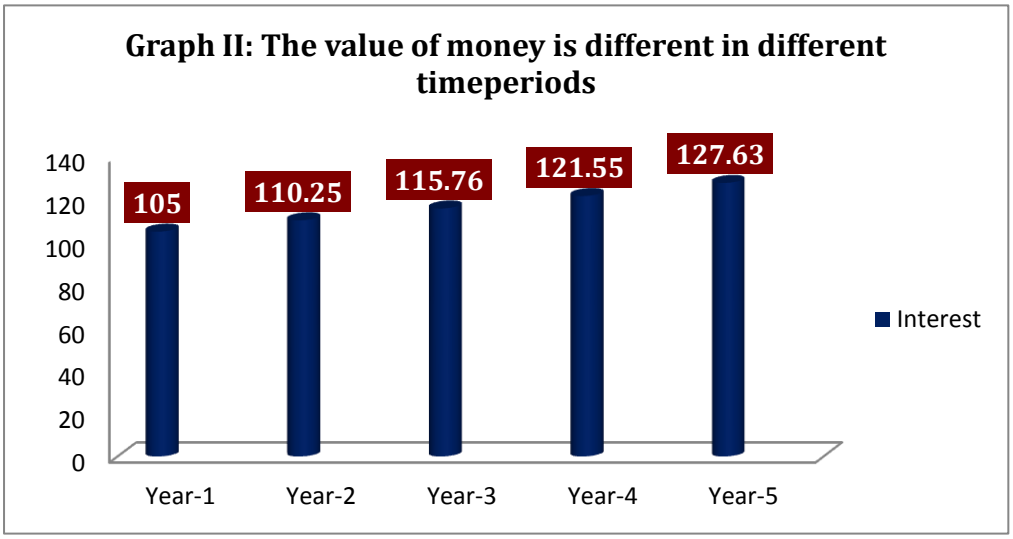
3.1 Compound interest

Compound interest is another Topic. It's good to receive compound interest, but not so good to pay compound interest. With compound interest, interest is calculated not only on the beginning interest, but on any interest accumulated in the meantime. For instance, if one were to receive 5% compound interest on a beginning value of Rs.100, the first year interest would be the same as simple interest on the Rs.100, or Rs. 5. The second year, though, interest would be calculated on the beginning amount of year 2, which would be Rs.105. So the interest would be:

Rs.105 × .05– or – Rs.5.25 in Interest

This provides a balance at the end of year two of Rs.110.25. If this were to continue for 5 years, the growth in the investment would look like:

Year 1	**5% of Rs.100.00**	**=Rs. 5.00 + Rs.100**	**= 105.00**
Year 2	**5% of Rs. 105.00**	**=Rs. 5.25 + Rs.105**	**=110.25**
Year 3	**5% of Rs. 110.25**	**=Rs. 5.51 + Rs.110**	**=115.76**
Year 4	**5% of Rs. 115.76**	**=Rs. 5.79 + Rs.115**	**=121.55**
Year 5	**5% of Rs. 121.55**	**=Rs.** 6.08 **+ Rs.120**	**=127.63**



There is a significant difference between simple and compound interest. In simple interest there is no opportunity to earn interest on interest where as in compounding interest each interest payment is (reinvested) having the opportunity to earn interest on interest. There is no difference between simple interest and compound interest when investment maturity period is one year maturity. But difference can be seen only when the investment is made for more than two years between

3.2 Compounding Value of A Single amount

Compound value or future value of single amount at single time for future period can be calculated by the following formula

$$FV=Po(1+I)^n$$

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Example: 1

Suppose if you have Rs.10, 00, 000 and Deposit any nationalized bank @ 8% compound rate of interest for 5 years period. How much amount would get after 5 years?

$$FV=10,00,000(1+0.08)^5$$

$$=10,00,000(1.469)$$

$$=\textit{Rs.14, 69, 000}$$

3.3 Variable Compounding Periods:

Generally Compounding is done annually. If the investor Promised to pay Compound interest for variable periods such as Semi-annually, quarterly, and etc

3.3.1. Semi-Annual Compounding:

It is one of the components of Variable Compounding Periods; according to this interest calculate twice in a year. The Following Formula can be useful to us to know the value of an investment.

$$FV=Po(1+I/m)^{n\times m}$$

Whereas,

FV=Future vale of an Investment

Po=Invested amount I=Rate of Interest

M= No. of times Compounded annually, n=No. of years to maturity

Example: 2

If amount Rs.50, 000, Deposited @6%rate of interest in SBI for10 years Period, it is compounding twice in a year. How much amount would get after 10 years?

$$FV=Po(1+I/m)^{n\times m}$$

$$FV=50{,}000\ (1+.06/2)^{10\times 2}$$

$$=50,000(1.806)$$

$$=Rs.\ 90{,}300$$

3.3.2. Quarterly Compounding

It is one of the components of Variable Compounding Periods, according to this interest calculate once in every three months it means four times in a year. The Following Formula can be useful to us to know the value of an investment.

$$FV=Po(1+I/m)^{n\times m}$$

Whereas,

FV=Future vale of an Investment

Po=Invested amount I=Rate of Interest

M= No. of times Compounded annually, n=No. of years to maturity

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Example: 3

Suppose the firm Deposits Rs.1, 00,000 for four years period @ 8% rate of interest p.a, here interest compounding quarterly. How much amount would get after four years?

$$FV=Po(1+I/m)^{n\times m}$$

$$FV=1,\ 00,000\ (1+.08/4)^{4\times 4}$$

$$=1,\ 00,000\ (1.373)\ =Rs.1,\ 37,300$$

3.4. Compounded Value of Series of Cash flows: According to this some cases investor may be deposits annually up to certain future date, that may be even cash deposits or uneven cash deposits, then we need to find out the deposits value in future date.

3.4.1. Even Cash deposits annually up to certain future date:

The following formula can be useful to know the value of Deposits in future

$$FV=P1(1+I)^{n-1}+P1(1+I)^{n-1}+P1(1+I)^{n-1}+\text{----------}+Pn\text{-}1(1+I)+P^{n-n}$$

Example: 4

If you deposits Rs.1000 at the end of every year for Six years@6% rate of interest. Determine the value of money after six years

$$FV=P1(1+I)^{n-1}+P1(1+I)^{n-1}+P1(1+I)^{n-1}+\text{----------}+Pn\text{-}1(1+I)+P^{n-n}$$

$$FV=1000(1+0.06)^{6-1}+1000(1+0.06)^{5-1}+1000(1+0.06)^{4-1}+1000(1+0.06)^{3-1}$$
$$+1000(1+0.06)^{2-1}+1000(1+0.06)^{1-1}$$

$$=1000(1.338)+1000(1.262)+1000(1.191)+1000(1.124)+1000(1.060)+1000(1.00)$$

$$=1338+1262+1191+1124+1060+1000$$

$$=Rs.6975$$

3.4.2. Even Cash deposits annually up to certain future date:

The following formula can be useful to know the value of Deposits in future

$$FV=P1(1+I)^{n-1}+P1(1+I)^{n-1}+P1(1+I)^{n-1}+\text{----------}+Pn\text{-}1(1+I)+P^{n-n}$$

Example: 5

If an Investor Deposits at the end of every year Rs.10,000, Rs.15000,Rs.20,000,Rs.25,000 and Rs.30,000 in a year 1.2.3,4and5,respectively at 6% rate of interest. How much he will get at the end of five years?

$$FV=10,000(1+0.06)^{4}+15,000(1+0.06)^{3}+20,000(1+0.06)^{2}+25,000(1+0.06)^{1}+$$
$$30,000(1+0.06)^{0}$$

$$=10,000(1.262)+15,000(1.191)+20,000(1.124)+25,000(1.060)+30,000(1.00)$$

$$=12,620+17,865+22,480+26,500+30,000$$

$$=Rs.1,\ 09,465$$

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IV. DISCOUNTING TECHNIQUE

It is an important component of Time value of money it can be useful to know the present value of future cash inflows. Present value is exact contrary to compound value. The process of determining present value of future cash flows is called discounting. It is concerned with determining the present value of future amount with that value investors will take decision whether accept or reject of the investment proposal.

4.1. Present Value of Future Single amount:

It is one of the ingredients of discounting technique it can be useful to know Present value of future single cash flow. Through the following formula we can calculate the present value.

$$PV=FV(1/1+I)^{n}$$

Where

PV=Present Value, FV= Future value receivable at the end of 'n' years

I = Interest rate N = Duration of the cash flow

Example: 6

An Investor wants to know the Present value of Rs.20, 000, it will come after 3 years current market interest rate is 10%

$$PV=20{,}000(1/1+0.10)^{3}$$

$$= 20{,}000\ (0.751)$$

$$=\text{Rs. } 15{,}020.$$

4.2 Present Value of a series of Cash flows

We have calculated present value of a single cash flow to be received in future date. Not only that some cases we need to convert future series of cash inflows into present values. This may be uneven cash inflows or even cash inflows.

4.2.1 Present Value of Even Cash inflows

In future if we will get even cash inflows annually up to certain future. Through the following formula we can calculate the present value.

$$PV=CF\left[\frac{(1+I)^{n-1}}{I(1+I)^{n}}\right]$$

Example: 7

Mr. Anand wants to invest his funds in a particular project, expected cash inflows from that project Rs.50, 000 annually up to six years period and he wants to know the Present value of future cash inflows. Current market interest rate is 10%

$$PV=CF\left[\frac{(1+I)^{n-1}}{I(1+I)^{n}}\right]$$

$$= 50{,}000\left[\frac{(1+0.10)^{6-1}}{0.10(1+0.10)^{6}}\right]$$

$$= 50{,}000\ (4.355) \quad = 2,\ 17{,}750$$

4.2.2 Present Value of uneven Cash inflows

In future if we will get uneven cash inflows annually up to certain future. Through the following formula we can calculate the present value.

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$$PV= \frac{C1}{(1+I)^1} + \frac{C2}{(1+I)^2} + \frac{C3}{(1+I)^3} + \ldots\ldots\ldots + \frac{Cn}{(1+I)^n}$$

Where

C1, C2, C3 and Cn = Expected future cash flows

I= Rate of Interest Rate

n = Duration of cash flows

Example: 8

Ms. Sahasra wants to invest of her funds in particular Project, expected cash inflows from that project Rs.10,000 Rs.15,000 Rs.20,000, Rs.22,000 and Rs.18,000 in years 1,2,3,4 and 5 respectively. Current market interest rate is 10% and finds out the Present value of future cash inflows.

$$\boxed{PV= \frac{C1}{(1+I)^1} + \frac{C2}{(1+I)^2} + \frac{C3}{(1+I)^3} + \ldots\ldots\ldots + \frac{Cn}{(1+I)^n}}$$

$$PV= \frac{10,000}{(1+0.10)^1} + \frac{15,000}{(1+0.10)^2} + \frac{20,000}{(1+0.10)^3} + \frac{22,000}{(1+0.10)^4} + \frac{18,000}{(1+0.10)^5}$$

=9,090 +12,390 +15,020 +15,026 +11,178

=Rs.62, 704

V. CONCLUSION

Companies apply the time value of money to make yes-or-no decisions on capital projects as well as to decide between competing projects. Two of the most popular methods are net present value and internal rate of return. You start with the cost of the project and determine the rate of return that would make the present value of the future cash flows equal to your upfront cost. This concept is crucial in areas like capital budgeting, lease-or-buy decisions, accounts receivable analysis and many others.

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IMPLEMENTATION OF RIGHT TO EDUCATION ACT IN CONTEXT OF DRINKING WATER AND SANITATION FACILITIES: A CASE STUDY OF HIMACHAL PRADESH

Paper ID	IJIFR/V4/ E2/ 042	Page No.	5268-5274	Subject Area	Education
Keywords	Basic facilities, Drinking Water, Sanitation Facilities				

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Abstract

The prevalence of basic facilities in the schools creates an environment which ensures the high rate of students' participation in school education. The availability of these facilities make the school environment supportive and motivated to them which help them to perform better in their academic activities and also increase their interest in school education. The much has been done and much has to be done to provide better basic drinking and sanitation facilities in the schools. More comprehensive strategies need to be designed not only to provide these facilities but also to ensure its proper maintenance. The present paper aimed at examining the status of implementation of right to education act in context of drinking water and sanitation facilities in Himachal Pradesh.

I. INTRODUCTION

Every child has a basic right of some basic facilities at school which include the drinking water, toilets, safe campus, playgrounds etc. These basic facilities at school have manifold positive effects on the development and the education of the children (UNICEF, 2012). A study by UNDP (2006) reveals that in many of the countries of world high occurrence of water related illness among children adversely affected regularity of students in schools, their intellectual development and also led to the problem of stagnation and drop out.

The prevalence of basic facilities in the schools creates an environment which ensures the high rate of students' participation in school education. The availability of these facilities make the school environment supportive and motivated to them which help them to perform better in their academic activities and also increase their interest in school education. Also,

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with the formation of good habits of safe drinking water and sanitation in school, the students also become the agents of healthy and hygienic environment at home and among their companions. For this the teachers, in particular and the school managements, in general have a key role to play by not only making arrangements for safe drinking water and hygienic sanitation facilities at school but also develop in them a habit to the use these facilities appropriately.

The review of the related literature reflects many ill effects of the lack of such basic facilities at school. The improper drinking and sanitation facilities have adversely affected the physical health of the students causing the many physical problems and the psychological as well which include child malnutrition, mental and social disorders, low IQ, behavior problems (Barlett, 2003; Jasper, Le and Bartram, 2012) and also have lower down their educational outcomes and rose absenteeism, particularly among the girls students (Birdthistle, Dickson, Freeman, Javidi, 2011; Alexander, Dreibelbis, Freeman, Ojeny, Rheingans, 2013; Doyle, 2015). Adukia (2013) in a longitudinal study conducted in India found that provision of the latrine in schools have resulted into increased enrollment and also increased educational outcomes. The World Health Organisations reported that 14 % of parents initiated to improve the drinking and sanitation facilities at home after the intervention of water, sanitation and hygiene at schools and also suggested that the students are the best agents to transfer the hygiene behaviors learned at schools to their households and among the family members (Onyango-Ouma, Aagaard-Hansen, Jensen, 2005; Blanton, Ombeki, Oluoch, Mwaki, Wannemuehler, Quick, 2010). Most recently a nationwide campaign 'Swachh Bharat: Swachh Vidyalya' has been initiated. It aims at well maintained water, sanitation and hygienic facilities at schools which are termed as the minimum requirements for establishing a healthy environment at school and also to develop in students the healthy and hygienic behavior. These basic facilities have categorized into two components namely technical and human development. The technical component include drinking water, hand-washing, toilet and soap facilities in the school campus for use by children and teachers whereas the human development component include all those conditions in schools and the behaviors and activities on the part of students which help them to prevent water and sanitation diseases. The teachers being the most essential agent for bringing behavioural changes in students must design their teaching strategies in such a way that the students should be made realized about the importance of healthy and hygienic environment and also make them aware about the ill effects due to its absence. The efforts made by teachers in this regard could be of great help to improve students' school enrollment, attendance, retention rate and also to make them aware about the significance of basic facilities of drinking and sanitation inside and outside the school.

II. REVIEW OF LITERATURE

- Mishra (2011) studied the RTE Act in Odhisa and found that only 60 percent of schools had boundary wall where as 40% schools had no boundary wall. 80% schools had approach road and 20% of the schools did not have approach road. The results revealed

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that only 40 percent of schools had head master's room whereas, around 60% schools had no such rooms for the head masters. . Most of the schools had adequate teachers but only 5% schools had teachers at the ratio one teacher per class. The study observed that 56.3% co-educational schools had no separate toilet facilities for male and female students where as 43.7% schools had separate toilet facilities. 50% of schools had safe drinking water provision where as 50% schools had no such facility for the students. About 45% schools had kitchen for cooking mid-day meals and 55% schools have no kitchen facility. The study found that 55% schools had no play ground facility.

- Soni & Rahman (2013) examined the status of implementation of RTE Act-2009 in context of disadvantaged children at elementary stage. The study found that there were very few cases of age appropriate admissions of disadvantage and children with disabilities. The materials for training of children admitted under age appropriate placement in different classes were not available in majority of cases. The study found that the state, district, block level functionaries and teachers were aware of provisions of RTE Act, 2009. The study also revealed that the shortage of teachers, alarming pupil-teacher ratio, other official duties assigned to teachers, busyness in training programmes, duties in block level office, making Aadhar cards and voter ID Cards etc, no training of regular teachers in education of children with disabilities and non-availability of special teacher support on daily basis are challenges in the implementation of RTE.
- Uma (2013) found that there was lack of basic facilities in the Government Primary Schools of Mohali. Furniture was not available in majority of schools for the students. The study also revealed that no separate toilets were available for male and female students.
- Singh (2016) explored the status of implementation of the Right to Education Act, 2009 in Himachal Pradesh. The study found that after the implementation of RTE Act, 2009 that drinking water facility increased by 22 percent, ramp facility increased by 10 percent, play ground facility increased by 21 percent, boundary wall facility increased by 14 percent and kitchen shed facility increased by 70 percent in the schools of Himachal Pradesh.

III. STATEMENT OF THE PROBLEM

Implementation Of Right To Education Act In Context Of Drinking Water And Sanitation Facilities: A Case Study Of Himachal Pradesh

IV. OBJECTIVES OF THE STUDY

1. To examine the status of drinking water facilities in the primary and upper primary schools of Himachal Pradesh with respect to Right to Education Act.
2. To examine the of sanitation facilities in the primary and upper primary schools of Himachal Pradesh with respect to Right to Education Act.

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V. JUSTIFICATION OF THE STUDY

In India many programmes related to safe drinking water and proper sanitation facilities have been launched by central and the state govt. as well. The Ministry of Drinking Water and Sanitation (MDWS) national sanitation guidelines provide for additional sanitation facilities in schools, including incinerators for menstrual hygiene management through the NGP incentive. In the most promising programme of universalisation of elementary education, Right To Education Act (2009), the strong emphasis has been laid on the provision of safe drinking water and the sanitation facilities in schools. The present paper, therefore, was undertaken to examine the status of drinking water and toilet facilities in the primary and the upper primary schools of Himachal Pradesh, which are functioning under the Department of Education, after the implementation of Right to Education, Act, 2009.

VI. RESEARCH METHODOLOGY

As the present research aimed at examining the status of implementation of Right to Education Act, 2009 with respect to the provision of drinking water facilities and the sanitation facilities in the primary and upper primary schools in Himachal Pradesh, therefore the present research falls under the category of evaluative research.

Data Collection

In the present research the investigator used the secondary data in the form of educational data published by Govt. of Himachal Pradesh since the year 2010.

VII. RESULTS AND DISCUSSION

Table 1: Status of Drinking Water facilities in Primary and Upper Primary Schools (Department of Education)

Level / Year	Primary Schools (in %)	Upper Primary Schools (in %)
2010	97.26	96.95
2011	98.69	98.58
2012	98.89	98.51
2013	98.90	98.23
2014	98.93	98.09
2015	99.88	99.44

The above table shows that the majority of primary and the upper primary schools (functioning under the department of education) had been having the drinking water facility since 2010 i.e. prior to the implementation of RTE Act, 2009. The 97.26 % of the primary schools of Himachal Pradesh were equipped with the drinking water facility whereas the same for the upper primary schools was 96.95% which further increased to 99.88 % and 99.44 % respectively in the year 2015. It is clear from the above table that 0.12 % of total primary schools (13 schools out of 10710) and 0.56 % of total upper primary schools (12 schools out of 2130) still lack the basic drinking water facility.

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Table 2: Status of Separate Toilets for Boys and Girls in Primary and Upper Primary Schools (Department of Education)

Level / Year	Primary Schools (in %)		Upper Primary Schools (in %)	
	Boys' Toilets	Girls' Toilets	Boys' Toilets	Girls' Toilets
2010	NA*	60.06	NA*	75.76
2011	NA*	96.40	77.31	97.55
2012	90.12	97.02	90.83	96.66
2013	93.32	96.89	92.03	94.87
2014	94.92	97.56	91.87	93.96
2015	99.65	99.79	98.97	99.25

**** In these years data for common toilet were available instead of separate boys' toilet.***

It is clear from the above table that till the year 2010 there has been only 60.06 % of the primary schools which had the separate toilet facility for the girl students which rapidly increased to 96.40 % of the primary schools in 2011 i.e. just one year after the implementation of RTE Act 2009. The consistent rise in percentage of primary schools with separate boys' toilets has been observed from 90.12 % in 2012 to 99.65 % in 2015. The above table also indicates the retrogressive change in percentage of girls' toilet as the same decreased from 97.02% in 2012 to 96.89% in 2013. It could be attributed to the reason that the total number of primary schools goes up to 10650 in 2013 as compared to 10613 in 2012. However, all the newly constructed schools could not have the facility of separate girls' toilet. In-case of upper primary schools the percentage of separate girls' toilets rose from 75.76 % in 2010 to 97.55 % in 2011 whereas the percentage of separate boys' toilets increased significantly from 77.31 % in 2011 to 90.83% in 2012. The percentage of total upper primary schools with separate girls' toilet fell down to 96.66%, 94.87%, 93.96% in the successive years 2012, 2013 and 2014 respectively. It could be due to the reason that in 2012 total number of upper primary schools were 2278 which increased to 2321 in 2013 however, no proportionate change was observed in number of separate toilets for girls, which remained constant (2202) in both the years. In 2014 many of the upper primary schools upgraded o high schools and the total number of these schools reduced to 2201, out of which only 2068 (93.96%) schools were equipped with separate toilet facility for girl students. However, in 2015 the same rose to 99.25 % indicating that 16 upper primary schools out of total of 2130 still do not have separate toilet for girls.

Table 3: Status of Toilet Facilities for CWSN in Primary and Upper Primary Schools (Department of Education)

Level / Year	Primary Schools (in %)	Upper Primary Schools (in %)
2010	NA	NA
2011	NA	NA
2012	NA	NA
2013	11.61	11.29
2014	15.33	18.04
2015	17.96	22.21

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The above table clearly shows that the status of toilet facilities for the children with special needs in both the primary and the upper primary schools operating under the department of state education even after the 5 years of implementation of RTE Act. Till 2012 none of these schools had toilet facility for CSWN. In 2013 11.61 % of the primary schools and 11.29% of the upper primary schools were equipped with such facility which further increased to 17.96 % of primary schools while 22.21 % of upper primary schools in 2015. The increase is still insignificant as the majority of the schools are lacking the basic facility for CSWN.

VIII. CONCLUSION

The much has been done and much has to be done to provide better basic drinking and sanitation facilities in the schools. More comprehensive strategies need to be designed not only to provide these facilities but also to ensure its proper maintenance. Special efforts are required to ensure separate toilet facilities for the girls of the adolescence stage as biological realities mean that girls need adequate sanitary facilities at school to manage menstruation. Basic facilities that provide for good hygiene and privacy, along with sensitive health promotion assist girls to stay in school and complete their education. Children with disabilities are also vulnerable to dropping out of school. Accessible school facilities are a key to school attendance for children with disabilities. An effective water, sanitation and hygiene programmes seeks to remove barriers by promoting inclusive design – user-friendly, child-friendly facilities that benefit all users, including adolescent girls, small children and children who are sick or disabled.

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GROUNDWATER ANALYSIS IN THE DISTRICTS OF WARANGAL

Paper ID	IJIFR/V4/ E2/ 052	Page No.	5275-5286	Subject Area	Civil Engineering
Keywords	Groundwater, Yearly Water Level Fluctuation, Monsoon Season Fluctuation , Average Water Level Fluctuation Over Nine Years, Groundwater Estimation Committee				

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Abstract

In view of increasing demand of water for various uses like agriculture, domestic and industrial purposes, a greater emphasis is being laid for planned and optimal utilization of water resources. Among the two major water resources, surface water and groundwater, the groundwater resources need to be managed carefully. Assessment of groundwater potential is a suitable and accurate technique for estimating the potential of water storage in the groundwater reservoirs. Measurement of groundwater levels, especially in monitoring wells, is done by several means. In this paper an attempt is made to study the different methods of estimating the groundwater potential and compared to arrive at the most suitable technique for practical utility. In this study, groundwater potential is estimated by three methods viz, Yearly water level fluctuation, Fluctuation in Monsoon Season and Average Water Level Fluctuation over Nine Years as recommended by Groundwater Estimation Committee, GEC (1997). From the study it was observed that among the three methods , the results obtained by the second method is more conservative and the result obtained from the third method is best suited for recharge of groundwater in Warangal district. The results of this study help in accurate prediction of groundwater availability, which in turn may avoid groundwater over exploitation and suggest proper management of the available resources.

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I. INTRODUCTION

Increased demand for water has resulted into over dependence on groundwater, especially in regions where surface water resources are limited and temporal rainfall is uneven. Exploitation of groundwater for various reasons has resulted in depletion of resources and rapid decline in groundwater table in several parts of India. Quantification of the rate of natural groundwater recharge is a pre requisite for efficient groundwater resource management. The rate of aquifer recharge is one of the most difficult factors to measure in the evaluation of groundwater resources. Estimation of recharge, by any method is normally subjected to uncertainties and errors. This paper presents the methods for estimating groundwater potential of Warangal district, Andhra Pradesh. The approach accounts for different time periods for the recharge potential of the aquifer. A comparative evaluation is made on these methods.

A fundamental problem of groundwater systems is that most of the subsurface is inaccessible, therefore most measurements related to groundwater and its flow as well as aquifer characteristics are generally indirect. The most direct groundwater measurements are groundwater levels measured in wells. Groundwater level data are extremely important in providing information about the overall groundwater flow regime and water budget of an aquifer. Groundwater flows from regions of higher potential to regions of lower potential. Rate of groundwater movement depends upon the slope of the hydraulic head (hydraulic gradient) and intrinsic aquifer and fluid properties. If head measurements from regular wells are available, it is possible to infer the horizontal direction of flow from higher to lower head, but not the vertical flow. If there is a vertical component of the groundwater flow, there must be differences in vertical head. This can be determined if two or more piezometers, designed to probe different depths, are available at the same location. However, only by noticing the difference in head between the two piezometers, it is possible to infer that groundwater in the unconfined aquifer is flowing upwards, as well as from left to right.

Accurate measurements of groundwater level can be made more rapidly with an electronic water level meter (or water level indicator). In the field, groundwater level measurements are made with reference to a local datum that is often the top of well casing, concrete plinth, drill table, etc. These measurements must be reduced to a regional datum or the mean sea level before plotting and interpretation for regional groundwater flow. Long-term, in-situ monitoring of groundwater levels is useful for developing regional water tables in order to establish sources of water for industry, agriculture, human consumption and evaluation of ground water potential of the area.

II. STUDY AREA

Warangal is one of the 10 districts of Telangana region of Andhra Pradesh (A.P.). The district lies between 17°19' & 18°36' N latitude and 78°49' & 80° 43' East longitude. The district is bounded by Khammam district of AP on the East, Karimnagar district on the North, Nalgonda on the South and Medak on the West. River Godavari serves as border on

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one side. The District Headquarter is Warangal, which lies about 150 kms away from the capital city of Hyderabad. The geographic area of the district is 12846 Sq.Kms. The topography of the district consists of isolated hills, rainfed tanks, lakes and shrubby forests. River Godavari forms the North East border of the district, but is not yet tapped for irrigation. The major soil types found in the district are red Chalka (55%), Black cotton soil (22%), Loamy soil (14%), and Sandy loams (9%). The climate in Warangal district is generally dry. Summers are hot, with mercury sometimes touching 50^{o} C. The temperature dips to 13^{o} C in winter months of December and January. Warangal district receives maximum rainfall from the South – West monsoon, during the months of July, August and September. The normal annual rainfall of the district is 994 mm,with Cherial, Maddur, and Bachannapet areas receiving rainfall only upto 750 mm and classified as dry areas whereas Mulugu, Parkal, Mahabubabad and Narsampet Mandals receive the maximum rainfall.

Ground water occurs in all the geological formations in the district. The occurrence and movement of the groundwater is a consequence of a finite combination of topographical, climatological, hydrological, geological, structural and pedalogical factors, which together form integrated dynamic system. Ground water levels are monitored from a network of observation wells three times in a year. In Pre monsoon the depth to water levels range from 2.98 meters below ground level (mbgl) to 28.5 m below ground level. The shallow water level of <5 m is observed in the north western part of the district. The deeper water levels of more than 20 m bgl are observed in north eastern part of the district. In rest of the area it varies from 5 to20 m bgl. In Post monsoon the water levels are between 2 and 10 mbgl. The area under < 2 mbgl occurs in the north eastern and eastern parts of the district. Water level of more than 10 mbgl is seen only in a very small isolated patch in the north western part. The water levels are between 2 and 5 mbgl in the central part from south to north and it varies from 5 to 10 mbgl all along the western part. In general the water levels are deep in the western part and shallow in eastern parts of the district. The study area of Warangal district is shown in Fig.1.

2.1 Field Data Collected

Monthly rainfall data for a period of nine years during 2003-2012 was collected from Meteorological department, Warangal. Monthly groundwater level data for fifty observation wells in the district was collected from Groundwater division, Warangal district, Andhra Pradesh. The details of locations of the observation wells along with their elevation from mean sea level are shown in Table 1.

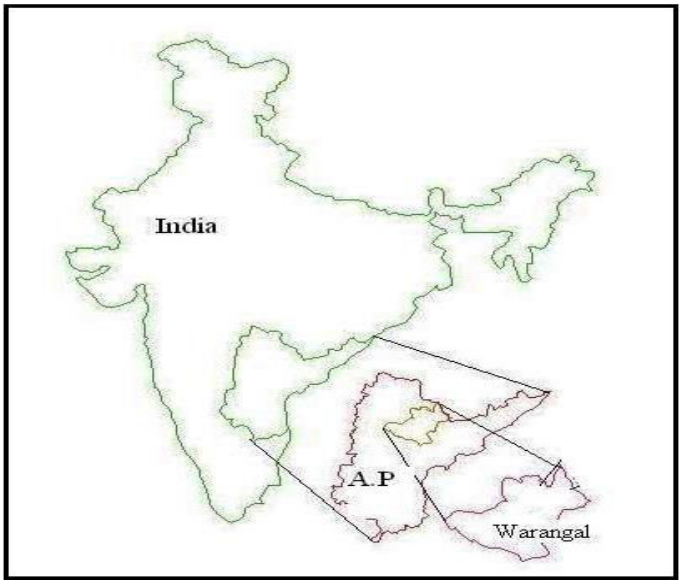

Figure - 1: Map of India showing exact location of Warangal district in Andhra Pradesh

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III. METHODOLOGY

The commonly used method for estimation of groundwater storage available annually as recommended by Groundwater estimation committee (GEC 1997) is,

Q = Area influencing the well x depth of fluctuation in groundwater table x Specific yield ……. (1)

Area influencing the well is obtained by Theissan polygon method using ARC GIS software as in Fig. 2. The specific yield values were considered as per the recommendations of GEC 1997.Estimation of groundwater recharge is analysed by three methods viz, Yearly water level fluctuation, Water level fluctuation in monsoon season and Average water level difference between highest and lowest water level for nine years.

3.1 Recharge by Yearly Water Level Fluctuation

In this method, fluctuation of groundwater is taken as the difference of highest (of the second season) and the lowest (of the first season) in the year is used in equation and the recharge value is estimated for all the forty three observation wells for the period of 2001-2010.

3.2 Recharge by Water Level Fluctuation in Monsoon Season

In this method, groundwater recharge is estimated by taking the difference between highest and the lowest water levels during the monsoon season (June to September) is used in the equation. The recharge value is estimated for all the forty three observation wells for the period 2003-2012.

3.3 Recharge by Average Water Level Difference over Nine Years

The estimation is worked out for an average fluctuation over nine years. The difference between the highest and the lowest fluctuations for every year is taken and an average over nine years is calculated. This is done for all observation wells and the quantity of recharge is calculated.

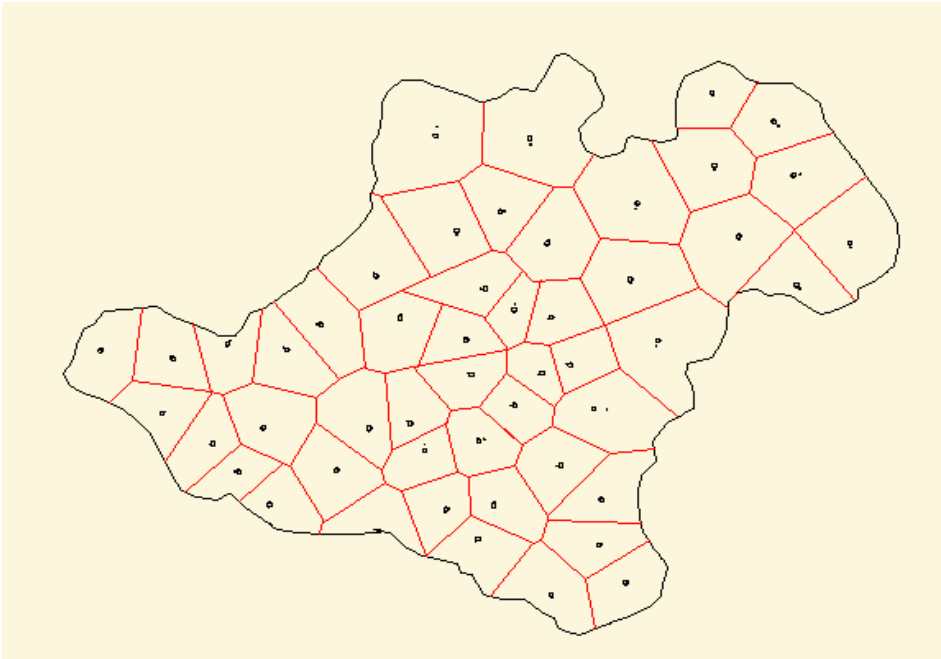

Figure 2: Warangal district with 50 observation wells and its influence area

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IV. RESULTS AND DISCUSSIONS

The groundwater fluctuation over the entire study period was analyzed and the estimated values of recharge for a period of nine years from 2003-2012 for the three different methods are shown in Table 2, 3 and 4 and the comparison of the recharge potential by three methods is shown in Table 5. From Yearly Water Level Fluctuation method it was observed that the maximum recharge occurred in Cheriala mandal and the minimum occurred in Narsamhulapet mandal. It is because the area surrounding Cheriala region has many lakes and ponds. As per the recharge estimation done using the method of Water Level Fluctuation in Monsoon Season, the maximum recharge of 71.81 MCM occurred in Hasanaparthy region and minimum of 9.72 MCM has occurred in Lingaghanapuram. It is due to the fact that the runoff in Hasanaparthy region is less and infiltration is more. From the recharge estimated by the Average Water Level Fluctuation over Nine Years, it is observed that the maximum recharge of 88.11 MCM has occurred in Hasanaparthy region and minimum of 12.30 MCM in Lingaghanapuram region. Lingaghanapuram region shows less recharge as it is a hard rock region and percolation is very low. As per the groundwater estimation committee norms, the results obtained by the three methods are close to the assessment made by the groundwater board which can be used for planning of water resources for Warangal district. In particular the second method is more conservative and the third method is best suited for the estimation of groundwater recharge.

Table – 1: Details of Observation Wells in Study Area

Well Number	Observation Wells	Longitude (E)	Latitude (N)	Mean Sea Level (m)
1	Cheriala	78.90	17.93	509.59
2	Madduru	79.06	17.92	466.14
3	Bachannapet	79.04	17.79	448.40
4	Raghunathpalli	79.26	17.76	358.11
5	Devaruppula	79.27	17.59	243.75
6	Kodakandla	79.51	17.53	251.93
7	Narmetta	79.18	17.94	454.91
8	Janagaon	79.17	17.73	372.73
9	Lingalaghanapuram	79.20	17.66	333.98
10	Zaffergadh	79.49	17.76	281.09
11	Ghanpur station	79.31	17.93	371.80
12	Palakurthy	79.42	17.67	288.07
13	Wardhannapet	79.58	17.77	253.22
14	Thorruru	79.66	17.58	233.31
15	Rayaparthy	79.61	17.71	244.46
16	Duggondi	79.81	18.02	240.71
17	Narsimhulapet	79.73	17.51	219.04
18	Maripeda	79.89	17.39	192.11
19	Dornakal	80.05	17.42	165.11

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20	Sangem	79.71	17.88	255.19
21	Geesugonda	79.70	17.96	261.09
22	Athmakur	79.74	18.07	233.44
23	Parvathagiri	79.73	17.73	228.81
24	Warangal	79.60	17.98	274.32
25	Hasanparthy	79.51	18.10	253.64
26	Hanamkonda	79.56	18.00	268.33
27	Mahabubabad	80.00	17.60	190.46
28	Kesamudram	79.91	17.68	217.89
29	Korivi	79.99	17.50	192.13
30	Chennaraopet	79.87	17.88	226.63
31	Nellikuduru	79.76	17.59	200.77
32	Nekkonda	79.81	17.81	222.28
33	Gudur	79.98	17.80	234.33
34	Narsampet	79.89	17.92	236.46
35	Nallabelli	79.89	18.01	257.04
36	Khanapuram	79.93	17.90	233.91
37	Parkala	79.68	18.20	222.32
38	Mulugu	79.88	18.17	261.06
39	Eturunagaram	80.42	18.32	92.85
40	Regonda	79.78	18.24	228.50
41	Mogullapalli	79.69	18.27	195.14
42	Dharmasagar	79.38	17.99	331.01
43	Bhupalpalle	79.85	18.42	193.25
44	Shayampet	79.57	17.98	267.54
45	Chityal	79.61	17.54	241.89
46	Kothagunda	79.45	17.25	23245
47	Venkatapur	79.67	18.22	217.12
48	Govindaraopet	80.13	18.2	152.67
49	Mangapet	80.52	18.25	81.68
50	Nelligudur	80.35	18.36	198.72

Table – 2: Recharge by Yearly Water Level Fluctuation

Observation Wells	Well No.	Specific Yield %	Area (km^2)	Depth of Fluctuation (m)	Recharge (MCM)
Cheriala	1	2.75	257	11.47	78.52
Maduru	2	2.75	238	4.03	20.88
Bachannapet	3	2.75	206	7.24	34.44
Raghunathpalli	4	2.75	272	9.36	61.26
Devaruppula	5	2.75	175	7.03	32.39
Kodakandla	6	2.75	181	9.93	40.72
Narmetta	7	2.75	176	6.59	30.06
Janagaon	8	2.75	203	6.94	36.68
Lingalaghanapura	9	2.75	142	3.15	11.32

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Zaffergarh	10	2.75	268	3.14	20.86
Ghanpur Station	11	2.75	242	8.54	50.78
Palakurthy	12	2.75	262	8.84	54.83
Wardhannapet	13	2.75	178	5.53	22.86
Thorruru	14	2.75	284	8.36	55.76
Rayaparthy	15	2.75	182	6.73	33.03
Duggondi	16	2.75	163	5.31	21.70
Narsimhulapet	17	2.75	124	4.84	11.15
Maripeda	18	2.75	215	5.91	27.08
Dornakal	19	2.75	268	9.18	65.30
Sangem	20	2.75	224	3.66	21.50
Geesugonda	21	2.75	177	5.69	22.54
Athmakur	22	2.75	166	4.58	20.22
Parvathagiri	23	2.75	215	6.02	29.80
Warangal	24	2.75	189	5.74	29.05
Hasanparthy	25	2.75	534	6	70.19
Hanamkonda	26	2.75	348	5.92	42.97
Mahabubabad	27	2.75	255	5.91	37.59
Kesamudram	28	2.75	246	5.48	33.96
Korivi	29	2.75	237	5.3	31.68
Chennaraopet	30	2.75	209	3.87	19.02
Nellikuduru	31	2.75	121	4.12	12.94
Nekkonda	32	2.75	206	5.81	30.87
Gudur	33	2.75	158	3.11	11.91
Narsampet	34	2.75	341	4.11	37.32
Nallabelli	35	2.75	467	4.33	54.32
Khanapuram	36	2.75	188	12.84	64.94
Parkala	37	2.75	154	5.68	21.94
Mulugu	38	2.75	323	3.21	25.05
Eturunagaram	39	2.75	300	5.2	39.85
Regonda	40	2	346	4.05	33.21
Mogullapalli	41	2.75	239	2.95	14.85
Dharmasagar	42	2.75	557	3.68	47.79
Bhupalpalle	43	2	230	2.34	12.52
Shayampet	44	2.75	353	1.89	12.43
Chityal	45	2	210	3.24	18.25
Kothagunda	46	2	402	2.62	21.89
Venkatapur	47	2	260	2.24	14.51
Govindaraopet	48	2	376	4	41.15
Mangapet	49	2	306	2.52	19.69
Nelligudur	50	2.75	450	1.54	16.83

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Table – 3: Recharge by Fluctuation in Monsoon Season

Observation Wells	Well No	Specific Yield Percentage	Area (km^2)	Depth of Fluctuation (m)	Recharge (MCM)
Cheriala	1	2.75	257	11.47	69.40
Maduru	2	2.75	238	4.03	19.77
Bachannapet	3	2.75	206	7.24	33.93
Raghunathpalli	4	2.75	272	9.36	58.42
Devaruppula	5	2.75	175	7.03	23.10
Kodakandla	6	2.75	181	9.93	32.95
Narmetta	7	2.75	176	6.59	15.73
Janagaon	8	2.75	203	6.94	21.55
Lingalaghanapuram	9	2.75	142	3.15	9.72
Zaffergarh	10	2.75	268	3.14	20.34
Ghanpur Station	11	2.75	242	8.54	36.40
Palakurthy	12	2.75	262	8.84	31.13
Wardhannapet	13	2.75	178	5.53	21.10
Thorruru	14	2.75	284	8.36	41.63
Rayaparthy	15	2.75	182	6.73	25.43
Duggondi	16	2.75	163	5.31	18.92
Narsimhulapet	17	2.75	124	4.84	10.26
Maripeda	18	2.75	215	5.91	27.08
Dornakal	19	2.75	268	9.18	23.07
Sangem	20	2.75	224	3.66	9.98
Geesugonda	21	2.75	177	5.69	16.89
Athmakur	22	2.75	166	4.58	10.91
Parvathagiri	23	2.75	215	6.02	30.21
Warangal	24	2.75	189	5.74	9.88
Hasanparthy	25	2.75	534	6	71.81
Hanamkonda	26	2.75	348	5.92	37.99
Mahabubabad	27	2.75	255	5.91	27.00
Kesamudram	28	2.75	246	5.48	27.67
Korivi	29	2.75	237	5.3	20.46
Chennaraopet	30	2.75	209	3.87	16.61
Nellikuduru	31	2.75	121	4.12	9.98
Nekkonda	32	2.75	206	5.81	21.24
Gudur	33	2.75	158	3.11	10.12
Narsampet	34	2.75	341	4.11	25.88
Nallabelli	35	2.75	467	4.33	44.56
Khanapuram	36	2.75	188	12.84	54.65
Parkala	37	2.75	154	5.68	13.64
Mulugu	38	2.75	323	3.21	11.99
Eturunagaram	39	2.75	300	5.2	36.63
Regonda	40	2	346	4.05	28.26

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Mogullapalli	41	2.75	239	2.95	18.80
Dharmasagar	42	2.75	557	3.68	39.37
Bhupalpalle	43	2	230	2.34	11.95
Shayampet	44	2.75	353	1.89	13.78
Chityal	45	2	210	3.24	17.44
Kothagunda	46	2	402	2.62	28.30
Venkatapur	47	2	260	2.24	11.94
Govindaraopet	48	2	376	4	35.67
Mangapet	49	2	306	2.52	17.17
Nelligudur	50	2.75	450	1.54	14.97

Table – 4: Recharge by Fluctuation over Nine Years

Observation Wells	Well No	Specific Yield %	Area (km^2)	Depth of Fluctuation (m)	Recharge (MCM)
Cheriala	1	2.75	257	11.47	81.06
Maduru	2	2.75	238	4.03	26.38
Bachannapet	3	2.75	206	7.24	41.01
Raghunathpalli	4	2.75	272	9.36	70.01
Devaruppula	5	2.75	175	7.03	33.83
Kodakandla	6	2.75	181	9.93	49.43
Narmetta	7	2.75	176	6.59	31.90
Janagaon	8	2.75	203	6.94	38.74
Lingalaghanapuram	9	2.75	142	3.15	12.30
Zaffergarh	10	2.75	268	3.14	23.14
Ghanpur Station	11	2.75	242	8.54	56.83
Palakurthy	12	2.75	262	8.84	63.69
Wardhannapet	13	2.75	178	5.53	27.07
Thorruru	14	2.75	284	8.36	65.29
Rayaparthy	15	2.75	182	6.73	33.68
Duggondi	16	2.75	163	5.31	23.80
Narsimhulapet	17	2.75	124	4.84	16.50
Maripeda	18	2.75	215	5.91	34.94
Dornakal	19	2.75	268	9.18	67.66
Sangem	20	2.75	224	3.66	22.55
Geesugonda	21	2.75	177	5.69	27.70
Athmakur	22	2.75	166	4.58	20.91
Parvathagiri	23	2.75	215	6.02	35.59
Warangal	24	2.75	189	5.74	29.83
Hasanparthy	25	2.75	534	6	88.11
Hanamkonda	26	2.75	348	5.92	56.65
Mahabubabad	27	2.75	255	5.91	41.44
Kesamudram	28	2.75	246	5.48	37.07
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Mulugu	38	2.75	323	3.21	28.51
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Mangapet	49	2	306	2.52	21.21
Nelligudur	50	2.75	450	1.54	19.06

Table – 5: Comparison of Three Methods

Observation Wells	Well No.	Yearly Water Level Fluctuation (MCM)	Fluctuation in Monsoon Season (MCM)	Average Fluctuation over Nine Years (MCM)
Cheriala	1	78.52	69.40	81.06
Maduru	2	20.88	19.77	26.38
Bachannapet	3	34.44	33.93	41.01
Raghunathpalli	4	61.26	58.42	70.01
Devaruppula	5	32.39	23.10	33.83
Kodakandla	6	40.72	32.95	49.43
Narmetta	7	30.06	15.73	31.90
Janagaon	8	36.68	21.55	38.74
Lingalaghanapuram	9	11.32	9.72	12.30
Zaffergarh	10	20.86	20.34	23.14
Ghanpur Station	11	50.78	36.40	56.83
Palakurthy	12	54.83	31.13	63.69
Wardhannapet	13	22.86	21.10	27.07
Thorruru	14	55.76	41.63	65.29
Rayaparthy	15	33.03	25.43	33.68
Duggondi	16	21.70	18.92	23.80
Narsimhulapet	17	11.15	10.26	16.50
Maripeda	18	27.08	27.08	34.94

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Hasanparthy	25	70.19	71.81	88.11
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Mahabubabad	27	37.59	27.00	41.44
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Gudur	33	11.91	10.12	13.51
Narsampet	34	37.32	25.88	38.54
Nallabelli	35	54.32	44.56	55.61
Khanapuram	36	64.94	54.65	66.38
Parkala	37	21.94	13.64	24.05
Mulugu	38	25.05	11.99	28.51
Eturunagaram	39	39.85	36.63	42.90
Regonda	40	33.21	28.26	38.54
Mogullapalli	41	14.85	18.80	19.39
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Bhupalpalle	43	12.52	11.95	14.80
Shayampet	44	12.43	13.78	18.35
Chityal	45	18.25	17.44	18.71
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Venkatapur	47	14.51	11.94	16.02
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Mangapet	49	19.69	17.17	21.21
Nelligudur	50	16.83	14.97	19.06

V. CONCLUSIONS

In this work, the optimum average recoverable groundwater reserve that can be exploited from the aquifer was found out using different time scale for the depth of fluctuation. Among the three methods, the recharge obtained by the first method is more conservative and the results obtained from the third method are best suited for recharge of groundwater in Warangal district. Here the estimation of groundwater potential using the water level fluctuations in the dug wells enhances the assessment of water resources.

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ROLE OF EXECUTIVE LOUNGE IN ENHANCING CUSTOMER EXPERIENCE

Paper ID	IJIFR/V4/ E2/ 057	Page No.	5287-5297	Subject Area	Hotel Management
Keywords	Concierge, Executive, Lounge, Hotel				

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Abstract

Service management is becoming the new paradigm in the hospitality industry. Hospitality establishments offer services to fulfill the needs and experiences of customers through innovative concierge or personalized services. Hospitality managers are conceptualizing their hospitality offerings as service offerings conducted in a framework of human relationships. This essay will advance the framework through a concierge service study to determine how and why customer service has either increased or decreased in regards to the acquisition of concierge service marketing techniques. The purpose of this research is to first, analyze how and why customers seek concierge services and second, determine whether the acquisition of these concierge services affect guest stay experience and offer increased choices in guest services. The hotel lounge was once a simple affair, offering a television, perhaps, and a small buffet to its regular customers. But as business travel has started to pick up, and revenue along with it, a number of major hotel brands are once more turning to sprucing up their executive club lounges, making them more residential in feel and providing healthier food and improved technology like free Wi-Fi.

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I. INTRODUCTION

Concierge Level -- the very phrase conjures up an image of your own personal hotel staff member, catering to your every request, no matter what time of night. Is it worth it? The answer depends on the particular hotel's service at concierge level and your own personal needs. Here's a rundown of what you can expect. This might include meeting room spaces, internet stations, a reception area with complimentary food and drinks, and of course, a special concierge desk to help you with requests. It is a lounge that is value for money. This concept was introduced by the Marriott Hotels, by starting a lounge facility for their repeat customers and business travelers. Over time it was a known fact that guests were ready to pay extra for the lounge facility. It also played a major role in guest satisfaction and repeat business.The American concierge is most common in larger cities and performs many of the same duties as the European concierge. One significant difference is that the American concierge deals primarily with business travelers, and thus, the need for foreign language skills is less important. The American concierge is less supervisory also, and therefore, does not have a large service staff reporting to them for direction.

Executive floors are fairly standard features across four- and five-star hotels. You almost certainly will find them at the well-known hotel brands: Hilton (hilton.com), Marriott (marriott.com) and Hyatt (hyatt.com) offer them at many of their properties, for example. Upper-tier boutique or independent hotels in major cities also are likely to have them. You'll find them less frequently at lower tiers of hotels, but some do offer them, particularly in business-travel-heavy locations. Holiday Inn (holidayinn.com), for example, has business and executive levels in some of its larger properties.

Amenities on an executive floor can vary wildly, even among properties in the same hotel brand, so you will need to check with your hotel, either by phone or on its website, for the exact offerings. As a base expectation, they should offer a public lounge area with work spaces and a small buffet, and a room with extra working areas. Many hotels, however, have invested well beyond that. In the lounge, you might find cocktails, gaming areas and free Wi-Fi hot spots. Your room might have free goodies to eat and drink and nicer bedding and furniture. You also might have an elevator exclusive to lounge floors or a private check-in area. Some luxury properties even offer high-service perks such as a butler to handle your packing and unpacking.All the hotel lounges do not provide the same services the services may vary from hotel to hotel or brand to brand. The customers' requirements are also a part in setting up for the services and facilities. Some of the common services provided by the hotels are:

- **Full Buffet Breakfast:**

Most travelers, families included, love the convenience of getting breakfast without having to leave the hotel in the morning. That becomes even more important on days you chose to take early day trips or leave very early for the airport since many places are not even open at that hour. Note that breakfasts can vary by chain, country, and property. While some might offer a continental version, others have a full brunch-like buffet

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- **Extravagant Happy Hours:**

The "Happy Hour" that first started in restaurants has successfully crossed over to hotel lounges. Most properties offer appetizers and drinks as a free option between 5-8 pm. Some executive lounges offer potatoes chips, pretzels, and cheeses, while others can offer ample spreads making it unnecessary for some to eat dinner (which can be a money saver for the average family.)

- **Ample Seating Space:**

Depending on the space allocated by the property the executive lounge can feel spacious or crowded. Naturally, the larger the room the more comfortable the traveler will feel. Bear in mind that during the peak hours of 8am-10am and 6pm-8pm even some of the larger lounges might appear packed.

- **Unlimited Sodas or Drinks:**

Though many hotels in the United States offer unlimited bottled waters, sodas and coffees throughout the day, this will vary from country to country. You will discover greater differences on the wines, beers and hard liquor policies – some places offering very few choices and actively limiting patron consumption.

- **Separate family space:**

A growing number of hotels wishing to cater to traveling families now offer a separate room with books, toys and the quintessential TV/video set to help occupy the kids. This is a good idea for all lounge guests – the adults enjoy a relaxing atmosphere while the kids get to play and enjoy their own TV shows.

II. RESEARCH DESIGN

2.1 Need & Significance of the study: Hotels will understand how a concierge lounge can be effectively used for improving Guest Experience. The hotels that do not currently have a concierge lounge will get a ready insight on the details, and it would help them if they intend to propose for their property. The research will help academicians to understand the comparisons between hotels that have a concierge facility, and those who do not have. Thus it will provide as a platform for further studying the reasons and limitations of not having such a facility, mainly with regards to cost implications. This research will thus further create a platform for further studies by academicians.

2.2 Scope of the study: The scope of the study will be beneficial to the following hospitality professionals- hotels that intend to have an executive lounge will be able to this study.The research experience will help us, (the researchers) in understanding the subject in detail.It will act as a ready reference for hospitality students, to know more about the subject.

2.3 Limitations of the Study

The study is based on information received by the employees, managers and guests of sample hotels in Pune city.

2.4 Statement of the Problem

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The executive lounge which is a new trend in the hotels these days, does it contribute towards enhancing guest satisfaction in the hotels.

2.5 Definitions

Concierge: The word "concierge" is uncertain, but some suggest that it comes from the Latin "conserves," meaning "fellow slave." Others claim that the first concierge "Count of the Candles" was in charge of Paris's royal prison. The concierge is a separate entity from the reception staff, room clerks, and cashiers.

III. LITERATURE REVIEW

- **Richard Mills, Denis P. Rudd, Frank Flanegin, 2009**, this paper suggests that the concierge services are not only related to the facilities provided but also to the service provider. It determines that the concierge facility also helps to find the customer satisfaction level. Now days the customers are looking forward to innovative concierge or personalized services. The paper also throws light on the human relationship.
- **Jane L. Levere, 2004**, this article is saying that the customers do return to the hotels offering concierge services as a part of the facilities. It was noticed that 90% of the repeat customers were business travelers, who look forward to use this facility as it aids in their business trip needs.
- **Sara Dolnicar, 2003,** in this research the author focuses on the Hotel attributes which turns out to be a wide and extremely heterogeneous field of research. The authors review empirical studies investigating the importance of hotel attributes, provide attribute rankings and suggest a framework for past and future research projects in the field, based on the dimensions.
- **Noora Sirkiä,2013**, This thesis gives information about the types of VIP guests in hotel industry in the United States and the specific procedures the hotel departments use in order to answer to the various needs of the guests and to provide high quality customer service, and one way of achieving the same is through the executive lounge.
- **SuzanaMarkovic, SanjaRaspor and KlaudioSegaric, 2010**, have examined and analyzed that satisfaction has a greater impact on customer loyalty. And it can be achieved through the services and facilities provided by the hotels.
- Sarah Peterhans, 2010, Standards, has studied that maintaining the level of service in the hotel should be done by understanding the guests' expectations and setting service standards to meet the guests' expectations.
- **Jiao Mingyu, 2014**, this paper analyses the formation of customer value and has identified the five driving factors which are functional value, social value, emotional value, utility value and cost value.
- **Phillips Paul Louvieris Panos, 2005** have analyzed the performance measurement processes. And have suggested a balance score card for the improving the service quality for customer retention in the hotel.

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IV. OBJECTIVES OF THE STUDY

1. To study the availability of various services and facility in the executive lounge.
2. To find out how executive lounge, helps in enhancing the guest experience.
3. To understand guests expectations from the executive lounge.

V. RESEARCH METHODOLOGY

5.1 Primary Data: Primary data was collected through following sources-

- **Through Questionnaires for guests:** A well designed questionnaire was drafted and circulated to hotel managers of 5 and 4 star hotels.
- **Through Personal Interviews**: Personal Interviews and Interaction with hotel employees and the Managers of 5 star and 4 star hotels were conducted to understand how guests were satisfied and retained at their property.
- **Through Questionnaires for guests:** Also a separate questionnaire would be circulated to guests to understand their expectations from the concierge lounge.

5.2 Secondary Data collection: Secondary data was collected through various internet sites and research journals. Information is also taken published articles in magazines and newspapers.

5.3 Sampling Technique: The population of the research was homogeneous in nature – "The hotel managers and guests". Hence few perspectives and ideas might be on similar grounds. Considering this fact a random sample of 30 hotel managers was selected from various five star hotels in Pune, as a Sample Size for the research. Also 70 guests were selected randomly as a sample size for the survey.

VI. OBSERVATIONS AND DISCUSSIONS

i. 70% of the hotels have executive lounge facility provided in the hotel. Maximum of the hotels believe that the concierge lounge helps to enhance the stay of the guest as it not mere a business center. However there are 30% of hotels which do not provide an executive lounge facility but are looking forward to do so. As it is also seen that 80% of the guest are aware about this facility it is also important decision making factor for the guest while selecting a property.

ii. As the guests are using the lounge for the meeting spaces, Wi-Fi, food and beverage and the happy hour it is also necessary that the hotel should take efforts in improvising the other facilities like conference calling, computer stations and printing facilities.

iii. It is observed that the guest utilizing this facility the maximum is the business travelers and the members of the lounge also there are corporate company guests who also use this facility for hosting small meetings and lunches.

iv. The lounge is making a considerable amount of revenue in the sales mix. It is also seen that as an outlet in itself it is making a revenue of more then 5,00,00/-

v. The percentage of guests who are aware about the facility and are using the same is 70%, which shows that the guests are aware about the latest trends in the industry.

vi. It is also observed that 80% of guests say that the executive lounge does add on to their

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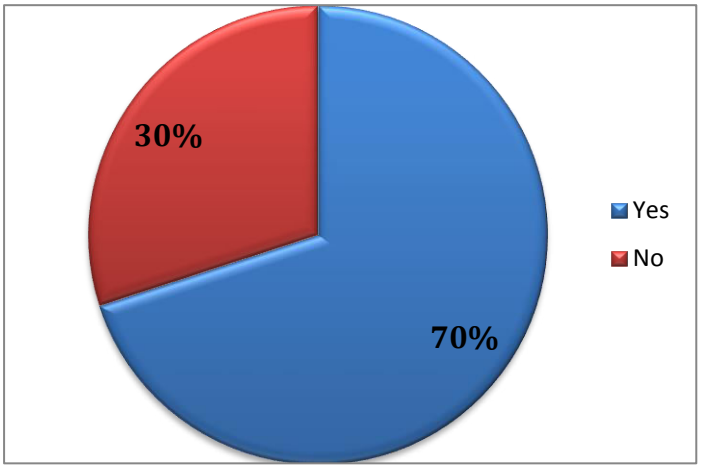
stay experience in the hotel. This helps in generating more repeat guests.

VII. DATA ANALYSIS & INTERPRETATION

7.1 FOR HOTELS

1) **Availability of Executive Lounge**



According to the surveys it was observed that 70 % of the hotels have an executive lounge service provided to the hotel guests. 30 % hotels in Pune did not have and executive lounge. These hotels are generally the four star properties in the city.

Figure 1: Availability of Executive Lounge

2) **Facilities Provided in Lounge**

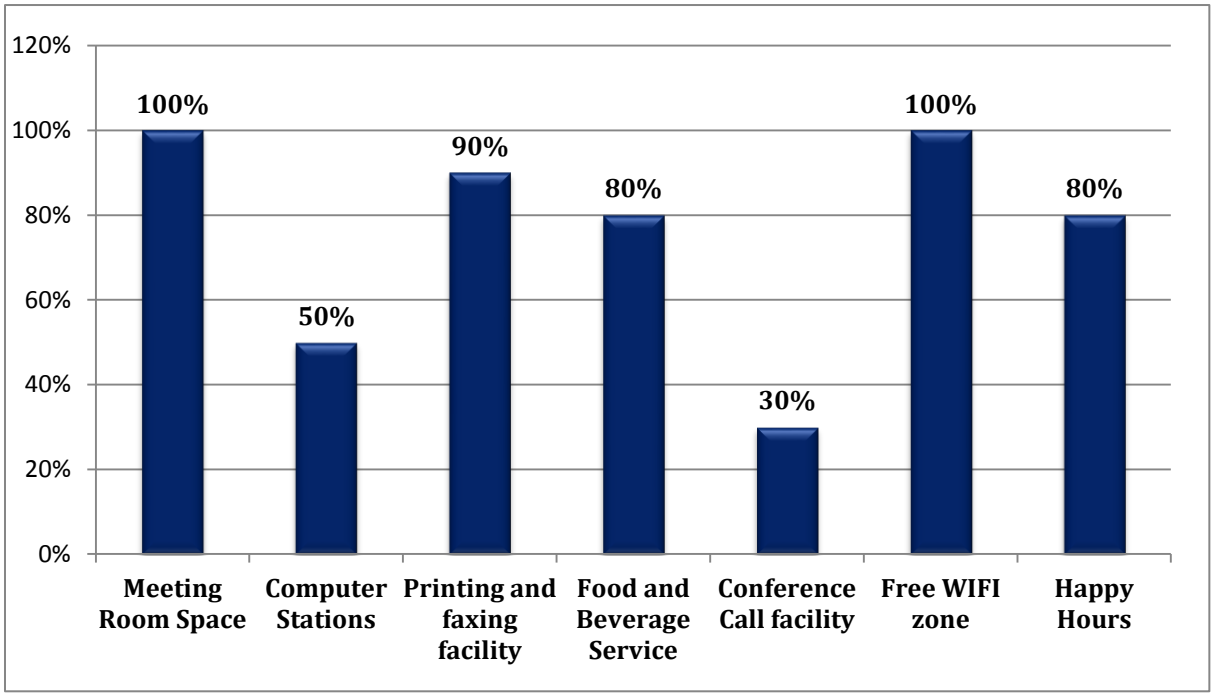


Figure 2: Facilities provided in the Executive Lounge

With the above data it is observed that the facilities utilized the most are Meeting rooms, Printing and faxing facility and the WIFI zone. Also guest also enjoys the facilities like the Happy hours and the food and beverage services provided during the meetings. Guest on business trips find it really useful as it gives them the opportunity to utilize the time wisely as the break timings can be reduced.

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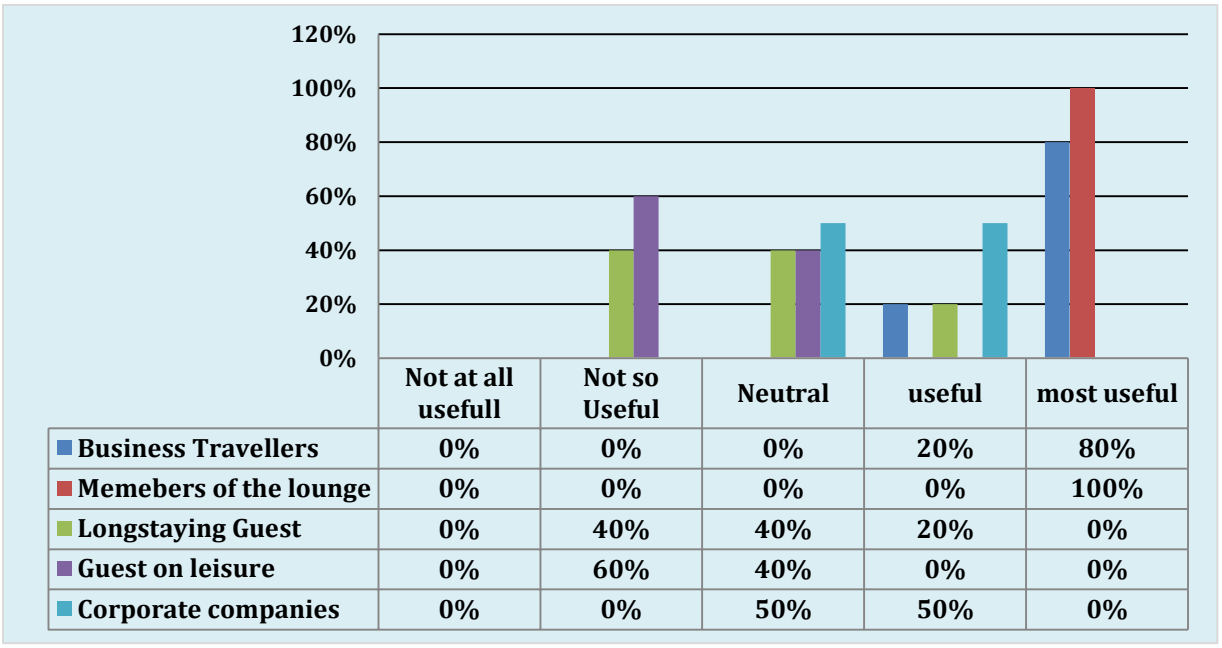
3) Type of Guests who use the Facility.



	Not at all usefull	Not so Useful	Neutral	useful	most useful
Business Travellers	0%	0%	0%	20%	80%
Memebers of the lounge	0%	0%	0%	0%	100%
Longstaying Guest	0%	40%	40%	20%	0%
Guest on leisure	0%	60%	40%	0%	0%
Corporate companies	0%	0%	50%	50%	0%

Figure 3: Guests Who Use the Executive Lounge Facility

From the above data we can conclude that guests who use the executive lounge facility the most are the members of the lounge and the business travelers as it suites there purpose the most, however even guest on leisure trips prefer to use the facility as they feel it is value for money with regards to the happy hours provided.

4) Revenue Generated through Executive Lounge

In a five star hotel the executive lounge generates a revenue of more then 5,00,000. It is a through there food and beverage services provided during meetings (Apart from the happy hours) and also from the printing services. The lounge also generates revenue by hosting small lunch and hi tea services for companies.

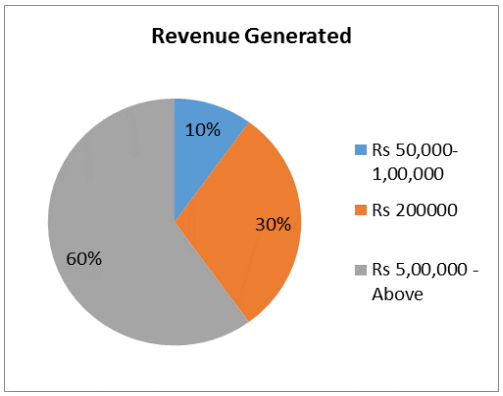


Figure 4: Revenue Generated through Executive Lounge

5) Revenue Generated as a Sales Mix

Revenue generated by the executive lounge in the sales mix is 10% - 40%. This is a considerable amount of contribution with not being a food and beverage outlet in itself. The prime focus is on the meeting spaces. However with the increase in awareness about the facility within the guests it would be generating more percentage of profit.

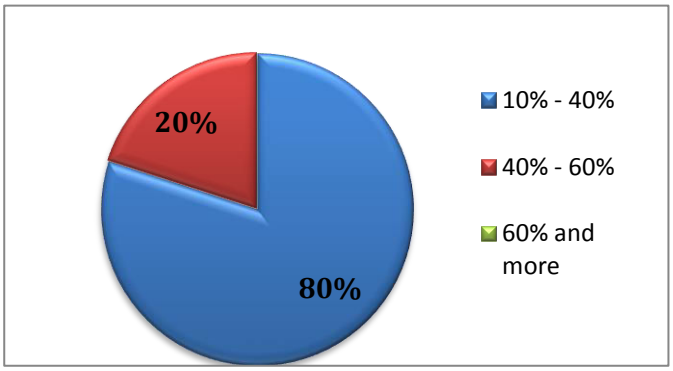


Figure 5: Revenue as per Sales Mix

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6) Impact of Executive Lounge on Guest Experience

With all the facilities and services provided by the executive lounge it shows that the executive lounge has a great effect on the guest experience. As guest prefer to visit the lounge more not only for the facilities but also for the ambience and the service provided by the polished staff. The find it as a one point contact for the requests and complaints. It is also observed by the hotel managers and the guest who have used this facility once during their stay opt for the same during there next visit and are also ready to pay extra for the club floor rooms. Increase the room revenue.

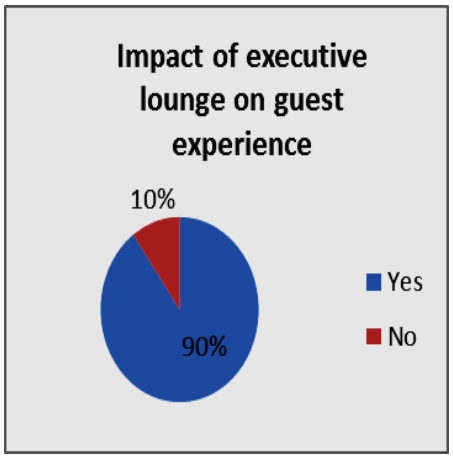
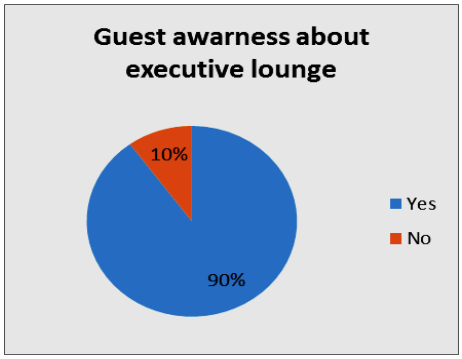


Figure 6: Impact of Executive Lounge on Guest Experience

7.2 FOR GUESTS

1) Guest Awareness of Executive Lounge



From the above analysis it can be seen that 90% of the guest are aware about the executive lounge facility provided by the hotel. Hence it can be seen that the customers now a days are aware about the new trends which are upcoming in the hotels. It can also be said that the hotels are also taking initiative in introducing the new facilities to its guests

Figure 7: Guest Awareness of Executive Lounge

2) Use of Executive Lounge by Guests

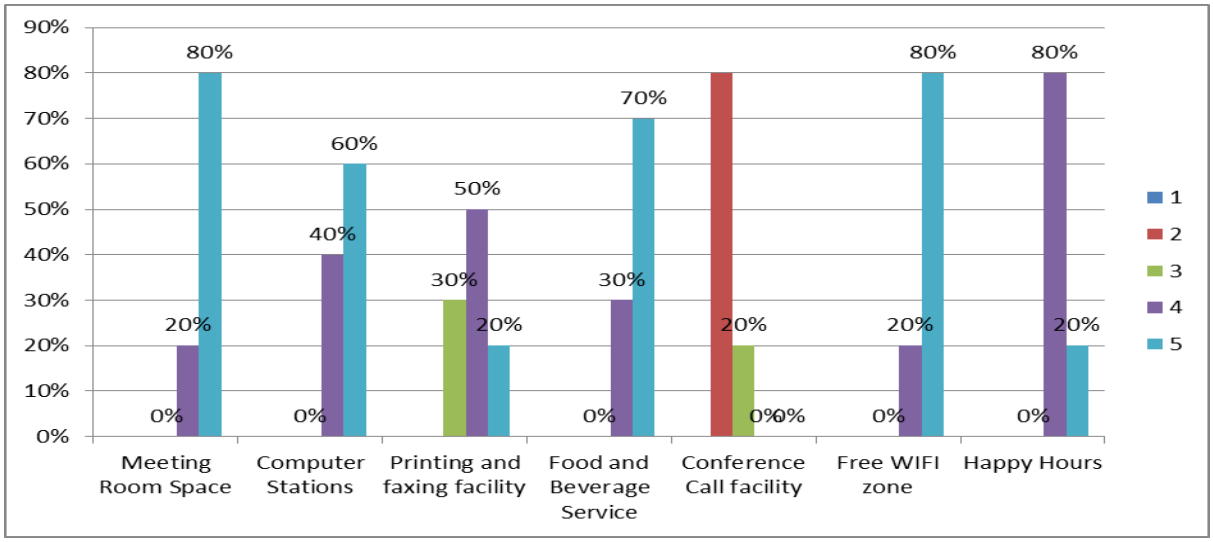


Figure 8: Use of Executive Lounge by Guests

From the above chart it can be seen that the guest use the executive lounge to avail the meeting room spaces, free wifi zone, the food and beverage services and the happy hours

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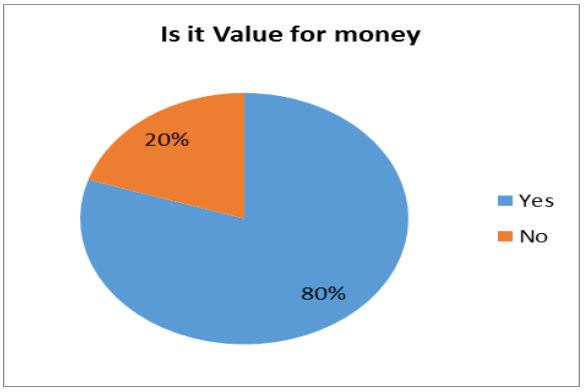
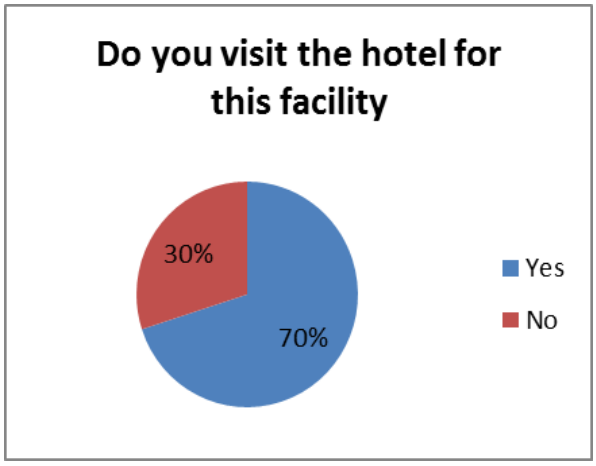
facilities the maximum. It can be seen that the guests are looking forward for the executive lounge to cater to their business needs the most. And also the guests on a business trip look forward for the happy hours to entertain the business clientele.(where number 1-indicates not used and number 5- indicates used maximum).

3) Guests Perception about Lounge with respect to Value For Money



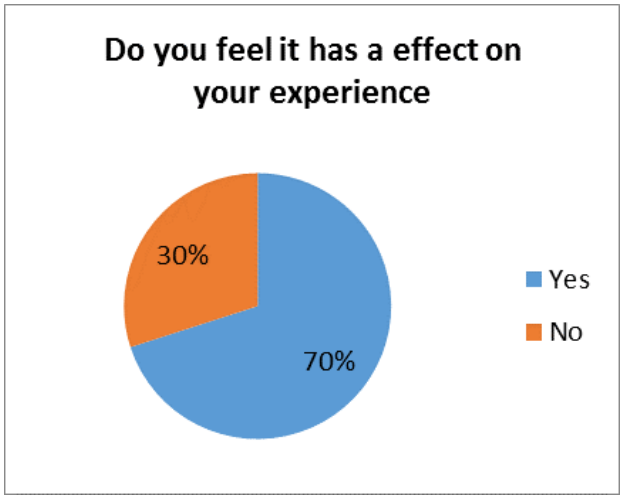
It can be seen that 80% of the guest find the executive lounge value for money. It also shows that the guests are happy with the services and the hotels are able to deliver as per the guest's perception most. It also gives the hotels to upgrade

4) Guests Using the Lounge Facility



It can be seen that the guest do visit the hotel for the executive lounge facility. Business travelers are the ones opting for this service more. It is also seen in the survey taken from the front office managers that there are a number of guest who opt for the executive lounge facility if they are a repeat guest and also don't hesitate in paying more for the same.

5) Guests view on Experience



From the above data it shows that executive lounge has an effect on the guest experience. It shows that the executive lounge does add up to the value of the guest stay experience. It provides personalized service and also technology which guest's prefer to see in a five star hotel. They are also looking for getting the experience which is equivalent for the money they have spent in the hotel.

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7. RECOMMENDATIONS AND SUGGESTIONS

- Hotels which do not provide the executive lounge facility should provide this facility as the guest awareness about the executive lounge is high and a hotel may end losing business as business travelers would prefer a hotel which provides such facility.
- It is also recommended that hotels should take measures in introducing services in the lounge which would also draw more guests who are travelling on leisure. It would help to increase the revenue.
- Guests are using the lounge mostly for the business oriented needs, hence hotels should upgrade and introduce facilities which would aid in providing better experience.
- Also as there is high percentage of guest who do not find the lounge to be value for money , hence the hotel should take initiative in understanding there expectations from the lounge through feedback or a personal conversation.
- Hotels should take into consideration in making the guests aware of such a facility provided through the check in process, website or promotions in the hotel. It would help in increasing awareness about the facility.
- As it can be seen that the facility does have an effect on the guest stay experience it is necessary for the hotels to provide more personalized service, which would require a well-trained and well informed staff. It is also important.
- It is also recommended that the hotels should incorporate services which would help draw more long staying guests and guest on leisure trips to the hotel.

8. CONCLUSIONS

The executive lounge services continue to have a great impact on the hospitality industry that is greatly affected by loyalty programs. Therefore the level of executive lounge services continues to have a great impact on the revenue of the business as well. To be able to maintain the relations the property needs to excel in the job without exceptions. As executive lounge guests also include high profile individuals from around the world and therefore it is imperative in the hospitality business to make a long lasting impression that gives a positive impression of the property and furthermore effects on the reputation and revenue of the hotel. In the future the executive lounge guest services could be further researched by utilizing properties that are more involved with transient guests or properties that are located in other countries. This might provide surprising information on the executive lounges. Although executive lounge guests in different cultures and locations may have different requests and preferences, the fact that the hotel should nevertheless provide the guest with undivided attention and act on preferences and requests does not in my opinion change. I believe that the fact that unobtrusive personal service keeps the guests coming back to the property.

Also for future reference I would recommend using an objective guest satisfaction survey targeted to the executive lounge guests. I think if would correctly executed provide valuable information to hospitality industry. Because hospitality industry relies on customer service, it is essential to have a comprehensive training program for the associates who are

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providing the service. By providing professional and polished customer service the hotel is able to demonstrate that every guest is as important and that the guest is the reason for the hotel's existence. In my opinion the basis for excellent executive lounge service starts from recruitment and continues through training. This combined with well-planned executive lounge service processes results in high-quality customer service and in impressed guests.

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LANDSLIDE SUSCEPTIBILITY MAP IN SILLAHALLA MACRO-WATERSHED NILGIRIS, TAMIL NADU USING BY FREQUENCY RATIO METHOD

Paper ID	IJIFR/V4/ E2/ 062	Page No.	5298-5308	Subject Area	Civil Engineering
Keywords	Landslide, GIS, Frequency ratio, Nilgiris				

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Abstract

This study considers landslide susceptibility mapping by means of frequency ratio methods using geographical information system (GIS) techniques as a basic analysis tool. The selected study area was that of the Sillahalla macro watershed in Nilgiri district, Tamil Nadu. GIS was used for the management and manipulation of spatial data. Landslide locations were identified from field survey and aerial photographic interpretation was used for location of lineaments. Nine factors in total are related to the occurrence were slope, aspect, drainage density, distance from drainage, lineament density, distance from lineament, distance from road, land cover density, geomorphology density are recommended to analyze the mechanism of landslides. Based on the same set of factors, landslide susceptibility maps were produced from frequency ratio methods were then compared and evaluated.

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I. INTRODUCTION

Landslides are amongst the most damaging natural hazards in mountainous regions. Every year, hundreds of people all over the world lose their lives in landslides; furthermore there are large impacts on the local and global economy from these events. Nilgiris mountains is one of the most popular hill stations in south India and during the past hundred years it has undergone tremendous development. Landslides are the second most common natural hazard after earthquakes. The goal of this paper is to present a simple procedure for assessing landslide hazard and consequent mapping. Landslides occur due to the combination of factors such as heavy rainfall, steep slopes, rugged topography, lack of vegetation or deforestation, incompetent geological formation, and structurally fragmented rock. Human activity also often aggravates hazards due to insufficient attention being given in the traditional methods of cultivation and during infrastructures development, or in the over-exploration of natural resources. The frequency ratio is the ratio of the area where landslides occurred to the total study area and calculated by dividing the percentage of landslide in a sub-variable by the percentage of the sub-variable in the total area. The correlation between landslide areas and associated factors that cause landslide can be allocated from the connection between areas without past landslide and landslide-related parameters. In order to prepare the landslide susceptibility map quantitatively, the frequency ratio method was implemented using GIS techniques.

II. STUDY AREA

This study was conducted in a landslide-prone area in the Sillahalla macro-watersheds in Nilgiris, using a variety of spatial datasets. The study is located a total extent of 67 km^2 is selected for study as the area is affected by landslides during the years 1969 and 1970. It lies between the latitudes 11^{o}25’0”N and 11^{o}20’0”N, and longitudes 76^{o}38’0”E and 76^{o}44’0”E, and forms parts of Survey of India Toposheet Nos 58 A/11/N (Fig.1). The minimum and maximum altitude of the area selected is 1860 m and 2640 m respectively above mean sea level.

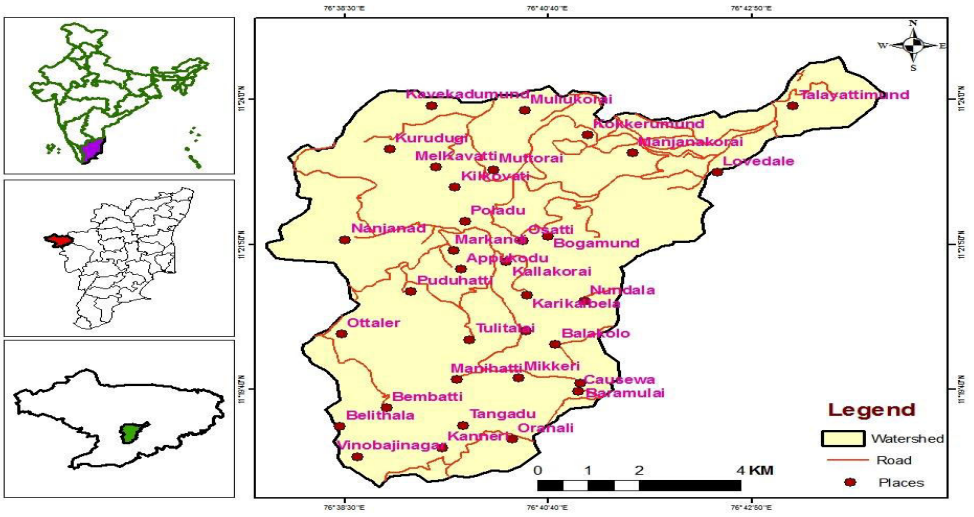

Figure 2.1: Base Map of the study area

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3. FREQUENCY RATIO METHOD

Frequency ratio model was used based on the assumption that future landslides will occur under circumstances similar to those of past landslides (Lee, *et al.*, 2004a). Frequency ratio approach is based on the observed relationships between distribution of landslides and each landslide-related factor, to reveal the correlation between landslide locations and the factors in the study area (Lee and Pradhan, 2006). This method is based on the concept of the favorability function (Chung and Fabbri, 1993; Fabbri, *et al.*, 2002). It assumes that the likelihood of landslide occurrence can be measured by statistical relationships between past landslides of a given type and specified spatial data sets. The relationship between the landslide occurrence area and the landslide related factors could be deduced from the relationship between areas where landslides had not occurred and the landslide related factors. To represent this distinction quantitatively, the probability likelihood (frequency ratio) was used. The probability likelihood (frequency ratio) is the ratio of the probability of an occurrence to the probability of a non-occurrence for given attributes (Bonham-Carter 1994). For calculating the frequency ratio the raster data set of a thematic layer of is vectorised into polygons after reclassifying using spatial analyst. The landslide inventory map is overlaid on the vector layer and by intersection method using analysis tool, the class in which each landslide falls is obtained. The attribute table of the intersect layer is opened and the class column is summarised. The summary output attribute gives the number of landslides in each sub-variable from which the percentage of landslides is calculated. If the thematic layer is in vector format as in landuse and geomorphology, the layer is directly used for intersection. The area for the subvariables was also calculated. The data from summarised output is used for the calculation of percentage of landslides in each class and the percentages of pixels in domain are also calculated to arrive at the frequency ratio.

3.1 Slope

The major parameter of slope stability analysis is the slope angle (Lee and Min, 2001). Slope angle is very regularly used in landslide susceptibility studies since landsliding is directly related to slope angle (Dai et al.,2001; Cevik and Topal, 2003;). Slope map of the study area was divided into six categories viz., 0 – 5°, 5 – 10°, 10 – 15°, 15 – 20°, 20 – 25°, >25°. It is found that majority of the area falls in the category of 10 – 15° followed by 15 – 20°, 5– 10°, 20 – 25°, 0 – 5°, >25°. From the calculation of frequency ratio, class intervals of 10-15° and 15-20° are maximum with 34 landslides each out of 55 slides which is 61.82%. The frequency ratios for the different classes of slope used in the study are given in (Table 1).

The frequency ratio was worked out for the each class of slope as shown below:

$$\text{Frequency ratio of very low slope} = \frac{\text{Landslide Occurrences\%}}{\text{Pixel domain \%}}$$

Where,

i.) Landslide occurrence = Number of Landslide occurrence present in very low slope class (0 to 5°) = 2

ii.) Total number of landslides = 55

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iii.) Landslide occurrence % = Percentage of Landslides present in Very low slope class (2/55)*100 = 3.64 %.

iv.) Pixel domain = Number of Pixel in which very low slope class is present - 9897

v.) Number of Pixels in the area = 74726

vi.) Pixel domain % = Percentage of Pixel domain very low slope class (9897/74726)*10 = 13.24

These values were substituted in the formula and the frequency ratio value was calculated i.e.,

Frequency ratio for very low slope class

= 3.64 / 13.24

= 0.27

Table 1: Frequency ratio of Landslide occurrences based on Slope

Slope Class	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain %	Ratio
0 - 5°	2	3.64	9897	13.24	0.27
5 - 10°	14	25.45	21999	29.44	0.86
10 - 15°	17	30.91	19710	27.71	1.12
15 - 20°	17	30.91	14726	17.03	1.81
20 - 25°	5	9.09	7531	11.42	0.80
>25°	0	0	863	1.15	0.00
Total	55	100.00	74726	100	4.87

3.2 Slope Aspect

Aspect is also considered an important factor in preparing landslide susceptibility maps (Cevik and Topal, 2003; Lee, 2005; Yalcin and Bulut, 2007; Ga lli et al 2008). Aspect associated parameter such as exposure to sunlight, drying winds, rainfall (degree of saturation), and discontinuities may affect the occurrence of landslides (Suzen and Doyuran, 2004; Komac, 2006). Aspect regions are classified in nine categories according to the aspect class as fat covering 7252 pixels, North covering 8136 pixels, Northeast covering 7932 pixels, East covering 8633 pixels, Southeast covering 8903 pixels, South covering 7680 pixels, Southwest covering 8112 pixels, West covering 9014 pixels and Northwest covering 9064 pixels in the study area of 74,726 pixels (i.e. total of all the nine). The East and Southeast aspect maximum with 16 landslides each out 55 landslides which is 32.00%, followed by West, Flat, Northeast, South, North, Southwest and Northwest. Aspect isoline maps can be constructed based on DEM using Spatial Analyst. Aspect change is measured relative to the change in direction (perpendicular) of contour lines. The frequency ratio for landslides calculated for aspect factor is given in (Table 2)

Table 2: Frequency ratio of landslide occurrences based on Aspect

Aspect	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain %	Ratio
Flat	6	10.91	7252	9.70	1.12
North	5	9.09	8136	10.89	0.83
Northeast	6	10.91	7932	10.61	1.03
East	8	14.55	8633	11.55	1.26

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Southeast	8	14.55	8903	11.91	1.22
South	6	10.91	7680	10.20	1.06
Southwest	4	7.27	8112	10.86	0.67
West	7	12.73	9014	12.06	1.06
Northwest	5	9.09	9064	12.13	0.75
Total	55	100.00	74726	100.00	9.00

3.3 Drainage density

The next factor considered is drainage density. The drainage density ranges from 0 to 8 km and is classified into five classes viz., 0 – 1.5 km, 1.5 – 3 km, 3 – 4.5km, 4.5 – 6 km and 6 – 8 km based on Natural Breaks (Jenk's) method. The frequency ratio shows that highest ratio is found in areas with a drainage density of 3 – 4.5 sqkm, followed by 1.5 – 3sqkm, 4.5 – 6 sqkm 0 – 1.5 and 6 – 8sqkm. The drainage density is an important factor as rain water percolates in areas with low drainage density. However, in the study area highest ratio is found in drainage density class 3 – 4.5sqkm which, suggests that the erosional action by streams also play a role in increasing the slope instability. Further, high drainage density is encountered in steeper slopes. The relationship between drainage density and landslides.

Table 3: Frequency ratio of landslide occurrences based on Drainage density

Class	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain%	Ratio
0 – 1.5sqkm	**6**	**10.91**	**9495**	**12.17**	**0.86**
1.5 – 3sqkm	**16**	**29.09**	**19354**	**25.90**	**1.12**
3 – 4.5sqkm	**22**	**40.00**	**26514**	**35.48**	**1.13**
4.5 - 6 sqkm	**9**	**16.36**	**11607**	**15.53**	**1.05**
6 – 8sqkm	**2**	**3.64**	**7756**	**10.38**	**0.35**
Total	**55**	**100.00**	**74726**	**100.00**	**4.51**

3.4 Distance to drainage

The distance to drainage layer has been categorised into 5 sub variables namely 0-100 m covering 36,217 pixels, 100-200 m covering 23,241 pixels, 200-300 m covering 6,757 pixels, 300-400 covering 7,338 pixels and 400-500 covering 173 pixels. Majority of landslides (90.91%) in the area have been occurred close to the stream with in a distance of 100m and 200m and 3 landslides (5.45%) have occurred with in 300m distance, 2 landlides (3.64%) have occurred with in 400m distance, no landslide has taken place beyond 500m. Hence, distance to drainage taken as basis for landslide hazard zonation .this is due to the fact that the land slides are due to the creation of steep slope due to erosion. From the frequency ratio (Table 4) it is evident that (90.91%) of the landslides have occurred within a distance of 100m and 200m from the drainage and hence the factor can be effectively used.

Table 4: Frequency ratio of Landslide occurrences based on Distance to drainage

Distance to Drainage Class	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain%	Ratio
100m	30	54.55	36217	49.12	1.11
200m	20	36.36	23241	31.52	1.15

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300m	3	5.45	6757	9.17	0.60
400m	2	3.64	7338	9.95	0.37
500m	0	0.00	173	0.23	0.00
Total	55	100.00	74726	100.00	3.22

3.5 Lineament density

The lineament density layer has been classified into 5 sub variables viz., very low (0-1sqkm) lineament density covering 18,596 pixels, (1-2sqkm) lineament density covering 28,323 pixels, moderate (2-3sqkm) lineament density covering 16,460 pixels, high (3-4 sqkm) lineament density covering 9,129 pixels and very high (4-5sqkm) lineament density covering 2,228 pixels. The very low lineament density sub variable covers 24.87% of the area and 25.45% of the percentage of the total landslide followed by low lineament density 37.90% of the area and 43.64% of the percentage of the landslides (Table 5).

Table 5: Frequency ratio of landslide occurrences based on Lineament Density

Lineament Density Class	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain%	Ratio
0 – 1sqkm	14	25.45	18596	24.87	1.02
1 – 2sqkm	24	43.64	28323	37.90	1.15
2 – 3sqkm	10	18.18	16460	22.03	0.83
3 – 4sqkm	6	10.91	9129	12.22	0.89
4.- 5sqkm	1	1.82	2228	2.98	0.61
Total	55	100.00	74726	100.00	4.50 `

3.6 Distance to Lineament

The distance to lineament layer has been classified into 7 sub variables viz., 0-100m distance to lineament covering 25,398 pixels, (101-200m) covering 20,710 pixels, (201-300m) covering 13,511 pixels, 301-400m covering 7,714 pixels and 401-500m covering 4,216 pixels, 501-600m covering 1,972 pixels, >601covering 1,205 pixels. Majority of landslides (78.18%) in the area have been occurred within a distance of 101to 300m, 6 landslides (10.91%) have occurred within 401m distance, 5 landslides (9.09 have occurred within 501m distance, only1 landslides (1.82) have occurred within 601m distance and no landslide has taken place From the frequency ratio (Table 6).

Table 6: Frequency ratio of landslide occurrences based on distance from Lineament

Distance to Lineament Class	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain%	Ratio
0-100m	23	41.82	25398	33.99	1.23
101-200m	10	18.18	20710	27.71	0.66
201-300m	10	18.18	13511	18.08	1.01
301-400m	6	10.91	7714	10.32	1.06
401-500m	5	9.09	4216	5.64	1.61
501-600m	1	1.82	1972	2.64	0.69
>601m	0	0	1205	1.61	0
Total	55	100.00	74726	100.00	6.25

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3.7 Geomorphology

Geomorphology is classified into five categories viz., hills covering 15,939 pixels, moderately dissected plateau covering 25,065 pixels, Pediment covering 20,883 pixels, hill topweathered covering 12,932 pixels, plateau covering 108 pixels. The Pediment is maximum with 16 landslides each out of 55 slides which is 29.09%. Moderately dissected plateau is 15 landslides each out of 55 landslides which is 27.27%. The Hills is 14 landslides each out of 55 landslides which is 25.45%. the Hill topweathered is 10 landslides each out of 55 landslides which is 18.18%., no landslide has taken place beyond Plateau. The frequency ratios for the different classes of geomorphology used in the study are given in (Table 7).

Table 7: Frequency ratio of landslide occurrences based on geomorphology

Geomorphology Class	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain %	Ratio
Hills	14	25.45	15939	21.06	1.21
Moderately dissected plateau	15	27.27	25065	33.54	0.81
Pediment	16	29.09	20883	27.95	1.04
Hill topweathered	10	18.18	12932	17.31	1.05
Plateau	0	0.00	108	0.14	0.00
Total	55	100.00	74726	100	4.11

3.8 Landuse and Land cover

The landuse/ land cover exerts a control over landslides and is considered next to slope in importance, as human activities and consequent deforestation has altered the stability of slopes. The urban activities result in the modification of slope due to widening of road and leveling of the terrain forming steep cut. As a result high frequency was arrived for the Vegetation where most of the road network occurs. The vegetation is maximum with 23 landslides each out of 55 slides which is 41.82%. mixed cultivation, forest plantation, tea estate, reserve land and settlement rank next in the susceptibility. The frequency ratio for landslides calculated for landuse factor is given in (Table 8)

Table 8: Frequency ratio of landslide occurrences based on Landuse and land cover

Landuse & Landcover	Landslide Occurrence	Landslide Occurrence %	Pixels Domain	Pixels Domain %	Ratio
Dense Forest	0	0.00	2857	3.82	0.00
Forest Plantation	7	12.73	10211	13.66	0.93
Mixed Cultivation	15	27.27	12977	17.37	1.57
Out crop	0	0.00	240	0.32	0.00
Reserved land	2	3.64	6261	8.38	0.43
Settlement	2	3.64	3262	4.37	0.83
Tea estate	6	10.91	8728	11.68	0.93
Vegetation	23	41.82	30190	40.40	1.04
Total	55	100.00	74726	100.00	5.74

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3.9 Distance to Road

The Distance to Road layer has been classified into 6 sub variables viz., 0– 100 m covering 17,761 pixels, 100 – 200 m covering 13,674 pixels, 200 – 300 m covering 10,575 pixels, 300 – 400 m covering 8,489 pixels, 400 – 500 m covering 6,573 pixels and 500-600 m covering 17,654 pixels (Table 6.9). Majority of landslides (54.55%) in the area have been occurred within a distance of 100m, 13 landslides (23.64%) have occurred within >600m distance, 9 landslides (16.66%) have occurred within 300m distance, 6 landslides (10.91%) have occurred within 200m distance, 6 landslides (10.91%) have occurred within 500m distance. Hence, distance to road taken as basis for landslide hazard Zonation. From the frequency ratio (Table 9) it is evident that 25.45% of the landslides have occurred within a distance of 100m and hence the factor can be effectively used.

Table: 9 Frequency ratio of landslide occurrences based on distance to Road

Distance to Road Class	Landslide occurrence	Landslide occurrence %	Pixels domain	Pixels domain%	Ratio
100m	14	25.45	17761	23.77	1.07
200m	6	10.91	13674	18.30	0.60
300m	9	16.36	10575	14.15	1.16
400m	7	12.73	8489	11.36	1.12
500m	6	10.91	6573	8.80	1.24
> 600m	13	23.64	17654	23.62	1.00
Total	55	100.00	76726	100.00	5.11

3.10 Landslide Susceptibility Map

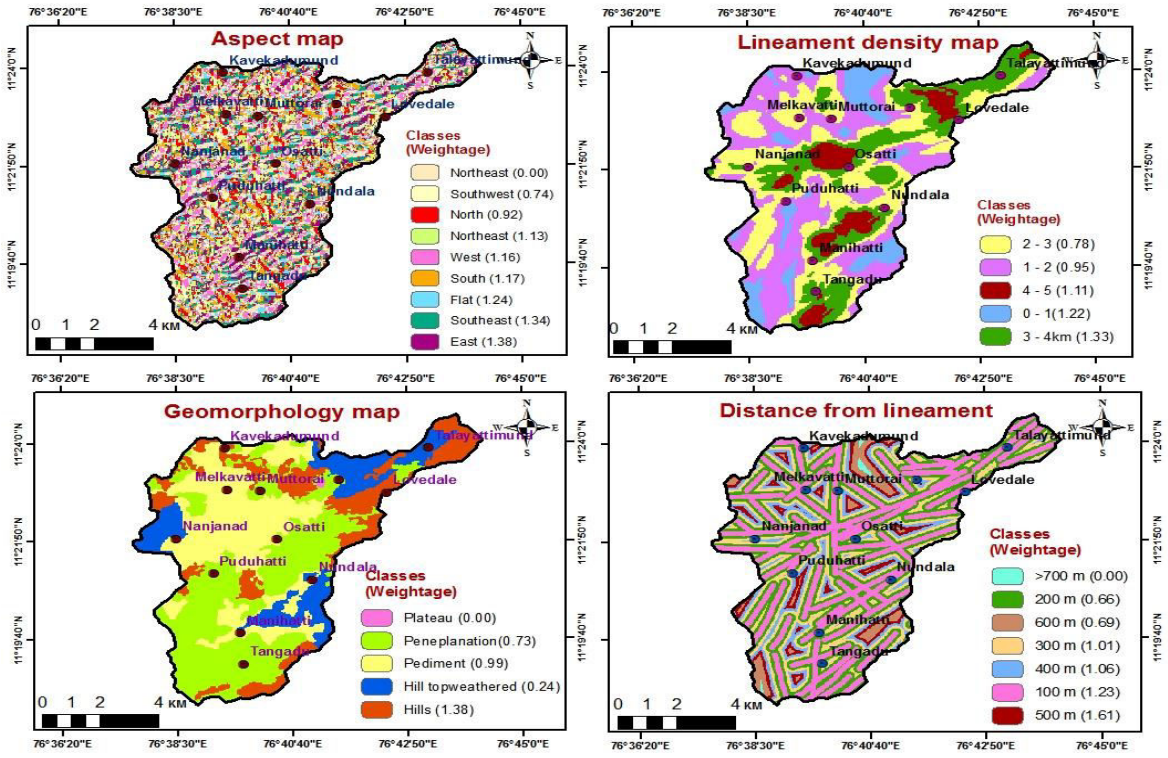

Figure.3.1 Map showing the reclassified layers using Frequency Ratio method

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The frequency ratios calculated display the relationship between a landslide location and each landslide causative factor (Lee and Pradhan, 2006). Using the frequency ratios, the Landslide Susceptibility Index (LSI) is calculated by adding the frequency ratio for each pixel by weighted sum overlay analysis in ArcGIS.

$$LSI = \Sigma Fr$$

To calculate the LSI for each pixel, the thematic layers are reclassified with the frequency ratio which is multiplied by 1000 to make it an integer. The pixel size of all the reclassified layers is maintained as 30 x 30m and is presented analysis was carried out using all the 9 parameters selected for the landslide susceptibility analysis in Spatial Analyst extension of ArcGIS. . The LSM generated is reclassified based on Natural Breaks (Jenks) method into five classes viz., Very Low, Low, Moderate, High and Very High. In summary >90% of the slides fall in the field of very high and high landslide hazard zoned validating the model and methodology adopted.

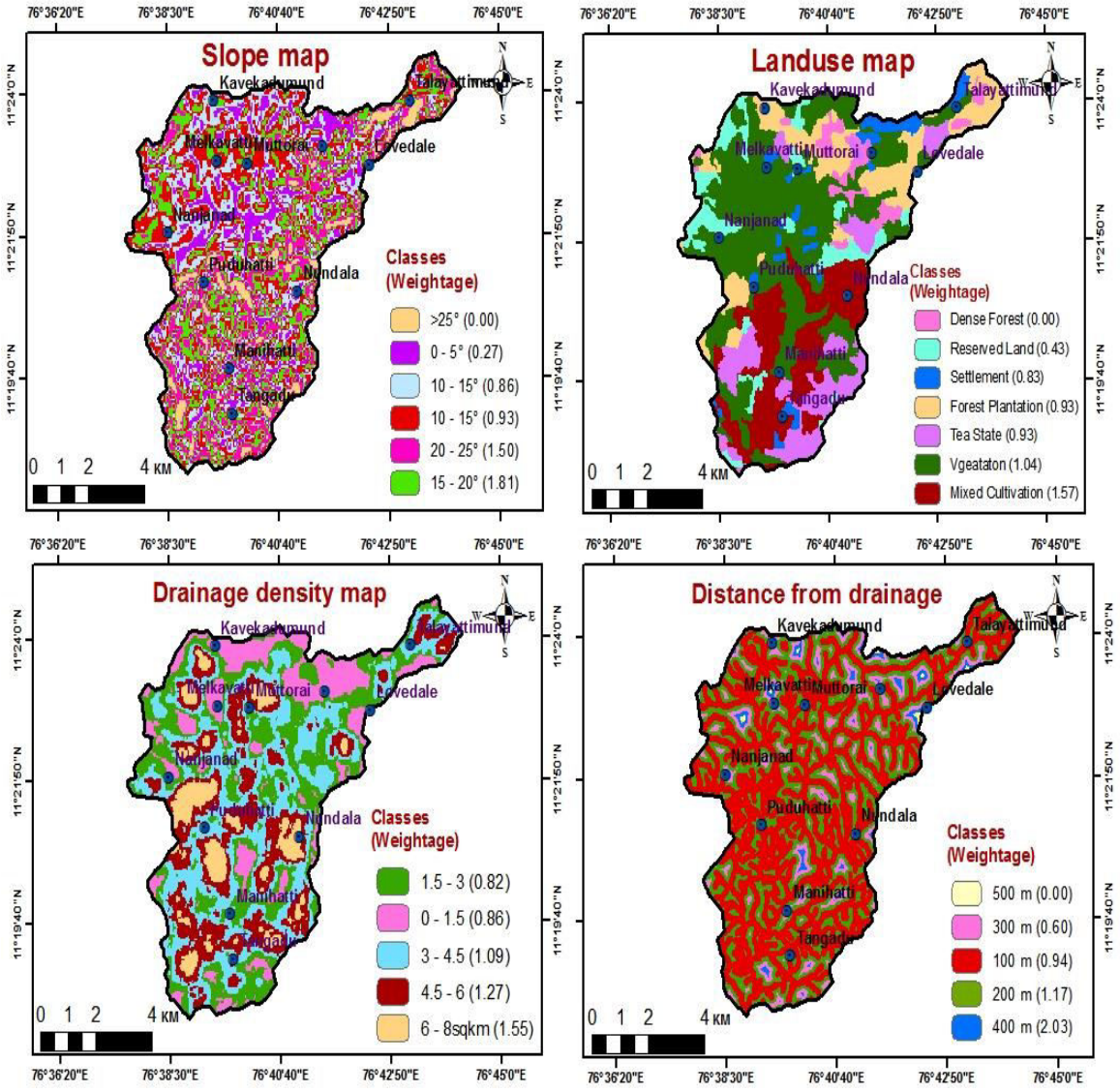

Figure.3.2 Map showing the reclassified layers using Frequency Ratio method

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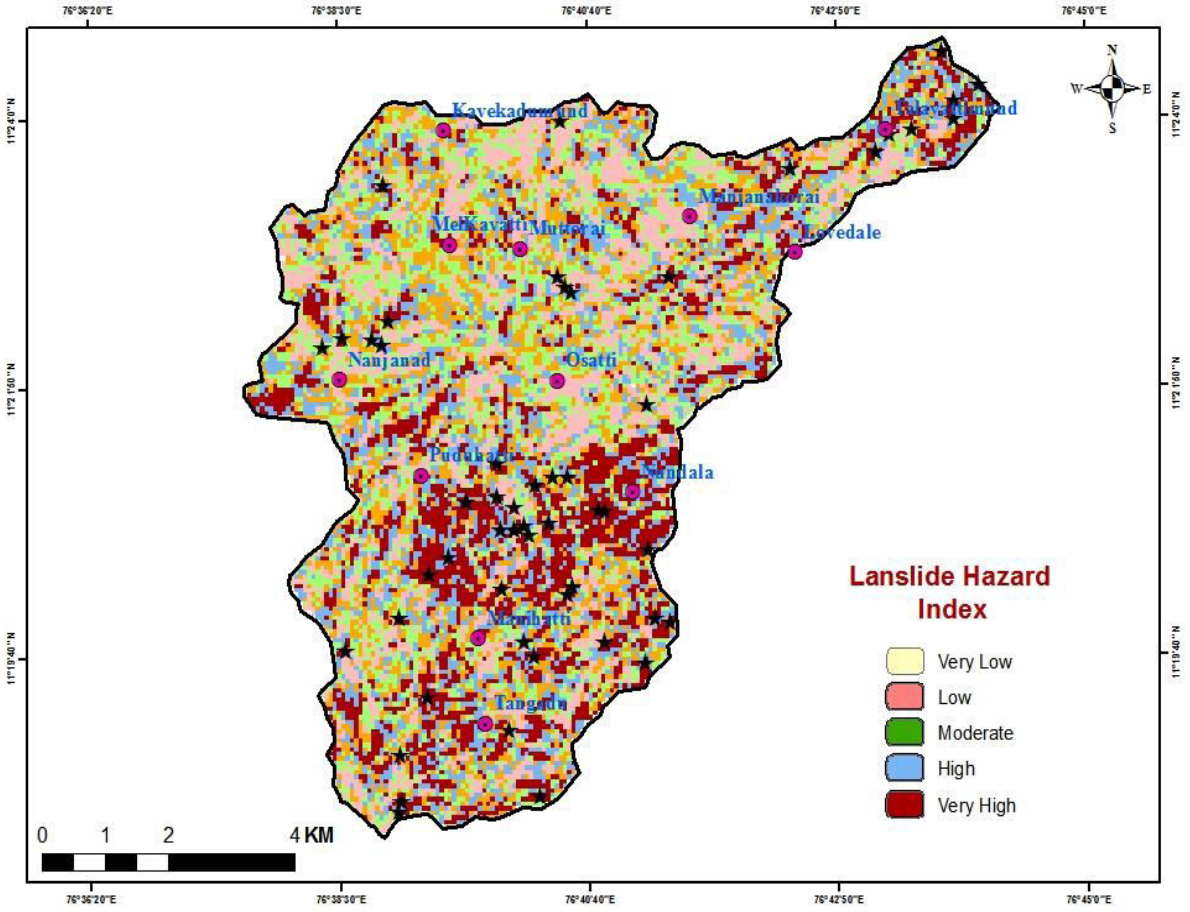

Figure.3.3 Landslide Susceptibility Map

4. CONCLUSION

In the study, a neural network approach for assessing landslide susceptibility process in Nilgiris was applied different ways compared with previous analyses based on frequency ratio models using GIS and remote sensing data. To determine the level of correlation between the location of landslides with the factors, such as the slope angle, aspect, drainage density, distance to drainage, lineament density, distance to lineament, geomorphology, land cover, distance to road frequency ratio was used. The landslides on regional extent were first experienced in 1978 and 1979. Since then the frequency of landslides are increasing, due to increased instability caused by human activities killing people, destroying houses and disrupting communication whenever heavy rains devastate the mountains. While the landslides of the past were isolated taking place in uninhabited areas, landslides are now taking place in areas where settlements have been established. The reason is housing sites were developed in unstable slopes and people are buying those areas without realising that the landslide proneness. As a result, the death toll and damage to houses are increasing. The study has demonstrated the usefulness of GIS in the preparation of landslide susceptibility maps. The probabilistic analysis has provided good results and hence studies should be extended to other macro-watersheds in the district.

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DESIGN AND ESTIMATE OF MODIFIED (WITH PLASTIC WASTE) BITUMINOUS PAVEMENT FOR A GIVEN STRETCH OF ROAD

Paper ID	IJIFR/V4/ E2/ 051	Page No.	5309-5321	Subject Area	Civil Engineering
Keywords	Plastic Waste, Bitumen, Aggregates, Plastic Roads, Flow Value				

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Abstract

Plastic waste is an emerging issue posing serious pollution problems to the human and the environment. New effective waste management options need to be considered especially on recycling concepts. This project presents the results of an investigation to study the performance of bituminous pavement with plastic waste mixed with bitumen. An effort has been made for detail a systematic study of Marshall Stability specimens with various proportions of coarse aggregates, fine aggregates, fillers, bitumen along with plastics waste. Efforts have been made to use plastic waste as a partial replacement of the bitumen. An experimental study is made on the utilization of waste particles as binder in bituminous pavement with a percentage replacement ranging from 3 % to 6% on the strength criteria of VG 30 grade of bitumen. The test results shows that no significant loss in strength was found in the plastic modified bituminous pavement compared to conventional bituminous pavement.

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I. INTRODUCTION

Bitumen is a useful binder for road construction. Different grades of bitumen like30/40, 60/70, and 80/100 are available on the basis of their penetration values. Nowadays more rational type of paving bitumen, known as 'Viscosity Grade (VG) has been adopted by Bureau of Indian Standards (BIS) which is based on the viscosity test values. Different viscosity grade of bitumen with respect to penetration values are VG40 (30/40), VG30 (60/70), VG20 (70/80), VG10 (80/100). The steady increase in high traffic intensity in terms of commercial vehicles, the increase in overloading of trucks and the significant variation in daily and seasonal temperature demands improved road characteristics. Any improvement in the property of the binder is the need of the hour.

Elastomers like natural rubber, crumb rubber, SBR, etc. as well as plastomeric substances like Polyethylene, Ethylene Vinyl Acetate and Ethylene Butyl Acrylates are mixed with Bitumen to modify the properties. Modified Bitumen possesses better quality. Today the availability of the waste plastics is enormous, as the plastic material shave become part and parcel of daily life. They either get mixed with Municipal Solid Waste and or thrown over land area. Their present disposal is either by land filling or by incineration. Both the processes are not eco-friendly. Under these circumstances, an alternate use for the waste plastics is also the need of the hour. Plastics are organic in nature and Bitumen is also a mixture of organic compounds. Hence the mixture of the two is possible.

II. OBJECTIVES

The objectives derived for the study are :

- To find out the properties of modified bitumen (with Non-Biodegradable Plastic waste)
- To Design a bituminous mix with modified bitumen
- To use the designed mix in wearing course of flexible pavement for a selected stretch with present traffic load.
- Find out the cost benefit analysis with modified bitumen for wearing coarse for 1 km stretch of road in Port Blair conditions

III. MATERIAL INVESTIGATION

The physical properties of the materials used for construction of road pavement were investigated and the materials required for pavement construction including their specification were verified.

3.1 Aggregates

The tests carried out to assure the quality of aggregates includes Aggregate Impact test , Crushing Test, Los Angeles Abrasion Test and Shape test for Flakiness Index and Elongation Index. In addition to the above specific gravity and water absorption tests were also carried out for the aggregate to ensure its suitability for the proposed pavement with modified bitumen. The tests results obtained from the investigation is as shown in Table 3.1

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Table 3.1: Test Results of Aggregate

SN	Property	Test Result	Remark	IRC
1.	Aggregate crushing value	18.22%	Satisfactory	< 30%
2.	Impact value	20.825	Satisfactory	< 30%
3.	Specific gravity of course aggregate	2.66	Satisfactory	2-2.85
4.	Specific gravity of fine aggregate	2.03	Satisfactory	2-2.9
5.	Specific gravity of filler material	1.72	Satisfactory	-
6.	Flakiness index	58.66%	Satisfactory	< 15%
7.	Elongation index	86.06%	Satisfactory	-
8.	Abrasion value	22.05	Satisfactory	35-40
9.	Water absorption for course aggregate	2.03	Satisfactory	2-2.65
10.	Water absorption for fine aggregate	2.615	Satisfactory	2-2.65

3.2 Bitumen

The various tests carried out on Bitumen samples includes Penetration Tests, Softening point, Ductility tests and Viscosity tests to assure its suitability according to its grade for being used for wearing course . The tests results obtained for Bitumen is shown in Table 3.2.

Table 3.2: Test Result of Bitumen

S. No.	Property	Test Result	Specified Value	Remark
1.	Softening Point	50°C	More Than 30	Satisfactory
2.	Ductility Value	100 cm	>100	Satisfactory
3.	Penetration Value	62	50-70	Satisfactory
4.	Viscosity of Bitumen	75seconds	Min. 45-50	Satisfactory

These results were compared with IRC (Indian Road Congress) specified values and the same is shown in graph in Figure 3.1.

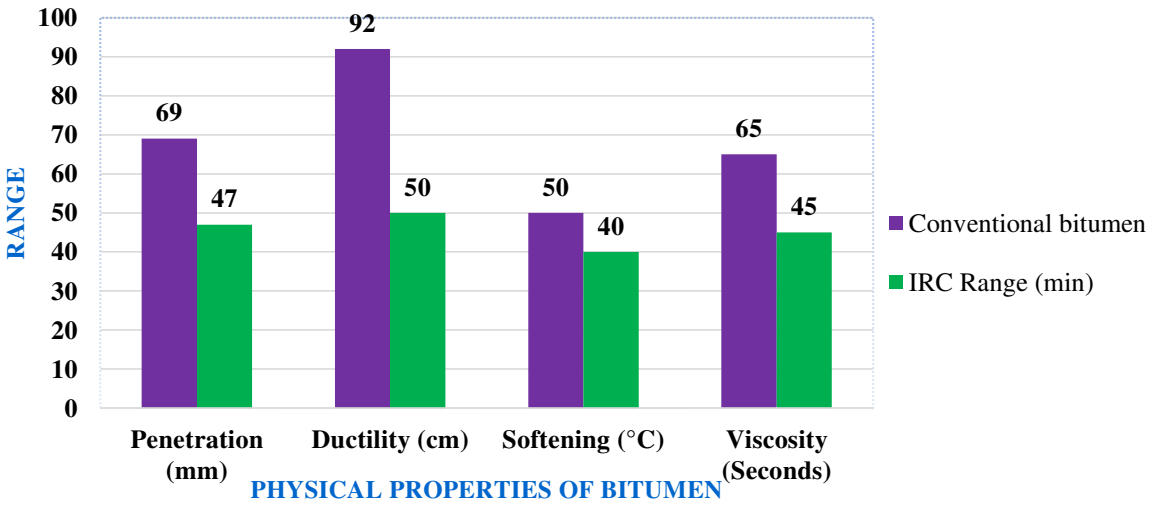

Figure 3.1: Graph Showing Test Result of Conventional Bitumen and IRC Range of Bitumen

In addition to the conventional Bitumen, Modified Bitumen (with Plastic waste) was also tested for the all the above stated properties. The content of Bitumen was kept same varying the quantity of modified bitumen (starting from 3 % to 7%). The results obtained during the

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specified tests with Bitumen and modified bitumen was compared with IRC specified values as shown in Figure 3.2

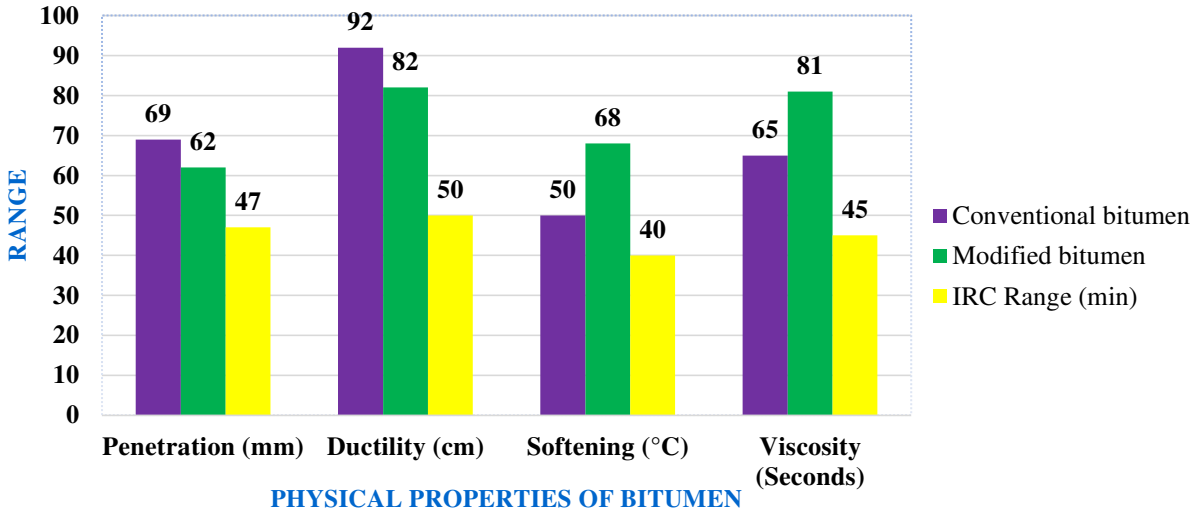

Figure 3.2: Graph Showing Difference with Conventional Bitumen and Modified Bitumen

3.3 Gradation of Aggregates

Gradation of an aggregate is one of the most influential aggregate characteristics in determining its performance as a pavement material. In HMA (Hot Mix Asphalt), the gradation helps to determine important properties such as stability, durability, permeability, workability, fatigue resistance or frictional resistance and moisture susceptibility. Best gradation is the one which produce the maximum density. The gradation of final mix after blending of the aggregates and filler should be within the specified range as per the specifications of both IRC and MoRTH, Government of India (shown in Table 3.3). In this project we are using gradation specification of MoRTH.

. **Table 3.3: Grading of Aggregate**

Grading	Desired Gradation for BC I as per MoRTH	BC I as per MoRTH Gradation	% Cumulative Retained	% Retained	Wt. % Retained for one sample	Total for 24 Samples
25	100	100	0	0	0	0
20	79-100	89.5	10.5	10.5	0.126	3.024
12.5	59-79	69	31	20.5	0.246	5.904
10	52-72	62	38	7	0.084	2.016
4.75mm	35-55	45	55	17	0.204	4.896
2.36mm	28-44	36	64	9	0.108	2.592
1.18mm	20-34	27	73	9	0.108	2.592
600mic.	15-27	21	79	13	0.156	3.744
300mic.	10	10	90	5	0.060	1.44
150mic.	5	5	95	3	0.036	0.864
75 mic.	2	2	98	2	0.024	0.576
< 75 (filler)				4	0.048	1.152
				TOTAL = 1200gms		

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IV. PREPERATION FOR MARSHAL STABILITY TEST

4 .1 Marshal Method of Mix Design for the Determination of Optimum Binder Content (OBC)

Indian specifications recommend the use of Marshall Method for mix design of bituminous mixtures by using standard cylindrical test specimens of 63.5mm height and 101.6mm diameter. The procedure for Marshall Test has been standardized by American Society for Testing and Materials, ASTM D-1559 to determine the OBC of different mixes. The vital aim of Marshall Mix design is to determine the design bitumen content and this process starts with preparing at least three samples for each binder content in the sequence of 4.5%, 5%, 5.5% and 6.0%. The range of binder contents taken varies by 0.5% to ensure that the design bitumen content is lying within the range and in this present study the selected mixing and compaction temperatures of bituminous mixes using VG 30 were 160°C and 140°C respectively which is in the considerable range (mixing temperature: 150-165°C and compaction temperature: 140°C) of bituminous mixes as per the IRC 111:2009 guidelines.
During the mix design process, after the batching of aggregate as per their respective binder content, aggregates are then placed in oven to attain the temperature of +10°C above the mixing temperature. Then mixing is done and the loose bituminous mix is placed in temperature controlled oven at the compaction temperature for 2 hours as conditioning time. After conditioning, the loose mix is compacted in manual Marshall Compactor by applying 75 blows on either side of the specimen and then, after 24 hours of curing, the samples are extracted from the mould and are tested for Bulk Density (G_{mb}) and Air Void (V_a) analysis. After Bulk Density and Air Void analysis the samples were tested for stability and flow.

4.2 Mixing and Casting

The mixing of ingredients was done as per the following procedure (ASTM - 1559).

- Required quantities of coarse aggregate, fine aggregate & mineral fillers were taken in an iron pan.
- This was kept in an oven at temperature 1600°C for 2 hours. This is because the aggregate and bitumen are to be mixed in heated state so preheating is required.
- The bitumen was also heated up to its melting point prior to the mixing.
- The required amount of shredded polythene was weighed and kept in a separate container.
- The aggregates in the pan were heated on a controlled gas stove for a few minutes maintaining the above temperature.
- The polythene was added to the aggregate and was mixed for 2 minutes.
- Now bitumen (60 gm.), i.e. 5% was added to this mix and the whole mix was stirred uniformly and homogenously. This was continued for 15-20 minutes till they were properly mixed which was evident from the uniform colour throughout the mix.
- Then the mix was transferred to a casting mould.
- This mix was then compacted by the Marshall Hammer.

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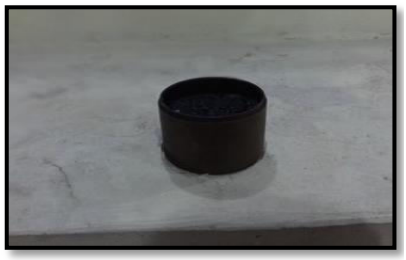
- 75 no. Of blows were given per each side of the sample so subtotal of 150 no. of blows was given per sample. The Figure 4.1 shows the pictures of specimen preparation
- Then these samples with moulds were kept separately and marked.

Mixing of mixture

Pouring of mixture

Tamping

Prepared specimen



24 hours cooling

Weighing in water

Weighing balance

Prepared Specimen

Figure 4.1: Preparation of Marshall Specimen

V. MARSHAL STABILITY TEST

In Marshall Test, mix design for three samples was prepared after compaction with separate binder content. All compacted specimen were tested (as shown in Figure 5.1) to find out the maximum Marshall Value and Flow value. After that calculation of bulk density, percentage of air voids (V_v), percentage volume of bitumen (V_b), voids in mineral aggregate (VMA), void filled with bitumen (VFB) were calculated as given in Table 5.1 and Table 5.2

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Figure 5.1(a): Marshall Specimen with Modified Bitumen

Figure 5.2(b): Testing of Modified Bitumen Sample

Table 5.1: Recommendation of marshal value and flow value as per IRC

S. No.	Description	Requirement
1.	Marshall stability (ASTM Designation: D-1559) determined on Marshall specimens compacted by 75 compaction blows on each end	820 kg (1800 lb.) Minimum
2.	Marshall flow (mm)	2-4
3.	Per cent voids in mix	3-5
4.	Per cent voids in mineral aggregates (VMA)	Minimum 11-13 per cent
5.	Per cent voids in mineral aggregates filled by bitumen(VFB)	65-75
6.	Binder content, per cent by weight of total mix	Minimum 4.5

Table 5.2: Results of BC Mix Design Using VG-30 Grade Bitumen

S.No.	% Bitumen	Marshall Stability Value	Flow Value	Bulk Density (G_m)	Air Void % (V_v)	% of Bitumen (V_b)	VMA	VFB
1	4	686	3.26	2.006	3.9	7.622	11.522	65.96
2	4.5	765	3.36	2.010	3.26	8.560	11.82	67.68
3	5	820	3.8	2.012	2.6	9.46	12.06	78.44
4	5.5	672	4.2	2.020	1.46	10.340	11.80	85.6
5	6	518	4.3	2.004	1.43	10.540	11.97	87.0

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The tests results were plotted to obtain Marshal Stability value and Flow value as shown in Figure 5.3

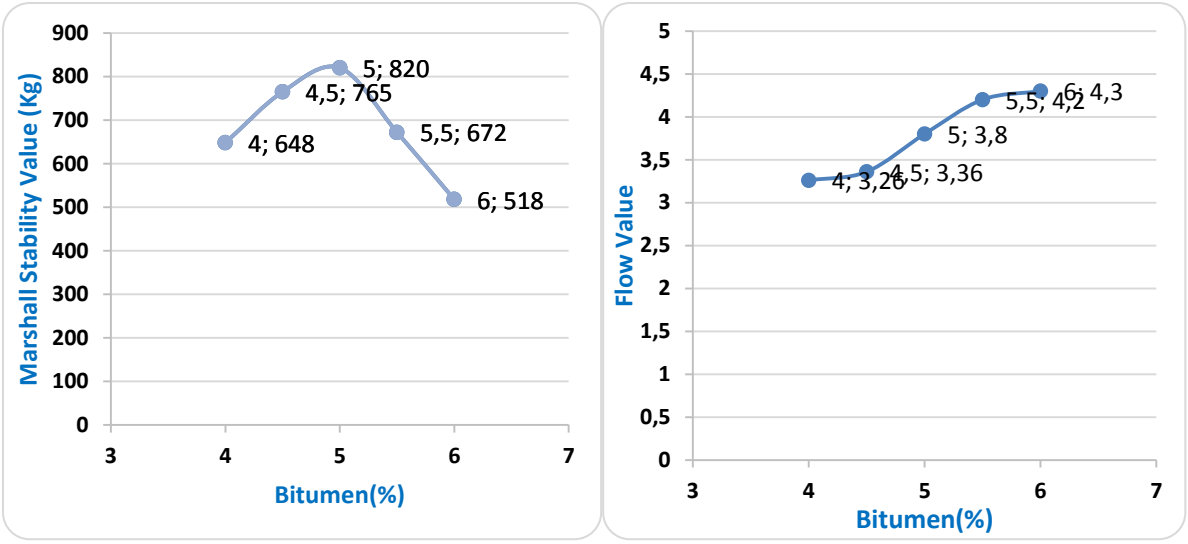

Figure5.3: Marshal Stability Curve for optimized sample

5.1 Marshal Stability Test with Modified Bitumen

Plastic Shredding is an integral part of the modified bitumen preparation with plastic waste. Firstly first sorting of LDPE (as shown in Figure 5.4) was done from vast amount of different plastics. The plastic was shredded in a size of about 2mm or less for better melting and binding properties. Table 5.3 shows the result of Bituminous Concrete Mix Design using VG 30 grade with varying percentage of LPDE. And the related values of Marshal Stability Value and Flow value is shown in Figure 5.5 to 5.7

Figure 5.4: Shredded Plastic

The Bituminous concrete was made with Modified Bitumen for varying mixes to analyse the optimum content of modified Bitumen for economising the construction

Table 5.3: Results of BC Mix Design Using VG-30 Grade Bitumen Along With Varying % of LDPE

S.N	Bitumen	LDPE %	Marshal Stability	Flow Value	Bulk Density (G)	Air Voids V_v	V_b	VMA	VFB
1	3.50%	3	650	2.5	1.970	4.36	9.259	13.619	67.980
		3.5	665	2.8	1.968	4.99	9.250	14.250	64.910
		4	680	3.1	1.973	4.77	9.273	14.040	66.047

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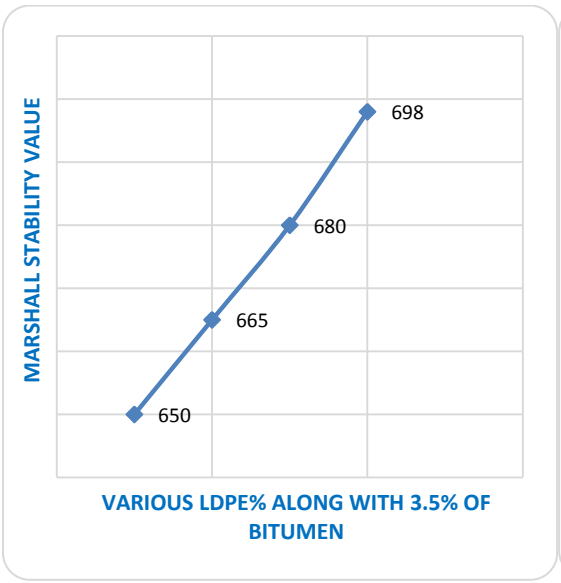
		4.5	698	3.3	1.979	4.48	9.300	13.780	67.480
2	4	3	720	2.7	2.006	2.6	9.420	12.02	78.315
		3.5	790	3.1	2.011	2.36	9.450	11.81	80.000
		4	860	3.4	2.010	2.43	9.440	11.877	79.480
		4.5	910	3.6	2.020	1.94	9.49	11.434	82.99
		5	840	3.7	2.0190	1.97	9.489	11.459	82.800
3	4.5	3	950	3.4	2.0120	2.28	9.456	11.744	80.510
		3.5	1040	3.6	2.060	2.13	9.548	11.6	81.650
		4	1120	3.8	2.020	1.94	9.494	11.434	83.030
		4.5	1200	4.2	2.032	1.35	9.550	10.9	87.610
		5	1150	4.4	2.028	1.54	9.660	11.2	86.250
		5.5	1110	4.6	2.020	1.80	9.750	11.45	84.820
		6	1080	4.7	2.010	2.16	9.860	12.02	82.110
4	5	3	940	3.8	1.997	3.05	9.385	12.435	75.467
		3.5	1050	4.2	2.002	2.80	9.410	12.200	77.070
		4	1095	4.4	2.010	2.40	9.447	11.850	79.740
		4.5	1180	4.6	2.020	1.94	9.494	11.430	83.033
		5	1150	4.7	2.018	1.99	9.484	11.482	82.950
		5.5	1145	4.9	2.014	2.23	9.465	11.690	80.926
		6	1115	5	2.000	2.90	9.400	12.300	76.423
5	5.5	3	740	4.4	2.000	1.94	9.400	11.340	82.900
		3.5	810	4.6	2.010	2.42	9.440	11.867	79.540
		4	890	4.9	2.020	1.94	9.494	11.434	83.030
		4.5	950	5.2	2.022	1.84	9.500	11.340	83.770
		5	910	5.3	2.030	1.46	9.540	11.000	86.720
		5.5	870	5.5	2.029	1.50	9.530	11.030	86.400
		6	830	5.7	2.040	0.97	9.580	10.550	90.730



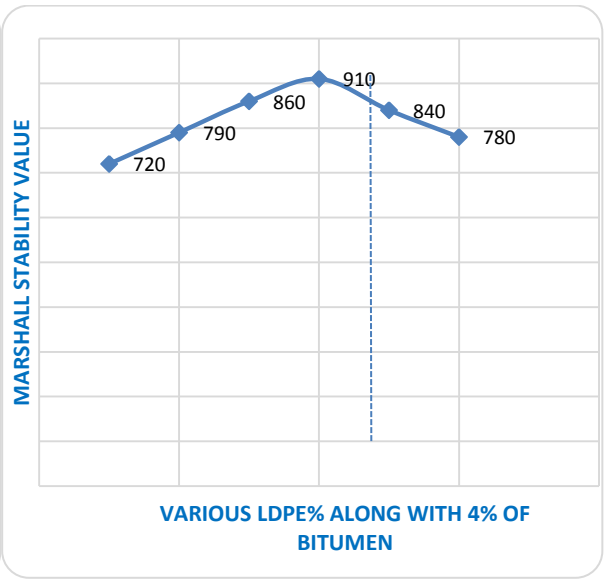


Figure 5.5: Marshal Stability Curve for LDPE% along with 3.5 % and 4% Bitumen

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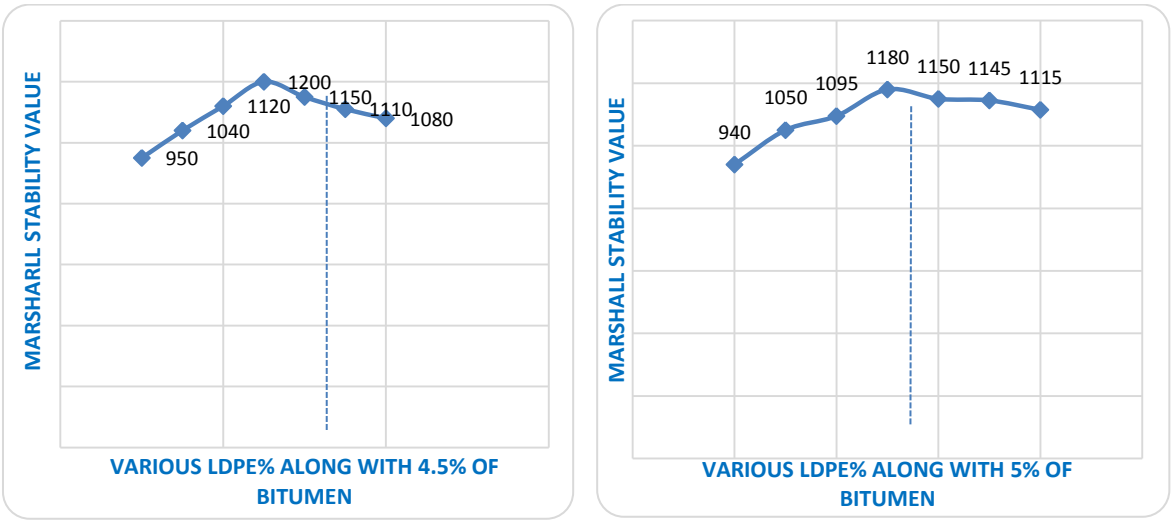

Figure 5.6: Marshal Stability Curve for LDPE% along with 4.5% and 5 % Bitumen

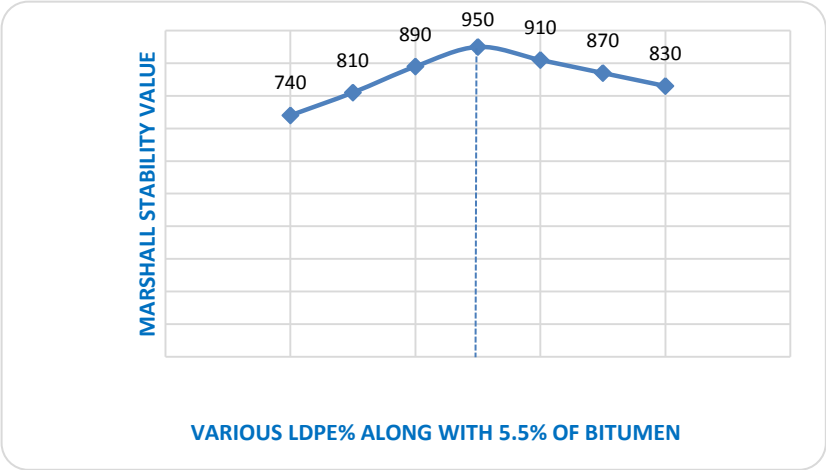

Figure 5.7: Marshal Stability Curve for LDPE% along with 5.5% Bitumen

The Flow value for the varying percentage of Modified Bitumen obtained for the attempted Mixes of sample is shown in Figure 5.8 to Figure 5.10

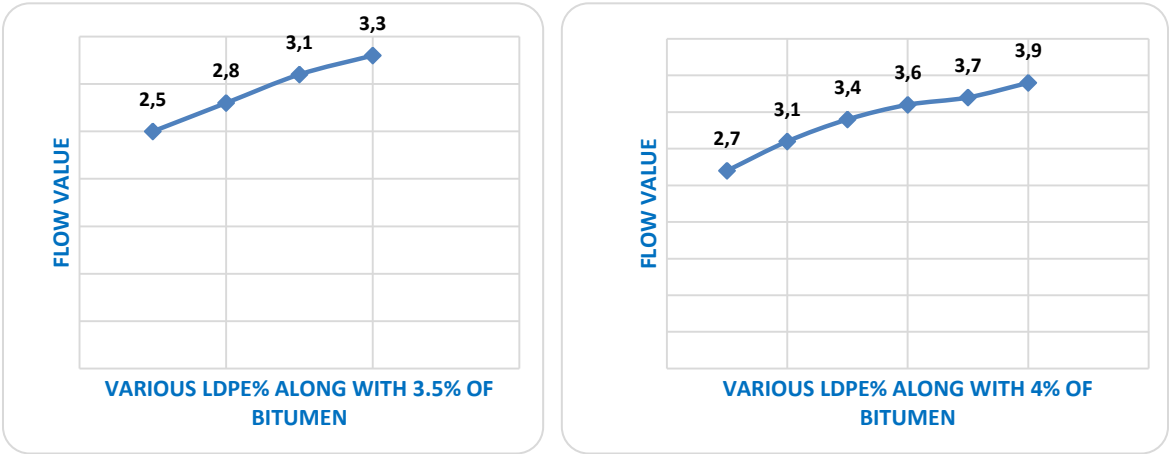

Figure 5.8: Flow Curve for LDPE% along with 3.5% and 4 % of Bitumen

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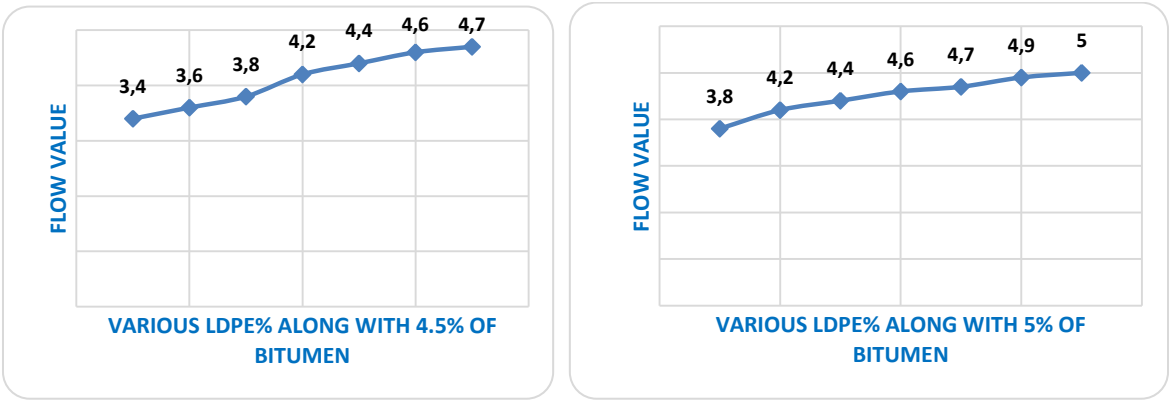

Figure 5.9: Flow Curve for LDPE% along with 4.5% and 5 % of Bitumen

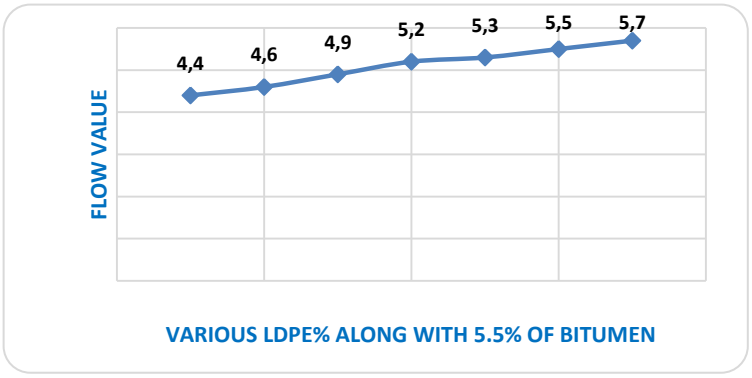

Figure 5.10: Flow Curve for LDPE% along with 5.5% of Bitumen

If you draw 0the figure directly in Word, make sure the various parts are grouped together. Right-click on the (grouped) figure and under Format Object go to Layout and Advanced. On the text wrapping tab select top and bottom, and on the picture position tab select centred relative to column and absolute position 0.5cm below paragraph. Under Options select move with text, lock anchor, but not allow overlap. This combination generally keeps the figure in place.

VI. COST ANALYSIS FOR RE-SURFACING FOR 1 KM STRETCH ROAD USING MODIEFIED BITUMEN

The road stretch of 1 km was evaluated for Port Blair condition, with Bitumen replacing with modified bitumen. The modified Bitumen chosen for the analysis was the one which gave the optimum Marshall Stability Value. The analysis is shown in Table 6.1

Table 6.1: Calculation for Optimization of Bitumen Content

SNo.	Description	Quantity
1.	Bitumen required for tack coat	1819.0Kg
2.	Bitumen required for BPM OF 50 mm thick	1825.0Kg
3.	Bitumen required for premix concrete	5256.0Kg
4.	Bitumen required for seal coat (VG-10, 80/100 Grade)	2803.20 Kg
5.	Total bitumen quantity	11703.2 Kg
6.	Total bitumen required in BPM and PC	7081.0 Kg or 7.081 ton
7.	Total LDPE % (i.e. 4.5% of total bitumen required in BPM & PC)	4.5% of 7081.0 = 318.645Kg = 0.318645 ton

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8.	Quantity of Bitumen required in BPM & PC after the addition of LDPE	7081.0 – 318.645 = 6762.355 Kg =6.762355ton
9.	Total quantity of bitumen saved	318.645 Kg = 0.318645 ton
10.	Total cost of the project	Rs.25,92,047.50
11.	Final cost of project	Rs **25,78,106.782**

VII. CONCLUSION

This project work included preparation and testing of various Marshall specimen with 60/70 grade (VG30) of varying percentage of conventional bitumen as well as varying percentage of modified bitumen (using waste plastic), to know the optimum content of bitumen required for getting the maximum Marshall value, flow value. And it has been observed that the values of other parameters i.e. V_v, V_b VMA and VFB in the cases conventional and LDPE modified bitumen have found out to be within required specifications. The study also found that at 4% of bitumen along with 4.5% of plastic modified bitumen shows higher value of Marshall Stability value and suitable flow value which achieves greater density. The study revealed that utilization of waste plastic in road construction can be considered for waste management as well as to improve longevity of road performance. Though the cost analysis was carried out only for the Bitumen requirement for re-surfacing purpose which showed the reduction by around 4.5% i.e318.645Kg (0.318645 ton) for 1km stretch of road. This will provide more stable and durable mix for the flexible pavements. The serviceability and resistance to moisture will also be better when compared to the conventional method of construction.

However this modified bitumen used in designed mix for pavement construction will have strong, durable and eco-friendly roads which will relieve the earth from all type of plastic-waste. This will help in increase in the life span as well as maintenance period of roads.

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Corresponding author is a Civil Engineer and has done her Post graduation (M.E.) in construction Management & Technology. She is born and brought up in Andaman Islands and did her graduation from Gujarat University in the year 1993 and her Post graduation from NITTTR, Chandigarh with Punjab University. She is been in teaching profession for last 22 years and has been actively guiding both Diploma & Degree (B.Tech) students of Civil Engineering Department of BRAIT, in their Major Projects Her field of interest is Traffic Engineering. The other four authors are her students.

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CYTOLOGICAL ANALYSIS OF CALLUS CULTURES OF DIPLOID MUSA ACUMINATA CV.NJALIPOOVAN

Paper ID	IJIFR/V4/ E2/ 054	Page No.	5322-5326	Subject Area	Botany
Keywords	Musa Acuminata cv. Njalipoovan, Polyploid , Diploid				

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2nd	K. R. Binoy	Assistant Professor Department of Botany, Govt. Victoria College, Palakkad, Kerala, India
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Abstract

Musa acuminata cv. Njalipoovan (AB) is a popular shade loving tolerant variety, cultivated mainly in South Indian states, have great demand among the consumers due to its fruit quality. Embryogenic callus was obtained from leaf sheath explants inoculated on Murashige and Skoog medium supplemented with 0.414 µM -16.56µM picloram and 2,4-D (2.25 µM – 9.00 µM). Cytological analysis of non- embryogenic calli derived on 2, 4-D containing medium showed high frequency of polyploid cells. While embryogenic calli induced from picloram containing medium showed high frequency of diploid cells, cells with interphase stage and chromocentres.

I. INTRODUCTION

India has a rich genetic diversity of banana with more than 90 distinct clones. South India is well known for the presence of numerous diploid as well as triploid edible banana cultivars (Heslop Harrison and Schwarzacher, 2007). With the development and refinement of plant

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tissue culture technique the prospect of chromosome manipulation at the cellular level is quite promising. The extent of change in the chromosomal status of the cell population may be the response of physical and chemical composition of the medium. Njalipoovan is a popular shade loving tolerant variety, having great demand among consumers due to its fruit quality. It is a tall growing cultivar with relatively small bunches and fingers. The fruits are very sweet and soft with thin peel. This variety is less susceptible to most of the pests and diseases and adapted to rainfed cultivation with ratooning. It is also known as Safed Velchi, Ney Poovan, Ney Kadali, Vadakan Kadali Deva bale or Elakki bale (Narayana et al., 2006). Banana cultivars of AB are recognized as the gene pool for imparting resistance to leaf spot and wilt (INIBAP, 2001). Present study is aimed to examine the extent of chromosomal variation during callus culture in the presence of different plant growth regulators and to clarify the change in chromosome number. Such an attempt will be useful for the production of plantlets with novel genotypes for exploitation in crop improvement programme.

II. MATERIALS AND METHODS

The rhizome of sword suckers were collected and sterilized as per the methods developed by Vidhya and Nair (2002) for callus induction. Three or four leaf sheaths surrounding the shoot meristem were collected from sterilized rhizome. The leaf sheath explants with basal meristem of ~ 1 sq cm were isolated and inoculated on MS medium supplemented with 2,4-D (2.25 µM – 9.00µM), and Picloram (0.414 µM - 16.56 µM) alone. The cultures were incubated at 25ºC, 50-70% relative humidity and 16h photoperiod with light intensity of 3000 lux. The cultures were maintained through subculturing on same medium in one-month interval for a period of three months. For mitosis preparation, the procedure described by Fluminhan (1990) was employed. Samples of globular stage proembryoids were taken from picloram derived embryogenic calli 7 day after their transfer to fresh medium. As for non-embryogenic cultures, actively growing regions were collected from the surface of calli. These calli were fixed in Carnoy's fluid (1 alcohol:3 acetic acid) overnight. Squash preparations were made in 1% acetocarmine solution, and the cells were observed under a microscope. Photographs were taken with the help of image analyzer.

III. RESULTS

The somatic chromosome number of *Musa acuminata* cv.Njalipoovan is 2n=2x=22. In the present study mitotic preparation of root of field grown cv. Njalipoovan showed chromosome number 2n=22 (Fig.1). Similarly the mitotic preparation of root of *in vitro* regenerated plantlet also possess the chromosome number 2n=22 (Fig.2). Cytological analysis of two month old non-embryogenic calli induced in MS medium supplemented with various concentrations of 2,4-D (Type 1 callus) and embryogenic calli induced on MS medium fortified with picloram alone (Type 2 callus) were selected for cytological analysis. Callus culture induced on 2,4-D (4.5 µM) revealed a high frequency of polyploid cells than diploid cells. The chromosome number observed in the polyploid cell was 3n=33 (Fig.3). Cells with varying number of chromosome such as >44 were also observed (Fig.4). The

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embryogenic calli (Type 2) in most of the combinations showed interphase with chromocentres. Compared to type 1 non-embryogenic calli, type 2 embryogenic calli showed diploid cells in a high frequency with nucleolus (Fig.5). The cells with diploid chromosome numbers were shown in Fig 6. The dividing cells at metaphase were observed in very low frequency in both the calli. A remarkable variation in chromosome number was observed in leafsheath derived calli at different hormonal concentrations. It was noted that karyotypic composition of callus cultures ranges from diploid to tetraploid. It was clear from the present observation that in this callus line there was a tendency to an increase of the proportion of euploids. Besides the change in the chromosome number, alterations in the morphology of chromosome were also observed.

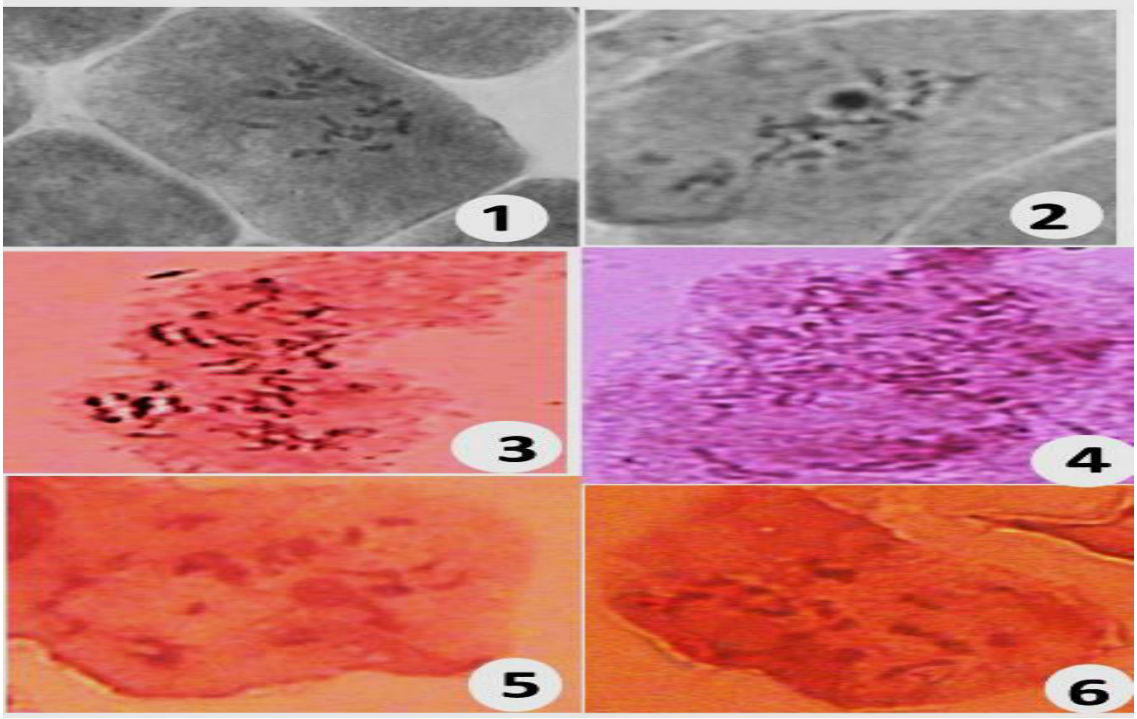

Figure 1: Mitotic preparation of roots of field grown plants showing chromosome number 2n=22
Figure 2: Mitotic preparation of roots of *in vitro* plantlet showing chromosome number 2n=22.
Figure 3: Polyploid cell showing 3n=33
Figure 4: Polyploid cell showing tetraploidy (44)
Figure 5: Diploid cell with nucleolus
Figure 6: *in vitro* cell showing diploidy

IV. DISCUSSION

Stability of plant genome under *in vitro* condition is an important factor, determining the successful application of any culture system. In some plant system lack of such instability result in increased variability, which was commonly described as somaclonal variation (Larkin and Scowcroft,1981).Variations associated with *in vitro* culture can be classified as chromosomal changes as well as physical and morphological changes in the undifferentiated plantlets. The most widely employed technique for creating variation via tissue culture has been the regeneration of plantlets through the callus phase. In the present

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study high frequency of cytological variations were observed in Type1 non-embryogenic calli compared to Type 2 embryogenic calli. Cytological analysis of callus culture revealed a wide range of variation in chromosome number during culture. The variation partly reflects the nuclear conditions of primary explant and partly it results from the nuclear change under *in vitro* conditions, induction and during further growth *in vitro*, in the presence of growth substance. Increase in the concentration of 2,4-D enhanced the frequency of polyploid cells with the age of culture as reported in *Allium sativum* L. (Novak et.al,1981). Prolonged culture of callus on high concentrations of 2,4-D in the medium resulted in polyploid cells due to endomitosis was also reported in barley (Ziauddin and Kaswa,1990). According to Balzan (1978) considerable increase in the volume of nuclei in plant cells during *in vitro* cultures, can be attributed to the high degree of ploidy. Polyploid plant material has been widely used in plant breeding programs for the production of new improved and elite varieties permitting the restoration of hybrid fertility and it was known to be the most wide spread cytogenetic process which has greatly contributed species formation and evolution in higher plants (Stebbins, 1971). According to Jones and Smith (1967) polyploidy clearly plays a part in initiating discontinuity both within and between species. There was also evidence that embryogenic response can be introduced by breeding into agronomically valuable genotypes.

V. CONCLUSION

The result of this study also indicates that different hormonal concentration enhance polyploidy could be induced during *in vitro* culture in a relatively short period, and that abnormal ploidy levels coincide with poor regeneration ability. Callus cultures of *Musa* indicate its potential source as a reservoir of variable genotypes. The use of chromosomal changes in plant regeneration experiments allows the exploitation of the available genetic variation. However, in this culture, it remains to be investigated to what extent this variation can be advantageously exploited through plant regeneration.

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AN ECO FRIENDLY BENTONITE CLAY CATALYSIS FOR THE STEREOSELECTIVE SYNTHESIS OF AMINO CARBONYL SCAFFOLDS

Paper ID	IJIFR/V4/ E2/ 055	Page No.	5327-5333	Subject Area	Chemistry
Keywords	Green Synthesis, Carbonyl Scaffolds, Multicomponent Reactions				

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2nd	V.S. Shinu	Assistant Professor Department of Chemistry St.Joseph College, Devagiri- Kozhikode, Kerala

Abstract

We report a green synthetic approach for the synthesis of amino carbonyl scaffolds via four component coupling of aromatic aldehydes, ketones and nitriles in presence of acetyl chloride by using bentonite clay as catalyst under solvent free conditions. Our interest is in developing this methodology as a novel route to access highly functionalized carbonyl scaffolds via green synthetic approach.

I. INTRODUCTION

The increasing rates of petrochemicals and increase of energy and raw material utilization is forcing the traditional chemistry to gain a greener look. As a consequence, chemical industry demands the development of green reaction methodologies to obtain novel structural scaffolds in a fast, clean and efficient way[1-11]. The same thing is happening in the area of multicomponent reactions (MCRs) and scientists practicing MCRs are constantly engaged in the search for new catalysts and processes. The chemistry of amido carbonyl compounds is also subjected to such a change and consequently, large numbers of new catalysts are available for this process[12-18]. This includes $SnCl_4/SiO_2$ [19a], Cu $(OTf)_2$ and $Sc(OTf)_3$[19b], $Mn(bpdo)_2Cl_2$/MCM-41[19c], $CeCl_3 \cdot 7H_2O$ [19d], iron (III) chloride [19e] $SiCl_4$-$ZnCl_2$[19f]etc. Even though these chiral Lewis acids have proven to be efficient for many

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reactions, a major drawback is that most Lewis acids are unstable in presence of water and some of them are even moisture sensitive and also the multi-step program demands high synthetic skill. On regarding the new methodologies, some are efficient and provide the practical means for the synthesis of acetamido ketones, but some of the reported methods suffer draw backs such as longer reaction times, tedious work up, higher temperatures, expensive catalysts, lower yields and feasible only under an inert atmosphere.

Until recently, the scope of this four component process was limited to the synthesis of amido carbonyl compounds. Recent developments in this area, particularly from our laboratory, revealed the potential of this protocol as an economic way for the synthesis of highly functionalized organic intermediates. Therefore, the introduction of new and efficient methods is still necessary for this reaction. Towards this goal, and in continuation of our investigations on the synthesis of highly functionalized structural scaffolds in a cost-effective, environmentally friendly and more importantly, for the development of a process which requires less operational skill and infrastructure, we were prompted to explore new methods for the incorporation of a large variety of substrates in mild conditions. For this, we decided to explore the possibility of Bentonite Clay Catalysis (BCC) in this reaction.

II. EXPERIMENTAL PROCEDURE

General: All solvents and reagents were of reagent grade quality from Aldrich Chemical Company, Fluka, or Merck and used without any further purification. Fourier transform infrared (FT-IR) spectra were recorded on a Jasco FTIR-4100 spectrometer. The ^{1}H-nuclear magnetic resonance (NMR) spectra operating at the frequencies of 400, respectively, were measured with Varian NMR (VNMRS-400) spectrometer in dimethylsulphoxide-d (DMSO-d_6). Chemical shifts are reported in parts per million (ppm) relative to TMS as internal standard (d=0ppm) for ^{1}H NMR. The coupling constants are reported in hertz (Hz). Reactions were monitored by thin-layer chromatography (TLC) using plates prepared with Merck silica gel G by irradiation with UV light and/or treatment with iodine. Column chromatography was performed on Merck silica (100 to 200 meshes) eluting with the indicated solvent system. Stereochemistry of the compounds were assigned by comparing the coupling constant (J value) of the methine proton with reported data.

Typical Experimental Procedure for the Stereoselective One Pot Three Component Coupling Reaction of Aldehydes, Ketones and Acetonitrile with bentonite as catalyst.

A 100 mL Rb flask was charged with a solution of the aryl aldehyde (1.25 mmol), aryl ketone (1.25 mmol), acetyl chloride (3 mL) and acetonitrile (5 mL) in the presence of bentonite clay (10wt%). The resulting mixture was then set to stirr continuously for 4 hours at70^{0}C. After the completion of the reaction as indicated by TLC, the reaction mixture was diluted with distilled water and stirred well. The obtained precipitate was collected by filtration, washed with distilled water (3 x 20 mL) and dried under vacuum. Column chromatography was performed on Merck silica (100 to 200 mesh) . The product was identified by comparing its NMR and IR values.

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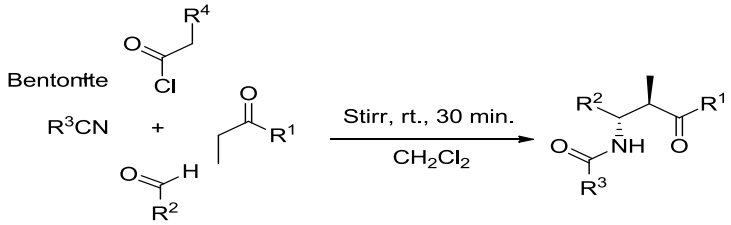
III. RESULTS AND DISCUSSION

We have initiated our studies with the synthesis of the amino carbonyl compound **2a** (Table 2). The sequential addition of benzaldehyde, ethyl methyl ketone and acetyl chloride in the presence of bentonite clay in acetonitrile resulted in the rapid formation of **2a**. With a very low amount of the clay, the reaction reached 55% conversion (with respect to the consumption of aldehyde and ketone) within 4 hour. Here the nitrile source acted as both reagent and solvent. Many nitriles are expensive and their uses in quantities at solvent level are not affordable. In order to overcome this problem, we then examined the synthesis of **2a** in solvents like chloroform and dichloromethane with stoichiometric amount of aldehyde, enolizable ketone, nitrile source and acid chloride and successfully isolated the desired amino acid derivatives in comparable yield corresponding to that obtained from reactions carried out with excess amount of nitriles.

Table 1: Activity of bentonite clay for the multicomponent synthesis of amino carbonyl scaffolds.



Entry	Catalyst	Amount of the catalyst (wt %)	Reaction time (h)	Yield (%)[a]	
				Reaction at 70 °C	Reaction at rt.
1	Bentonite	10	1.0	40	20
2	Bentonite	10	1.5	42	20
3	Bentonite	10	2.0	43	22
4	Bentonite	10	2.5	44	23
5	Bentonite	10	3.0	46	23
6	Bentonite	10	3.5	49	24
7	Bentonite	10	4.0	55	24
8	Nil	-	4.5	0	0

[a]***Based on the weight of the isolated pure products.***

The reaction can be readily followed by FT-IR spectroscopy by recording the disappearance of the aldehyde peak followed by the appearance of amide peak at 1654 cm^{-1}. The structure of the product was confirmed via ^{1}H NMR and FT-IR studies. Stereochemistry was assigned by comparing the J values of the methine proton with reported data.

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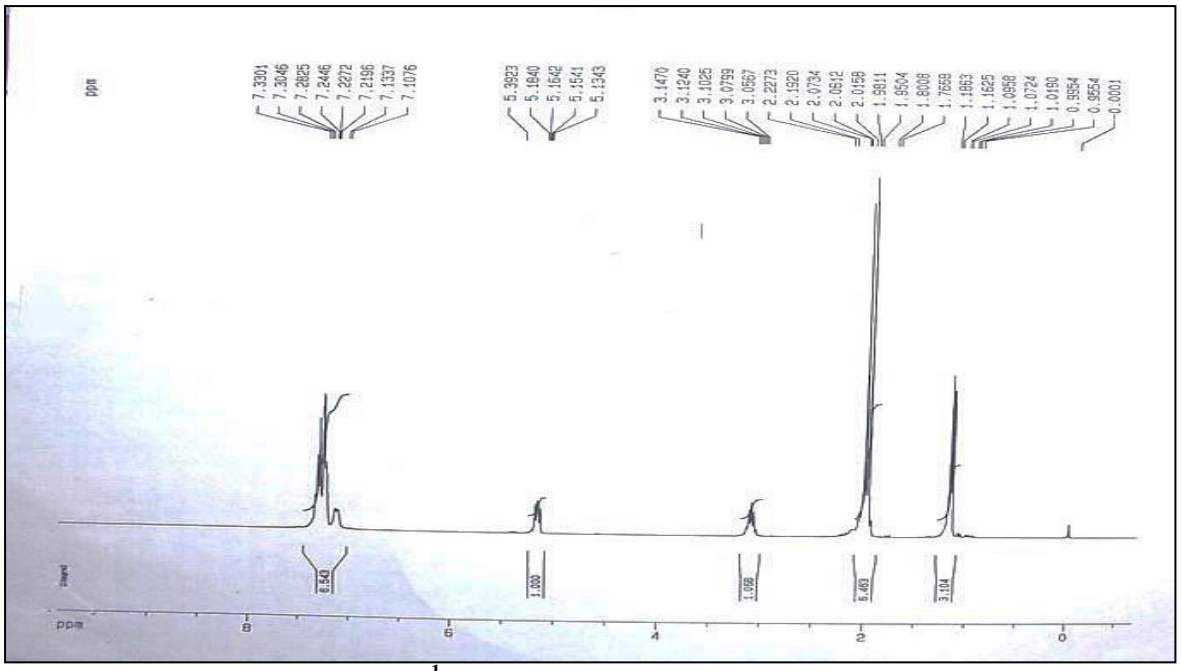

Figure 1: ^{1}H NMR spectrum of compound 2a

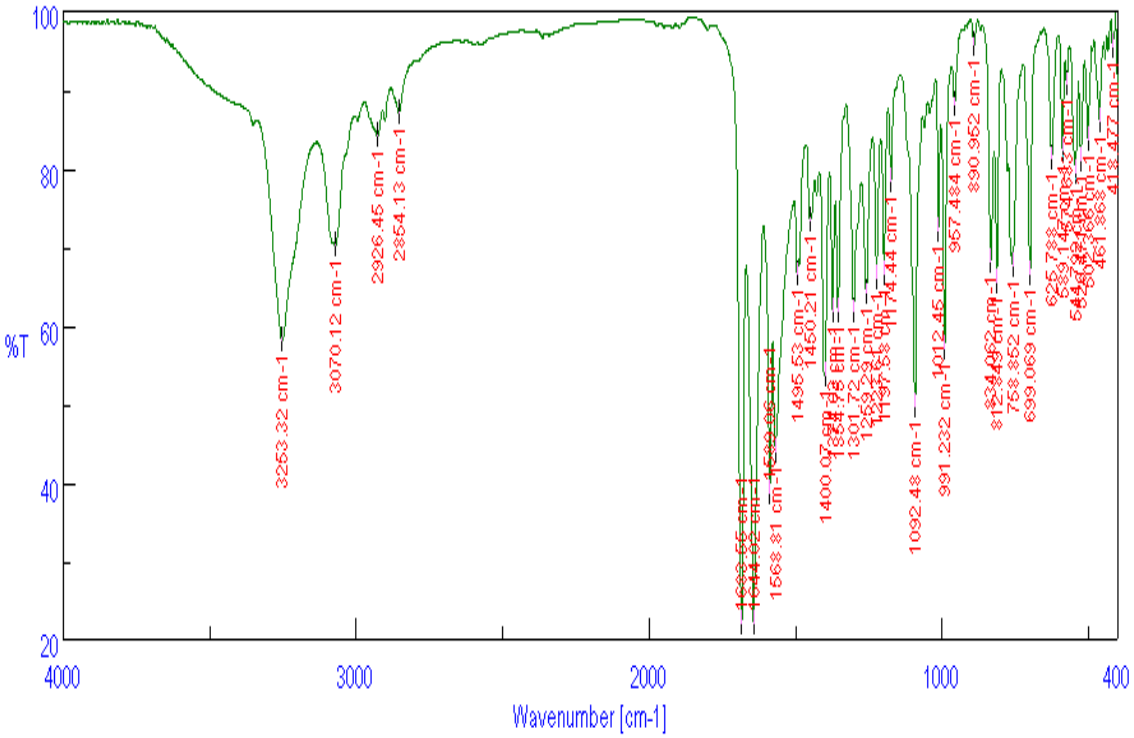

Figure 2: FT IR spectrum of compound 2a

The substrate scope of the reaction was demonstrated with various aldehydes and ketones (Tables 2). The reactions were generally conducted with 2g of bentonite clay. In general, variations in the substitution patterns on aldehyde and ketone units were well tolerated (Table 2).

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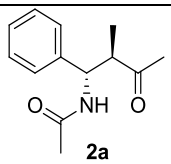
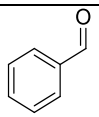
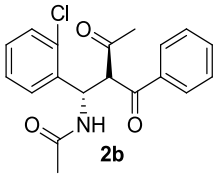
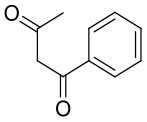
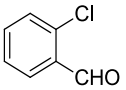
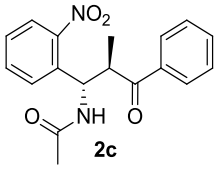
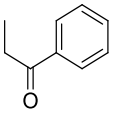
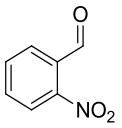
Table 2: Bentonite clay catalyzed stereoselective four component reactions of aldehydes, substituted ketones , acetonitrile and acetyl chloride.

Entry	Product	Bentonite as catalyst % Yield[b]	Components A	B	C	D
1	 **2a**	55				
2	 **2b**	57				
3	 **2c**	56				

[a] ***All reactions were carried out at room temperature.***
[b] ***Isolated yield, all products were identified by comparing their NMR and IR values with those for authentic samples.***
[c] ***Assigned based on comparison with literature value for the coupling constants of methine proton.***[19a]

The reaction is initiated by the complexation of the carbonyl oxygen of the ketone to the catalyst to produce a more sterically hindered enolate anion with a more nucleophilic carbon. Subsequent reactions of this enolate with aldehyde and acid chloride resulted in the carbon-carbon bond formation to produce a acyloxy ketone derivative. The steric interaction between the acyloxy group present in the aldehyde carbon and the more hindered substituted enolate anion restricts the addition to takes place through the less hindered face to produce an intermediate in the *anti* form. The acyloxy group in the intermediate then displaced by nucleophilic nitrogen of the nitrile to produce a stable cation intermediate. Addition of water or other reactive species like HOCl formed during the reaction leads to the formation of the *anti*-diastereomer.

IV. CONCLUSION

Conclusively, we have reported the efficiency of bentonite clay catalysts for the synthesis of amido carbonyl compounds (Mannich type products) via a four component coupling reaction. Under the described catalytic conditions, a diverse array of functional groups, present in aldehydes, ketones and nitriles are tolerated. The reusability of the catalyst and increased *anti*-diastereoselectivity makes it as a green alternative to the rapid generation of Mannich-type products. To our knowledge, this report describes the first example of the use of bentonite clay in a stereoselective multicomponent process.

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MANAGERIAL COMPETENCIES AS RELIABLE CONTRIVANCE FOR COPING DEPRESSION

Paper ID	IJIFR/V4/ E2/ 058	Page No.	5334-5342	Subject Area	Education
Keywords	Depression, university teachers, managerial skills differences,				

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Abstract

Depression is considered to be a serious problem amongst university teachers, who perform their job in various environments. Therefore, their psychological problems caused by work conditions, their perception of work environment and how they cope-up with these problems differ. The present study intended is to determine the level of depression of university teachers caused by the work done in different environments and the managerial skills used to cope with this depression. Significant difference between male and female university teachers in their level of depression managerial skills the reason can be similar kinds of limited facilities available to both and no significant relationship exists between level of depression and managerial skills of male university teachers. Similar results are found in case of female university teachers as well. It is due to the fact that depression and managerial skills are two different streams of mind, flowing in two different directions.

I. INTRODUCTION

The number of universities is increasing tremendously over the past few years. Due to the competitive pressure on the management, the academic staff is eventually bearing difficulty in executing their job. The primary duty of the university teachers is to teach and to prepare

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for the classroom experience .Faculty members are also expected to support an educational environment which stimulates inquiry and a shared sense of responsibility for the education of a "whole man". The duties of faculty members are many and varied. Like every profession, teaching job requires satisfaction in the job and commitment towards this noble profession on the part of teachers. Unless a teacher feels satisfied and is professionally committed in his job, he will not be able to discharge his duties and responsibilities intelligently and effectively. In addition to classroom teaching, faculty members are expected to carry out a variety of duties, viz. advising students and student organizations; accompanying students on field trips and other educational excursions, including attendance in professional meetings; directing independent study and research projects: supervising honors theses; supervising academic year and summer research projects; engaging otherwise in a significant amount of teaching that takes place outside the usual boundaries of the classroom.

The university teachers also face many problems due to work load, excessive pressure from higher authorities, low salary, non availability of resources and cut throat competition, which results in non satisfaction of job and finally results in depression among teachers. Teacher depression has been documented by a number of researchers over the years. Researchers have identified depression in the university setting such as relationship with students, colleagues, parents and administrators, time pressures, workload, excessive societal expectations and feelings of isolation in the class. In addition, there are professional issues that impact teacher depression such as low salary concerns, departmental and college policy problems, demands from continuing education or training for recertification and lack of opportunities for part time employment.

Depression is one of the many reasons teachers leave their job. Unfortunately, our universities often cannot find sufficient replacements and frequently face severe teacher shortages. Across the nation, one out of every five full-time teachers leave their teaching profession to pursue a career outside the education field (National Center for Education Statistics, 1998).

Teacher depression is defined by Kyriacou (1987) as “the experience by a teacher of unpleasant emotions, such as tension, frustration, anxiety, anger, and depression, resulting from aspects of work as a teacher”

Teacher burnout is defined by Kyriacou (1987) as “the syndrome resulting from prolonged teacher stress, primarily characterized by physical, emotional and attitudinal exhaustion”.

In order to be an effective teacher, it is necessary to posses many skills. These common skills include problem solving, organizational, interpersonal and communication skills. Teachers can do miracles and shape the destiny of children.

According to Lavingia (1979), a teacher who is happy with his work, finds satisfaction in his life and plays a pivotal role in the uplift of society. Such a teacher can do justice to his work and is highly accepted personality among students. The styles of managing learning situations largely determine the effectiveness of teachers as managers. The recently established teaching and learning development units in universities should adopt a more

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realistic approach towards promoting high teaching standards, since teaching constitutes only one aspect of the teachers', lecturers' and trainers' daily activities as they go about managing learning situations and all that they entail. Thus to get rid of depression one needs to come out of it and apply the managerial skills efficiently to make a mark in profession.

Schonfeld (1991) revealed that teachers in most difficult schools showed an increase in depressive symptoms and that the relationship between working conditions and depressive symptoms is strong. Teachers in the most adverse school environments exhibit the most depressive symptoms. It was also found that adverse school conditions may have detrimental effects on mental health and that more benign work environments may be related to better mental health. Semra and Unal (2000) stated that teachers do not differ according to variants as gender, age, working environment, weekly lesson load in regard with stress indicators and coping techniques. In order to decrease stresses of teachers within obtained results, it was recommended to improve their working conditions, decrease their weekly lesson loads to get them work more efficiently, to promote sports activities, to integrate them in social and cultural activities and to improve their financial opportunities.

McManaman (2004) asserted that the cause of this dramatic increase in teacher depression can be attributed to the changes in education that have accompanied changes in government over the years, what it refers to as the "education wars" of the last decade. These changes include the new curriculum, cutbacks, increased paperwork, stressed students and concerned parents.

Mustafa and Jaseena (2008) concluded that teachers above ten years experience were found highly satisfied in their job than the teachers belonging to the category below ten years experience. Trained teachers were highly satisfied in their job in comparison to untrained teachers as they are able to easily cope up with the situations by using their interpersonal skills. From all studies it is indicated that untrained teachers were rated lowest in response to administrative problems while trained teachers were rated lowest in response to teacher related problems. Increase in anxiety will ensure in depression and approximately one out of ten individuals working in the education sector will have depression over the course of a year. Depression causes limitation in the type or amount of work that can be done. It may lead to complete withdrawal from the labor force. It also indicated that leadership behaviors and skills are the most important factors for the success of quality management plans in universities. A person with strong managerial skills will be able to adapt and overcome any and all obstacles that the work environment throws their way.

All studies have indicated mostly the depression in teachers related to students, colleagues, parents and administrators, time pressures, workload, excessive societal expectations and feelings of isolation in the class. In addition, there are professional issues that impact teacher depression such as low salary concerns, departmental and college policy problems, demands from continuing education or training for recertification and lack of opportunities for part time employment but a very few studies has been done in the area of depression in relation to managerial skills of university teachers. That is why the investigator felt tempted to study the depression among university teachers in relation to their managerial skills.

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II. OBJECTIVES OF THE STUDY

The study was conducted with following objectives:

1. To explore the depression of male and female university faculty members.
2. To explore the managerial skills of male and female university faculty members.
3. To find out the significant difference between male and female university teachers in their level of depression.
4. To find out significant difference between male and female university teachers in relation to their managerial skills.
5. To find out the relationship between depression and managerial skills of the male university teachers.

III. HYPOTHESES

1. The depression among more experienced male university teachers is less than the less experienced male university teachers.
2. There is significant difference of depression among more experienced female university teachers and less experienced female university teachers.
3. There is no significant difference in the depression between the female university teachers and male university teachers.
4. There is significant difference in the managerial skills among more experienced male university teachers and less experienced male university teachers.
5. There is significant difference in the managerial skills among more experienced female university teachers and less experienced female university teachers.
6. There is no significant difference in the managerial skills between the female university teachers and male university teachers.
7. There is no significant relationship in the managerial skills and depression between the female and male university teachers.

IV. RESEARCH METHODOLOGY

The study was descriptive survey type.

4.1 Population and Sample: The present study was conducted on Lovely professional university teachers. Total 100 university teachers were taken as sample for the present study of which equal number of male and female university teachers was included in the sample. Keeping in mind the nature of the problem, purposive random sampling technique was used.

4.2 Tools: In order to collect data the following tools were used.

1. Beck Depression Inventory – 2nd Edition (BDI II) by Aaron T Beck, Robert A Steer and Gregory K Brown, (1996)
2. Managerial effectiveness scale by Upinder Dhar, Santosh Dhar and Preeti jain(2005)

4.3 Data Collection: Data was collected from 100 university teachers and collected data was analyzed keeping in view the objectives and hypotheses of study by applying correlation and z-test. In z-tests the observed values were compared with critical values at 0.05 and 0.01 levels to know whether the results are significant or not.

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V. ANALYSIS AND INTERPRETATION OF DATA

1. Results pertaining to depression among university teachers

In order to study depression among university teacher's data was collected and scores were tabulated and interpreted in the light of the following hypothesis:

Hypothesis1: There is no significant difference between male and female university teachers in their level of depression. Results pertaining to depression among university teachers are shown in table 1

Table 1 Depression among university teachers

Variable	N	Mean	S.D	Z Value	Remarks
Depression	50(Male)	18.52	7.95	1.021	Insignificant
	50(Female)	16.62	7.099		

It is revealed from table 1 that the value for mean turned out to be 18.52 for male whereas for female it is 16.62. It shows the average level of depression of university teachers. The S.D for male university teachers is 7.95 whereas for female university teachers are 7.099. The z statistics regarding their depression level turned out to be 1.021 which is insignificant. Hence the hypothesis namely there is no significant difference between male and female university teachers in their level of depression is found to be accepted in the light of above evidences.

2. Results pertaining to managerial skills among university teachers

In order to study managerial skills among university teacher's data was collected and scores of managerial skills were tabulated and interpreted in the light of the following hypothesis

Hypothesis 2: There is no significant difference between male and female university teachers in their managerial skills. A result pertaining to managerial skills of university teachers is shown in table 2.

Table 2: Managerial skills among university teachers

Variable	N	Mean	S.D	Z Value	Remarks
Managerial skills	50(Male)	109.5	23.09	1.08	Insignificant
	50(Female)	117.62	23.72		

It is evident from table 2 that the value for mean turned out to be 109.5 for male whereas for female it is 117.62. It shows level of managerial skills of female university teachers is more. The S.D for male university teachers is 23.09 whereas for female university teachers is 23.72. The z statistics regarding their depression level turned out to be 1.08 which is insignificant. Hence the hypothesis namely there is no significant difference between male and female university teachers in their managerial skills is found to be accepted in the light of above evidences.

3. Relationship between depression and managerial skills among male university teachers.

In order to assess relationship between depression and managerial skills among university teachers, collected data were scored and tabulated to test the following hypothesis.

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Hypothesis 3: There is no significant relationship between level of depression and managerial skills of the male university teachers. Results pertaining to relationship between depression and managerial skills of male university teachers are shown in table 3

Table 3: Level of depression and managerial skills among male university teachers

Computation	Male N=50 (Depression)	Male N=50 (Managerial skills)	Correlation Value	Remarks
Mean	18.52	109.5	0.16	Insignificant
S.D	7.959	23.09		

It is revealed from table 3 that the value of mean for depression turned out to be 18.52 whereas for managerial skills it is 109.5. It shows more level of managerial skills is used by male university teachers to overcome depression. The S.D for depression of male university teachers is 7.959 whereas for managerial skills is 23.09. The value of correlation turned out to be 0.16 which is insignificant. Hence the hypothesis namely there is no significant relationship between level of depression and managerial skills of the male university teachers is found to be accepted in the light of above evidences.

4. Results pertaining to relationship between depression and managerial skills of female university teachers.

In order to assess relationship between depression and managerial skills among female university teachers, collected data were scored and tabulated. In order to test the following hypothesis, mean and S.D was computed on tabulated data.

Hypothesis 4: There is no significant relationship between level of depression and managerial skills of the female university teachers. Results pertaining to relationship between depression and managerial skills of female university teachers have been shown in table 4.

Table 4: Depression and managerial skills among female university teachers

Computation	Female N=50 (Depression)	Female N=50 Managerial skills	Correlation Value	Remarks
Mean	16.62	117.62	0.040	Insignificant
S.D	7.099	23.72		

It is revealed from table 4 that the value of mean for depression turned out to be 16.62 whereas for managerial skills it is 117.62. It shows more level of managerial skills is used by female university teachers to overcome depression. The S.D for depression of female university teachers is 7.099 whereas for managerial skills is 23.72. The value of correlation turned out to be 0.040 which is insignificant.

Hence the hypothesis namely there is no significant relationship between level of depression and managerial skills of the female university teachers is found to be accepted in the light of above evidences.

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5. Results pertaining to relationship between depression and managerial skills of university teachers.

In order to assess relationship between depression and managerial skills of university teachers, collected data were scored and tabulated. In order to test the following hypothesis, mean and S.D. was computed on tabulated data.

Hypothesis 5: There is no significant relationship between level of depression and managerial skills of the university teachers. Results pertaining to relationship between depression and managerial skills of university teachers are shown in table 5.

Table 5 Depression and managerial skills of university teachers

Computation	N	Depression among university teachers	Managerial skills of university teachers	Correlation Value	Remarks
Mean	100	17.58	113.5		
S.D		7.987	23.75	0.025	Insignificant

It is revealed from table 5 that the value of mean for depression turned out to be 17.58 whereas for managerial skills it is 113.5. It shows appropriate level of managerial skills is used by university teachers to overcome depression. It is 14 for depression and 123 for managerial skills. The S.D for depression of university teachers is 7.987 whereas for managerial skills is 23.75. The value of correlation turned out to be 0.025 which is insignificant. Hence the hypothesis namely there is no significant relationship between level of depression and managerial skills of the university teachers is found to be accepted in the light of above evidences.

V. SUGGESTIONS

On the basis of results and discussion following suggestions were drawn:

- **Stress Awareness:** Teachers should participate in awareness sessions presented in a non-threatening environment with updated information about the nature, signs, causes, and symptoms of stress which would help to reduce depression.
- **Environmental Adjustment:** Another major component of successful prevention from depression is the development of situational coping strategies which would help them either change their reaction to specific stressful situations or alter their work environment.
- **Training focuses on several mental techniques:** Replacing self-defeating, self-limiting beliefs with more constructive, realistic, and empowering ones: learning how to recognize self-doubt in order to coach one into changing these thoughts.
- **Identifying barriers:** Examining personal values, both work- and non-work related, and setting goals. Through this technique, roadblocks are identified. With training in other techniques such as time management, barriers can be overcome. Activities such as to do lists, weekly schedules, and six month planning calendars can help teachers to focus energy and combat procrastination.

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- **Using problem-solving techniques:** Encouraging teachers to analyze, understand, and deal with problem situations rather than avoiding them, blaming others, or feeling helpless.
- **Handling emotions:** looking closely at how emotions such as frustration, anxiety, and fear contribute to ineffective coping strategies; and allowing participants to reassess their feelings and "re-write" effective responses.
- **Dealing with life changes:** Developing counseling skills among teachers in order to help deal with stressful events. This includes listening and empathy; actively listening as well as communicating ones' thoughts effectively; and clarifying one's personal feelings.

VII. CONCLUSION

The above cited results enabled the researcher to conclude rationally that there is no significant difference between male and female university teachers in their level of depression. The reason can be similar kinds of limited facilities available to both. It may also be due to the same adverse environment in which they work. Further, the lack of respect and recognition from students towards both male and female teachers may be leading to similar levels of depression amongst them. There is no significant difference between male and female university teachers in their managerial skills. Managerial skills are not just honed during learning; they also get imbibed with experience. The reason for similar managerial skills amongst male and female university teachers can be the similar type of formal education system and opportunities provided to them in service.No significant relationship exists between level of depression and managerial skills of male university teachers. Similar results are found in case of female university teachers as well. It is due to the fact that depression and managerial skills are two different streams of mind, flowing in two different directions. Depression sets in not just due to professional reasons, but as a result of many personal experien ces as well. Further, depression is within oneself and affects our own life. On the other hand, managerial skills are more to do with the outside world. It is the way how we affect the functioning of others. Depression is a state of working, while managerial skill is an attribute.

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IX. WEB PAGES

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[4] http://www.ibogaine.desk.nl/graphics/3639b1c_23.pdf
[5] http://eku.comu.edu.tr/index/5/1/mbalkis_eduru.pdf
[6] http://www.depression.com
[7] http://ihcrp.georgetown.edu/agingsociety/pdfs/depression.pdf
[8] file://localhost/D:/depression%20folder/define_depression%20-%20Google%20Search.mht
[9] file://localhost/D:/depression%20folder/management_%20Definition,%20Synonyms%20from%20Answers.com.mht
[10] file://localhost/D:/depression%20folder/Psych%20Central%20-%20Depression%20Research.mht
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[12] file://localhost/D:/depression%20folder/What%20Are%20Managerial%20Skills_%20-%20Blurtit.mht

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PATTERN MATCHING ALGORITHMS FOR RETRIEVING INFORMATION FROM WEB DOCUMENTS

Paper ID	IJIFR/V4/ E2/ 061	Page No.	5343-5351	Subject Area	Computer Engineering
Keywords	Web Mining, Text Mining, Pattern Matching, Content Mining, Reverse Factor, Smith				

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Abstract

Web mining is the important area of data mining, it is used to discover patterns and extract useful information from web documents and web services. Web mining is categorized into web usage mining, web content mining and web structure mining. This research work mainly focused on web content mining. It is used to extract the useful data, information and knowledge from the web page content. It describes the discovery of useful information from web pages. In web content mining the contents may be a text, image, audio, video, metadata and hyperlinks. It is mainly used in the area of document clustering, document classification and information extraction from the web pages. In this research work, pattern matching algorithms are used for web page content analysis and these algorithms are used to match the pattern accurately. The main objective of this research work is to retrieve the relevant information from a collection of web documents. For this analysis, two algorithms are used; they are, Reverse factor algorithm and Smith algorithm. From this analysis, based on the performance measures it is observed that the Smith pattern matching algorithm gives the better result.

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I. INTRODUCTION

Web mining is the application of data mining techniques to extract knowledge from Web data, which includes Web documents, hyperlinks between documents, and usage logs of web sites [1]. This research work mainly focused on web content mining. For analyzing the content, pattern matching algorithms are used. Pattern matching algorithm is an essential idea for many problems and it is used in various applications which include text mining, data retrieval, DNA pattern matching and finding certain vital keywords in security applications [2]. This algorithm has two strategies such as, exact matching and approximates matching. In exact matching, the pattern is completely matched with the specific text window of input text and it displays the initial index position [3]. In approximate matching, if precise portion of the pattern matched with the selected text window straight away it displays the output.

This paper organized as follows section II describes the related works; section III illustrates the methodology of this research work. Result and discussion given in Section IV and section V describes the conclusion of this research work.

II. RELATED WORKS

Sathish Kumar et al. [1] the research in the area of applications of neural networks and pattern matching algorithms in classification is presented. Artificial neural networks for classification and different pattern matching algorithms for matching the given DNA patterns or strings with the existing DNA sequences available in the databases are specially studied. A set of local searching algorithms were experimented for different test string lengths and their time complexity is tabulated.

Abdulwahab Ali Al-mazroi et al. [5] proposed a new hybrid algorithm called BRSS by combining two algorithms, Berry-Ravindran and Skip Search. The hybrid algorithm demonstrates enhanced character comparisons, number of attempts and searching time performances in all the different data size and pattern lengths, therefore the proposed algorithm is useful for searching DNA, Protein and English text. This also proved that the application of the hybrid algorithm will lead to better searching and matching of the patterns than the use of one algorithm as data is becoming more complex presently.

Saima Hasib et al. [6] discussed the Aho-Corasick algorithm is best suited for multiple pattern matching and it can be used in many application areas. The complexity of the algorithm is linear in the length of the patterns plus the time taken of the searched text plus the amount of output matches. It is found to be attractive in large numbers of keywords, since all keywords can be simultaneously matched in one pass. Aho-Corasick provides solution to many real world problems like Intrusion detection, Plagiarism detection, bioinformatics, digital forensic, text mining and many more. Aho-Corasick is one of the most productive algorithms in text mining.

Jorma Tarhio et al. [7] proposed an efficient string matching algorithm with compact memory as well as high worst-case performance. Using a magic number heuristic based on the Chinese Remainder Theorem, the proposed ACM significantly reduces the memory

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requirement without bringing complex processes. Furthermore, the latency of off-chip memory references is drastically reduced. The proposed ACM can be easily implemented in hardware and software. As a result, ACM enables cost-effective and efficient IDSs.

Chinta Someswara Rao et al [13] implemented parallel string matching with JAVA Multithreading with multi core processing, and performed a comparative study on Knuth Morris Pratt, Boyer Moore and Brute force string matching algorithms. For testing, gene sequence database are used which consists of lacks of records. From the test results it is shown that the multi core processing is better compared to lower versions. Finally this proposed parallel string matching with multi core processing is better compared to other sequential approaches.

III. METHODOLOGY

The main objective of this research work is to retrieve the relevant information from a collection of web documents. In order to perform this task this research work uses two phases; Pre-processing phase and Searching phase. In the preprocessing phase the converter has to be used to convert the wed documents into the pdf file format. In the searching phase, there are two pattern matching algorithms are used namely reverse factor algorithm and smith algorithm. The performance factors are time taken for searching the pattern, number of iterations and the relevancy. Figure 1 shows the methodology of this research work.

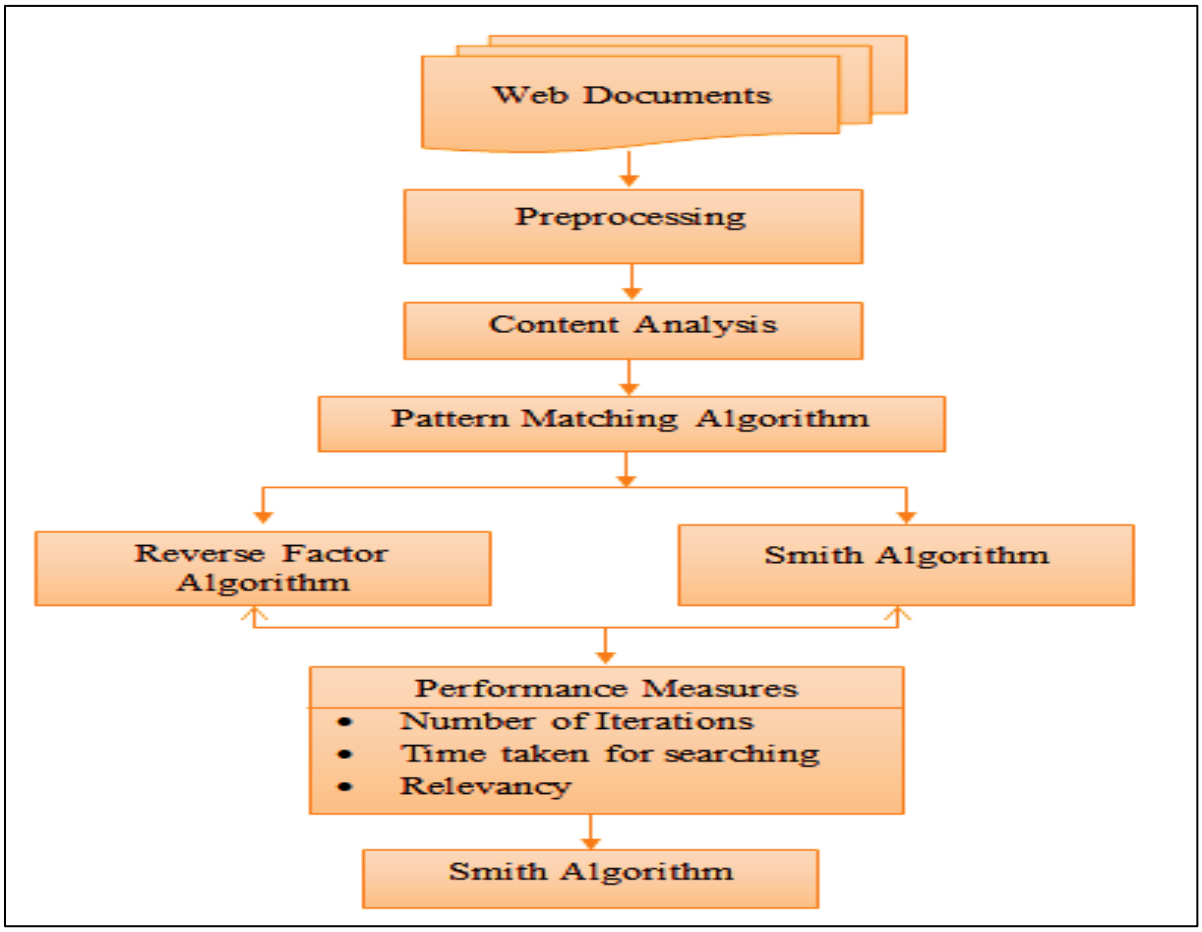

Figure 1: System Architecture

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A. Web Documents

In order to perform this task, the input documents are collected from the web. For this analysis the ten web document links are used as input. The sample input document links are given in Table 1.

TABLE 1: SAMPLE INPUT

S. N.	Web Document Links
1	https://en.wikipedia.org/wiki/Document_clustering
2	https://en.wikipedia.org/wiki/Web_mining
3	https://en.wikipedia.org/wiki/Data_mining
4	https://en.wikipedia.org/wiki/Social_media_mining
5	http://scikit-learn.org/stable/auto_examples/text/document_clustering.html
6	http://wikid.eu/index.php/Image_Mining
7	http://www.tcs.com/SiteCollectionDocuments/White%20Papers/Insurance_Whitepaper_Mining_Unstructured_Text_Data_for_Insurance_Analytics_08_2010
8	https://www.linguamatics.com/blog/text-mining-full-text-scientific-articles-more-facts-more-types-facts-faster
9	http://searchbusinessanalytics.techtarget.com/definition/association-rules-in-data-mining
10	http://www.sciencedirect.com/science/article/pii

B. Preprocessing Phase

In this phase the converter is used for converting web documents into pdf file format. The content analysis has to done in the pdf file format [8]. The name of the converter is Wed2PDF. It is the open source online tool, and it helps web users, website publishers and bloggers to save their web content to PDF files. So that they can print, share and archive the web documents. This converter is made by Baltsoft software; it is an information technology company and specializing in the development of high quality software for organization, business and individuals [9]. The original web pages given into the Web2PDF and it convert the web pages into PDF files. The converted PDF with their names is given in Table 2.

TABLE 2: PDF CONVERSION OF WEB PAGES – PDF NAMES

S.No	Web Document Links	Converting the Link to Pdf using Web2PDF
1	https://en.wikipedia.org/wiki/Document_clustering	Document Clustering-Wikipedia.pdf
2	https://en.wikipedia.org/wiki/Web_mining	Web Mining-Wikipedia.pdf
3	https://en.wikipedia.org/wiki/Data_mining	Data Mining-Wikipedia.pdf
4	https://en.wikipedia.org/wiki/Social_media_mining	Social Media Mining-Wikipedia.pdf
5	http://scikit-learn.org/stable/auto_examples/text/document_clustering.html	scikit-learn-org.pdf
6	http://wikid.eu/index.php/Image_Mining	wikid-eu.pdf
7	http://www.tcs.com/SiteCollectionDocuments/White%20Papers/Insurance_Whitepaper_Mining_Unstructured_Text_Data_for_Insurance_Analytics_08_2010	www-tcs-com.pdf
8	https://www.linguamatics.com/blog/text-mining-full-	www-linguamatics-com.pdf

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	text-scientific-articles-more-facts-more-types-facts-faster	
9	http://searchbusinessanalytics.techtarget.com/definition/association-rules-in-data-mining	searchbusinessanalytics-techtarget-com.pdf
10	http://www.sciencedirect.com/science/article/pii	www-sciencedirect-com.pdf

C. Searching Phase

In this phase the pattern matching algorithms are used to search the particular pattern in the text. For this analysis, two algorithms are used they are reverse factor algorithm and smith algorithm.

1. Reverse Factor Algorithm

The Boyer-Moore based algorithms match some suffixes of the pattern [10]. But it is possible to match the prefix of the pattern also by scanning from the right to left of the string. Instead of doing this, we can do by using the smallest suffix automaton of the reverse pattern of the string [11]. This approach is called as Reverse Factor algorithm. This algorithm parses the character of the window from right to left with the help of the automaton in its searching phase. This process continues until there is no more transition outlined for the current character in the current automaton. This algorithm uses the suffix automation and it is very fast for long patterns and small alphabets. The time complexity for the preprocessing phase is O (m) and for the searching phase is O (mn).

Algorithm 1: Reverse Factor Algorithm

Input: A text string T and a pattern string P with lengths n and m respectively
W be the Window
Output: All occurrences of P in T.
Set i to 1;
Step 1: if i+m-1 >n then exit.
else let W is equal to T (i, i+m-1) be a window.
find LSP (W, P)
if |LSP (W, P)| is equal to m,
return the pattern; match is found at ti and a is equal to m-|LSP (W, P)|.
Else, set a=m-|LSP (W, P)|.
increment i by a
Go to Step 1.

2. Smith Algorithm

Smith algorithm is used to compute the shift with the text character just next to the rightmost text character of the particular window [12]. This operation gives sometimes shorter shift than using the rightmost text character of the particular window. The preprocessing phase of this algorithm consists in computing the bad character shift function and the Quick Search bad-character shift function [13]. The preprocessing phase is in O (m+σ) time and the searching phase has a quadratic worst case time complexity.

Algorithm 2: Smith Algorithm

void SMITH(character x, integer m, character y, integer n)

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```
begin
initialize j, bmBc[ASIZE], qsBc[ASIZE];
preprocess preBmBc(x, m, bmBc);
 preprocess preQsBc(x, m, qsBc);
initialize j = 0;
 while (j<= n - m)
 begin
 if (memcmp(x, y + j, m) is equal to 0)
 OUTPUT(j);
 Equal j to j + max of bmBc[y[j + m - 1]], qsBc[y[j + m]]
end
end
```

IV. RESULT AND DISCUSSION

In order to perform this analysis, the performance factors are search time, number of iterations and relevancy for various types of inputs. The inputs are single word, multiple words and a file for .pdf file format. For this analysis, the pattern matching algorithms were implemented by using Java. Here the input query is "Mining", "Text Mining" and "Text mining is also known as text data mining" for single word, multiple words and a file respectively. Based on this input query only the results are analyzed.

- Search Time: It refers the time taken for searching the pattern within the input text. It can be estimated by comparison of each character in pattern with the input text.
- Iterations: It refers the total number of iterations for matching the pattern with the input text. It is based on the given input document and various algorithms.
- Relevancy: It refers the accuracy of the algorithm; the accuracy is calculated by using the formula is given in Equation (1).

$$\text{Accuracy}=\frac{Total\ Number\ of\ Pattern\ Retrieved}{Total\ Number\ of\ Pattern\ in\ Text}\ X\ 100 \qquad \text{.....Equ (1)}$$

Table 3 shows the sample input for this experimentation and the size of the each files. These input documents are collected from web pages.

TABLE 3: SAMPLE INPUT

File Name	Size (Kb)
Document Clustering-Wikipedia.pdf	151
Web Mining-Wikipedia.pdf	198
Data Mining-Wikipedia.pdf	481
Social Media Mining-Wikipedia.pdf	271
scikit-learn-org.pdf	377
wikid-eu.pdf	91
Www-tcs-com.pdf	736
Www-linguamatics-com.pdf	81
Searchbusinessanalytics-techtarget-com.pdf	416
Www-sciencedirect-com.pdf	48

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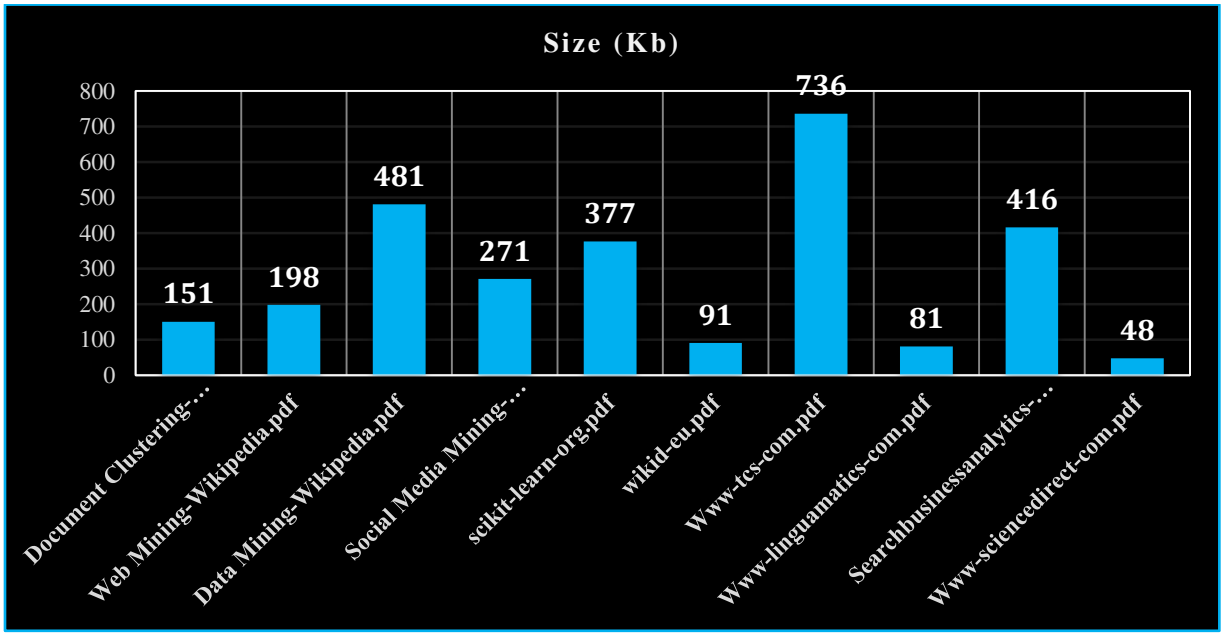

Figure 2: Sample Input with Size

Figure 2 illustrates the sample input of the ten documents used for this analysis and the size of the each document. Table 4 describes the performance analysis of Reverse Factor and Smith pattern matching algorithms.

TABLE 4: PERFORMANCE ANALYSIS OF REVERSE FACTOR AND SMITH ALGORITHM

Input Pattern	Reverse Factor Algorithm			Smith Algorithm		
	Time (ms)	Number of Iterations	Relevancy (%)	Time (ms)	Number of Iterations	Relevancy (%)
Single Word	09	12	100	09	10	100
Multiple Words	29	27	100	21	27	100
File	59	20	93	49	18	96

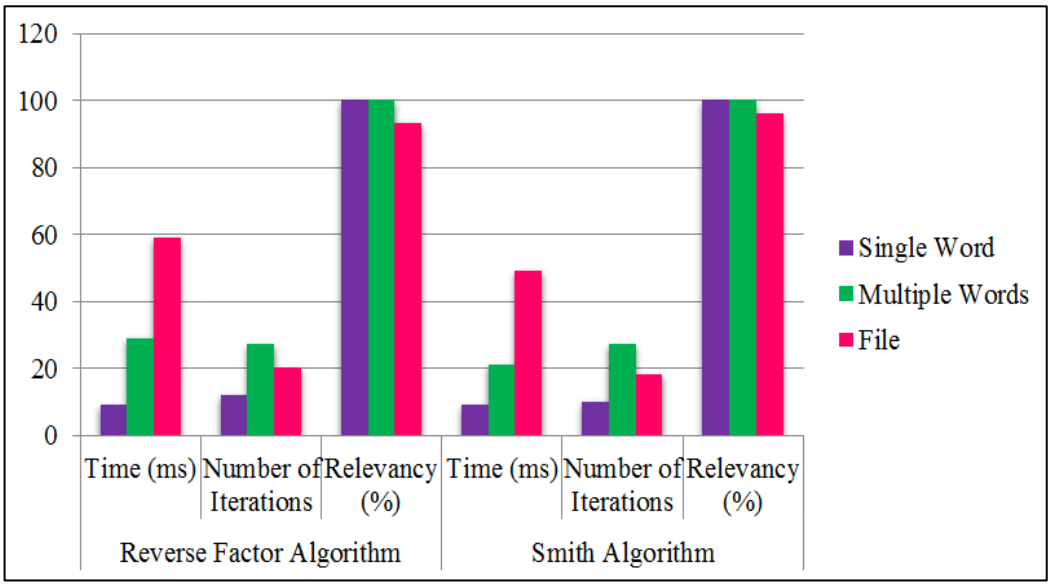

Figure 3: Performance analysis of Reverse Factor and Smith Algorithm

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Figure 3 illustrates the performance analysis of Reverse Factor and Smith pattern matching algorithms. From this figure it is observed that Smith algorithm gives better result. Table 5 illustrates the ranking the documents based on pattern occurred in the particular document.

TABLE 5: RANKING THE DOCUMENTS BASED ON PATTERN OCCURRED IN THE PARTICULAR DOCUMENT

File Name	Total Number of words	Total number of times Pattern occurred	Rank
Document Clustering-Wikipedia.pdf	1194	0	10
Web Mining-Wikipedia.pdf	2642	71	2
Data Mining-Wikipedia.pdf	6118	109	1
Social Media Mining-Wikipedia.pdf	2931	28	4
scikit-learn-org.pdf	1041	1	9
wikid-eu.pdf	956	10	6
Www-tcs-com.pdf	5680	66	3
Www-linguamatics-com.pdf	867	6	8
Searchbusinessanalytics-techtarget-com.pdf	978	12	5
Www-sciencedirect-com.pdf	594	8	7

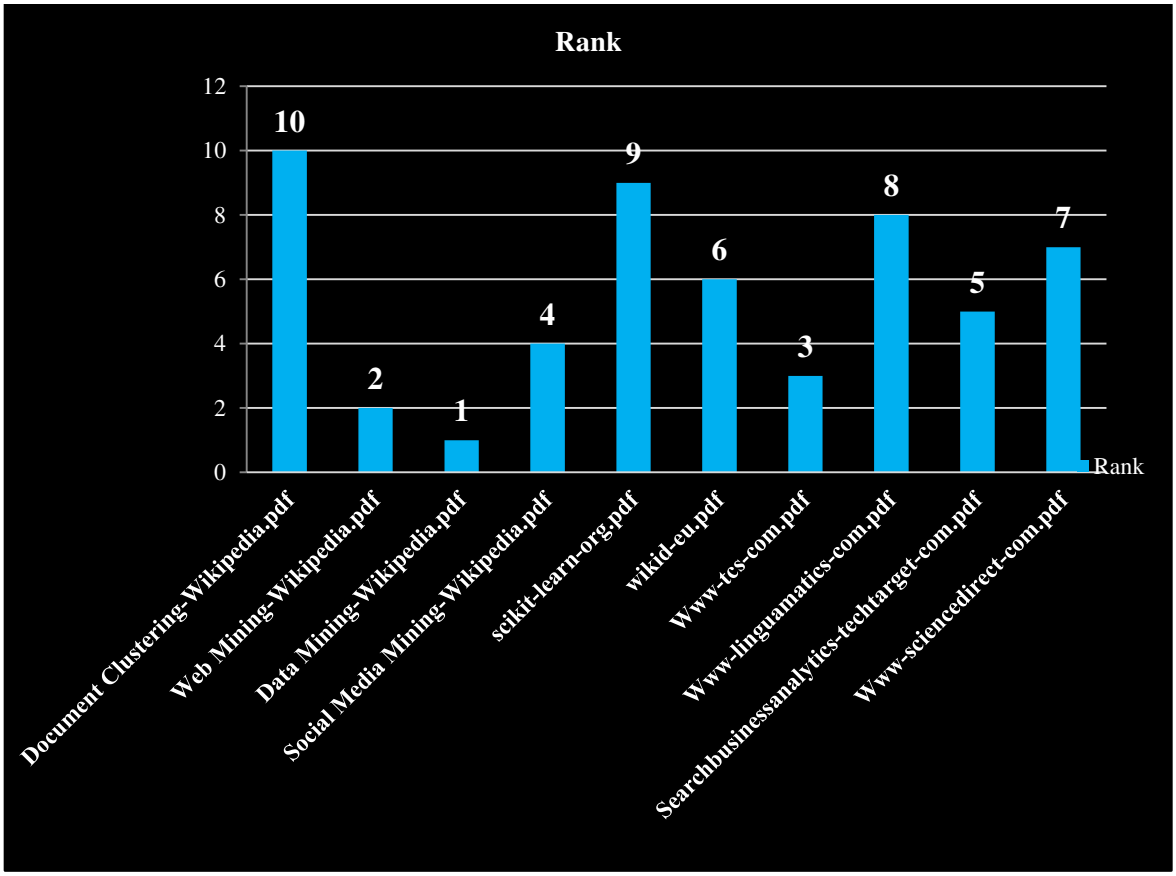

Figure 4: Ranking of Documents

Figure 4 describes the ranking of the documents based on pattern occurred in the particular document. From this figure, the pattern "Mining" occurred more times in the document "Data Mining-Wikipedia.pdf".

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V. CONCLUSION

Web mining is used to gather, organize and provide the exact information on the web based on the user's query. It is used to determine the relevance of the content to the search query. This research work focused on web content mining, it uses the ideas of data mining. For mining or analyzing the web content, the pattern matching algorithms are used in this research work. The main objective of this work is to retrieve the relevant information form web pages. In order to perform this task, there are two pattern matching algorithms are used they are reverse factor algorithm and smith algorithm. From the experimental results it is clearly observed that the Smith algorithm gives the better accuracy.

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CUSTOMER'S PERCEPTION ON AUTOMATED TELLER MACHINE SERVICES

Paper ID	IJIFR/V4/ E2/ 060	Page No.	5352-5356	Subject Area	Commerce
Keywords	Customer Perception, Account Holder, ATM-(Automated Teller Machine) Customer Satisfaction , ATM Card Holders				

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2nd	N. Pushpa Kala Devi	

Abstract

This research study was carried out to obtain the Customer perception of ATM Card holders in Chennai city. Research on the use of ATM system of banking customer perception remains unrepresented and is a growing area of interest. It further offered a controversial topic that ATM holders could engage in to further make sense of the different negative and positive effects of ATM use that exist, and how these directly influenced responses to gendered phenomena. It was therefore elicited significant constructions of results and hence was used as a vehicle to further add insight into the constructed nature of awareness about the customer services offered by ATM points to account holders, effectiveness of ATM service on account holders and the relationships between ATM services and customer satisfaction. This study thus shed light on the awareness of the ATM services to nurture evident results in customer satisfaction in society and as a view point for banking industry by showing how quality services offered by ATM service points are essential and its relationship to customer satisfaction.

I. INTRODUCTION

ATM (Automated Teller Machine) channel provides opportunity for banks to go for competent and cost effective models. There was a belief that internet banking channel will make the ATM channel irrelevant. However, ATM Channel has dominated the public technology segment, and future of ATM industry is also quite bright in India. New technological innovations emerge in our society on a continuous basis. But the diffusion of

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this technological innovation by the members of the society determines its success and continuation. In that sense, Automated Teller Machine (ATM) is not an exception. With the advent of ATMs, banks are able to serve customers outside the banking halls.

An Automated Teller Machine (ATM) allows customers to perform banking transactions anywhere and at any time without the need of human teller. By using a debit or ATM card at an ATM, individuals can withdraw cash from checking or savings accounts make a deposit or transfer money from one account to another or perform other functions. You can also get cash advances using a credit card at an ATM. Individuals should be aware that many banks charge transaction fees – generally ranging from Rs 50-150 per transaction - for using another bank's ATM.

II. STATEMENT OF THE PROBLEM

A study like the present one offers customers the opportunity to express themselves concerning their satisfaction or dissatisfaction with the use of banking services. One major problem faced by bank customers before the advent of ATM was long queues in banking halls which left many bankers frustrated. Customers of various banks in the Chennai city continue to grapple with problems related to automated teller machines (ATMs), a month after the inter-bank ATM transaction charges were scrapped on the directions of the Reserve Bank of India. While using ATM services found that 'machine out of cash', 'machine out of order', 'no printing of statement' and 'poor visibility of statement slip' were the important issues. It was clearly reflected from the study that there was no significant difference of opinion between male and female and public and private sector Bank ATM users regarding various problems while using ATM services.

III. OBJECTIVE OF THE STUDY

- To analyse the customer perception between various demographic variables and ATM services provided by various banks.
- The aim of the paper is to provide a groundwork investigation of the various ATM transactions, reasons to use ATM cards and various problems while using ATM card services.

IV. SCOPE FOR FUTURE STUDY

The present research on ATM services is a very convenient and has any time anywhere usage. As the services of ATM and number of ATM is increasing day-by-day, and simultaneously. Generally the youth prefer to use innovative and technology-based delivery channel like ATM that offer multiple benefits and autonomy of executing the transaction. The old age people are generally shy of use of ATM because of perceived risk of failure, complexity, security, and lack of personalized service. Future research should explore the association between age and attitude and determine its effects on the ATM service quality and customers' satisfaction in ATM services in Chennai city.

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V. RESEARCH METHODOLOGY

1) **Study Area:** The study area taken by the researcher is Chennai city.
2) **Period of the study:** The study is conducted over the period of 2 months from 1st June 2016 to 31st July 2016.
3) **Questionnaire Design:** The formulated questionnaire consisted of part-1 and part-11. The part 1 completely deals with the demographic information about Age, Gender, Occupation, and Education. The part -11 completely dedicated to bring out the impact level of Awareness of benefit of influencing ATM's and card holders in Chennai Area. The Questionnaire is elaborately deals with 16 questionnaires with Yes or No type. The Questionnaire was personally administered to the target sample and they took 15-20 minutes to complete the questionnaire.
4) **Data collection:** Data collection comprises of primary data and secondary data .The primary data has been collected through questionnaire and secondary data from related with journals, Books, and Electronic mails.
5) **Sampling plan:**The sample plan chosen within the city of Chennai like Saidapet, Mambalam and Kodambakkam .Random sampling has been resorted to. The focus is on the influence of people in ATM card and holder's .The questionnaire is distributed to a sample population of 50 respondents.
6) **Pilot study Report:** A preliminary investigation is done by conducting a pilot study. In this process the researcher collected 20 questionnaires from part of Chennai city to test the reliability and validity of the research instrument. The study represented consumers from various field such as business man, homemakers, students and service industry.
7) **Tool for Analysis:** The primary data collected has been analysed using various statistical tools as under mentioned below:
   - **i.)** Percentage Analysis
   - **ii.)** Non-Parametric Chi Square Analysis

Percentage Analysis: Percentage are often used in data presentation for the simplify numbers, reducing all of them to a 0 to 100 range. Through the use of percentage, the data are reduced in the standard form with base equal to 100 which fact facilitates relative comparisons. While using percentages, the following rules should be kept in view by researchers:

- Two or more percentage must not be averaged unless each is weighted by the group size from which it has been derived.
- Use off too large percentages should be avoided, since a large percentage is difficult to understand and tends to confuse, defeating the very purpose for which percentages are used.
- Percentages hide the base, from which they have been computed, if this is not kept in view, the real differences may not be correctly read.
- Percentage decreases can never exceed 100 percent and as such for calculating the percentage of decrease, the higher figure should in variably be taken as the base.

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- Percentage should generally be worked out in the direction of the casual- factor in case of two dimension table for the this purpose we must select the more significant factor out of the two given factors as the casual factor .

VI. DATA ANALYSIS

Table-1: The Following Problems Do You Usually Face While Using ATM Services of a Bank

Statement	Often	Rarely	Never	Total
Poor visibility of statement	13	18	19	50
Cards get blocked	2	23	25	50
Machine out of order	24	21	5	50
Unsuitable location of atm	8	22	20	50
ATM's not working	19	22	9	50
Provide old currency notes	15	19	16	50
Machine out of cash	11	29	10	50
Wrong amount of statement	3	14	33	50
Total	**95**	**168**	**137**	**400**

Table-2: Observed / Expected Values

Observed	Expected	(0-E)	(0-E)2	(0=E)2/E
13	11.875	1.125	1.265625	0.106579
18	21	-3	9	0.428571
19	17.125	1.875	3.515625	0.205292
2	11.875	-9.875	97.51563	8.211842
23	21	2	4	0.190476
25	17.125	7.875	62.01563	3.62135
24	11.875	12.125	147.0156	12.38026
21	21	0	0	0
5	17.125	12.125	147.0156	8.584854
8	11.875	-3.875	15.01563	1.264474
22	21	1	1	0.047619
20	17.125	2.875	8.265625	0.482664
19	11.875	7.125	50.76563	4.275
22	21	1	1	0.047619
9	17.125	-8.125	66.01563	3.854927
15	11.875	3.125	9.765625	0.822368
19	21	-2	4	0.190476
16	17.125	-1.125	1.265625	0.073905
11	11.875	-0.875	0.765625	0.064474
27	21	6	36	1.714286
10	17.125	-7.125	50.76563	2.964416
3	11.875	-8.875	78.76563	6.632895
14	21	-7	49	2.333333
33	17.125	15.875	252.0156	14.71624
Total	400			73.21393

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Table-3: The table value of chi-square for 14 degree of freedom

Chi-square value	Degree of Freedom	Table Value
73.21393	14	23.685

Source: Primary Data

Inference:

The table value of chi-square for 14 degree of freedom at 5 percent level of significance is 23.685. The calculate value of chi-square is much higher than this table value and hence the result of the hypothesis is does not support the hypothesis. Therefore the hypothesis is rejected.

Hypothesis:

Ho: There is no association between using ATM services of bank in Chennai city.

VII. CONCLUSION

Based on the ATM studies we hereby conclude that ATM is the easiest way of depositing and withdrawing money. Transaction is possible any time, that's why in India some people call ATM as "all-time money". If ATM machines are connected to internet then it's possible to do transaction from anywhere, 24 hours days and 365 days a year. With the security of ATM improving it has now become a safe mode of transaction. Thus the findings of the study may be very useful for bank officials and it may also help the ATM section of the banks to develop their future plans and strategies. Hence it can be concluded that ATM is safe, fast, reliable, convenient, excisable and any time money machine.

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A STUDY ON THE ACADEMIC ACHIEVEMENT OF THE 9TH GRADE LEARNERS IN SOCIAL SCIENCE

Paper ID	IJIFR/V4/ E2/ 066	Page No.	5357-5365	Subject Area	Education
Keywords	Achievement, Curriculum, Social Science, Universal				

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Abstract

Education has been given importance in India since from the earliest time. But when we see the developmental process of education, important and innovative phases of education came only after the independence of India by 1947. All over India, the secondary education is given importance and with it, it is also given importance in the north eastern part of India. Among the north eastern states, we know that Arunachal is located in the eastern most part of India having international borders with China, Bhutan and Myanmar. The literacy rate as per the 2011 census of Arunachal Pradesh is 66.96%. The formal education in Arunachal Pradesh practically began after the independence of India. During 1980, there were only 44 secondary schools in the state. The census report 1991 records 73 secondary schools were in Arunachal Pradesh and it gradually keeps on increasing. In this context, the present paper intents to highlight the findings on the academic achievement of secondary school learners of Upper Siang District of Arunachal Pradesh in social sciences..

I. INTRODUCTION

The secondary education is an important stage in the educational ladder. The present problem dealt with social science at secondary schools and strived to illustrate the academic performance of the learners to this subject. In the context of academic performance of students in social science, many studies have been conducted by the researchers like *shaver and Narton (1980), Morrissett (1982), Singh (1985), Dubey (1986), Bhagirathi (1978), Jain*

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(1981), Mishra (2002), Acharya et-al(2010) etc. with several variables. But on the other hand, when we look at a glance about the current trends and status of social science in the school curriculum of Arunachal Pradesh at secondary education, this area is most considered spectacular in terms of student's performance and felt by the investigator as a neglected area of study. Although many studies have been conducted by the earlier researchers on social studies in India, Arunachal Pradesh and abroad , but no study has been undertaken by any researcher on social science curriculum in relation to academic performance particularly in upper siang district of Arunachal Pradesh. Taking into cognizance an attempt is made by the investigator to study the present area in upper siang district of Arunachal Pradesh on academic performance of secondary school students in relation to management, location, gender, race and socio-economic variables. It is to be seen that the present system of secondary education in social science is performing well in upper siang district. A number of types of regional disparities may exist in the performance of the system. If so, it is imperative to explore the ways and means by which the regional disparities in secondary education in social science can be overcome and also to find out factors which facilitate or inhibit the performance of secondary school system. Such discussions will provide light for future policies in establishment and management of secondary schools taking consideration in social science subject. They will help the curriculum framers to frame the syllabus of the secondary learner in a sequence and logical way.

II. OBJECTIVES OF THE STUDY

In tune with the nature of the present research problem, the chief objective of the study was to examine the academic achievement of the 9th grade learners in social science. The formulated objectives for the study were:

1) To study the status of secondary education in the upper siang district in term of enrolment, gender gap and pupil-teacher ratio.
2) To investigate the academic performance of 9th grade learners of upper siang district on social science with respect to settlement, and gender.

III. HYPOTHESES OF THE STUDY

Keeping in view the formulated objectives, the investigator devised the following hypotheses in null form.

1. **Ho_1:** There lies no significant difference between the academic performances of the 9th grade learners of upper siang district on social science in relation to settlement variation.
2. **Ho_2**: There does not exist significant difference in the academic performance of 9th grade learners of upper siang district on social science in relation to their gender variation.

IV. METHODOLOGY

In this part of paper the investigator has highlighted the research design and procedure of investigation, i.e. how the investigator used the tools for the students of government

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secondary schools Yingkiong for finding the academic achievement of 9th grade learners of upper siang district in social science of Arunachal Pradesh. Therefore, the investigator had used the descriptive –cum –survey method of educational research for the completion of the research work.

4.1 Method

In this present chapter, the investigator applied Descriptive-Cum- Survey Method of educational research in order to discover the academic achievement of 9th grade learners of upper siang district in social science of Arunachal Pradesh of government secondary schools.

4.2 Population of the Study

The target population of the present study consisted of Male-Female students, rural and urban, 9th grades learners of government secondary school Yingkiong upper siang district, Arunachal Pradesh during the session 2013-14.

4.3 Sample of the Study

In this study, since there was no sufficient time to conduct the study or to cover up the whole population, in this context a small number of sample was selected as representative of the target population. So far the sampling procedure is concerned the investigator used the ***stratified random sampling procedure*** for collection of data which was consisted of 5 government secondary schools of Yingkiong session 2013-14, Upper Siang District ,Arunachal Pradesh.

4.4 Tools used in the Study

The selection of any tools in any piece of research study may be considered as a significant part of the study depending upon the data and the data depend upon the accuracy of the tools through the establishment of validity and estimation of reliability as the characteristics of good tools of evaluation. Therefore, investigator in the present study used a *self-developed Data Capturing Format (DCF)* to find out the academic achievement the 9th grade learners in social science of upper siang district, Arunachal Pradesh.

It is important to note that the investigators did not use any achievement test for collecting the required data from the selected sample of 362 of 9th grade learners. But, the investigator visited all the selected schools personally and collected the achievement scores of 9th grade learners which were scored in the session 2013-14.The investigator visited each selected school and collected the achievement scores of 9th grade learners in social sciences. The investigator visited 5 government secondary schools of Upper Siang District in Arunachal Pradesh and collected the raw score on the achievement test of the learners of 9th grade of session 2013-14.The investigator did his field work with utmost care by taking and considering all the legacies and ethics of data collection in educational research. After completion of the field study, the investigator completed the scoring work.

4.5 Statistical Techniques used in the Study

The present study was concerning to the academic achievement of 9th grade learners in social science of Upper Siang District, Arunachal Pradesh. For analyzing and computing the

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result, the investigator used measures of central tendency, measures variability, and t-test for computing the results.

V. MAJOR FINDINGS OF THE STUDY

The analysis and computation along with interpretations have been placed objective wise in the following sections.

Objective -1: To Study the Status of Secondary Education in Upper Siang District in term of Enrolment, Gender-gap, Pupil-teacher ratio.

Table -1: Indicating the total Enrolment of Students in Secondary Schools of Upper Siang District, Arunachal Pradesh.

Group	Numbers
Boys	417
Girls	392
Total	809

Table -2: Showing the Gender gap in Secondary Schools of Upper Siang District, Arunachal Pradesh.

Group	Number
Boys	417
Girls	392
Gender gap	25

Table-3: Showing the Total Teachers in Secondary Schools of Upper Siang District, Arunachal Pradesh.

Group	Numbers
Female Teacher	193
Male Teacher	502
Total	695

Table-4: Indicating the Pupil - Teacher Ratio in Secondary Schools of Upper Siang District, Arunachal Pradesh.

Group	Numbers
Total Teachers	14
Total Student	326
Pupil Teacher ratio	1:23

Interpretation:

An examination of the above tables reveal that at present the total number of schools in upper siang district, Arunachal Pradesh were 119 and the total secondary school were 9. The total enrolment of Secondary school in class IX for session 2013-14 have been shown in the Table no.1.1. The total number of girls learners were 392 and the boys learners were 417.By seeing the enrolment of all the learners, it can be said that the boy learners were out

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numbered than the girl learners. Likewise,the table no.1.2. reveals that the total number of teachers in upper siang district. In Upper siang district of Arunachal Pradesh, there were 193 female teachers and 502 male teachers in the secondary schools level during the session 2014-2015. The study revealed that there are more male teachers than the female teachers in the said district. The gender gap of the boys and girls found to be 25 during 2013-14 session in class IX, \and _the pupil –teacher ratio of the 5 selected government schools also came out to be = 1:23.

Objective-2: To investigate the academic performance of 9th grade learners of upper siang district on social science with respect to settlement, and gender.

Hypothesis -1: There does not exist significant difference in the academic performance of 9th grade learners of upper siang district on social science in relation their settlement variation.

Table-5: Summary of Comparison between the Performance of Urban and Rural Learner in Government School in Upper Siang District, Arunachal Pradesh.

Groups	N	Mean Scores	SD	SED	t - value
Urban	246	27.1	11.39		
Rural	100	57.1	8.44	1.11	27.02

Interpretation: The above Table no. 5 reveals that the computed t-value came out to be 24.02 which is greater than the criterion t-value 1.97 at .05 level of confidence for 344 o df. These 27.02 is significant at .05 levels. Therefore, the formulated hypothesis "There does not exist significant difference in the academic performance of 9th learners of upper siang district on social sciences in relation to their settlement variation gets rejected.

From this it is understood that there is significant difference in the academic achievement of 9th grade learners in social science of upper siang district in Arunachal Pradesh. The computation signifies that the rural learners performed better than the urban learners according to their respective mean scores which have been shown in the above Table no. 5.

Objective -2: To investigate the academic performance of 9th Grade learners of upper siang district on social science with respect to gender variation.

Hypothesis-2: There is no significant difference between the academic performances of 9th Grade learners of upper siang district on social science in relation to the gender.

Table -6: Summary of Comparison between the Performance of Male and Female Learners of Government Schools

Groups	N	Mean Scores	SD	SED	t - value
Male	155	39.1	16.11	1.74	1.83
Female	207	42.3	16.85		

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Interpretation: The above Table no. 6 reveals that the computed t-value came out to be 1.83 which is less than the criterion. t-value 1.97 to .05 level of confidence for 360 df. Therefore, 1.83 is not significant at .05 level of significance. Therefore, the formulated hypothesis "There is no significant difference between the academic performance of 9th grade learners of upper siang district on social sciences in relation to Gender variation gets accepted.From this, it is understood that there is significance difference in the academic achievement of 9th grade learners in social sciences of upper siang district in Arunachal Pradesh. The computation signifies that the female learners performed better than the male learners according to their respective mean scores which have been shown in the above Table no 1.6.

VI. DISCUSSION OF THE RESULT

The analyses and interpretations of the result has drawn the generalization of the study that:

1. The enrolment of female learners was more than the male learners and the female learners had better academic achievement than the male learners.
2. The learners whose parents are in service had better academic achievement than those learners whose parents are farmers.
3. Non-APST /General .had better academic achievement than the APST learners.
4. The rural learners had better academic achievement than the urban learners

From the findings of the study, it can be taken into consideration that the male learners need guidance by the teachers as well as their parents immediately. The parents whose occupations are farming should be given awareness on importance of education so that those parents will also realize the importance of education and encourage and motivate their children. Apart from these, there should be guidance and counseling programmes for the urban dweller parents to create time for their children and pay attention for their studies than offering only luxurious items as and when they need.

In this perspectives, proper guidance, counseling and orientation programmes should be organized for the teachers, parents and the students knowing about the importance of social science in the secondary school than that of other subjects, because social sciences talk about the development of social mobility , adjustment and humanitarian values among the learners.

VII. EDUCATIONAL IMPLICATIONS OF THE STUDY

In tune of the analysis of the present study, the investigator has recommended some pertinent educational implications in reference to the academic achievement on social science. They are as under-

1. The study would help the teachers of secondary schools to know about the student's performances on social science and their level of achievement on it.
2. The study would help the teacher to use the teaching learning materials for making the teaching –learning process more interesting on social science subject so that the learner can perform better.

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3. It is found that female learners performed better than the male learners, so accord should be there for counseling for male learners and to develop positive parent's attitude towards their son.
4. The study would help the curriculum framers to frame the social science curriculum of the secondary school level on the basis of the finding of the study.
5. The study would help the education departments to strengthen the quality and balance approach to deal with the students of secondary schools level on social science subject.
6. Necessary attention should also be accorded for the conduction of orientation programme for all the secondary school teachers, parents and students about the importance of social science in daily life.
7. In the study, it is found that learners of rural areas perform better than the learners in urban areas, so from the study it has found that only urban learners did not perform better always but the rural learners also had better achievement. Therefore, the urban learner's parents also should be given proper guidance and counseling for their children academic performances.
8. The study would help the APST parents to take care of their children's academic performances and give them orientation programme.
9. The study would help to give orientation and counseling programme for the learners whose parents are farmers, so that even their children will perform better in the subject of study.
10. The study would help the teacher to make the learners more active on social science subject along with science and mathematics subjects.

VIII. CONCLUSION

The present study has revealed that the performance of 9th grade learners in social sciences of upper siang district, Arunachal Pradesh. Thus, Secondary education has become very important in the sphere of education. The part of the curriculum which deals with human relationships and aims to contribute to the development of good citizenship is usually referred to as social studies. In numerous school systems, it means a series of separately taught subjects such geography, economics, and civics, and history. In other educational systems social studies consist of the direct examination of issues and problem encountered in the learner's environment. In 9th grade this latter approach is more common than separate subject centered approach. This deals with social studies and strives to illustrate specifically academic performance of learners to this subject by presenting detailed information about teaching social studies in 9th grade of upper siang district, Arunachal Pradesh.Thus, the government of Arunachal Pradesh should take importance on the performance of the achievement on social science along with the other academic subject because social science subject is very important for any individual who lives in the society. Social science teaches us about the mobility and adjustment within the society. Social science teaches about the humanitarian and tolerance unlike those of scientific thought. Last not the least; it is the education which creates a backbone for a nation. Where there is good

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quality of education, there will be certainly good and quality citizen and when there is good citizen then any obstacles cannot prevent a nation from prospering and development. Hence, education should be the most priority for any nation whether it is pre - primary, primary, elementary, secondary and higher secondary level.

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ACADEMIC PROJECT CHARTER OF SIX SIGMA DMAIC METHOD - THE NEW PARADIGM SHIFT OF EDUCATIONAL RESEARCH

Paper ID	IJIFR/V4/ E2/ 063	Page No.	5366-5372	Subject Area	Education
Keywords	Academic Project Charter, Six Sigma DMAIC Method, Educational Research				

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Abstract

The quality, necessitated as the renewed interest in teacher education, has been spurred by the free spirit and the new world enterprise, which seeks to create human talent pool that can adapt to new ideas, cultures and environment (Hariharan and Mohanasundaram (2013). Further, Looking to the 2030 horizon, a highly competitive and sustainable social market economy will be needed in order to maintain social cohesion according to the European council. The teacher education and training are the key factors to achieve this aim (HariHaran, Zascerinska & Swamydhas, 2013).

I. INTRODUCTION

But for now, the 2030 horizon requires teacher training reform in order to facilitate teacher's creation of new products, new patents, new entrepreneurial activities and new jobs as prospective teachers succeed harder to find a job in the light of enormous socio-economic and unprecedented demographic challenges. Therefore, innovative teacher training should teach how to turn challenges into advantages, thereby producing innovative products and services of the highest quality and improving their competitiveness (HariHaran, Zascerinska & Swamydhas, 2013).

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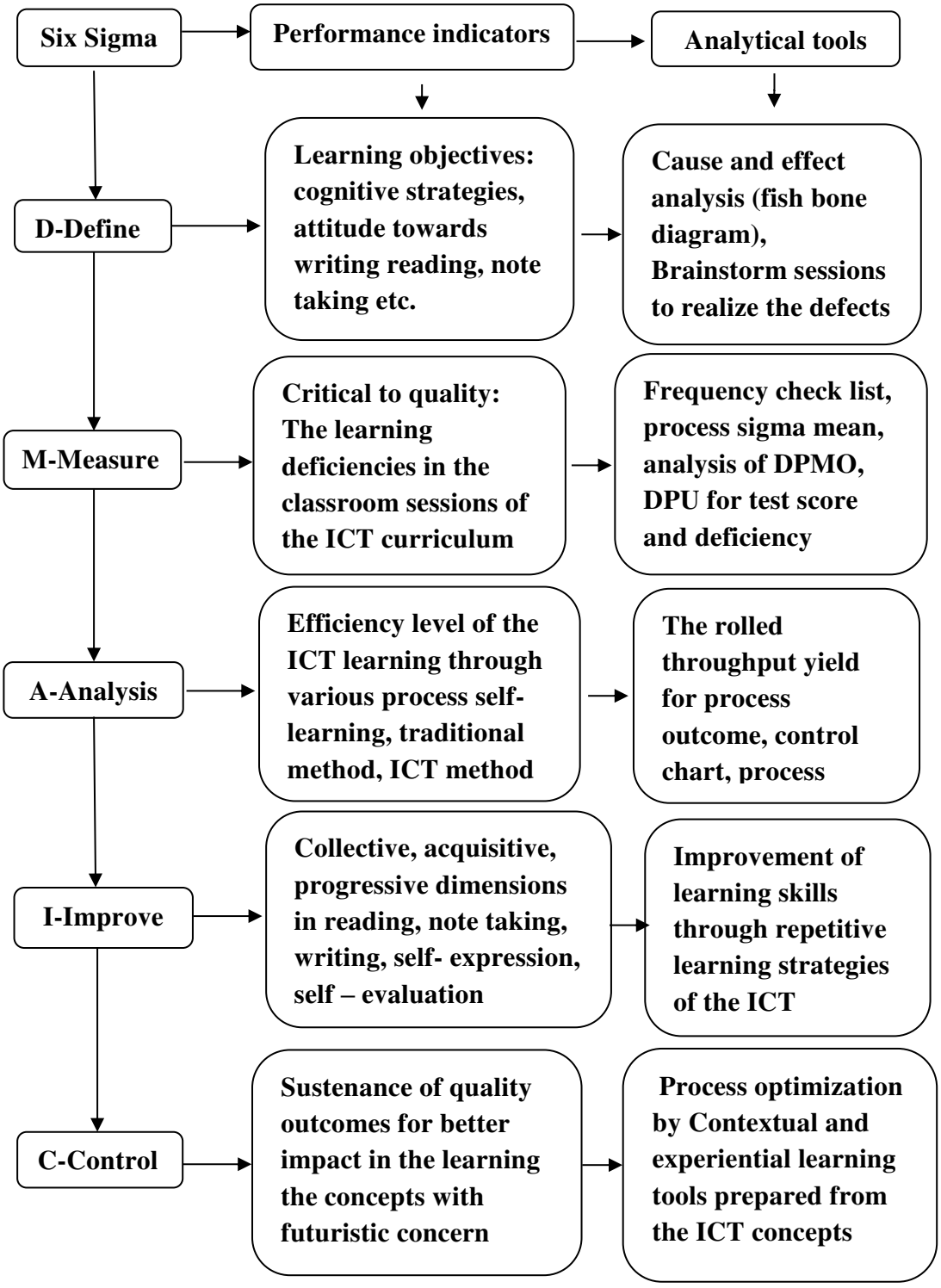

Figure: 1 – Six sigma – DMAIC based analysis of learning

For attaining the quality, Six Sigma methodology can be applied and this has seen broad acceptance in industry, no study has been published about its use in the learning

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process of secondary teacher trainees. Although some indicate that the methodology would be applicable to higher education (Raifsnider & Kurt, 2004) but its approach is limited only to specific administrative setting. It has five stages with each letter in the acronym stands for one as in figure 1 in which the various performance indicators and its analytical tools are illustrated.

The DMAIC method emphasizes data analysis and fact-based decision making. The method guides a structured exploration of reasons leading to the problem. The essence of the DMAIC method is to reduce variation in a process to achieve high conformance quality in customers' terms and its application in the class room learning framed by HariHaran, Zascerinska & Swamydhas (2013), is shown in the table 1.

Table – 1: DMAIC Principles Applied to the class room learning System

D : Define the instructional process with learning objectives and outcomes
M : Measure student learning in the classrooms of prospective teachers
A : Analyse student learning in the classroom by statistical process
I : Improve student learning based on the data analysis in the analyse phase
C : Control plans that institutionalize the improvements for the future to ensure that student learning stay at a desired level

The whole concept of Six Sigma DMAIC is discussed in detail as under:

II. CONCEPT OF SIX SIGMA DMAIC

2.1. Define Phase

This phase defines the academic process, identifies critical learning requirements and links them with the academic needs. It also defines the strategy charter and class room processes to be undertaken for Six Sigma and present case study focuses on the project through which the passing rate of the prospective teachers in a teacher education college is to be improved.

In the define phase, the goals of the improvement activity are clearly defined. The parameters which greatly influence the goals of the academic practice in respect to quality are called critical to quality (CTQ) parameters. In the process of defining, the goals of CTQ are identified through Voice of Customer (VOC). VOC is collected by conducting brain storming sessions among the customers. Project Charter, CTQ flow down and Process mapping are the important tools used in this phase.

2.2. Academic Project charter

Academic project charter revealed in table 2 is a document stating the purposes of the project. It contains the elements such as academic activities, problem statement and goal statement. Academic charter indicates the purpose of the project in which the goals and objectives are established. The next element is the problem statement which clearly expresses the problem to execute. After establishing the problem statement the six sigma team has to decide the target values by thoroughly observing the past data. These values are mentioned in a statement called Goal statement.

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Table 2 - Academic project charter

<table>
<tr><td colspan="4">Project title: Enhancement of learning ICT concepts of prospective teachers</td></tr>
<tr><td colspan="4">Project description: The psycho - somatic variations occur during the learning of ICT concepts in the classroom and these variations may be disruptive factors of learning outcome which is reflective through depleted level in writing, reading, self – expression, cognitive, note taking etc. While this study analyses to bring these effects down, The potential effect of various learning modes on the positive development of learning have also been additionally analyzed.</td></tr>
<tr><td colspan="4">Scope: The classroom analysis on learning by suitable statistical tools</td></tr>
<tr><td>Project objectives:
To enhance the learning efficiency the prospective teachers
To the minimize learning deficiencies</td><td>Mode of learning
1. Self– learning
2. Traditional teaching
3. ICT based learning</td><td>process variations
Cognitive, writing, Reading, note taking, self–expression and self – evaluation</td><td>process outcome
To reduce the defects in learning.
To increase achievement level.</td></tr>
<tr><td rowspan="3">The need for the analysis</td><td colspan="3">Customer Impact : The students are ‘customer’ and learning efficiency is ‘product’ and making the more productive learning in the class rooms is an indispensable impact</td></tr>
<tr><td colspan="3">Process impact : To minimize the influence of the psycho – somatic factors</td></tr>
<tr><td colspan="3">Social impact: quality in learning of prospective teachers is the supreme essence for the best societal transformation at all levels in this modern global scenario which is based on neo economical world order. Moreover, This will yield the best impact in the entire functioning of the school system.</td></tr>
<tr><td>Academic officials</td><td>Members of management council</td><td colspan="2">Entire process responsibility</td></tr>
<tr><td>Project champion</td><td>Dr.K.Mohanasundaram, Theprincipal-grade-1, Government Arts college, The chief of research work on academic six sigma for process performance.</td><td colspan="2">Advocates the team efforts to manifest the perfect leaning by remarkable modifications of the class room instructional process.</td></tr>
<tr><td>The master Black Belt</td><td>R. Hariharan ,
The investigator of the six sigma research work</td><td colspan="2">Deals to implement Six Sigma & gathers and analyses data about team activities as per the direction of the project champion.</td></tr>
<tr><td>The Black Belts
(Team of professors)</td><td>Dr.P. SwamyDas
Dr.R. Arumuga Rajan
Dr.D.Sivakumar
Dr. K. Thiyagu
&
Shri.K.Natarajan</td><td colspan="2">Reviews/revises/clarifies the project, Works with team members, Selects project team members and Identifies resources for the team, Documents final project results.</td></tr>
<tr><td>Process owners</td><td>All staff members become responsible “owners”</td><td colspan="2">They are responsible for continuous improvement</td></tr>
</table>

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Receiving the solutions for improvement		and maintenance of the same
The Green Belt	The team members bring the brain and measure for collection and analysis of data needed to improve the process	**Student Advisory Committee** • Carries out instructions for data collection and analysis • Carries out assignments. • Reviews the efforts of the team itself. • Learns new data-driven ways to manage the operation
Process acceptance (The Association of Teacher Education in Europe-ATTE)	Prof. Irena Zogla Prof. Andris Grinfields Dr.Linda Daniella Dr.Sanita Baranova	Verification of process report presentation in its final form.
Process Discussion	Dr. Jelena Zascerinska Dr. Alaster. S. Douglas Dr. Paulo Dias	Discussing the processes outcome and the publication of the research reports.

2.3. Measure Phase

This phase is inclusive of identifying the critical to quality (CTQs) characteristics of the process which is decisive to determine the factors that contribute to student attrition. Once the CTQs are identified, surveys and interviews can be used to measure their effects on passing rate and data collection is the main emphasis of this phase.

Define	Measure	Analyse	Improve	control
Project definition (31-10-2010) Top level process (13-11-2010) Team formation (13-11-2010)	Process variation Estimation of variation Estimation of Baseline	Value stream analysis (muda analysis) Statistical inference	Implementation of new process Access the benefits Evaluation of failure mode	Standardising academic plans Control plan Learning the process more

The baseline statistics such as sample mean (μ), standard deviation (σ) and process capability indices *C*p and the *C*pk for each CTQ are calculated. The process capability index is an easily understood aggregate measure of the goodness of process performance. The Failure mode and effect analysis (FMEA) can also be performed to measure the failure factor.

2.4 Analyse phase

In this phase, process capability analysis is analysed to find out the actual state of the process. The existing DPMO (Defects per million opportunities) or PPM (Parts per million)

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level which is the way to calculate the sigma level or yield of a process is determined using process capability analysis. Minitab software may be used for analysing the data and it generates a process capability report.In the present case, a survey is conducted among the prospective teachers on the basis of collection opinion method through check lists. This is the most appropriate way of finding the Key Critical Factors (KCF) of a teacher training college which directly or indirectly affects the passing rate of the students. The procedure followed is enumerated:

- As the academic process has found the key critical factors of the institute so we are opting for the student system. Being students this would be most appropriate to collect the data.
- The student performance will be adjudged in the most important fields like class room learning.
- A survey will be conducted among the students to categorize the degree of importance of various factors of learning.
- The learning deficiencies and some key performance areas will be located in sub-systems like home environment and assigned weightage according to the importance.

2.5 Improve phase

Improve the process to remove cause of defects. The optimal solution for reducing mean and variation is determined and confirmed in improve phase. The gains from the improve phase are immediate and are corrective in nature. Specific problem identified during analysis are attended in improve phase. This phase involves improving process performance characteristics for achieving desired results and goals.

2.6 Control phase

This phase requires the process conditions to be properly documented and monitored through statistical process control methods. After achieving the desired level of Sigma in the learning stage of DMAIC cycle, there is a continuous control of the process. The control phase aims to institutionalize the improvement results from six sigma methods through documentation and standardization of the new procedures. It includes the setting up of monitoring and process control systems. Control charts are used to monitor the system performance. In the control phase control charts are prepared in respect of CTQs to sustain the quality improvement

III. CONCLUSION

The academic six sigma as a comprehensive and flexible system of achieving, sustaining and maximizing the process outcome through adopting the societal needs, efficient use of facts, statistical quality control principles and attaining the objectives through effortful consideration to manage, improve and reinventing the educational process (Hari Haran & Mohanasundaram, 2013).

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AN ANALYSIS OF USAGE OF SOCIAL NETWORKING SITES AMONG COLLEGE STUDENTS

Paper ID	IJIFR/V4/ E2/ 067	Page No.	5373-5377	Subject Area	Management
Keywords	Social Media, SNSs Among Students, Usage Of Social Networking Sites				

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Abstract

Social networking sites (SNSs) have created a new social dimension where individuals can increase their social awareness by keeping, dispensing new data or products and gathering information in every of life. SNSs are dominating all internet users', especially the students' community. The use of social media to exchange information for the purposes of learning and social activity has become a common practice among the college students. The present study investigates the usage and the purpose of usage of SNSs among college students.

I. INTRODUCTION

A social networking service (social networking site or SNS) is a platform to build social networks or social relations among people who share similar interests, activities, backgrounds or real-life connections. Social Media are media that allow users to meet online via the internet, communicate in social forum like Facebook, Twitter, etc., and other chat sites, where users generally socialize by sharing news, photo or ideas and thoughts, or respond to issues and other contents with other people. Social network site (SNS) has become the most dynamic Web 2.0 application which enables students not only to socialize with friends but also interact with lecturers (Hamat et al., 2012). The usage of Social Networking Sites (SNS) among the people of India is evidently increasing, particularly

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among the Indian college students (Manjunatha, 2013). Today`s college students have matured by playing video games and using social networking sites. This generation students prefers to stay connected around clock with their friends and family by means of texting, instant messaging, mobile phones and facebook (Ito et al., 2008).

II. OBJECTIVES OF THE STUDY

- To analyze the usage of social networking sites.
- To identify the purpose of usage of social networking sites.

III. LIMITATIONS OF THE STUDY

- Most of the students are not ready to express their full information based on the structured questionnaire.
- The sample size was only 150, so the results of the study cannot be generalized.

IV. REVIEW OF LITERATURE

- Helou et al., (2014) attempted to obtain students' perceptions on how social networking sites impact their academic performance. The study confirmed that most of the students are engaged in the use of SNS mainly for socializing activities rather than for academic purpose. However, most of the students felt that the SNS have more positive impact on their academic performance especially among the undergraduate students.
- Salvation and Azharuddin (2014) opined that Social network sites (SNS) attracts considerable attention among teens and young adults who tend to connect and share common interest. The study was designed in ways to analyze the impact of social network sites on students' academic performance in Malaysia, using a conceptual approach. The study concluded that more students prefer the use of facebook and twitter in academic related discussions in complementing conventional classroom teaching and learning process.
- Shahzad et al., (2014) investigated the use of social media to exchange information for the purposes of learning and social activity among the university students at Saudi Arabia. The analysis revealed that there is no direct relationship between the social media usage and the academic grades unless the usage does not become excessive. Average use of social media by students exceeding 13 hours a week and 2 hours a day has negative effect on their academic grades.
- Tayseer et al., (2014) in their study examined the effect of usage of social networks on students' engagement in both academic and social aspects. The study revealed that students use social networks for social purposes more than the academics. Students consider social media as entertainment networks and it reduces stress and makes them forget about academics.

V. METHODOLOGY

The present study is descriptive research. The study was conducted for a period of 3 months (April 2016- June 2016). The study was conducted among the various college students in

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Coimbatore. A sample size of 150 respondents is selected using convenience sampling technique.

VI. ANALYSIS AND INTERPRETATION

6.1 Percentage Analysis

The following are the findings based on Percentage analysis:

- **Personal Details:** 80% of the respondents are in the age group of 19-23 years, 74.7% of the respondents are female, 46% the respondents are from urban area, 65.3% of the respondents are UG students , 50% of the respondents are arts students, 90% of the respondents are single, 78.7% of the respondents belong to family size of 3-5 members.
- **Usage Pattern of Social Networking Sites:** 56.7% of the respondents use SNS daily, 64.7% of the respondents use SNS socially, 92.7% of the respondents feel SNS are important , 72% of the respondent's parents are aware of SNS usage of their children , 67.3% of the respondents access SNS through smart phone, 42.7% of the respondents use Social Networking Sites in evening, 33.3% of the respondents use SNS 2-3 years, 40.7% of the respondents spend between 1-2 hours daily in SNS, 32% of the respondents have 51-100 friends in SNS, 51.3% of the respondents use SNS for e-learning and 44.7% of the respondents are neutral in initiating online courses.

The following table shows the ranking factors for usage of social networking websites

Table- 1: Ranking Of Usage Of Social Networking Web Sites

PARTICULARS	WEIGHTED AVERAGE	RANKING
Youtube	18.33	2
Wikipedia	16.52	4
Facebook	20.17	1
Twitter	14.36	5
Google+	16.64	3
Linked in	9.80	6
Flickr	9.48	7
Slideshare	9.19	8
Blogger	7.79	9
Orkut	6.77	10

It is inferred that facebook (20.17) is the main social networking website used by the respondents.

6.2 Descriptive Analysis

The following table shows the descriptive statistics of the respondent's opinion on purpose of using social networking sites

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Table -2: Purpose Of Using Social Networking Sites

Purpose of using SNS	N	Mean	Std. Deviation
To meet people	150	4.0333	1.06448
Sharing photo files, music, videos	150	3.9267	1.12981
Instant message	150	4.3667	.86247
To find information	150	4.1733	1.02811
Updating profile information	150	3.9333	1.04056
Entertainment	150	4.2133	1.00727
Asking question or responding to question	150	3.6667	1.02103
Expand applied knowledge in a subject	150	3.7800	1.01578
Helps to build a student- lecture relationship	150	3.6133	1.10391
Help academic performance	150	3.8667	1.08477
Understand lecture	150	3.6867	1.01754
Valid N (list wise)	150		
	AVERAGE MEAN	3.932727	

The result from the above table shows the agreeability of the purpose of using social networking sites among the respondents. The highest mean score of 4.36 implied that respondents use social networking sites for the purpose to message instantly and the lowest mean score of 3.61implied that respondents use social networking sites for the purpose to build a student – lecture relationship.

The average mean score of (3.93) denotes that the respondents agree with the purpose of usage of social networking sites.

VII. SUGGESTIONS

- Students should use social networking sites academically more than using it for socially.
- Students should use social media to improve their academic performance.
- Students should ignore the unwanted attention and messages from unknown persons. Students should not get addicted to social networking sites.
- Education institutions can create some education sites in Social Networking Sites to help students.
- Students should be taught proper time management to enhance their better academic performance through Social Networking Sites.

VIII. CONCLUSION

In this study the impact of social networking sites has been presented and discussed. It is found that most of the respondents belong to the age group of 18-23years, are female, most of them use social networking sites socially rather than using it for academic performance. The social networking sites such as facebook, twitter, youtube is most widely used nowadays. Social network sites revealed that it has attracted millions of users due to affordance and reach. While some use it for socializing purposes, others use it for academic purposes to complement classroom teaching and learning activities. Students personally achieve the basic competences required to access SNS applications by themselves or

through friends. They open accounts for themselves, post photos or even video and audio, exchange messages, and build groups of interest.

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