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Contents

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About the Journal

The Journal of Teacher Education and Research (formerly Ram-Eesh Journal of Education) is the official Journal of the Ram-Eesh Institute of Education, which was established in 1999 under the Rama-Eesh Charitable Trust, New Delhi. Its first issue was published in 2004. It is a half-yearly journal. The purpose of this Journal is to foster inter cultural communication among educators and teachers nationwide; encourage transactional collaborative efforts in research and development; and promote critical understanding of teacher education problems in a global perspective. The Journal is designed to reflect balanced representation of authors from different regions of the Country.

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Editorial

These days there seems to be restlessness in the academic sphere in this country. NCERT School learning survey made great revelations about school learning out comes at different levels. Government of Delhi-NCR broke new grounds in fund allocation for school education in its budget of 2016-17. It also initiated innovative measures for training and developing educational leaders from among its principals by sending them to I.I.Ms and even to cambridge university, other larger states need to follow.

There is upheaval in some of our universities which shows academic and political diversities.

Layman feels nothing seems to work while we educators feel such turmoils augur good times to come.

There is another good thing that innovation and research is receiving attention at public, government and academic levels. Gujrat government has given a list of research topics to the universities in the state which has rattled political parties and media houses. Research as such is being recognized for its potential in driving the country on the part of development.

This all leads to a feeling that academics may see some better times.

In this issue of the Journal, we present to our readers host of paper on varied topics. Most of the papers are focussed on teachers. One paper is on developing and standardizing of an achievement test in chemistry.

No research paper on the teacher education was received.

However it is heartening to note that educational research is entering the portals of medical college and the first research paper on addressing teaching and learning practices in the dental education is being published here.

We hope in times to come we may get research papers on teacher education and primary education too.

The research paper are present here –

Atul Bamrana conducted study to improve competency of multiplication process among grade V students by adopting appropriate use of teaching learning material to perk up their understanding of mathematical concepts. The results were significant.

Mohsin Ali Khan made a comparative study of social maturity of students of Government and private secondary schools 70% of students of Government schools were found to have

good level of social maturity in comparison to 40% students of private schools. It was concluded that students of government schools are more socially mature.

Prakash Chandra Jena through descriptive research and survey has studied the optimistic and pessimistic tendency among senior secondary school students. Analysis of data revealed significant difference in optimistic-pessimistic tendency among male and female students studying in government and private schools.

Anuradha Sekhri focused on construction and standardization of achievement test in Chemistry for class IX students. Experts were consulted. The content validity was ascertained by preparing a blue print of test items showing weightage given to objectives and competencies of these items. Reliability of the test was established by split half method coefficient of correlation was calculated to be 0.82 between two tests.

Malvinder Ahuja undertook this study for finding effectiveness of using advance organizers in initial teaching for mastery. Two sets of learning packages – generalizations as advance organizers and analogy as advance organizer- were prepared. Findings were that treatment groups scored higher than conventional group. Out of two groups, the generalizations advance organizers group scored higher than analogy group. However self-esteem, gains were not found significant among the groups. Mastery learning strategies had larger effect size between experimental and control group.

Poonam Pandey and Poonam Pandey attempted a comparative study of job satisfaction among teachers of government and private schools. No significant difference in job satisfaction in respect of age of two types of teachers was observed. In respect of teaching experience also no significant difference was found. With regard to salary also no significant difference was observed.

V. Balakrishnan and A. Anbutahasan have tried to investigate the soft skills of teachers in relation to locality, type of management and teachers grade. The study reveals that rural and urban school teachers differ significantly in their team building skills. It also showed significant difference in oral communication, computer organizing leadership and team building skills of government and private school teachers. Further significant difference was observed among teachers working at different grade levels viz. secondary, graduate and post graduate grades in their oral communication, computer, leadership and ethical skills.

Jyotsna A. Amin in her study has attempted to establish the status of science laboratory in the secondary schools of Vadodara city and its use by teacher and students. She also discussed problems faced by teachers in using and managing the laboratory. Suggestions were also sought to improve the laboratory work at secondary school stage.

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A Study to Improve the Competency of Multiplication Process among Grade V Students

Atul Bamrara

ABSTRACT

Teachers are subjective insiders concerned in classroom education as they go about their daily routines of instructing and guiding students, evaluating papers and their day to day performance as well as looking at the curriculum. The teachers are supposed to involve them in each and every activity associated to all round development of students. But, the task of teaching-learning is not as easy as it seems and the teachers face a lot of intricacies in this process. The present research focuses on application of teaching learning material in teaching Mathematics and its correlation with learning level of students.

Keywords: Mathematics learning, Action research, Teaching learning material, Learning level, Teaching methodology

ACTION RESEARCH – AN INTRODUCTION

Since its inception in the work of Kurt Lewin in 1946, the meaning and purpose of action research has taken on many forms.

"Action research is the study of a social situation with a view to improving the quality of action within it." (Elliot, 1991)

"Action research is a form of collective self-reflective inquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as their understanding of those practices and the situations in which the practices are carried out …. The approach is only action research when it is collaborative, though it is important to realize that action research of the group is achieved through the critically examined action of individual group members" (Kemmis and McTaggart, 1988).

"It is an approach to improve your own teaching practice. You start with a problem you encounter. Faced with the problem, the action researcher will go through a series of phases (reflect, plan, action, observe) called the Action Research Cycle to systematically tackle the problem. Usually you discover ways to improve your action plan in light of your experience and feedback from students. One cycle of planning, acting, observing and reflecting, therefore usually leads to another, in which you incorporate improvements suggested by the initial cycle. Projects often do not fit neatly into a cycle of planning, action, observation and reflection. It is perfectly legitimate to follow a somewhat disjointed process if circumstances dictate" (Center for Education Innovation, 2016, para. 4).

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"Action research … aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously. Thus, there is a dual commitment in action research to study a system concurrently with collaboration among members of the system in changing it in what is together regarded as a desirable direction" (Gilmore, Krantz, and Ramirez, 1986).

RATIONALE

Mathematics is an important domain of human life. We can be cheated in routine life if we don't have sound understanding of basic mathematical processes (addition, subtraction, multiplication, division etc.) – everybody requires minimum skills. At primary level, mathematics is supposed to be a complex subject among kids as well as for society. That's why, it is very important to teach the subject with utmost care using appropriate teaching/learning materials with appropriate activities. Multiplication is a normal process which is expected to be carried out by a V grade student. Using the process, a student may apply the skills in his/her routine life and make his life better as well as improved. Using the appropriate teaching methodology, the students can understand the concept and learn quickly. Not only the students' learning level will be improved, but also the performance of students as well as the fame of school will be acknowledged by society. In such a way, we can make our school a learning centre and set an example for others.

OBJECTIVES OF THE PROPOSED RESEARCH

After completing this research, we will be able

- to inculcate the knowledge of multiplication and to clarify the correlation in between
- to acquaint with the different mathematical symbols: '+', '-', '×', '÷'.
- to develop the skill of solving one-digit and two-digit multiplication problems.
- to develop the analytical framework of the students with respect to multiplication process.

PROBLEM STATEMENT

I have observed in my school that the performance of the students with respect to the topic 'multiplication' is not up-to-mark, and they are unable to solve the problems based on the topic. The schedule was too tight for the academic year, and the examinations are very close, but many of the students don't have a sound knowledge and understanding of basic arithmetic operations. After observation, I started the 'multiplication' topic, and accordingly, I practiced the problems to students and rest of the questions was given as exercises/home work. On the next day, I observed that they were unable to perform the home work, and in such a way I identified the said problem.

REVIEW OF LITERATURE

The term 'action research' was introduced by social psychologist, Kurt Lewin. In his paper 'Action research and minority problems' published, when he was a professor at MIT, he described the action research as 'a comparative research on the conditions and effects of

various forms of social action and research leading to social action' that uses 'a spiral of steps, each of which is composed of a circle of planning, action and fact-finding about the result of the action' (Wikipedia Encyclopedia, 2015).

It is because of Kurt Lewin that the action research was associated with research where the goal was to promote social action through a democratic process and have active participation of practitioners in the research decisions. The action research flourished through the 1950s under Stephen Corey at Teachers College, Columbia University (Feldman, 1994). Later, in the 1960s, it was not as popular because it was associated with radical political activism, and there were concerns about both the level of rigor used and the training involved for those who lead action research projects (Stringer, 1999). In the 1970s, the action research remerged under the influence of Laurence Stenhouse and John Elliott in Britain. The emphasis shifted to that of practical deliberation, focusing on human interpretation, negotiation and detailed descriptive accounts in place of measurement and statistical analysis (Center for Educatio Innovation, 2016, background of action research). In the 1980s, it gained popularity once again, partly because of the work in Britain, but also because of the tradition that was started by Lewin and Corey in the United States (Feldman, 1994).

Groups doing the action research include field workers, teachers, administrators and supervisors. The goal has been to change and improve practice. It is usually seen as a group process enabling cooperative work to influence both thought and action among the group members. The action research has become a form of research that describes how humans and organisations behave, and it has also become a change mechanism helping people and organisations reflect on and enact change (Reason and Bradbury, 2001). Since its inception, there have been many key people studying action research. There are hundreds of books on the subject and numerous web sites.

In educational settings, there are a variety of action research methods available to use, depending on the group and the goals that are identified. It can involve a single teacher investigating an issue in his or her classroom, a group of teachers working on a common problem, a team of teachers working with others focusing on a school or an even larger group working on a district-wide issue. Ferrance (2000) classifies these different types of action research as individual, collaborative, school-wise and district-wise.

LIMITATIONS OF THE RESEARCH

The outcomes/reasons observed may be applicable to only our school as the learning level of children may vary with geographical locations. The societal framework may also create an impact to grasp the content quickly/slowly.

IDENTIFICATION OF REASONS FOR THE PROBLEM

Reasons	Fact/Observation	Control
No or less knowledge of ascending and descending order of numbers	Self-observation	Teacher
No or less knowledge of multiple, multiplier and multiplication process	Observation by inspection	Teacher

Not using the carry over process	Observation by inspection	Teacher/Student
No use of TLM	Self-observation	Teacher
No interest in multiplication process	Self-observation	Teacher, family env.
No excitement in teaching	Self-observation	Teacher/Student

On identifying the above mentioned problems I worked on –

Hypothesis 1 (H_0): There is no significant correlation between identification of numbers and understanding of multiplication processes

Hypothesis 2 (H_0): There is no significant correlation between the use of teaching learning material (TLM) and understanding of multiplication process

RESEARCH METHODOLOGY

SN	Actions	Processes	TLM Used	Time
Hypothesis 1				
1	Counting of numbers, right pronunciation & writing of numbers or recognition of numbers using TLM and home work	From general to abstract, exercise method	Match sticks, white board, marker, pebbles and others	02 Days
2	Teaching how to write two- and three-digit numbers in ascending and descending order, home work, discussion	The concept of ascending and descending order	Chart, riding of monkey on the three (video)	01 Day
3	Evaluation of past day's Home Work, sums based on two-digit numbers without carry, home work	Self-demonstration of addition process	White board	02 Days
4	Evaluation of past day's HW, sums based on addition & subtraction processes with carry of large numbers	Self-demonstration of addition process	White board	02 Days
Hypothesis 2				
1	Allotting as HW to remember/ learn tables up to 25	*Demonstration* Multiplication is the miniature form of addition process, for example $2+2+2+2=8$ Or $2\times4=8$	Chart showing tables up to 25	1 Week

2	Teaching the multiplication process of one digit with each other	*Demonstration* Question–answer method (oral/written)	Flash cards	02 Days
3	Teaching the multiplication process of two digits with each other	*Demonstration* Question–answer method (oral/written)	Flash cards, seeds, rosaries	02 Days
4	Teaching the multiplication process of more than two digits with each other	*Demonstration* Question–answer method (oral/written)	Coins, marbles and others	05 Days

EVALUATION

Evaluation has been done in two steps. Two set of questionnaires has been designed to test the knowledge of kids, one before implementation of the above plan and another after implementation. The following results have been observed:

Before Implementation

Total Students	Passed	Failed	Average % of Total Marks Gained	Passed %	Failure %
4	2	2	52.5	50	50

After Implementation

Total Students	Passed	Failed	Average % of Total Marks Gained	Passed %	Failure %
4	4	–	85	100	0

CONCLUSION AND RECOMMENDATIONS

After analysing the post test results, it is clearly inherent that the positive outcomes have been accomplished. Nevertheless, there is a gap of 15 marks in average which has to be uplifted by micro-level observations.

After making this study, it has been observed that a fearless milieu as well as appropriate use of teaching learning material can perk up the students' understanding of mathematical concepts, and they will take interest in the subject. So, the research outcomes can be replicated in other classes to pick up the students' output as far as the associated subject is concerned. The teachers should alter their teaching methodology to inculcate the right and appropriate knowledge as the fundamental concepts are the backbone of the subject.

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ANNEXURE I (Pre-Test Questionnaire)

1.	Write down the following in 1s, 10s and 100s form: 143,256, 7,554,389
2.	Which is the smallest and biggest number in the following: 14,356, 7,554, 4,256
3.	Write the following numbers in words: 2,451, 765,342
4.	Write the place value of seven in following: 2,471, 765,342
5.	Write down the smallest and largest six digit number:
6.	Multiply the following: $37,743 \times 9$, $7,630 \times 45$, $31,985 \times 43$
7.	Rohit matchstick's company manufactures 12,000 match boxes in a day, how many match boxes will be manufactured by their company in a week?
8.	One farmer grows 1,500 quintals of rice in a plot. So, how much rice will he produce with 15 such plots?

ANNEXURE II (Post-Test Questionnaire)

1.	Write down the following in the expanded form: 143,256, 7,554,389
2.	Which is the smallest and biggest number in the following: 14,356, 7,554, 4,256
3.	Write the following in the numeric form: Two thousand fifty nine, Fifty five thousand eight
4.	Find out the even and odd numbers: 2,471, 765,342, 29,054, 10,092
5.	Write down the smallest and largest five digit number.
6.	Multiply the following: $37,743 \times 9, 7,630 \times 45, 31,985 \times 43$
7.	Rohit matchstick's company manufactures 1,000 match boxes in a day, how many match boxes will be manufactured by their company in a year?
8.	Swati got 72 out of 100 marks in the half-yearly examination of mathematics. How many marks she has to score 160 out of 200 marks?

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Social Maturity of Students of Government and Private Secondary Schools – A Comparative Study

Mohsin Ali Khan

ABSTRACT

The present study reveals the comparative data on social maturity of adolescents studying in government and private secondary schools in district Faridabad, Haryana. The sample comprises of randomly selected a total of 80 students (40 from each type school) from class 9th. Standardised tool of social maturity (by: Dr. Roma Pal, Agra University) was used to collect the relevant data. The major findings of study indicate that majority of government secondary school students (70%) were found under good level of socially maturity and more aware about various social issues. Whereas less number of private school students (40%) were reported under the same good socially mature category and less aware about various social issues. Low number of government school students (22%) and a little high number of private school students (55%) were found under average level of socially maturity. A significant difference (t-value 2.98) in level of social maturity was found between the students of government and private secondary schools, which shows that government school students are more socially mature and aware about our social issues than their fellow students of private schools. Thus, it was concluded that parents of government school students are more concerned with human and social values as compare to the parents of private school students because family environment is a key factor for socialisation.*

Keywords: Social maturity, Levels of social maturity, Types of social maturity, Socialisation, Adolescents, Social environment

INTRODUCTION

Development is essential aspect for the individual as well as the process of socialisation. It is also true that maturity marks the end of growth and development, the development depends upon the maturation and learning which is concerned with the force, inside as well as outside of the individual (Newman and Newman, 1986). In some aspects of development, maturity of development in term of structure and function comes of fairly early age, whereas in others it comes later. Social maturity permits more detailed perception of the social environment which helps adolescents to influence the social circumstances and develop stable patterns of social behaviour. How an individual performs in an environment also depends largely on how he or she has adapted or adjusted to it.

MEANING AND TYPES OF SOCIAL MATURITY

Man is a social animal and his existence without social set up can hardly be imagined. Parents, family members, neighbours, peer groups, society and others expect him to behave in a

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socially acceptable manner and to learn the ways to interact with them. Social maturity produces a climate of trust, harmony, active co-operation and peaceful co-existence. This ability functions in an appropriately responsible manner while understanding the social rules and norms in place in a given culture, and the ability to use that knowledge effectively is known as social maturity. Social maturity is a term commonly used in two ways: first, with respect to the behaviour that is appropriate to the age of the individual under observation, and second, the behaviour that conforms to the standard and expectations of the adults. A person who has characteristics of bodily development, mental development and finally societal awareness and his/her roles in the group for sense of fair play, socialisation treatment with others create a peaceful coexistence (Clausen, 1968).

RATIONALE OF STUDY

School is an institution which contributes to the total educational and socialisation process directed to the development of personality of an adolescent. Social maturity may be classified into five categories; Self confidence, Self direction, Social feeling, Social productivity and Social values. These features of social maturity are the guiding force for an individual to behave properly in any social environment (Greenberger, 1974). School environment includes relationships among and between administration, teachers, parents, students and the community that influences over all development. School has two types of responsibilities, to remove those situations which produce maladjustment in students and to detect undesirable behaviour of students and to correct them.

School plays a vital role in the development of an adolescent as they spend most part of their day attending school, engaging in extracurricular activities; and even at home engaged in scholastic work (Rao Nalini and Shanker, 1975). Studies reveal that the positive effect of social maturity on the overall behaviour of a person and at adolescence age this maturity governs the overall behaviour of growing children almost everywhere in life. In present study, the researcher had tried to find out the level of social maturity of growing adolescents studying in government and private secondary schools of district Faridabad, Haryana. This study may provide some useful results which could help students to improve achievement and teachers their performance.

STATEMENT OF THE PROBLEM

To compare the level of social maturity of students studying in government and private secondary schools.

OBJECTIVES

1. To study the status of social maturity of students of government secondary school of district Faridabad.
2. To study the status of social maturity of students of private secondary school of district Faridabad.
3. To find out significant difference in level of social maturity between the students of government and private secondary school of district Faridabad.

HYPOTHESIS

The null hypothesis has been formulated for the study:

H0-1: There is no significant difference in level of social maturity between the students of government and private secondary school.

OPERATIONAL DEFINITIONS OF KEY TERMS

Social Maturity

The ability to function in an appropriately responsible manner while understanding the social rules and norms of a place in a given culture and the ability to use that knowledge effectively is known as social maturity.

Govt. and Pvt. Secondary School Students

The students studying in classes 9th and 10th in any recognised Govt. and Pvt. schools are called as secondary school students.

DELIMITATIONS

1. The study was limited to the sector-22, district Faridabad of Haryana State.
2. Two governments and two private secondary schools were selected to get a total sample of 80 students.
3. Only class 9th students were chosen for the study.
4. A standardised tool was used to collect the data.

METHODOLOGY

The normative survey research method will be applied to conduct the present study.

Population

Students of all government and private secondary schools of district Faridabad, Haryana constitute the population for study.

Sample

The sample comprises of randomly selected 80 students (40 students from each type of school) of class 9th of sector-22 of district Faridabad.

Tool

A standardised tool of social maturity constructed by Dr. Roma Pal (Agra University) was used to collect relevant data.

Analysis of Data

The data was analysed quantitatively as well qualitatively by using appropriate statistical techniques.

Table 1: shows the raw score and level of social maturity

S.No.	Range of score	Interpretation
1.	149 & above	Highly social mature
2.	106–148	Good social mature
3.	85–105	Moderate social mature
4.	61–84	Social immature
5.	60 & below	Highly social immature

Tabular and Graphical Presentation of Data

The analysis and interpretation of relevant data has been done quantitatively and qualitatively.

Table 2: Social maturity level of students of government secondary school

S.No.	Social maturity level	No. of student *N* = 40	Percentage of student	Result/Interpretation
1.	Highly social mature	03	7.5	Approx. 7% students show high level of social maturity
2.	Good social mature	28	70.00	70% students show good level of social maturity
3.	Moderate social mature	09	22.50	Approx. 22% students show average level of social maturity
4.	Social immature	None	00.00	None of students show social immaturity
5.	Highly social immature	None	00.00	None of students show high social immaturity
	Total	**40**	**100.00**	

Table 2 reveals that out of the total sample of students, 40 belong to Govt. secondary school; only 7.5% students show *very high level* of social maturity, around 70.00% students have shown *good level* of social maturity and 22.50% students were classified under *average level* of social maturity, whereas *none* student was found under socially immature category.

Table 3 reveals that out of the total sample of students, 40 belong to private secondary school; none of the students show *very high level of social maturity*, around 40% students have shown *good level of social maturity* and 55% students were classified under *average level of social maturity,* whereas 5% students were found under low level of social maturity or *social immature category*.

Testing of Hypothesis

The testing of hypothesis is the backbone of any research. The hypotheses are based on the major objectives, since it is the pathway to achieve them through proper investigation (Mangal, 2007). In the present study, null hypothesis (H0) was formulated, which was testified and result/interpretation is given in Table 4.

Table 3: Level of social maturity of private secondary school students

S.No.	Social maturity level	No. of student *N* = 40	Percentage of student	Result/Interpretation
1.	Highly social mature	00	00	None % of students show high level of social maturity
2.	Good social mature	16	40.00	40% students show good level of social maturity
3.	Moderate social mature	22	55.00	55% students show average level of social maturity
4.	Social immature	02	5.00	05% of students show social immaturity
5.	Highly social immature	00	00	None of students show high social immaturity
	Total	**40**	**100.00**	

Table 4: shows significant difference in level of social maturity between students of government and private secondary school

Type of students	*N*	*M*	S.D.	*t*-value	d.f.	Interpretation and result
Govt. school	40	103.92	78.34	**2.98***	(*N*1 + *N*2) - 2	*t-Value significant*
Private school	40	91.10	45.72		40 + 40 = 80	*at both levels of*
					80 - 2= **78**	*confidence*

As per the major objective of the study, Table 4 reveals clear difference in the mean (45.56) and standard deviation (21.92) values of data related to social maturity, which is reflected in calculated *t-value, 2.98** which is *significant* at both levels of confidence (0.01 and 0.05). Therefore, as per the *null hypothesis*; 'that there is no significant difference in level of social maturity between the students of government and private secondary schools of Faridabad, Haryana was '*rejected*'.

With the result, it can be concluded that the level of social maturity of students studying in recognised government and private schools of district Faridabad, Haryana was found different. Majority of government school students were found more socially mature and aware about our social issues than their fellow students of private schools, whereas private school students show little low level of social maturity, and they were found less socially mature and aware about the social issues.

MAJOR FINDINGS AND RESULT DISCUSSION

- Government school students (08%) were found in *high level of social maturity*, whereas none student of private school was reported in this level of social maturity.
- Majority of government school students (70%) were found *good level of socially maturity* and more aware about various social issues.

- Private school students (40%) were also found *good socially mature* but they were less aware about various social issues as compare to the government school students.
- Majority of private school students (55%) were found under *average category of social maturity, whereas* less number of government school students (22%) was reported in this category of social maturity.
- A significant difference *(t-value 2.98*)* in level of social maturity between the students of government and private secondary schools was found showing the rejection of null hypotheses.
- Though the academic achievement of private school students is being normally higher than those government school students but generally they are being more ill mannered and less sensitive towards social issues as compare to government school students.
- The major finding of study revealed the high level of social maturity of students belonging to government school, since students in government school come from middle and poor class families.
- Generally parents of government school students are more concerned with human and social values as compare to the parents of private school students who normally belong to upper-middle and rich-class families.

IMPLICATIONS OF THE STUDY

The following implications could be helpful for students, teachers and policy makers:

- Studies reveal the positive effect of social maturity on the overall behaviour of a person. At adolescence age, this maturity governs the overall behaviour of students and growing children.
- A separate period in school time table should be given every day for moral education, where all students can learn human and social values.
- Project work should also be given in real sense to all students for better knowledge, cooperation and understanding about human and social issues.
- A counselling session on benefits of human and social values for both students and parents should be arranged by every school every month along with Parenet Teacher Meeting PTM.
- The findings of the present study may help teachers and policy makers to understand actual problems of social maturity among students, since it is directly related to adjustment, anxiety and overall the academic performance.

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Optimistic–Pessimistic Tendency among Senior Secondary School Students

Parkash Chandra Jena

ABSTRACT

Descriptive research and survey method has been used. All the senior secondary school studying in different senior secondary schools in Ludhiana district of Punjab constitutes the population for the present study. The investigator has selected 200 students (100 each from govt. and private schools) from 20 schools by using simple random-sampling technique. To collect data, optimistic–pessimistic scale by D.S. Parasar was used and for result analysis, t-test has also applied. The findings of the study revealed that there exists no significance difference in optimistic–pessimistic tendency among senior secondary school male and female students studying in government and private schools.

Keywords: Optimistic, Pessimistic, Senior secondary school, Govt. and private school, Students

INTRODUCTION

Improve all aspects of the quality of education to achieve recognized and measureable learning for all-especially in literacy, numeracy and essential life skills

(World Education Forum, 2000)

Education plays a pivotal role in shaping a person. Education in its general sense is a form of learning in which the knowledge, skills and habits of a group of people are transferred from one generation to the next through teaching, training or research. The aim of education is to make a man physically, mentally, practically job-oriented, independent, open-minded, helpful and perfect in every field. A balanced education, while aiming at total growth, should give full opportunity to the learner to discover and use his fullest potential. The teacher plays a vital role to encourage the students to become an independent learner and member of the classroom, school and community. To foster a co-operative, respectful working relationship in teaching and learning process, positive tendency can help to make a person stronger with his outlook and pursuit of goals where as a person with negative tendency faces all the demons that break his whole personality and adversely affect his progress in life. To provide effective optimistic-learning environment for students, the teacher works and share responsibility to:

- Develop a positive, respectful working relationship.
- Meet standards of professional and ethical conduct in relation to students, parents and colleagues.

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- Advocate for conditions of success for students with their needs.
- Advocate for the protection of the legal and human rights of students.
- Follow guidelines established by the school/district to protect the safety and well being of children and youth.
- Maintain positive, supportive and professional relationships within the education.

OPTIMISTIC–PESSIMISTIC TENDENCY

Optimism and pessimism – expecting a positive or negative future – are distinct modes of thinking that are best conceptualised, not rigidly and dichotomously but rather, as a continuum with many degrees of optimism and pessimism. A person can be optimistic in regard to a specific area of life but pessimistic regarding other aspects. People also may shift positions on the optimism–pessimism continuum as the timeline unfolds. Successful living requires a fine balance between optimism and pessimism. Over-optimism may encourage one to take uncalculated financial risks that will end up disastrously. Similarly, over-confidence may lead to negligent and reckless behaviours, for example not taking the necessary precautions to prevent common health and fires hazards, which may result in a catastrophe. On the other hand, worrying too much about potential dangers and focusing one's energy on what might go wrong leads to avoidance behaviour, passivity, exacerbation of low mood and an increase in the vulnerability to depression. Therefore, the optimal equilibrium is a cautious optimism which is firmly grounded in reality.

Optimism is an attitude on the part of an individual towards life or towards certain events, which tends to an excessive extent to dwell on the hopeful side, whereas pessimism is an attitude towards life or philosophy of life expressing itself in the view that is better not to be, or that man is born to misfortune. It is the mental position that represents an individual's degree of like or dislike of an item and generally positive or negative view of a person, place, thing or event. At the most general level, optimism can be described as the belief and resultant behaviours that one can positively affect the future, or even more simply that the future will be better than the past. Pessimism can be described as the general belief and resultant behaviours that one cannot positively affect the future, or more simply that the future will be no better – indeed will be worse – than the past. The contrasting descriptions of optimism and pessimism argue that both the attitudes are fundamentally habits of thought (dispositional interpretations of reality) and hence, like any other habits, can be changed.

In terms of general character traits and behaviours, optimists are more confident and persistent, and are able to meet challenges. They have higher subjective well-being, experience fewer negative feelings when problems arise, are more reality focused and are approach coping; that is, if a problem is encountered, optimists tend to approach the problem and attempt to solve it. Whether in specific areas of life or as general attitudes across all areas of life, optimism and pessimism are self-fulfilling prophecies involving self-enhancing, and self-defeating cycles of thought, emotion, behaviour and environment effects. The key to success in life is positive attitudes illustrated as "No pessimist ever discovered the secret of starts, or sailed to an uncharted land, or opened a new heaven to human spirit." (Helen Keller).

Pessimism is a state of mind in which one anticipates undesirable outcomes or believes that the evil or hardships in life outweigh the good or luxuries. Value judgments may vary dramatically between individuals, even when judgments of fact are undisputed. The most common example of this phenomenon is the 'is the glass half empty or half full?' situation. The degree in which situations like these are evaluated as something good or something bad can be described in terms of one's optimism or pessimism, respectively. Throughout history, the pessimistic disposition has had effects on all major areas of thinking.

REVIEW OF RELATED LITERATURE

Kaur (2001) explored a study on optimistic–pessimistic attitude in relation to emotional maturity among high-school student of English and non-English medium schools and concluded that optimistic–pessimistic attitude of students of both English and non-English medium high-schools does not have significant impact on their emotional maturity.

Yates (2002) studied the influence of optimism and pessimism on student achievement in mathematics and found the relationship between pessimism and lower achievement in mathematics and optimism and higher achievement in mathematics.

Hasan and Power (2002), in their study 'Optimism and pessimism in children: A study of parenting correlates', found that maternal pessimism was correlated with child pessimism and maternal depressive symptoms were negatively correlated with child optimism and indicated that mothers who were moderately controlling their children little autonomy in problem solving had the highest level of depressive symptoms.

Kaur (2004) conducted study on optimistic and pessimistic attitude in relation to extroversion and neuroticism in senior secondary school students found that there existed no significant relationship between optimistic and pessimistic attitude in relation to extroversion and neuroticism in senior secondary school students. She further concluded that there exists a significant relationship between extroversion and attitude in girl students, and there exists no significant relationship between attitude and extroversion in boys.

Joseph (2004) conducted his study on the influence of optimism and pessimism on the psycho-physical wellness of learners in Grades 8–12 and predicted a positive correlation between optimism and physical wellness of adolescents. It also found that pessimism had a significant negative correlation with the indices of physical wellness.

Ganguly (2005) conducted study of optimism and pessimism and its impact on adjustment pattern of B.Ed. students and concluded that though optimism and pessimism do not have any impact on adjustment pattern, even then parents should develop optimistic attitude among children towards life in to lead a progressive, successful and adjusted life.

Kaur (2005) explored in a study on psycho-social problems of educated working women in relation to optimism and pessimism found that there exists no significant relationship between psycho-social problems of educated working women and optimism and pessimism.

Joshi *et al.* (2006a,b) explored a study on in relation to optimistic and pessimistic attitude among adolescent boys and girls and found that boys as compared with girls experience more depression. The respondents having pessimistic attitude were more depressed than the respondents who had reported optimistic attitude.

Kaur (2003) conducted a study on the impact of optimistic–pessimistic attitude on academic achievement of adolescents and stated that optimistic–pessimistic attitude has significant impact on academic achievement of students.

Kaur (2007a,b,c) conducted a study on optimistic–pessimistic attitude in relation to creativity and found that there exists no significant relationship between optimistic–pessimistic attitude and creativity of senior secondary school students, and it was also found that there exists no significant difference in the optimistic–pessimistic attitude between boys and girls.

Kaur (2007a,b,c) conducted a study on adolescents in relation to optimism and pessimism and found that there exists no significant relationship between occupational aspirations of adolescents and optimism and pessimism of adolescents. She further concluded that it is parents who still dominate occupational aspirations and choices of their wards.

Chadha *et al.* (2008) studied the impact of optimistic and pessimistic attitude on academic achievement of adolescents and signifies that the optimistic–pessimistic attitude had significant relationship with academic achievement among male and female adolescents as well as adolescents of science and arts stream.

OBJECTIVES

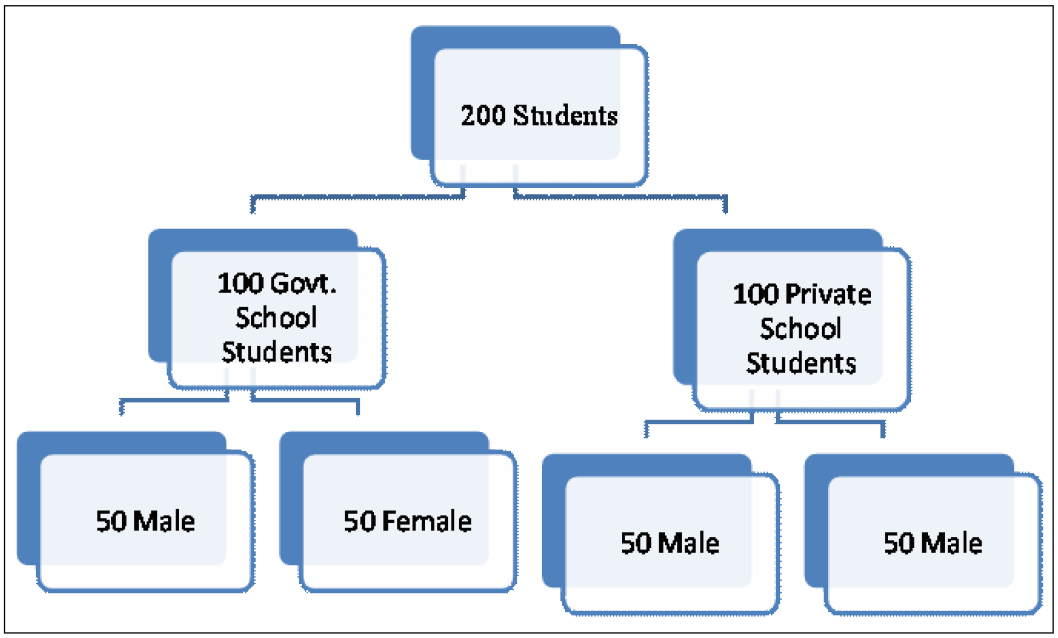
- To study the difference in optimistic–pessimistic tendency among senior secondary school students in relation to gender and type schools.

HYPOTHESES

- There exists a significant difference in optimistic–pessimistic tendency among senior secondary school male and female students studying in government schools.
- There exists a significant difference in optimistic–pessimistic tendency among senior secondary school male and female students studying in private schools.

METHODOLOGY

A descriptive research and survey method has been used. All the senior secondary students studying in different senior secondary schools in Ludhiana district of Punjab constitutes the population for the present study. The investigator has selected 200 students (100 each from govt. and private schools) from 20 schools by using simple random sampling technique. To collect the data, optimistic–pessimistic scale standardised by D.S. Parasar in 2002 was used and for result analysis, *t*-test has also used. The classification students as sample are given below:



RESULT PERTAINING TO DIFFERENCE IN OPTIMISTIC–PESSIMISTIC TENDENCY AMONG SENIOR SECONDARY SCHOOL MALE AND FEMALE STUDENTS STUDYING IN GOVERNMENT SCHOOLS

To find out the difference in optimistic–pessimistic tendency among senior secondary school male and female students studying in government schools, *t*-test was applied, and the result is presented in Table 1.

Table 1:

Type of School	Gender	Variable	*N*	*M*	S.D.	SE_M	df	*t*-Ratio
Government senior secondary school	Male	Optimistic–pessimistic tendency	50	27.48	4.09	0.58	98	0.12
	Female		50	27.58	4.44	0.63		

Table 1 shows that the mean scores of optimistic–pessimistic tendency of male and female senior secondary students studying in government schools as 27.48 and 27.58, respectively. The *t*-ratio is 0.12 with df = 98 which is not significant at 0.05 level of confidence. Therefore, it can be interpreted that there exists no significant difference between optimistic–pessimistic tendency of male and female senior secondary students studying in government schools. Thus, the proposed hypothesis was rejected.

The significance of the difference between means of optimistic–pessimistic tendency among male and female senior secondary students studying in government school has been shown graphically in Figure 1.

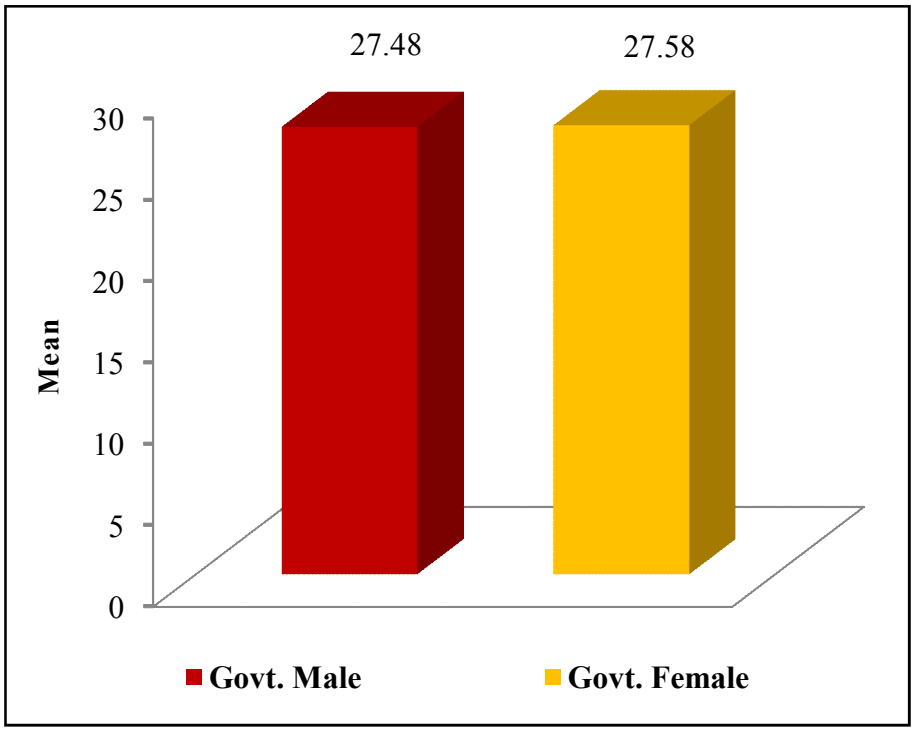


Figure 1: Bar graph showing difference between means of optimistic–pessimistic tendency among senior secondary male and female students studying in government schools

RESULT PERTAINING TO DIFFERENCE IN OPTIMISTIC–PESSIMISTIC TENDENCY AMONG SENIOR SECONDARY SCHOOL MALE AND FEMALE STUDENTS STUDYING IN PRIVATE SCHOOLS

To find out the difference in optimistic–pessimistic tendency among senior secondary school male and female students studying in private schools, *t*-test was applied, and the result is presented in Table 2.

Table 2:

Type of School	Gender	Variable	*N*	*M*	S.D.	SE_M	df	*t*-Ratio
Private senior secondary school	Male	Optimistic–pessimistic tendency	50	28.80	3.32	0.47	98	1.34
	Female		50	27.80	4.08	0.58		

Table 2 depicts the mean scores of optimistic–pessimistic tendency of male and female senior secondary students studying in private schools as 28.80 and 27.80, respectively. The *t*-ratio is 1.34 with df = 98 which is not significant at 0.05 level of confidence. Therefore, it can be interpreted that there exists no significant difference between optimistic–pessimistic tendency of male and female senior secondary students studying in private schools. So, the proposed hypothesis was rejected.

The significance of the difference between means of optimistic–pessimistic tendency among male and female senior secondary students studying in private school has been shown graphically in Figure 2.

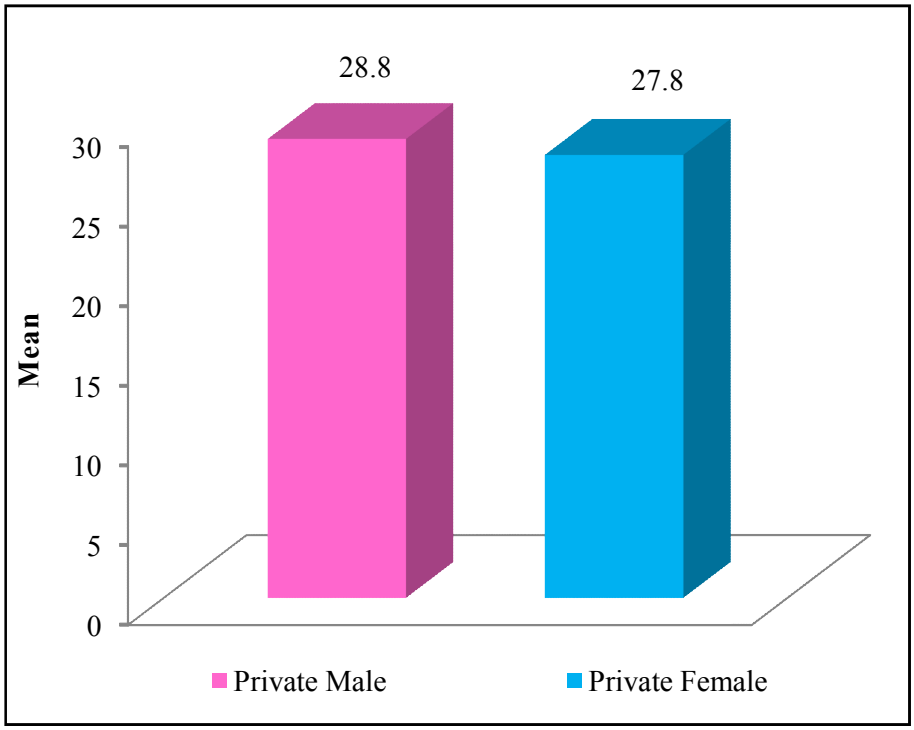


Figure 2: Bar graph showing difference between means of optimistic–pessimistic tendency among senior secondary male and female students studying in private schools

MAIN FINDINGS

- There exists no significant difference between mean scores of optimistic–pessimistic tendency of male and female senior secondary students studying in government schools.
- There exists no significant difference between mean scores of optimistic–pessimistic tendency of male and female senior secondary students studying in private schools.

RECOMMENDATIONS

- This study may be helpful while providing guidance and counselling to the students.
- This study may be helpful to develop optimistic tendency among students with good learning environment.
- This study provides the importance of learning environment in developing optimistic tendency among students.
- This study may be helpful to tell us that optimistic learning environment plays important role in developing efficient and skilful individual in the society.

SUGGESTIONS

- The present topic of investigation can be repeated with large sample of school students to get more reliable and valid results.
- The present study was confined to senior secondary students of Punjab only. The study can be extended to the other states of the country.
- Similar study may be conducted with respect to other variables like emotional intelligence, coping strategies, home environment, parental encouragement and certain demographic variables like age, socio-economic status and others.
- The study may be conducted on school-going students and degree colleges-going students.
- Similar study may be conducted on residential school students, elementary school students, college students, university students and teacher trainees.
- The sample size should be large for clear and appropriate results.
- Hindi and Punjabi version tests may be used for Hindi and Punjabi students.

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Construction and Standardisation of Achievement Test in Chemistry of Class IX

Anuradha Sekhri

ABSTRACT

This study focused on the necessity of construction and standardisation of achievement test in chemistry. The purpose of the test was to measure the acquisition of concepts of chemistry. The test was made to measure knowledge, comprehension and application of the concepts of class IX chemistry students. All the items were of multiple choices, fill in the blanks, matching type and true–false statements. Each item has four alternatives out of which one is correct. After deciding the objectives of the test, a pre-assessment is made of the items to be put in the test. The nature of questions was given after weighting each and every component of subject matter as far as the curriculum is concerned. The study discussed the need for constructing standardised mathematical aptitude test for secondary-stage learners. The achievement test was constructed in mathematics for class IXth. In the final draft, 62 items were retained. The opinion of experts was taken to find content validity. The content validity is concerned with the adequacy of sampling of a specified universe of content. To determine the content validity of the test items, a list of outcomes was given to experts individually in subject matter. Experts also solved the test so that the scoring key could be verified. Only those items were kept in the draft for which there was complete agreement among the experts. The content validity was ascertained by preparing a blueprint of the test items indicating the weight age given for the objectives and competencies by these items. The split-half method was used to find the reliability of the test. The product moment coefficient of correlation was calculated. The coefficient of correlation between two test scores was found to be 0.82.

Keywords: Construction, Standardization, Achievement, Reliability, Validity, Test, Chemistry

INTRODUCTION

Achievement is the pivot and centre of educational growth and development. In general, it refers to the scores obtained in the annual examination. It is measured and assessed by achievement tests and compared to the set norms so as to evaluate an individual's performance. These tests may either be standard or made scholastic. Achievement occupies the most important place in the field of education.

IMPORTANCE OF ACHIEVEMENT IN CHEMISTRY

The importance of achievement is evident from the efforts being put in by all educational institutions to maximise the achievement of their students. Achievement is the most important goal of education. It refers to the degree or level of success of proficiency attained in some

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specific area concerning scholastic or academic work. It may have a pervasive effect on student's personal behaviour towards a goal. Good (1959) defined standardised achievement test as 'a test for which content has been selected and checked empirically, for which norms have been established for which uniform methods of administering and scoring have been developed and which may be scored with a relatively high degree of objectivity'. According to Anastasi (1955), 'undoubtedly the large number of tests covering the content of specific courses is prepared by the instructors for use in their own classroom. Most of the schools focus on student progress as the ultimate criterion therefore, it is important to evaluate the status of pupils expertly'.

OBJECTIVES

- To construct an achievement test in chemistry for the students of class IXth.
- To standardise an achievement test in chemistry for the students of class IXth.

Research method: Survey method was used as it was most appropriate for the study.

DEVELOPMENT OF ACHIEVEMENT TEST IN CHEMISTRY

Achievement tests propose to measure what and how most pupils have learnt as a result of formal and informal instructions. These are utilised as evaluating courses of study or efficiency of teacher and teaching methods or other educational factors. The achievement tests differ from intelligence or aptitude tests in that the former measures the quantity or quality of learning attained in a subject of study or group of subjects after a certain period of instruction and the latter measures pupil's innate capacity for attainment or accomplishment independent of learning. An achievement test can be designed for the following purposes. *First*, performance can be measured to provide information about the characteristics of student's present behaviour. *Second*, achievement test can be measured to provide information about the instructional treatment which produces that behaviour. So, from the above point of view, the development of achievement test was a crying need. In the present study, achievement test was developed from criterion referenced tests that exhibited significant response variance to measure the performance of the students. It can be differentiated from criterion referenced tests on the basis of purpose, different age, normality of conditions and others. The development of achievement test passed through three stages: (i) first draft of achievement test, (ii) second draft of achievement test and (iii) final draft of achievement test. The description of all drafts of achievement test in chemistry has been given below:

FIRST DRAFT OF ACHIEVEMENT TEST IN CHEMISTRY

The first draft of achievement test was prepared on the basis of 87 test items selected after the validation of criterion referenced tests. The development of achievement test involves following steps: (i) planning, (ii) preparation, (iii) tryout and (iv) evaluation. The detail description of tryout and evaluation has been given in the following section.

First Tryout and Evaluation

After a tryout of the criterion referenced test, problems faced by the students were noted and

given due consideration at the time of revision of the first draft. On the basis of the performance of the students, discussions were held with the science teachers individually. The test was administered to 50 students of class IX of D.A.V. Model School, Sector-15, Chandigarh. During data collection, proper rapport was established and maintained by the students. The respondents were explained how to take the test. Every reasonable precaution was taken to ensure normal conditions during the administration of the test. The aim of this try-out was to provide data for item analysis. The detailed and clear instructions were given for proper administration of the test. After scoring, item analysis was done. The items were analysed qualitatively, in terms of their content, and quantitatively in terms of their statistical properties. To make a selection of items objectively and scientifically, item analysis was done. Item analysis is the process to evaluate the effectiveness of items in a test by exploring the examinee's responses to each item. Item analysis of the test is primarily done to find out ambiguities, clues, ineffective distracters and technical defects that might have been overlooked during test construction. In addition, it yields two kinds of information, namely answer-sheets were evaluated and arranged in a descending order of scores. Kelley (1939) criteria of item analysis were used to find out the difficulty value and index of discrimination. Following procedure was followed:

(i) The answer sheets of all the students were arranged in descending order.

(ii) The top 27% cases formed the upper group and the bottom 27% cases formed the lower group.

(iii) After that, the correct response for each item in both the groups was calculated.

Each group consisted of 14 students. As such, difficulty value and discriminatory power were calculated from these subgroups making a total of 28 students. For calculating difficulty value and discrimination power, the following formulas were used:

$$\text{Difficulty value (DV)} = \frac{R_U + R_L}{N}$$

$$\text{Discriminating power (DP)} = \frac{R_U - R_L}{N/2}$$

Where, R_U = number of right responses in the upper group, R_L = number of right responses in the lower group and N = total number of students in both the groups.

The distribution of difficulty value (DV) and discriminating power (DP) for each item of the first draft were computed as given in Table 1.

Table 1 shows that item discrimination reflects the degree to which an item distinguishes between the high- and low-scoring groups. The discriminating power of the test items on the first draft ranged from 0.07 to 0.64. The items are considered very good and needed no revision when the discrimination value is 0.40 and above. Accept and scrutinise item for improvement when the discrimination value is between 0.30 and 0.39. Item may be used as marginal and scrutinised for improvement when the discrimination value is between 0.20 and

Table 1: Distribution of difficulty value and discriminating power of items of the first draft

Item No.	R_U	R_L	DP	DV	Remarks
1	12	7	0.36	0.68	A
2	11	5	0.43	0.57	A
3	10	1	0.64	0.39	A
4	12	6	0.43	0.64	A
5	10	5	0.36	0.53	A
6	9	5	0.29	0.50	A
7	8	3	0.36	0.39	A
8	9	4	0.36	0.46	A
9	8	3	0.36	0.39	A
10	10	4	0.43	0.50	A
11	8	2	0.43	0.35	A
12	10	4	0.43	0.50	A
13	10	5	0.36	0.53	A
14	9	4	0.36	0.46	A
15	9	3	0.43	0.43	A
16	9	5	0.29	0.50	A
17	10	5	0.36	0.54	A
18	13	12	0.07	0.89	R
19	8	3	0.36	0.39	A
20	8	4	0.29	0.43	A
21	8	3	0.36	0.39	A
22	8	1	0.50	0.32	A
23	6	2	0.29	0.29	A
24	8	4	0.29	0.43	A
25	12	10	0.14	0.78	R
26	6	2	0.29	0.29	A
27	6	2	0.29	0.29	A
28	10	3	0.50	0.46	A
29	14	6	0.57	0.71	A
30	7	2	0.36	0.32	A
31	8	4	0.29	0.43	A
32	8	3	0.36	0.39	A
33	8	4	0.29	0.43	A
34	9	2	0.50	0.39	A
35	9	4	0.36	0.46	A

Table 1 cont.....

Item No.	R_U	R_L	DP	DV	Remarks
36	8	3	0.36	0.39	A
37	6	2	0.29	0.29	A
38	8	3	0.36	0.39	A
39	6	1	0.36	0.25	A
40	7	3	0.29	0.35	A
41	12	8	0.29	0.42	A
42	6	2	0.29	0.29	A
43	6	2	0.29	0.29	A
44	13	11	0.14	0.85	R
45	8	3	0.36	0.18	A
46	7	2	0.36	0.32	A
47	6	1	0.36	0.25	A
48	7	2	0.36	0.32	A
49	7	2	0.36	0.32	A
50	8	3	0.36	0.39	A
51	10	5	0.36	0.54	A
52	7	1	0.43	0.29	A
53	12	10	0.14	0.78	R
54	6	1	0.36	0.25	A
55	9	3	0.43	0.43	A
56	13	11	0.07	0.85	R
57	6	2	0.28	0.29	A
58	7	3	0.28	0.36	A
59	8	4	0.28	0.43	A
60	9	3	0.42	0.43	A
61	10	5	0.36	0.54	A
62	12	7	0.36	0.68	A
63	6	2	0.29	0.29	A
64	8	1	0.50	0.32	A
65	8	3	0.36	0.39	A
66	8	1	0.50	0.32	A
67	9	3	0.43	0.43	A
68	7	3	0.29	0.36	A
69	7	2	0.36	0.36	A
70	7	2	0.36	0.32	A

Table 1 cont.....

Item No.	R_U	R_L	DP	DV	Remarks
71	8	4	0.29	0.43	A
72	8	2	0.42	0.36	A
73	13	12	0.07	0.89	R
74	9	5	0.28	0.50	A
75	8	2	0.43	0.35	A
76	5	1	0.29	0.21	A
77	7	3	0.29	0.35	A
78	9	3	0.43	0.43	A
79	6	2	0.29	0.29	A
80	8	3	0.36	0.39	A
81	8	4	0.29	0.43	A
82	12	8	0.28	0.71	A
83	11	2	0.64	0.46	A
84	8	2	0.43	0.36	A
85	12	6	0.42	0.64	A
86	9	5	0.29	0.50	A
87	12	7	0.36	0.68	A

Note: Here 'A' stands for accepted, and 'R' stands for rejected.

0.29. Reject and revise item when the discrimination value is 0.19 or below (Ebel, 1965, p. 364).

Table 1 shows that 23 items having discriminating power more than 0.40 were considered as very good items, 31 items with discriminating power between 0.30 and 0.39 were considered considerably good items, 27 items with discriminating power between 0.20 and 0.29 were regarded as marginal items while 6 items having discriminating power between 0.19 and below deserved to be eliminated.

The major purpose behind measuring of item difficulty was to choose items of suitable difficulty level. The criteria given by Ebel (1965) say that the items having difficulty level above 0.75 and below 0.25 were rejected as they were very easy and very difficult items, respectively. The items having difficulty value ranged from 0.25 to 0.75 were accepted as such for the achievement test. However, the difficulty level of items in the first draft ranged from 0.18 to 0.89. Table 1 shows that there are 6 items (see Table 2.4, p. 101) having a difficulty value above 0.75 indicating that these are easy items.

Hence, the first draft of achievement test contains 87 items. These items were analysed and assessed to improve the quality of the items. The distractors do not fall in close proximity of the correct response region needed revision or modification. The distractors which compete

with the correct answer are able to be made less attractive to avoid a greater appeal to the students as compared to that of the correct answer. The distribution of distractors competing with the correct answer and poor or weak distractors of the first draft of achievement test has been given in Table 2.

Table 2: Distribution of distracters competing with the correct response and weak distracters of first draft

S.No.	Form of Response	Item Number	*f*
1.	Distracters competing with correct response	3, 21, 23, 26, 27, 37, 49, 50, 52, 61	8
2.	Weak distracters	18, 25, 44, 53, 56, 73	6

Table 2 shows that out of total 87, in case of 8 items those were distracters competing with correct response, these items were revised by taking into consideration. The six items with poor distracters were removed from the first draft. Hence, finally the remaining 81 items were retained for the second draft. The selected and rejected items of the test after calculation of difficulty value and discriminating power are given in Table 3.

Table 3: Selected and rejected items for the second draft

S. No.	*f*	Item Number	Remarks
1.	81	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 54, 55, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87	Selected items
2.	6	18, 25, 44, 53, 56, 73	Rejected items

Table 3 shows that out of total 87 items, 6 items were rejected and 81 items were selected for the second draft. Thus, in the second draft of the achievement test, 81 test items were retained. The first draft of achievement test along with scoring key has been given in Appendix E

SECOND DRAFT OF ACHIEVEMENT TEST IN CHEMISTRY

The second draft of achievement test was prepared on the basis of item analysis. The draft consisted of those items which were modified taking into consideration discriminating power and difficulty value. The second draft of achievement test along with the scoring key has been given in Appendix F

Second Tryout and Evaluation

For the tryout of the second draft of achievement test, the test was administered to 50 students of class IX of Guru Gobind Singh Vidya Mandir, Mohali. The required numbers of copies of the second draft of achievement test were prepared. All the answer-sheets were scored with the help of the scoring key. After scoring of the answer-sheets, the item analysis of the second draft of achievement test was carried out. The discriminating power and difficulty

values were calculated. The difficulty value and discriminating power of items have been given in Appendix G. The distribution of discriminating power and difficulty value along with the item numbers belonging to each category has been presented in Table 4.

Table 4: Distribution of discriminating power (DP) of items of the second draft

S.No.	DP	*f*	Item Number	Remarks
1.	0.40 and above	38	2, 3, 5, 7, 8, 9, 10, 12, 15, 16, 22, 23, 26, 28, 29, 31, 35, 37, 38, 39, 40, 41, 42, 43, 46, 49, 56, 57, 58, 66, 67, 69, 70, 71, 73, 76, 79, 81	Very good items
2.	0.30 to 0.39	15	17, 18, 19, 32, 33, 45, 48, 51, 53, 55, 59, 60, 62, 65, 75	Reasonably good items
3.	0.20 to 0.29	9	4, 11, 14, 20, 30, 47, 50, 63, 77	Marginal items
4.	0.19 and below	19	1, 6, 13, 21, 24, 25, 27, 34, 36, 44, 52, 54, 61, 64, 68, 72, 74, 78, 80	Poor items

Table 4 shows that 38 items having discriminating power more than 0.40 were considered as very good items, 15 items with discriminating power between 0.30 and 0.39 were considered considerably good items, 9 items with a value between 0.20 and 0.29 were regarded as marginal items while 19 items having discriminating power between 0.19 and below deserved to be eliminated. The index of reasonable difficulty value along with the item number of every category has been given in Table 5.

Table 5: Distribution of difficulty value (DV) of items of the second draft

S.No.	DV	*f*	Item Number	Remarks
1.	Above 0.75	18	1, 6, 13, 21, 24, 25, 27, 34, 36, 44, 52, 54, 61, 64, 72, 74, 78, 80	Easy items
2.	0.50 to 0.75	34	2, 4, 5, 7, 8, 9, 11, 12, 16, 17, 20, 26, 29, 30, 32, 33, 35, 39, 42, 45, 46, 51, 57, 58, 62, 63, 67, 69, 70, 71, 73, 75, 76, 81	Reasonably good items
3.	0.25 to 0.49	28	3, 10, 14, 15, 18, 19, 22, 23, 28, 31, 37, 38, 40, 41, 43, 47, 48, 49, 50, 53, 55, 56, 59, 60, 65, 66, 77, 79	Marginal items
4.	Below 0.25	1	68	Difficult items

Table 5 shows that there are 18 items having difficulty value above 0.75 and one item below 0.25 indicating that these are very easy items. So, about 19 items were eliminated from the second draft of an achievement test. There were 62 items with values ranging from 0.25 to 0.75 which were retained for the final draft of achievement test.

FINAL DRAFT OF ACHIEVEMENT TEST IN CHEMISTRY

A final draft of the achievement test was prepared on the basis of criteria given by Ebel (1966), Dececco and Crawford (1974) for the selection of items in the final draft of achievement test. After the calculation of difficulty value and discriminating power of all the items, 62 items for the final form were selected. The most difficult and easy items were rejected. Items

Table 6: Selected and rejected items for the final draft of achievement test

S.No.	*f*	Item Number	Remarks
1.	62	2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 22, 23, 26, 28, 29, 30, 31, 32, 33, 35, 37, 38, 39, 40, 41, 42, 43, 45, 46, 47, 48, 49, 50, 51, 53, 55, 56, 57, 58, 59, 60, 62, 63, 65, 66, 67, 69, 70, 71, 73, 75, 76, 77, 79, 81	Selected items
2.	19	1, 6, 13, 21, 24, 25, 27, 34, 36, 44, 52, 54, 61, 64, 68, 72, 74, 78, 80	Rejected items

having poor discriminatory power were also left out. The selected and rejected items of the final draft of the achievement test have been given in Table 6.

Table 6 indicates that out of 81 items, 62 items were selected and 19 items were rejected from the second draft. So, the final draft of the achievement test was retained with 45 multiple choice, 2 matching type and 15 fill in the blanks type items. The final draft of achievement test along with scoring key has been given in Appendix H.

ADMINISTRATION

The final draft was administered to a selected sample of class IX students drawn from different government and private schools of Chandigarh. These students had already studied the selected content. The final test was comprised of 62 items. For the proper administration of the test, the investigator reached the class on the fixed date and normal testing conditions were explained to the students. The students were asked to fill up their information in the given test booklets. After that, the investigator gave them important instructions and the nature of items was made clear with the help of examples. After removing their doubts, the investigator asked them to start the test. No time limit was imposed but it was found that the majority of the students had completed in 45 min.

SCORING

The test was meant for class IX chemistry students and comprised of 62 items to be completed in 45 min. In this test, for scoring, a weighting of one-mark is given if the response is correct and zero weight age is given if the response is wrong. The total scores are found by adding all the correct responses. The answer sheets were scored with the help of scoring key prepared by the researcher on the basis of correct answer and a zero for an incorrect one. The total marks of the test were 62 marks.

RELIABILITY

The reliability of the achievement test in chemistry was determined by conducting study over a sample of 50 students from Government Model Senior Secondary School, Sector-43, Chandigarh. The split-half method was used to find the reliability of the test. The split-half method provides an estimate of the extent to which a test is internally consistent and permits a reliability coefficient to be obtained from a single administration of the test. This method involves the splitting of a single test into two comparable sets of items and calculating the correlation between them. A common practice is to allocate odd-numbered test items to one

set and even-numbered items to the other set. The advantage of the split method is that all data necessary for computation of reliability coefficient are obtained in single administration of the test. The product moment coefficient of correlation was calculated. The coefficient of correlation between two test scores was found to be 0.82. This coefficient of correlation is fairly high, which testifies the soundness of the test. The scores of the test to calculate the reliability has been given in Appendix I.

VALIDITY

Validity refers to the degree to which the test or other measuring instrument measures and what it claims to measure. No matter what other merits the test may possess, if it lacks validity, it is worthless. According to Lindquist (1951), 'the content of an achievement test is often formulated by the analysis of curriculum and test books and by the pooled judgment of recognised authorities in the field. Under these circumstances, a well constructed test may constitute the best available measure to criterion in a sense that the test itself defines the function it is to measure. Such tests may be described as self defining. Guilford (1954) also says here are some measures whose validity is taken for granted, for example achievement test scores'. The content validity is concerned with the adequacy of sampling of a specified universe of content. To determine the content validity of the test items, a list of outcomes was given to experts individually in subject matter. Experts also solved the test so that the scoring key could be verified. Only those items were kept in the draft for which there was complete agreement among the experts. The content validity was ascertained by preparing a blueprint of the test items indicating the weight age given for the objectives and competencies by these items.

FINAL DRAFT OF ACHIEVEMENT TEST IN CHEMISTRY

Q. 1 Liquids have -

(a) Fixed volume and fixed shape (b) Fixed shape and no fixed volume
(c) Fixed volume and no fixed shape (d) Fixed volume nor fixed shape

Q. 2 Dry ice means –

(a) Solid SO_2 (b) Solid water
(c) Solid CO_2 (d) Solid CO

Q.3 The forces of attraction between particles are strongest in –

(a) Solids (b) Liquids
(c) Gases (d) None of these

Q. 4 Which of the following is accompanied by cooling?

(a) Sublimation (b) Evaporation
(c) Condensation (d) None of these.

Q. 5 When we add sugar in water, particles of sugar disappear because they –

(a) Are very small (b) Get into the spaces between water particles
(c) Are moving (d) All above

Q. 6 The movement of particles is maximum in –

(a) Solids (b) Liquids

(c) Gases (d) Plasma particles

Q. 7 Which of the following statements is not correct?

(a) The temperature of boiling water rise on supplying heat.

(b) To convert a temperature on the Kelvin scale to Celsius scale, subtract 273 from the given temperature.

(c) To convert a temperature on the Celsius scale to Kelvin scale, add 273 to the given temperature.

(d) The temperature of melting ice does not rise even though heat is being supplied.

Q. 8 The smell of perfume spreads due to phenomena of

(a) Condensation (b) Diffusion

(c) Sublimation (d) Evaporation

Q. 9 Which of the following substances is not a liquid?

(a) Sugar (b) Petrol

(c) Alcohol (d) Kerosene

Q. 10 The temperature at which the solid melts to become a liquid at the atmospheric pressure is called –

(a) Boiling point (b) Melting point

(c) Freezing point (d) None of these.

Q. 11 Large volume of compressed natural gas (CNG) is available in small cylinders to us due to its property of –

(a) High inflammability (b) Easy availability

(c) High compressibility (d) Low density

Q. 12 The compressibility of which state of matter is high –

(a) Solid (b) Liquid

(c) Gas (d) All of these.

Q .13 Match the physical quantities given in column I to their SI units given in columns II.

Column I	**Column II**
(A) Pressure	(i) Cubic metre
(B) Temperature	(ii) Kilogram
(C) Density	(iii) Pascal
(D) Mass	(iv) Kelvin

	A	B	C	D
(a)	i	ii	iii	iv
(b)	ii	i	iv	iii
(c)	iii	iv	i	ii
(d)	iii	iv	ii	i

Q. 14 Match column I with column II

Column I	**Column II**
(A) Fixed Shape	(i) Gases
(B) Fixed Volume but not fixed shape	(ii) Solids
(C) High Compressibility	(iii) Liquids
(D) Very low densities	(iv) Plasma

	A	B	C	D
(a)	i	ii	iii	iv
(b)	ii	iii	i	iv
(c)	iii	iv	i	ii
(d)	iii	i	ii	iv

Q. 15 ———————— is the change of gaseous state directly to solid state by cooling

(a) Condensation (b) Evaporation
(c) Sublimation (d) Freezing

Q. 16 Property of matter which is based on motion of particles is ————————-

(a) Diffusion (b) Evaporation
(c) Sublimation (d) Vaporisation

Q. 17 The most abundant element in earth's crust is

(a) Carbon (b) Phosphorus
(c) Oxygen (d) Nitrogen

Q. 18 Which of the following is not mixture?

(a) Salt (b) Air
(c) Water (d) Milk

Q. 19 Which of the following is a heterogeneous mixture?

(a) A mixture of salt and water (b) A mixture of sugar and water
(c) A mixture of alcohol in water (d) A mixture of petrol and water

Q. 20 Which of the following may be termed as emulsion?

(a) Milk (b) Fog
(c) Ink (d) Starch solution

Q. 21 We can separate a mixture of two miscible liquids by

(a) Using a separating funnel (b) Distillation
(c) Centrifugation (d) Fractional distillation

Q. 22 We can separate cream from milk by

(a) Using a separating funnel (b) Distillation
(c) Centrifugation (d) Evaporation

Q. 23 Which method will we employ to obtain pure copper sulphate from an impure sample?

(a) Evaporation (b) Crystallisation
(c) Fractional distillation (d) Sublimation

Q. 24 We can obtain different gases from air by
(a) Evaporation (b) Crystallisation
(c) Fractional distillation (d) Sublimation

Q. 25 A mixture of ammonium chloride and sand can be separated by
(a) Sublimation (b) Fractional distillation
(c) Evaporation (d) Crystallisation

Q. 26 Separation of solutions of coloured substances is done by using:
(a) Evaporation (b) Chromatography
(c) Fractional distillation (d) Sublimation

Q. 27 The nature of non-metals are————.
(a) Malleable (b) Soft
(c) Ductile (d) Sonorous

Q. 28 A positively charged ion is known as:
(a) Cation (b) Anion
(c) Polyatomic ion (d) None of these

Q. 29 Mass of 0.5 mole of water is
(a) 9 (b) 16
(c) 18 (d) None of these

Q. 30 The valency of silver ion
(a) +1 (b) 0
(c) 3 (d) 4

Q. 31 The valency of magnesium ion
(a) +2 (b) 0
(c) -1 (d) +4

Q. 32 The law of constant proportions was given by
(a) Dalton (b) Berzelius
(c) Proust (d) Lavoisier

Q. 33 A chemical equation is always balanced to fulfil the condition of
(a) Dalton atomic theory (b) Law of constant proportions
(c) Law of multiple proportions (d) Law of conservation of Mass

Q. 34 The chemical symbol for bromine gas is
(a) Br (b) B
(c) $(BR)_2$ (d) Br_2

Q. 35 One atomic mass unit is equal to weight of –
(a) One atom of hydrogen (b) $1/16^{th}$ of oxygen atom
(c) $1/12^{th}$ of natural carbon atom (d) $1/12^{th}$ of C-12 isotope of carbon.

Q. 36 Which one of the following represents gram molecular mass of substance:
(a) 2 gm
(b) 6.022×10^{23} atoms of molecules
(c) 6.022×10^{23} molecules
(d) 1 mole of hydrogen.

Q. 37 Which of the following does not represent molar mass of a substance?
(a) 1 mole of HCl
(b) 6.022×10^{23} molecules of helium
(c) 16 g of O_2
(d) 44 g of CO_2

Q. 38 Formula mass of NaCl is:
(a) 23
(b) 35.5
(c) 58.5
(d) 58

Q. 39 The valency of element argon
(a) 1
(b) 0
(c) 2
(d) 8

Q. 40 Molar mass of sulphur molecule is
(a) 256
(b) 8
(c) 32
(d) None of these

Q. 41 Which of the following is ionic compound?
(a) NaCl
(b) KCl
(c) CaO
(d) H_2O

Q. 42 Match the ion in Column I with valency in Column II

Column I	**Column II**
(A) Hydrogen ion	(i) -2
(B) Hydride ion	(ii) +1
(C) Oxide ion	(iii) +2
(D) Zinc ion	(iv) -1

	A	B	C	D
(a)	i	ii	iii	iv
(b)	ii	i	iv	iii
(c)	iii	iv	i	ii
(d)	ii	iv	i	iii

Q. 43 The valency of sodium ion is
(a) +1
(b) -1
(c) +2
(d) -2

Q. 44 No. of electrons present in M shell are ————.
(a) 18
(b) 2
(c) 32
(d) 8

Q. 45 Number of neutrons in helium is
(a) 2
(b) 3
(c) 1
(d) 0

Q. 46 Anode rays are discovered by
(a) Rutherford (b) Dalton
(c) Bohr (d) Goldstein

Q. 47 Metal foil used by Rutherford in his experiment was
(a) Silver (b) Gold
(c) Both of these (d) None of these

Q. 48 The number of valence electrons in hydrogen are:
(a) 2 (b) 3
(c) 1 (d) 0

Q. 49 The atomic mass of sodium is 23. The number of moles in 46 g of sodium is
(a) 1 (b) 2
(c) 2.3 (d) 4.6

Q. 50 Isotopes of elements have
(a) Same mass number (b) Same atomic number
(c) Different chemical properties (d) Same physical properties

Q. 51 Which of the following is not radioactive isotope?
(a) Carbon-14 (b) Arsenic-74
(c) Iodine-131 (d) None of these

Q. 52 Rutherford's experiment on scattering of alpha particles showed for the first time that atom have
(a) Electrons (b) Protons
(c) Nucleus (d) Neutrons

Q. 53 The existence of protons was shown by:
(a) Chadwick (b) J.J. Thomson
(c) Rutherford (d) Goldstein

Q. 54 Alpha particles have:
(a) 2 units of positive charge (b) 4 units of positive charge
(c) 1 unit of positive charge (d) None of these

Q. 55 The atomic number of element X is 16. The valency of X will be:
(a) 3 (b) 2
(c) 1 (d) 4

Q. 56 Hydrogen atom does not have
(a) Proton (b) Neutron
(c) Electron (d) Proton and neutron

Q. 57 The number of electrons present in valence shell of Krypton is:
(a) 7 (b) 6
(c) 2 (d) 8

Q. 58 The value of charge of the electron was determined by

(a) Chadwick (b) J.J. Thomson
(c) Rutherford (d) R.A. Millikian

Q. 59 The valency of Neon (Atomic number = 10) is

(a) 0 (b) 2
(c) 1 (d) 8

Q. 60 Match the element in column I with electronic configuration in column II

Column I	**Column II**
(A) Sodium	(i) 2,5
(B) Aluminium	(ii) 2,8,6
(C) Sulphur	(iii) 2,8,3
(D) Nitrogen	(iv) 2,8,1

	A	B	C	D
(a)	i	ii	iii	iv
(b)	ii	i	iv	iii
(c)	iii	iv	i	ii
(d)	iv	iii	ii	i

Q. 61 No. of protons present in hydrogen is ————.

(a) 1 (b) 2
(c) 0 (d) None of these

Q. 62 Mass number of an atom is total of ————and ————.

(a) Electron (b) Proton and neutrons
(c) Neutrons and electrons (d) Electrons and protons and neutrons

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Effectiveness of Use of Advance Organisers in the Initial Instruction for Mastery on Self-Esteem of Field Dependent and Field Independent Students

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ABSTRACT

The study was undertaken with a purpose of studying effectiveness of use of advance organisers in the initial teaching for mastery. Two sets, each having 12 mastery learning packages were prepared. In one set of packages, generalisation was used as advance organiser, whereas analogy as advance organiser was used in the second set of ML units. The sample comprised of 509 IX-grade students from 12 schools selected randomly out of over 100 schools of Chandigarh. The main findings of the study were:

(i) Three instructional groups [Mastery learning-generalisation-ML-GEN, Mastery Learning-Analogy-ML-ANAL and conventional group learning (CGL)] were found significantly different in respect of self-esteem gain means yielded by them.

- *The treatment groups (ML-GEN, ML-ANAL) outperformed the CGL students in terms of their gain mean scores suggesting that both (ML-GEN, ML-ANAL) groups achieved higher as compared to the control group (CGL).*
- *Out of ML-GEN and ML-ANAL, the group with generalisations advance organiser (ML-GEN) achieved higher.*

(ii) The gain mean scores on self-esteem were not found to be significantly different for both field dependent and field independent groups of children.

(iii) There was no significant interaction effect between instructional strategy (ML-GEN, ML-ANAL and CGL) and cognitive style (FD and FI) to yield different gain means of self-esteem.

(iv) Mastery learning strategies (ML-GEN, ML-ANAL) had larger effect sizes and were found to be the best differentiating factors between experimental and control groups.

Key words: Mastery learning, Advance organiser, Generalisation, Analogy, Self esteem, Field dependent, Field independent

INTRODUCTION

As is evident from only cursory reviewing of mass media publications, the effectiveness and value of our formal educational structure is increasingly being questioned day-by-day. The instruction available in many classrooms is inappropriate for the levels at which many of the

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students are functioning. Many students lack the basic skills and knowledge needed to learn from the instruction presented to them. Moreover, the procedures, which are often used to measure and grade students' work limit and determine the number of students who can earn positive achievement. These instructional and evaluation procedures can be detrimental to the students' intellectual, social and emotional development. Students do not learn efficiently when the level of instruction is inappropriate for them.

No one denies that the goal of teaching is to foster learning. Mastery learning method has exhibited its potential for maximising attainments. It envisages that almost all students can learn all that is taught in the school. This strategy also promises effective social development of an individual through its methodology as well as the successful experiences it provides. Yet, to date, there have been relatively few successful systematic attempts to determine the effectiveness that maximise positive and minimise negative results.

During the time when a student is in school, he needs to attain mastery of essential learning tasks (Erikson, 1959). So that he can see himself as a competent student and to receive evaluation that indicates to him and to those important to him that his performance has been successful (White, 1960; Skinner, 1968; Kelly, 1939). If he fails to attain mastery or to achieve the status of one who is competent and successful, his chances for healthy development can be substantially reduced (Torshen, 1977). Yet teachers often give a homogeneous set of achievement standards which all students are expected to master at the same time. Mastery learning (Bloom, 1968) offers a powerful new approach to learning which can provide almost all students with successful and rewarding learning experiences now available to only a few.

However, attention should be paid to evaluation that forms part of the teaching/learning process and provides continuous feedback to improve learning and instruction (Torshen, 1969; Melvin, 1970; Torshen, 1973). Thus, tests should be used to form learning by helping to diagnose weaknesses and making remedial instructions easier (Melvin, 1970). Mastery learning, therefore, reduces competition and comparisons, but it does not eliminate them. Students who learn easily will meet the criterion for A grade with little effort. They are likely to go through the required sequence so rapidly that they have considerable time for independent study. At the same time, those students who learn at a slow pace will engage in a constant battle to keep up with the required work. Because capsules students learn faster, and can engage in more self-selected study, they will probably get further and further ahead of their less capable classmates (Melvin, 1970).

Mastery approach cannot by itself alter the fact that students who learn easily and rapidly are still likely to be rewarded. A mastery approach is therefore well worth the extra time, effort and trouble it requires. Thus, instructional programmes should be designed to permit variations in amounts of instructional time available to students. The mastery model is therefore designed to structure the curriculum and instructional programmes to maximise the likelihood that each student will have sufficient opportunity to learn from high-quality instruction and will be provided with adequate instructional time to enable him to attain mastery. Bloom's mastery learning strategy (B-MLS) consistently helps students to learn excellently, quickly and self-confidently. Bloom's (1974) mastery learning is a group-based and teacher-paced (GBTP)

approach. Students learn co-operatively with their classmates, and the teacher controls the delivery and flow of instructions. In the present investigation, the initial instruction in MLS was designed by using advance organiser model.

An organising statement called advance organiser acts as a connection between the material to be learned and the learner's cognitive structure (Eggen *et al.*, 1979; Kiewra, 1997). It also acts as a cognitive road map, guiding the students over the new content to be learned. Advance organisers are therefore instructional sets designed to provide students with an understanding of what the lesson is all about.

It is a bridging strategy that provides a connection between one unit and another. It also acts as schema. This connectivity is achieved through the advance organiser that organises new materials to be presented by outlining, arranging and logically sequencing the main ideas or procedures in the new material based on the learner's prior knowledge. The organisers are at a higher level of abstraction and generality than the actual facts, concepts and generalisations that form the lesson itself (Eggen *et al.*, 1979). The value of advance organisers particularly depends upon how well organised the learning material itself is and are helpful in situations, where the teacher must organise the content and are more necessary with less abstract and less organised materials.

Advance organisers may therefore take three different forms known as:

- concept definition,
- generalisation and
- analogy.

A *concept definition* is a summarisation of the significant experiences that go into making a concept. It focuses attention upon important aspects of the experience while ignoring others and is a means of describing the boundaries of a concept. Hence, concept definition helps to determine set inclusion and set exclusion.

The process of *generalisation* is expressed as a general proposition, and is a process whereby, the mind goes beyond the information immediately available (Bruner, 1964). Going beyond the immediate information is the most important distinctive feature of the process of generalisation. It is made possible by the learned probability judgements on interventional weightings to be given to different parts of the available evidence. If such probability judgements are not distinctive features of the recognition of something, then the process is not generalisation, but simply that of remembering (Bruner, 1964). When using generalisations as advance organisers, teachers must be certain that each of the concepts in generalisation is understood thoroughly by the learners. Generalisations, therefore, have the abilities to summarise large amounts of information. The effectiveness of generalisation as advance organisers can also be seen in the way in which they link new materials with the materials already learned. Whenever generalisations include concepts already familiar to the students, they usually become effective. The functioning of the organiser is to provide ideational scaffolding for the stable incorporation and retention of the differentiated material that will follow the lesson (Eggen *et al.*, 1979; Heinich *et al*., 1989; 1993; Witiw, 1997).

Analogy is the type of advance organiser which is quite effective in linking previously learned material with the new one. It is considered to be the most effective type of advance organiser termed by Ausubel (1963) as a *comparative advance organiser*. The effectiveness of analogies as advance organisers may be seen in the way in which they can be customised to fit the background of a particular student population (Wolfgang, 1996). Deep seated analogies can profoundly affect the way research findings are interpreted (Marsh, 1990). Even research results that are true can produce false conclusions if examined through the mental fitter of a flawed analogy (Baker and Keith, 1998; Pittman and Kim, 1999).

Learning through advance organisers will again be affected by the way a learner perceives it, that is his cognitive style. Cognitive style is a broad dimension of individual differences that extends across both perceptual and intellectual activities. Cognition covers various modes of knowing, perceiving, imagining, remembering, conceiving, judging and reasoning. The term 'style' is used because, what is at issue is the characteristic approach the individual brings with him to a wide range of situations. Since cognitive approach covers both perceptual and intellectual activities, it is then referred to as the learner's *cognitive style*.

Some types of cognitive style are:

i) Field dependence and field independence;

ii) Impulsive and reflective cognitive style;

iii) Individualistic vs. non-individualistic;

iv) Motivation centred vs. non-motivation centred;

v) Aural vs. visual;

vi) Environment oriented vs. environment free;

vii) Flexible vs. non-flexible;

viii) Responsible vs. irresponsible.

The cognitive functioning of the human mind is the process and the result of the cognitive functioning as the output or product (Hilgard and Bower, 1986). It is, therefore, the consistent individual differences that mediate between environmental input and the organism output.

Self-esteem: It is positive when we meet our standards for achievement. We feel good about ourselves when we are confident that we can master our chosen tasks in life. We also feel good when we gain the respect of others for what we do. We rely on others for prestige, status, recognition and reputation. However, when we cannot fulfil our esteem needs, we feel a sense of inferiority, helplessness and discouraged (Sarah, 1977).

Various researches conducted have shown that individuals are more confident of their behaviour, see themselves as more competent, and are more optimistic of favourable results from situations in which they find themselves (Maslow, 1939; Stagner, 1948; Bodaken and Sereno, 1975; Sarah, 1977; Levy, 1993;). A research conducted by Marsh (1990) revealed that students with higher self-esteem are somewhat more likely to be successful in schools although the strength of the relationship varies greatly depending on the characteristics of the students and the research method used (Hansford and Hattie, 1982; Marsh and Holmes, 1990).

The present generation is living in very complex times. This is the age of discontinuity and disbelief of ambiguity and ambivalence. The school's role as a social agency is meant to contribute to the general health and well being of young people (Mecca *et al*., 1989; Beane, 1993).

As difficult as it is for so many adults to find anything to hang on to, we can only imagine what this age looks like through the eyes of young people who typically lack the resources that are available to most adults. The litany of statistics about self-destructive tendencies such as substances abuse, crime and suicide must surely be seen as a signal from young people that many do not find much about themselves to like.

The idea of enhancing self-esteem becomes a moral imperative for schools, especially in a time when other social institutions and agencies seem unwilling or unable to provide support and encouragement in the process of growing-up.

Inside the school itself, the growing collection of studies on self-esteem indicates that there is a persistent correlation between it and such school concerns as participation, completion, self-direction and various types of achievements (Purkey, 1970; Rosenberg, 1979, Beane and Lipka, 1986). The correlation between self-esteem and achievement is the driving force in the growing interest in self-esteem.

RESEARCH REVIEW

The most common research format of MLS has been a comparison of an experimental group, which learned a particular topic using a mastery-structured curriculum, with a control group of students, purportedly identical to the experimental group with the exception that their curriculum did not include all the six components of the mastery model. The researchers demonstrated that experimental groups achieved higher scores as compared to control groups with their grade–level, subjects such as fifth-grade arithmetic (Kersh, 1971), fifth- to sixth-grade reading sills (Prestridge, 1997), ninth-grade language arts (Johnson and Pennypacker, 1990); ninth-grade algebra (Sawhney, 1993); secondary students anxiety levels (Yohon, 1996), Ninth-grade after school teacher directed tutoring (Hale, 1997); sixth grade peer tutoring, time-on-task and cooperative norms on academic success (Doyle, 1997), sixth through ninth grades music (Abbott, 1997), first year algebra (Seymour, 1997); third-grade mentally handicapped and difficult to teach children (Dube and Serna, 1998), ninth-grade peer teaching of the subjects in the study (Giacomo, 1999); secondary level ecology (DeBaar, 1999) and grades three through seven reading and mathematics (Wong, 1999; 2000; McAllister, 2001; Kahnweiler, 1998).

In many studies, the success of the effectiveness of advance organisers at school level in different subject areas has been cited For example for high school meteorology students (Witiw, 1997), high school science students (Cavalier, 1997), seventh- through eighth-grade students provision of rich learning environment (Davidson, 1998) and fifth-grade urban public school students. Applin (2000) concluded that programming style, documentation, practices, parameter passing mechanism use, code reuse and modularisation practice of those students who had been part of the experimental group were superior to that of the control group

participants on self-esteem (Thurman, 2000; Castro, 2000; on cognitive style (Atang, 1985), social studies fourth- through fifth-grade students logo programming (Easton *et al*., 1993 and science sixth grade students (Chia-Ling Linda, 1993; Hsu, 1993).

On self-esteem, Woolfolk (1993) concluded that when teachers use 10 steps set by Canfield (1990) in their classrooms, the improvements in students' self-esteem and achievements are rewarding. These studies were supported by McCallum (1999), Shah (1999), Pliner (1999), Zhong (1999), Thurman (2000), Brown (2000), DeMille (2000), Castro (2000) and Shaw (2000) on learning outcomes (Davis *et al.*, 1994; Pace, 1990; Kuh *et al.*, 1991; Pascarella and Torenzni, 1991; Astin, 1993 Pedego, 1999; Hoadley, 1999; Garatti 1999; Miller, 2000; Kong, 2000; Brogan, 2000; Simmering, 2000; Daniel, 2000). However, not many attempts seem to have been made to explore such impacts in teaching designed after various instructional models. The present investigation is an attempt to study the impact of use of advance organisers in initial instruction of MLS on self-esteem of field dependent and field independent adolescents.

OBJECTIVES

The present study was undertaken keeping in view the following objectives:

1. To study the impact of ML-GEN and ML-ANAL as against conventional group learning (CGL) on self-esteem.
2. To study the impact of cognitive style on self-esteem of IX graders.
3. To examine the interaction effect of ML-GEN, ML-ANAL and CGL on self esteem in relation to cognitive style.

HYPOTHESES

- **Ho. 1:** ML-GEN, ML-ANAL and CGL yield equal levels of learning outcomes as measured by gain scores of self-esteem.
- ♦ **Ho. 1.1:** ML-GEN and ML-ANAL exhibit equal level of self-esteem gain scores;
- ♦ **Ho. 1.2:** ML-GEN and CGL exhibit equal level of self-esteem gain scores;
- ♦ **Ho. 1.3:** ML-ANAL and CGL exhibit equal level of self-esteem gain scores.
- **Ho. 2:** Two cognitive styles field-dependent/field-independent (FD/FI) result in equal levels of learning outcomes as measured by self-esteem scores.
- **Ho. 3:** Cognitive style and instructional modes do not interact with each other to yield significant different levels of self-esteem.
- For instructional treatment (ML-GEN; ML-ANAL and CGL):
- ♦ **Ho. 3.1:** through ML-GEN: FD/FI cognitive style yield almost equal gain means on self-esteem scores;
- ♦ **Ho. 3.2:** through ML-ANAL: FD/FI do not differ in their gain means on self-esteem scores;
- ♦ **Ho. 3.3:** through CGL: FD/FI yield equal gain means on self-esteem scores.

- For cognitive style FD/FI groups:
- ♦ **Ho. 3.4:** for FD learners gain means on self-esteem for ML-GEN and ML-ANAL are not different;
- ♦ **Ho. 3.5:** for FD learners gain means on self-esteem for ML-ANAL and CGL are not different;
- ♦ **Ho. 3.6:** for FD learners gain means on self-esteem for ML-GEN and CGL are not different.
- ♦ **Ho. 3.7:** for FI learners gain means on self-esteem for ML-ANAL and ML-GEN are not different;
- ♦ **Ho. 3.8:** for FI learners gain means on self-esteem for ML-ANAL and CGL are not different;
- ♦ **Ho. 3.9:** for FI learners gain means on self-esteem for ML-CEN and CGL are not different.

DESIGN OF THE STUDY

The present study employed an experimental method with a 3×2 factorial design. Computational procedures were followed according to the techniques given by Brooter (2000. In the 3×2 factorial designs, instructional treatment and cognitive style were two independent variables. Out of these two independent variables, *instructional treatment* was studied at three levels namely:

- ➢ Mastery learning with generalisation as advance organiser (ML-GEN),
- ➢ Mastery learning with analogy as advance organiser (ML-ANAL) and
- ➢ CGL.

Whereas the second independent variable, the cognitive style was studied at two levels only namely: FD and FI.

The dependent variable in the present investigation was self-esteem.

TOOLS USED

Following tools were used to collect data:

- **Mastery Learning Instructional Packages** consisting of ML-generalisation. Mastery-learning-analogy is developed and validated by the investigator. Two sets of XII units each were developed on concepts of geography of IX grade. One set of instructional plan used generalisation as advance organiser in initial instruction through mastery learning, and the second set consisted of XII geography units each with analogy as advance organiser. Each package had clearly defined pre-requisite skills, instructional objectives, summative test and formative diagnostic unit tests.
- **Entry Behaviour (**EB**) Test:** The initial draft of EB test consisted of 35 items. Discrimination power of each item ranged between .12 and .49. Five items were rejected

which had DP less than .20. The final draft consisted of 30 items. The split-half reliability co-efficient was .91, and content validity was established.

- **Formative Unit Tests:** A total of 12 unit tests were developed by the investigator covering instructional objective of the respective units. Total 108 items were framed in the initial draft out of which 11 items were dropped during two tryouts of the tests. The final version of unit tests I to XII consisted of 30, 8, 6, 8, 8, 7, 9, 8, 9, 11, 12 and 12 test items, resp. sensitivity indices of items of final versions of unit-tests ranged between .27 and .84, and reliability coefficients as calculated by KR_{21} for I to XII units ranged between .62 and .83.
- **Summative Test:** The initial draft of summative test consisted of 93 test items, which were improved in the light of sensitivity indices calculated for each item. Item analysis for each of the 39 multiple-choice items was done separately also to check the attractiveness of each distracter. All other items 25 short answer 11 circle type, 12 draw and label, 4 matching type and 2 true/false type items had sensitivity indices in the range of .5 to .8. Only 19 items had sensitivity index between .02 and .5 which were modified with regard to language ambiguity, content level, weightage and others. The final draft contained 93 items. The reliability coefficient of the test as measured by test–retest technique was found to be .87. The content validity was ensured through 10 judges/experts who determined relatedness with objectives and technical accuracy of content for that particular group.
- **Group Embedded Figures Test (GEFT)** for cognitive style developed and standardised by Witkins (1971). It contains 18 complex figures in three sections. First section containing seven items is for practice. The second and third section contains more difficult items. The subject traces the simple form in the complex figure within each section. Each of the second and third sections are to be finished in five minutes. All correct lines traced by the student are scored. The reliability calculated through Spearman–Brown peophecy formula was .82. The validity of the test was ensured through assessment with parent form, it was administered and validated on Indian population before use.
- **Self-esteem inventory** developed and validated by Coopersmith (1967) (school-Form) and adapted on Indian adolescents by Motilal (1987) was used. The final form of the inventory consisted of 25 items related to self-attitudes in social-self peers, home-parents, school-academic and general self. These area-wise distributions are not indicated in the short form. The reliability coefficient on alternate forms was .90 and test–retest correlation as .42. Construct, concurrent and predictive validities were ensured. The inventory also depicts norms for these grades.

SAMPLE

A total number of 6 schools were selected randomly from a variety of over 100 secondary schools in Chandigarh city. The students from six schools were selected randomly. Each school had 4–5 sections of 40–50 students. The students were chosen randomly, in intact sections and were allocated to three experimental groups (ML-GEN, ML-ANAL and CGL). The sample of the study consisted of 537 IX-grade students studying in the union territory of

Chandigarh. However, 28 students dropped out at various stages of experiment and hence analysis was done on scores of 509 students.

DATA COLLECTION

The experiment was conducted in four phases as stated below.

- **Phase I:** For matching the groups: intelligence test, SES information and cognitive style inventory were administered.
- **Phase II:** EB test, pre-test (criterion), self-esteem inventory were administered for fixing the initial scores on EB status and self-esteem level.
- **Phase III:** Implementing the instruction through MLS, scores of EB test, pre-criterion test were used to design the initial instruction for unit-1. This information was also used to plan and design remedial instruction and enrichment material for slow learners and early masters, respectively. One of the basic components of MLS is to ascertain EB status of the students. Although MLS claim to take care of differences on EB status, yet, ascertaining EB helps the teacher to plan and then implement MLS. It is gives an exact entry point of each child on the basis of which the initial instruction of unit I can be designed. A score on pre-requisite skills test (EB test) is an index of accomplishment of a task basically required for further learning. High score on prerequisite test confirms that the researcher's assumptions about the learners were adequate, and that it could be assumed as the starting point for an instructional programme.

However, this kind of analysis does not provide any indication that the learners do not know more than specified pre-requisite skills. Sometimes, the score on pre-test is higher, but not zero. It indicates that the learner has already acquired some learning on concepts that have been included in the instructional programme. For such a learner, the initial starting point will be different as depicted in the following paradigm.

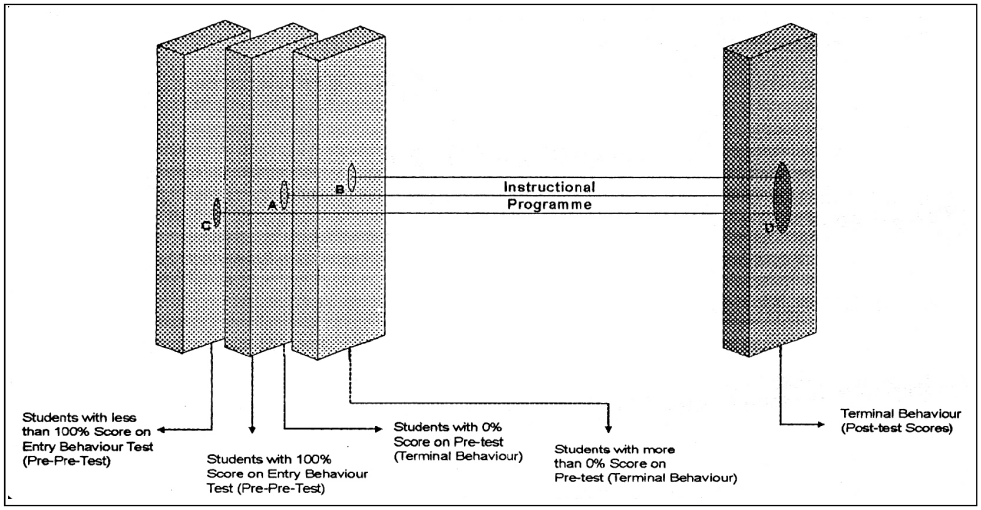

Figure 1: Planning instructional programme on the basis of pre-instructional status of learners

- *A* = Students with 100% scores on EB test (pre-pre-test) and with 0% scores on pre-test (terminal behaviour),
- *B* = Students with more than 0% scores on pre-test (terminal behaviour) and 100% on EB.
- *C* = Students with less than 100% scores on EB test pre-pre-test. These children require additional remediation in the beginning of the first unit of the mastery learning itself to bring them at par with EB status of others,
- *D* = Terminal behaviour (post-test scores) (Figure 1).

In MLS, therefore, pre-assessment is one of the most important components of the model which determines each student's entry status and helps the teacher to design additional and remediation instructional sequences. Pre-assessment component enables the investigator to identify each student's capacity relative to the pre-requisite skills that he has acquired, and learning outcomes, he is expected to achieve at the end of the programme (Torshen, 1977).

- **Phase IV:** Administration of the post-tests, self-esteem inventory to compute gain scores.

RESULTS

The data analyses were reported in two sections that is A and B. Section-A deals with analyses related with matching of groups and identifying pre-experiment status of students. Section-B focuses on post experimental analyses.

Section-A: Analysis to match groups on the basis of scores on EB test standard progressive matrices (SPM), gift and pre-criterion test;

Four analyses have been reported in Section-A.

1. One-way (ANOVA) on intelligence scores through SPM Sets A, B, C, D and E:

A one-way ANOVA was applied to match groups (MLS-GEN & MLS-analogy and conventional on the basis of scores on SPM sets A, B, C, D and E. The means, sum of squares and mean sum of squares, and the *F*-ratio were calculated for intelligence scores (Table 1).

Table 1: A summary of one-way ANOVA on scores of stand progressive matrices (SPM) sets A, B, C, D and E

Source of Variation	SS	df	MSS	*F*-value
Between groups	128.40	2	64.20	1.26
Within groups (error)	25,785.50	506	50.96	–
Total	**25,913.90**	**508**	–	–

The data could not provide sufficient evidence to infer that MI-GEN, ML-ANAL and CGL groups differ from each other on the basis of scores on SPM. The selected three groups to be used for experimental treatment were not different on intelligence score.

2. One-way ANOVA on EB scores (pre-requisite skills):

A one-way ANOVA was thus, applied on EB scores for the three groups. A summary of ANOVA on EB scores has been presented in Table 2.

Table 2: Summary of one-way ANOVA on entry behaviour (EB) scores

Source of Variation	SS	df	MSS	*F*-value
Between groups	384.84	2	692.42	9.50**
Within groups (error)	90,118.88	506	178.10	–
Total	**93,503.72**	**508**	–	–

**Significant at .01 level of confidence.

The *F*-ratio for the difference in means of the three groups (ML-GEN, ML-ANAL, CGL), selected for instructional treatment was not found significant even at the .05 level of confidence, indicating that the three groups were almost similar in their EB status.

3. One-way ANOVA on pre-criterion test percentage scores

The pre-test scores obtained were converted into percentages and a one-way ANOVA was applied. A summary of one-way ANOVA on pre-criterion test percentage scores has been presented in Table 3.

Table 3: Summary of one-way ANOVA on pre-criterion test scores

Source of Variation	SS	df	MSS	*F*-value
Between groups	88.97	2	44.48	2.47
Within groups (error)	9,108.09	506	18.02	–
Total	**40,443.08**	**508**	–	–

Table 4 shows that the *F*-ratio for the difference in means of pre-test percentage scores of the three groups (ML-GEN, ML-ANAL and CGL) was not found to be significant even at the .05 level of confidence, suggesting that the three groups were not significantly different beyond the contribution of chance. It may be inferred that the means of two mastery learning groups and one conventional learning group on pre-criterion test scores were not found different.

4. Representation of FD and FI students in the three groups;

To ensure that both FD and FI learners have their representation in the three treatment groups, a table of sample distribution on the basis of two independent variables was drawn as shown in Table 4.

Table 4: Distribution of sample according to the two independent variables

Treatments	ML-GEN	ML-ANAL	CGL
FD	$N = 36$	$N = 28$	$N = 130$
FI	$N = 94$	$N = 120$	$N = 101$
Total	$N = 130$	$N = 148$	$N = 231$

Table 4 reveals that although the number of FD and FI students varied in the three groups namely. ML-GEN, ML-ANAL and CGL, still there was sufficient representation of both types of cognitive style in each treatment group. The groups were matched on intelligence after ascertaining the EB status of each student on the basis of perquisite skills and pre-test. It was ensured that each group had an adequate number of students with FD and FI cognitive style.

Section-B: The sample was categorised into three groups, and MLS were implemented to the two experimental groups, and another group was considered as the control group. Post-tests were administered after implementing instructional treatment. The data were analysed for the impact of MLS on self-esteem scores.

A 3 × 2 ANOVA on self-esteem gain scores

For the analysis of the data, scores of the three instructional strategies namely:

- Mastery learning with generalisation as advance organiser (ML-GEN),
- Mastery learning with analogy as advance organiser (ML-ANAL) and
- CGL were transferred to a common base to ensure base to ensure their comparability.

The means and S.D. of the sub-samples and summary of two-way ANOVA on self-esteem sores have been presented in Tables 5 and 6.

Table 5: Means and S.Ds of the sub-samples of a 3 × 2 factorial design for gain scores in self-esteem

Cognitive Style	Instructional Strategies		
	ML-GEN	**ML-ANAL**	**CGL**
	Mean = 15.65 S.D. = 13.13 *N* = 130	Mean = 10.87 S.D. = 7.7 *N* = 148	Mean = 5.98 S.D. = 4.03 *N* = 231
FD	Mean = 14.81 S.D. = 10.97 *N* = 36	Mean = 10.52 S.D. = 6.74 *N* = 28	Mean = 5.79 S.D. 4.03 *N* = 130
FI	Mean = 15.97 S.D = 13.91 *N* = 94	Mean = 11.21 S.D 8.86 *N* = 120	Mean = 6.13 S.D. = 4.03 *N* = 101

Main Effects:

A: *Treatments: (Instructional Modes):*

Table 6 shows that the *F*-ratio for the difference in gain means of self-esteem scores for the three groups (ML-GEN, ML-ANAL and CGL) was found to be significant at the .01 level of confidence. This suggests that the three groups were significantly different on their gain means as measured by self-esteem scores. The groups were different beyond the contribution of chance. The null hypothesis Ho. 1 therefore stands rejected at the specified level. It may be

Table 6: Summary of two-way ANOVA on gain scores of self-esteem

Source of Variation	SS	df	MSS	*F*-value
Main effects: A: (Treatments) Instructional modes: ML-GEN; ML-ANAL and CGL	88.89	2	44.45	**40.20****
B: Cognitive style (FD/FI)	.0029	1	.0029	.0026
Two order interaction: (A × B)	.9678	2	.4839	.4377
Within groups (error)	556.1168	503	1.1056	–
Total	**645,9775**	508	–	–

** Significant at the .01 level of confidence.

concluded that students going through ML-GEN, ML-ANAL and CGL yielded different gain means of self-esteem. A *t*-test was applied to explore which of the combination groups among ML-GEN, ML-ANAL and CGL were significantly different in respect of their self-esteem. The *t*-ratios along with means and S.D. of various groups have been given in Table 7.

Table 7: *t*-Ratios for different combination pairs of three instructional modes as measured by self-esteem scores

Combination Groups	ML-GEN Mean = 15.65 S.D. = 13.13	ML-ANAL Mean = 10.87 S.D. = 7.7	CGL Mean = 5.98 S.D. = 4.03
ML-GEN	–	3.76**	7.04**
ML-ANAL	–	–	7.64**
CGL	–	–	–

** Significant at the .01 level of confidence.

The *t*-ratios as revealed in Table 7 for different combination groups in respect of instructional strategies were computed. All the three *t*-ratios for the difference in self-esteem gain means of ML-GEN vs. ML-ANAL and for ML-GEN vs. CGL and for ML-ANAL vs. CGL were found to be significant at the .01 level of confidence suggesting significant differences among all the three pairs of groups. All the three hypotheses Ho. 1.1, Ho. 1.2 and Ho. 1.3 were rejected. The means of the three groups were examined and it was concluded that

- ML-GEN group yielded higher self-esteem gain means as compared to ML-ANAL group,
- ML-ANAL group yield higher gain means as compared to CGL group and
- ML-GEM also yielded higher self-esteem gain means as compared to CGL.

Main Effect:

B Cognitive Style: Field Independent vs. Field Dependent

Table 6 reveals that the *F*-ratio for the difference in self-esteem gain means of FD and FI students was not found significant even at the .05 level of confidence. It suggests that the two

groups of students did not yield significantly different gain means on self-esteem scores. The null Ho. 2 was therefore supported by the findings. It may be concluded that field independents and field dependents yielded equal gain means in respect of self-esteem.

Interaction Effect: A X B

Instructional Strategies × Cognitive Style

Table 6 shows that the *F*-ratio for the interaction between instructional strategies and cognitive style was not found to be significant even at the .05 level of confidence. It means that the self-esteem gain means because of this interaction were not different for the variance combination groups. The null hypothesis Ho. 3 was therefore rejected at the specified level.

It may be concluded that:

- For instructional treatments (ML-GEN, ML-ANAL and CGL)
- With ML-GEN, self-esteem gain means of FD and FI were not significantly different (Ho. 3.1 not rejected)
- With ML-ANAL, self-esteem gain means of FD and FI were not significantly different (Ho. 3.2 not rejected)
- With CGL, FD and FI were not found to be significantly different (Ho. 3.3 not rejected)
- For FD
- Self-esteem gain means of FD students through ML-GEN and ML-ANAL were not different (Ho. 3.4 not rejected)
- Self-esteem gain means of FD groups through ML-ANAL and CGL were not different (Ho. 3.5 not rejected)
- Gain means of self-esteem for FD group were not different through ML-GEN and CGL (Ho. 3.6 not rejected)
- For FI
- Gain means on self-esteem for FI students of ML-ANAL and ML-GEN groups were not different (Ho. 3.7 not rejected)
- Gain means on self-esteem for FI students of ML-ANAL and CGL were not difference (Ho. 3.8 not rejected)
- Self-esteem gain means of FI students of ML-GEN and CGL groups were not different (Ho. 3.9 not rejected)

DISCUSSION OF THE RESULTS

The result of this study with respect to self-esteem reveals that the difference among the gain means of the three instructional treatment groups ML-GEN, ML-ANAL and CGL as measured by self-esteem scores was found significant, suggesting that the three instructional groups were not equal in respect of their self-esteem gain means. But the difference between the two

levels of cognitive style (FD/FI) was not found significant as measured by self-esteem scores. This suggests that the two groups of students having FD or FI cognitive style were not difference on the self-esteem gain means. The interaction between instructional modes and cognitive style was also not found to be significant suggesting that the gain means because of interaction of instructional strategies and cognitive style were not different from each other as measured by self-esteem scores. It may, therefore, be presumed that because both variables belong to affective domain and may require a larger time to interact to bring about significant changes, change in self-esteem scores due to cognitive style too may be expected to yield learning outcomes. Teachers may plan their instructional plans to achieve mastery levels, which in turn may boost self-esteem of the children.

Further researches should be conducted involving instructional strategies that enhance self esteem and their impact be studied not only on academic achievement but also in other areas like substance abuse, antisocial acts, adolescent pregnancy, suicide, HIV AIDS awareness and other self-destructive behaviours at school, college and at university levels. The self-esteem of students at school level must be transferred into positive and healthy images through MLS. The idea is that students will not hurt themselves if they like themselves. Moreover, if they have self-confidence, they are more likely to do well at whatever thing they try to do. Not only achievement but their self-esteem also increases because of the inbuilt motivation of MLS. These finding may prove relevant and important especially for under-developed and developing societies.

As students mature, self-esteem tends to increase, until students adjust to the new demands of high school workload, they may experience a decrease in self-esteem leading to riots, indiscipline and sometimes deaths, as has been witnessed in other countries recently. School is a place where children develop or fail to develop a variety of competencies that come to define self and ability, where friendships with peers are natured and where the role of the community members is played out, all during a highly formative period of development. Therefore, the building up of self-esteem, interpersonal competence, social problem solving and leadership becomes important in its own right. Teachers should intuitively know that when students feel better about themselves, they do better in school. It is, therefore, the duty of teachers to ensure that students feel wanted in the school. This is because more and more students have a tendency to have low self-esteem because youngsters today are not receiving enough positive, nurturing attention from adults, either at home or at school level. If teachers have low self-esteem, they are likely to pass it on to their students. Hence, teacher student interactions must be positive, validating, affirming and encouraging. This will increase student self-esteem hence improve their prospects for success. School administrators, guidance and counselling workers, teachers and students can take cues from the results of the present study regarding the effect of the variables of intelligence; cog at the findings may be used with advantage for ensuring better academic achievement in favour of the learners. The present study may also be replicated on a larger population for greater validation of results. The studies may be planed and conducted by involving more organism and environment variables. Studies may be undertaken to investigate the effect of different components of MLS namely perseverance, aptitude, rate of learning, different modes of feedback or alternate material in relation to advance organisers model. More studies should be undertaken to investigate the

effect of different dimensions of advance organisers namely meaningful reception learning that is derivative subsumption, correlative subsumption, super ordinate learning and combinatorial learning in relations to schema theory that is accretion, tuning and restructuring: metaphor, simile, analogy, imagery, mnemonics and rehearsal in relation to MLS.

To enhance the evolution of cognitism, the following observations should be taken into consideration. In the past, instructional designers traditionally focused on overt behaviours of breaking down instructions into parts. But today, new perspectives and visions for the future in the field of education have emerged. It is therefore recommended that:

Instruction designers should emphasise more on the internal representations of instruction and the active intellectual processing, which must occur if learning is to take place. Educational administrators, managers, instructional designers, curriculum developers/implementers and teachers should begin with the whole rather than always break instruction into component parts.

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A Comparative Study of Job Satisfaction of Government and Private School Teachers

Poonam Pandey[1]* and Poonam Pandey[2]

ABSTRACT

The quality of education depends on the teachers. A teacher occupies an improvement and unique role in any educational system. It is the teacher who implements all the programmes and policies of education to make it successful and prepare the manpower for tomorrow's India. No system of education can rise above the level of its teachers. The role of the present day teachers has become very challenging, complex and multifaceted so that this profession becomes one of the most unattractive profession. Teaching process up to a large extent and is directly proportional to the attitude towards teaching and job satisfaction of the teachers. A favorable attitude makes the work not only easier but also more satisfying. An unfavorable or negative attitude on the other hand makes the teaching work harder, more tedious and unpleased. Thus, job satisfaction of the teacher is necessary for teaching success and overall advancement of the education.

Keywords: Job satisfaction, Government school, Private school, Attitude, Age, Experience, Teacher, Salary

INTRODUCTION

Education is a process of human enlightenment and empowerment of achievement of a better and higher quality of life. The prosperity and well- being of a nation exclusively depends upon the quality of education that the teachers provide to the youth. It modifies the behaviors of a person from instinctive behavior human. People instead of acting impulsively, acts rationally, that is. Education gives a new shapes to man. It was Ruskin who said, you do not educate a man by telling him what he knows not, but by making him what he is not. The quality of education depends on the skill and ability of the teachers. Through them, the culture of a nation flows from one generation to another. A teacher occupies an important and unique place and is heart and soul of any educational institution. It is the teacher who implies all the programmes and policies of education to make it success full and prepare the manpower for tomorrow's India. He can influence development adversely by apposite innovation or merely remaining mute in the face of growing need for reform, and on the other stand, he can participate activity as an initiator himself or as an interpreter of the plans devised by others. He can do miracles, which can rise above the levels of the teachers.

Thus, the teacher occupies a key position in the world of knowledge, like the worker in the world of production. These two functionaries work at the grass-root levels, contributing the

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society with their varied functions. Unless they are satisfied well and highly motivated, it would be difficult to obtain their valuable inputs for the required output of the society. While the teachers promote the learning of the future citizens, the worker in a production organization helps in producing wealth for us; both are essential to the society. Let us try to the teacher who is a key figure in the world of knowledge to appreciate the importance of his input.

STATUS OF TEACHERS IN INDIA

Teaching in an education institution is taken up generally with the aim of promoting learning in the pupils. There are also the non-student youth who are the non starter of learning in a school. So, compulsory education is provided by the state to universalize education by bringing all the children to the school. So, the teacher has a pivotal place the in society for educating all the youngsters who are the future citizens, in view of the fact that an enlightened citizen is one major requirement in any modern state.

In ancient times too, education was required, but mainly to promote culture in the society by transmitting and developing it. Though the conditions of the society differed a lot in the ancient and the modern periods, yet education had figured prominently in these two periods, by making the teacher a key figure, in the educational system in these two periods.

Teacher was regarded as a holy person in the ancient India: he was compared to a God; he is to be treated as a combination of the trinity (Brahma, Vishnu and Maheshwar) as well as the supreme ONE. Thus, teacher was regarded as the most perfect being in those days, and teaching was considered to be a holy duty.

The relationship between the teacher and his pupils were regarded as filial in character, the teacher was regarded as the spiritual and the intellectual fathers of his students. It was the function of a teacher to lead the students from the darkness of ignorance to the light of knowledge. The lamp of learning was concealed under a cover, and the teacher removed it and let out the light.

Education commission (1964-1966) in India has emphasized the importance of the role of teacher in the following words, 'of all the different factors which influence the quality of education and it contribution to national development, the quality competence and character of teacher are undoubtedly the most significant. Nothing is more important than securing a sufficient supply of high quality recruits to the teaching profession, providing them with the best possible professional preparation and creating satisfactory conditions of worker in which they can be fully effective.'

In the modern age, the functioning of a teacher is regarded as transmitting the knowledge contained in the texts to the students. Apart from his academic work, other activities of para-academic and non-academic nature were also entrusted to him.

Kothari commission has stated that the destiny of the nation is shaped within the four wall of the class-room. Hence, the teacher is considered to be the nation builder and moulder of the personalities of children. He is responsible for shaping the character of the students and protecting the democracy.

OBJECTIVES OF THE STUDY

- To study the job satisfaction in respect of age of government school teachers.
- To study the job satisfaction in respect of experience of teaching of government school teachers.
- To study the job satisfaction in respect of salary of government school teachers.
- To study the job satisfaction in respect of age of Private school teachers.
- To study the job satisfaction in respect of experience of teaching of Private school teachers.
- To study the job satisfaction in respect of salary of Private school teachers.

HYPOTHESIS

Ho1: There is no significant difference in job satisfaction level between government and private school teachers.

Ho2: There is no significant difference in job satisfaction in respect of age of government and private school teachers.

Ho3: There is no significant difference in job satisfaction in respect of experience of teaching of government and private school teachers.

Ho4: There is no significant difference in job satisfaction in respect of salary government and private school teachers.

DELIMINATION OF THE STUDY

- The study will be delimited to the government schools.
- The study will be delimited to the private schools.
- The study will be delimited to only job satisfaction and would be explained in respect of age.
- The study will be delimited to only job satisfaction and would be explained in respect of experience in teaching.
- The study will be delimited to only job satisfaction and would be explained in respect of salary.

REVIEW OF RELATED LITERATURE

Chopra, (1982) studied that the organizational climate of schools in relation to job satisfaction of teachers and students. It was found that among the six climates the open-climate schools showed the overall job satisfaction of the teachers followed by the autonomous, familiar, closed and paternal-climate schools respectively, and overall job satisfaction of the teachers in the open-climate schools was significantly different from that of the teachers in the closed and paternal-climate school.

Aggarwal (1991) investigated the job satisfaction of primary and secondary teachers and found that cast, place of work and mother tongues were significantly related. Male graduate

trained teachers, single family teachers more experienced and government school teachers were more satisfied than others; age and marital status, however had no relationship with job satisfaction; economic and political values were found to be correlated with job satisfaction.

Lovett (1993) studied the job satisfaction in relation to job performance. She found that job was determined according to teaching assignments. The special teachers obtained the highest mean scores, whereas elementary school teachers recorded the lowest mean scores.

Biswas and Tinku (1994) examined job satisfaction of 124 secondary teachers they found that urban teachers; perceived greater satisfaction with their jobs as compared with rural areas and female teachers were less satisfied than male teachers.

Verma (1997) conducted a study on job stress and job satisfaction of physical education teachers in U.T. Chandigarh School. He collected and compared the job stress and job satisfaction of the teachers of physical education from government, public and private schools. Two standard questionnaires were developed and applied by Paliwal and Muthyya for job stress and job satisfaction, respectively.

METHOD

A researcher generally designs the study after surveying the related literature available in the field. For this purpose, he decides the methods and the samples, and constructs the required tools and finalizes the plan for the collection and analysis of data. The present section discusses the method used in the study. The sampling procedure and size of the sample are discussed in the second stage. In the last stage, the tool to be used and statically analysis have been discussed.

Sample of the Study

There will be two private and two government schools. There are 100 teachers working in the above schools. Among them, 50% will be selected by adopting simple random sampling method.

Selection of the Tool

In the course of a research study, a valid and reliable tool is needed for the collection of the data. These types of tools depend upon the nature of the study.

For a study survey, the most common data collecting tools are – questionnaire, rating scale, checklist, interview, schedule and others. The nature and need of the study works as the determining factors for selecting an appropriate standardized tool or constructing a new tool.

Tool of Research Adopted in the Present Study

The Hindi version of job satisfaction questionnaire was prepared by Dr. Meera Dixit for the teachers who were used in the study.

Description of the Tool of Investigation

The test measures the job satisfaction of government and private school teachers which cover all the major factors of the job satisfaction of teachers in Indian schools. These factors are:

a) Intrinsic aspect

b) Salary, service conditions and promotion

c) Physical facilities

d) Institutional plans and policies

e) Satisfaction with authorities

f) Social status and family welfare

g) Rapport with students

h) Relationship with coworkers

Administration of Tool

First of all, the investigator selected the few schools for the study. With the cooperation of the heads of the institution, the questionnaire was distributed to the teachers. The teachers were told that it was concerned with their job satisfaction. Important instruction were given to the teachers and were asked to give the answers of each question as soon as possible. It was announced that there is no time, yet it should normally be finished within an hour. During test, meaning of difficult words were made clear from time to time by the investigator. After the completion of the questionnaire by the teachers, the investigator collected the questionnaires from the teachers.

Statistical Analysis

This section of the article discusses the techniques used in the treatment of data of the present investigation. The following statistical techniques were used in the analysis of data:

a) Calculation of mean

b) Calculation of standard deviation

c) Calculation of *t*-values

Analysis and Interpretation of Data

The raw scores have no value without their interpretation and generalization. The investigator cannot achieve the objectives without interpreting the basic facts on the materials collected through the tools used for the study. The generalization and interpretations lead towards conclusions and suggestions. It is very necessary to get a very meaningful picture of raw information collected. Hence, the purpose of this section is to analyze and interpret the data collected from the tools.

'The process of interpretation is essentially one of the stating what the results show? What do they mean? What is their significance? What is the answer of the original problem? These are all the limitations of the data, which must enter into and become a part of interpretation of the results', says Good, Barr and Scate.

The analysis of the data means studying the tabulated material to determine inherent factors or

meanings. It involves breaking down existing complex factors into simpler parts and putting the parts together in new arrangement for the purpose of interpretation.

'Bars facts, objectives and data never determine anything. They only become significant only as interpreted in the light of accepted standards and assumptions.

In ordinary life, we seldom deal with bare facts interpreted. This interpretation of evaluation is determined by the purpose of which relates the facts'.

Objective 1

To study the job satisfaction among government and private school teachers in respect of age.

Hypothesis 1

There is no significant difference in job satisfaction in respect of age of government and private school teachers.

Table 1 shows the data of the study to find out job satisfaction in respect of age.

Table 1: Job satisfaction in respect of age

Age	*N*	Mean	S.D.	*t*-Value	Significance
< 30	50	126	16.26	1.44	Insignificant
>30	50	133	30.27		

Table 1 reveals that the *t* value of job satisfaction according to age is 1.44. This calculated value of 't' is less than the value of *t* at 0.01 and 0.05 levels.

This clearly indicates that the difference between job satisfaction level of government and private school teachers in respect of their age is insignificant.

Objective 2

To study the job satisfaction among government and private school teachers in respect of their teaching experience.

Hypothesis 2

There is no significant difference in job satisfaction in respect of teaching experience of government and private school teachers.

Table 2 shows that the data of the study to find out job satisfaction among government and private school teachers in respect of teaching experience.

Table 2: Job satisfaction among government and private school teachers in respect of teaching experience

Experience	N	Mean	S.D.	*t*-value	Significance
< 5	50	133	15.89	1.72	Insignificant
>5	50	139	18.80		

Table 2 reveals that the *t* value of job satisfaction according to salary is 1.72. This calculated value of *t* is less than the value of t at 0.01 and 0.05 levels.

This clearly indicates that the difference between job satisfaction level of government and private school teachers in respect of their teaching experience is insignificant.

Objective 3

To study the job satisfaction among government and private school teachers in respect of their salary.

Hypothesis 3

There is no significant difference in job satisfaction in respect of salary of government and private school teachers.

Table 3 shows that the data of the study to find out job satisfaction among government and private school teachers in respect of salary.

Table 3: Job satisfaction among government and private school teachers in respect of salary

Salary	N	Mean	S.D.	*t*-value	Significance
According to government norms	50	129.88	17.97	1.92	Insignificant
Consolidated Salary	50	138.1	24.36		

Table 3 reveals that the t value of job satisfaction according to salary is 1.92. This calculated value of t is less than the value of t at 0.01 and 0.05 levels.

This clearly indicates that the difference between job satisfaction level of government and private school teachers in respect of their salary is not significant.

SIGNIFICANCE OF THE STUDY

The teacher occupies a pivotal position, as he tries to moulds the destiny of the future citizens by educating them. The Kothari commission has stated that the destiny of the nation is shaped within the four walls of the classroom. Hence, the teacher is considered to be the nation-builder and moulder of the personalities of the children. So, the importance of the teacher even in this new era is multi-dimensional. Thus, the problem on hand is very significant not only for the teachers, but also for the society.

Job satisfaction is of great significance for efficient functioning of an organisation. Satisfaction leads to effective functioning of the system. If better services are expected from a teacher, then there is an immediate need to know the cause for dissatisfaction among the teacher and suggest remedies for them.

In the modern time, teacher works under varying amounts of stress and strain. As an outcome of stress and dissatisfaction, they lose interest in their professional responsibilities and consequently less attachment with their institution and less dedication to their profession. An unsatisfied teacher can become irritable and may create tensions which can have negative

influence on the students, their learning process and also affects their academic growth. Therefore it is very essential that a teacher feels satisfaction in his job.

Job satisfaction is a primary requisite for any successful teaching learning process. It is a complex phenomenon involving various personal, institutional and social aspects. School education is imparted quantitatively and qualitatively by the teachers who have academic excellence and apt training; besides these job satisfactions plays a very important role in imparting excellent education to the students as it acts a motivating factor. The job satisfaction is dependent on salary, management, curriculum, academic environment, qualification, experience, social status and others If teacher attains adequate job satisfaction they will be in a position to fulfill the educational objective and national goals.

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A Study of Soft Skills of Teachers in Relation to Locality, Type of Management and Teachers' Grade

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ABSTRACT

The present study aims at investigating the soft skills of teachers in relation to locality, type of management and teachers' grade. The sample consists of 600 teachers from Kanchipuram, Vellor and Tiruvannamalai Districts of Tamil Nadu, India. Soft Skills Inventory developed and validated by investigators (2013) was used for collecting the data. Normative survey method was adopted for the present study. The data was analyzed using descriptive and differential statistical techniques. The study reveals that the rural and urban school teachers differ significantly in their team-building skills. It is also showed that the Government and private school teachers differ significantly in the oral communication, computer, organizing, leadership and team-building skills. Further, it is disclosed that there is a significant difference among the teachers working at different grade levels such as secondary grade, graduate and post graduate levels in their oral communication, computer, leadership and ethical skills.

Keywords: Soft skills, Post graduate teachers, Locality, Type of management, Teacher's grade

INTRODUCTION

Soft skills refer to a set of skills that determine how to interact with others. Examples of soft skills include effective communication, problem-solving skills, leadership, Team building, flexibility, personal energy, positive attitude, interpersonal skills as well as the willingness to learn soft skills are keystones to success. They contribute to learning people in an effective and efficient manner. The term 'people' includes oneself as well as one's team. Leadership involves managing conflicts, selecting prospective team members, delegating responsibility and authority, coaching, networking and developing others. An effective leader has to manage activities like production quality, workplace safety, customer care and fund raising. A leader is also responsible for managing resources like people and finance and information in the form of decision making, problem solving, meeting management and persuasion. Many of these require presentation skills. In other words, good leadership presupposes refined 'soft skills'. Therefore, the present study is undertaken to quantify the Soft Skills of teachers.

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LITERATURE REVIEW

There are few studies conducted on soft skills of students (Taylor, 2004; Hellsten, 2005; Becker, 2007; Sasipriya and Annaraja, 2008; Pradeep, 2008, Iyamu, 2009; Jaya, 2009; Saravanan, 2010). From the literature reviewed on the Soft Skills of subjects, it could be concluded that the findings are inconclusive as some authors found significant difference and significant relationship between subgroups with respect to certain independent and dependent variables, whereas others did not find significant difference and significant relationship. This is an evidence of inconsistency which needs to be clarified and gaps that need to be filled. Therefore, the present study is undertaken with the purpose of studying soft skills of school teachers in relation to locality, type of management and teachers' grade.

METHODOLOGY

The investigators have employed the normative survey method in the present study. The present research work has been carried out on a random sampling of 600 teachers working in three districts of Tamil Nadu. To collect the necessary data and to achieve the objectives of study, soft skills inventory developed and validated by the investigators (2010) has been employed in the present investigation. The arithmetic mean, *t* value and *F* ratio of the statistical techniques have been used for the present study.

STATEMENT OF THE PROBLEM

A classroom situation demands an effective use of soft skills. The curriculum transaction, being a process of teaching–learning, becomes effective and efficient only in the use of soft skills by the teacher. The soft skills play a vital role in the professional success of the teachers. The soft skills are necessary to become a good and effective teacher as they cater to the development of one's personality and sharpening of teaching behaviour. The soft skills are of numerous types; the oral communication skills, written communication skills, computer skills, stress management skills, organizing skills, time management skills, leadership skills, interpersonal skills, team-building skills and ethical skills are taken into account in the present study in relation to three independent variables namely locality, type of management and teachers' grade. The problem stated for the present study is 'A

OBJECTIVES OF STUDY

The following objectives have been formulated for the present study:

1. To find out the soft skills of teachers.
2. To find out if there is any significance between rural and urban school teachers in their soft skills.
3. To find out if there is any significant difference between Government and private school teachers in their soft skills.
4. To find out if there is any significant difference among the teachers belonging to different grades in their soft skills.

HYPOTHESES OF THE STUDY

The following hypotheses were formulated from the above objectives:

1. The teachers have low level of soft skills.
2. There is no significance between rural and urban school teachers in their soft skills.
3. There is no significant difference between Government and private school teachers in their soft skills.
4. There is no significant difference among the teachers belonging to different grades in their soft skills.

DESCRIPTIVE ANALYSIS

The mean scores of Soft Skills of teachers were analyzed, and the details are given in Table 1.

Table 1: Means scores of the soft skills of teachers in ten dimensions

Dimensions of Soft Skills	*N*	Mean	SD
Oral communication skills	600	20.60	2.96
Written communication skills	600	20.24	3.40
Computer skills	600	19.57	4.09
Stress management skills	600	19.25	3.79
Organizing skills	600	19.89	3.60
Time management skills	600	19.69	3.48
Leadership skills	600	18.57	3.72
Interpersonal skills	600	21.26	3.04
Team-building skills	600	20.83	3.00
Ethical skills	600	22.28	2.75
Overall soft skills	600	202.36	20.99

Table 1 reveals the data pertaining to overall soft skills and its various dimensions namely oral communication skills, written communication skills, computer skills, stress management skills, organizing skills, time management skills, leadership skills, interpersonal skills, team-building skills and ethical skills.

The mean and standard deviation score of soft skills of total sample are 202.36 and 20.99, respectively. It indicates that level of soft skills of school teachers in all the 10 dimensions is high.

SOFT SKILLS AND LOCATION OF THE SCHOOL

The Soft Skills scores of various dimensions between rural and urban school teachers are analyzed, and the details are given in Table 2.

Table 2: Significance of mean difference between rural and urban school teachers in their soft skills

Dimensions of soft skill	Rural teachers (N = 288)		Urban teachers (N = 312)		t Values	Level of significance
	Mean	SD	Mean	SD		
Oral communication skill	20.62	3.11	20.57	2.83	0.23	Not significant
Written communication skill	20.45	3.44	20.06	3.37	1.41	Not significant
Computer skill	19.28	4.28	19.83	3.89	1.64	Not significant
Stress management skill	19.41	3.79	19.11	3.79	0.96	Not significant
Organizing skill	20.09	3.46	19.70	3.72	1.31	Not significant
Time management skill	19.74	3.49	19.65	3.48	0.30	Not significant
Leadership skill	18.76	3.72	18.39	3.71	1.21	Not significant
Interpersonal skill	21.15	3.28	21.37	2.81	0.91	Not significant
Team-building skill	21.11	3.14	20.58	2.86	2.18	Significant at the 0.05 level
Ethical skill	22.39	2.82	22.19	2.69	0.95	Not significant
Overall soft skills	203.02	21.36	201.70	2.66	0.75	Not significant

From Table 2, the calculated t value for overall soft skill of teachers is found to be 0.75, and it is not significant. Hence, the null hypothesis 2 is accepted. It is concluded that there is no significant difference between the teachers who are working in rural and urban school in their overall soft skills.

The study also reveals that the calculated t values of the teachers working in rural and urban schools differ significantly in one dimension of soft skill namely team-building skill (2.18), whereas the calculated t values are not significant in the soft skills dimensions of oral communication skill (0.23), written communication skill (1.41), computer skill (1.64), stress management skill (0.96), organizing skill (1.31), time management skill (0.30), leadership skill (1.21), interpersonal skill (0.91) and ethical skill (0.95).

It is inferred that the level of team building skill among the rural school teachers is significantly higher than those of their urban school counterparts.

From Table 3, the calculated t value for overall soft skill of teachers is found to be 3.16, and it is significant at the 0.05 level. Hence, the null hypothesis 3 is rejected. It is concluded that there is significant difference between the teachers who are working in Government and private schools with respect to their overall soft skills.

The study also reveals that the calculated t values for soft skill of the teachers working in Government and private schools do not differ significantly in the five dimensions such as written communication skill (1.91), stress management skill (0.82), interpersonal skill (1.14), time management skill (1.23) and ethical skill (0.88), whereas the calculated t values of soft skill are significant in the other five dimensions such as oral communication skill (2.55),

Table 3: Significance of difference between government and private school teachers in their soft skills

Dimensions of soft skill	Government school teachers (N = 294)		Private school teachers (N = 306)		't' values	Level of significance
	Mean	SD	Mean	SD		
Oral communication skill	20.29	3.05	20.90	2.86	2.55	Significant at the 0.05 level
Written communication skill	19.98	3.46	20.50	3.34	1.91	Not significant
Computer skill	18.79	4.41	20.32	3.61	4.66	Significant at the 0.01 level
Stress management skill	19.12	3.85	19.38	3.74	0.82	Not significant
Organizing skill	19.59	3.70	20.18	3.48	2.02	Significant at the 0.05 level
Time management skill	19.51	3.50	19.86	3.47	1.23	Not significant
Leadership skill	18.13	3.81	18.99	3.59	2.86	Significant at the 0.01 level
Interpersonal skill	21.11	2.92	21.40	3.15	1.14	Not significant
Team-building skill	20.54	3.07	21.12	2.91	2.37	Significant at the 0.05 level
Ethical skill	22.19	3.08	22.39	2.41	0.88	Not significant
Overall soft skills	199.73	21.53	204.99	2.14	3.16	Significant at the 0.01 level

computer skill (4.66), organizing skill (2.02), leadership skill (2.86) and team-building skill (2.37).

It is concluded that the levels of written communication, stress management, interpersonal, time management and ethical skills among the private school teachers are significantly higher than those of their Government school counterparts.

SOFT SKILLS AND TEACHERS' GRADE

The F ratio has been applied to find out whether there is any significant difference among the school teachers with different grade in their various dimensions of soft skill.

From Table 4, the calculated F ratios for soft skill are found to be not significant both in overall level (1.04) and its six dimensions such as written communication skill (0.86), stress management skill (2.33), organizing skill (0.05), time management skill (0.68), interpersonal skill (0.61) and team-building skill (0.55). It is concluded that there is no significant difference among the teachers belongs to different grades in their overall soft skills and also in above quoted six dimensions. Hence, the null hypothesis 4 is accepted for the above noted dimensions and overall soft skills. On the other hand, the calculated F ratios of soft skill scores are found to be significant in the four dimensions such as oral communication skill (3.24), computer skill (3.94), leadership skill (5.43) and ethical skill (4.46). It is concluded that there exists a significant difference among the teachers working at different grade levels in the four dimensions of soft skills. Hence, the null hypothesis 4 is rejected.

Table 4: ANOVA for significance of difference among the teachers of different grades in their soft skills

Dimensions of soft skills	Source	Sum of squares	df	Mean square	*F* ratios	Level of significance
Oral communication skill	Between groups	50.605	2	28.303	3.24	Significant at the 0.05 level
	Within groups	5,221.395	597	8.746		
	Total	5,278.000	599			
Written communication skill	Between groups	20.009	2	10.005	0.86	Not significant
	Within groups	6,941.484	597	11.627		
	Total	6,961.493	599			
Computer skill	Between groups	131.898	2	65.949	3.94	Significant at the 0.05 level
	Within groups	9,907.162	597	16.595		
	Total	10,039.06	599			
Stress management skill	Between groups	66.699	2	33.349	2.33	Not significant
	Within groups	8,560.299	597	14.339		
	Total	8,626.998	599			
Organizing skill	Between groups	1.270	2	0.635	0.05	Not significant
	Within groups	7,769.903	597	13.015		
	Total	7,771.173	599			
Time management skill	Between groups	16.510	2	6.255	0.68	Not significant
	Within groups	7,263.440	597	12.167		
	Total	7,279.958	599			
Leadership skill	Between groups	148.242	2	74.121	5.43	Significant at the 0.05 level
	Within groups	8,148.532	597	13.649		
	Total	8,296.773	599			
Interpersonal skill	Between groups	11.385	2	5.693	0.61	Not significant
	Within groups	5,537.008	597	9.275		
	Total	5,548.393	599			
Team-building skill	Between groups	9.965	2	4.98	0.55	Not significant
	Within groups	5,408.028	597	9.06		
	Total	5,417.993	599			
Ethical skill	Between groups	67.03	2	33.51	4.46	Significant at the 0.05 level
	Within groups	4,490.105	597	7.521		
	Total	4,557.118	599			
Overall soft skills	Between groups	915.795	2	457.897	1.04	Not significant
	Within groups	263,031.9	597	440.589		
	Total	263,947.7	599			

Table 5: Significance of difference between secondary grade and graduate teachers in their soft skills

Dimensions of soft skills	Secondary grade teacher (N = 124)		Graduate teachers (N = 330)		't' values	Level of significance
	Mean	SD	Mean	SD		
Oral communication skill	20.94	3.03	20.70	2.80	0.77	Not significant
Computer skill	20.48	4.07	19.28	4.11	2.78	Significant at the 0.01 level
Leadership skill	19.27	3.96	18.65	3.70	1.56	Not significant
Ethical skill	21.65	3.09	22.41	2.70	2.58	Significant at the 0.01 level

Table 5 reveals that the calculated *t* values for the soft skill of the teachers of secondary grade and graduates do not differ significantly in the two dimensions such as oral communication skill (0.77) and leadership skill (1.56), whereas the calculated *t* values are significant in the other two dimensions of soft skills such as computer skill (2.78) and ethical skill (2.58).

It is concluded that the level of computer skill is significantly higher among the secondary grade teachers than the graduate teachers, whereas the gradate teachers are having significantly higher level of ethical skill as compared to the secondary grade teachers.

Table 6: Significance of difference between secondary grade and post graduate teachers in their soft skills

Dimensions of soft skills	Secondary grade teacher (N = 124)		Post graduate teachers (N = 146)		't' values	Level of significance
	Mean	SD	Mean	SD		
Oral communication skill	20.93	3.02	20.08	3.21	2.24	Significant at the 0.05 level
Computer skill	20.47	4.06	19.46	3.98	2.05	Significant at the 0.05 level
Leadership skill	19.27	3.95	19.80	3.43	3.25	Significant at the 0.01 level
Ethical skill	21.64	3.08	22.56	2.51	2.68	Significant at the 0.01 level

Table 6 reveals that the calculated *t* values of for the soft skills of secondary grade and post graduate teachers differ significantly in the four dimensions such as oral communication skill (2.24), computer skill (2.05), leadership skill (3.25) and ethical skill (2.68). It is concluded that the levels of oral communication and computer skills are significantly higher among the secondary grade teachers than the post graduate teachers, whereas the levels of leadership and ethical skills are significantly higher among the post graduate teachers than those of their secondary grade counterparts.

Table 7 reveals that the calculated *t* values for the soft skills of the graduates and post graduate teachers differ significantly in the two dimensions such as oral communication skill (2.12) and leadership skill (2.40), whereas the calculated *t* values are not significant in the two dimensions such as computer skill (0.47) and ethical skill (0.59). It is inferred that the graduate

Table 7: Significance of difference between graduates and post graduate teachers in their soft skills

Dimensions of soft skills	Secondary grade teacher ($N = 330$)		Post graduate teachers ($N = 146$)		't' values	Level of significance
	Mean	SD	Mean	SD		
Oral communication skill	20.70	2.80	20.08	3.21	2.12	Significant at the 0.05 level
Computer skill	19.27	4.11	19.46	3.98	0.47	Not significant
Leadership skill	18.64	3.70	17.80	3.43	2.40	Significant at the 0.05 level
Ethical skill	22.40	2.70	22.56	2.51	0.59	Not significant

teachers are having significantly higher level of oral communication and leadership skills than the post graduate teachers.

CONCLUSION

The present study aims to find out the soft skills of teachers in relation to locality, type of management and teachers' grade. It is concluded that the rural and urban teachers differ significantly in their team-building skills. The teachers of Government and private schools differ significantly in their overall soft skills. Further, they differ significantly in the five dimensions of soft skill such as oral communication skill, computer skill, organizing skill, leadership skills and team-building skills, whereas they do not differ significantly in the written communication, stress management, time management, interpersonal, and ethical skills. The teachers working in different grade levels differ significantly among themselves and between one another in their overall soft skills. Further, they differ significantly in the four dimensions of soft skill such as oral communication, computer, leadership and ethical skills, whereas they do not differ significantly in the written communication, stress management, organizing, time management, interpersonal and team-building skills.

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A Study on the Status of Science Laboratories in Secondary Schools of Vadodara City

Jyotsna Ashokkumar Amin

ABSTRACT

'I hear, I forget, I see, I remember, I do, I understand' Science learning is best explained in this Chinese proverb. Learning by doing is the best way to understand the cause-and-effect relationship of science. Science learning can be ensured by providing practical exposure and first-hand experiences to the learners. Laboratory plays a vital role in the science curriculum and in school to consolidate the theoretical knowledge of science. Enhancing student–teachers' process skills, experimental skills, science laboratories is mandatory. Stressing the importance of practical work in science, national focus group on teaching of science (2006) mentioned that 'Experimentation, often involving quantitative measurement as a tool to discover/verify theoretical principles, should be an important part of the curriculum at this secondary stage. Experiments should be part of the content of the secondary-stage textbook to avoid their marginalisation or neglect. At higher secondary stage, for those opting science stream, laboratory is the second home. The fact is that majority of the students enter the laboratory when they come to eleventh grade as there was no practical work in secondary grades. So the status of secondary schools is also pitiable. Considering the importance of the science laboratory in science teaching and in developing practical understanding, its status is worth studying. Thus, in this research paper, attempt is made to provide the status of science laboratory in the secondary schools of Vadodara city and further about its use by the teachers and students. It further discusses about the problems faced by the teachers in using and managing the laboratory, and suggestions were sought to improve the laboratory work secondary stage.

Keywords: Science laboratory, Science education, Science teaching, Practical work, Learning by doing

INTRODUCTION

The present world is a world of science and technology. Everything and every event happening around us demand some knowledge of simple scientific facts or principles. The gifts of science have been profitably used for making life comfortable and raising the standard of living. But the use or abuse of the wonderful gifts of science depends on man and his mind. One should be open-minded, rational enough to see the positive or negative aspects of science. A person having high scientific attitude can do this task effectively. Therefore, citizen with scientific attitude is must in a country like India. Since we have people with different religion, caste, language, customs and traditions, it is expected that every citizen should have respect

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and tolerance for others' customs, traditions, religion and others and therefore scientific attitude, which is very crucial for the development of nation, is necessary to develop in our children.

'Learning by doing' and 'learning by living' are the two cardinal principles of teaching, and the same is true in case of teaching science. It is the natural urge in the children to make things, to break things and to handle things, but the present curriculum does not provide ample opportunities for the students for self-expression, independent research, constructive activities and projects. For an effective science teaching, the facilities for experimentation should be provided by using the science laboratory. This is possible only if adequate apparatus of the right type is available in the science laboratory. Laboratory work forms the basis of scientific study. To arrive at any conclusion, experimentation is needed. The achievements of science and technology today are all due to the experimental method. So the present study will be conducted to study the status of science laboratories in secondary schools. 'Learning by doing' and 'learning by living' are the two cardinal principles of teaching, and the same is true in case of teaching science. It is the natural urge in the children to make things, to break things and to handle things, but the present curriculum does not provide ample opportunities for the students for self-expression, independent research, constructive activities and projects. There is little scope for individual practical work by the students, and no time is allotted for such type of work in the time table. Naturally, there arises the need for such activities which can provide an outlet for the pent-up emotions of children and channelise their energies towards desirable goal.

For an effective and efficient teaching in science, a good laboratory with necessary equipment is essential. In the recent years, the purposes of teaching science at the secondary stage have undergone drastic changes. We do not aim at stuffing the minds of the pupils with mere facts of science but at developing in them the application ability, skills of experimentation, construction, improvising scientific attitudes, interests, appreciation and others. These can be achieved only if the students get the opportunities to work with their own hands in an atmosphere which pervades in science teaching.

National Policy on Education (1986), an important purpose of science and technology teaching in general education up to secondary stage is to familiarise the learner with various dimensions of scientific and technological literacy. These would include understanding the nature of science, ability to apply appropriate science concepts and their technological applications properly, capacity to understand values that underlie science and technology, willingness to understand and appreciate the joint enterprise of science, technology and society, ability to develop rich and satisfying views of the universe and to continue science and technology education throughout life and development of certain manipulative skills which are required in day-to-day life situations.

One of the important functions of the science laboratory is the deepening of the students, understanding that scientific concepts and application are closely related to his own natural environment. In the laboratory, the students can be taught more readily to be discriminating in observation, to evaluate evidence of data and to sense the importance of care and skill in the taking of measurements. Laboratory should be represented as an integral part of instruction in

science. So the laboratory, in all its forms, helps in achievement of the aims of teaching science which in turn help in future developments in the field of science. While constructing the science laboratory in the schools, the science teachers or science educators should be asked to collaborate with the architect in getting it built on the standardised and recommended plan to draw out the best educational purposes.

In a nutshell, laboratories can be considered as the back bone of the science education because it develops scientific skills among the learners. Therefore, it is imperative to provide science laboratory and emphasising its use in science teaching. This research project was an attempt to study the status of science laboratory for secondary schools that is for grade VII to X in Vadodara city, Gujarat so as to get the clear picture of the field realities.

STATEMENT OF THE STUDY

A study of status of science laboratory in secondary schools of Vadodara city

Objectives of the Study

1. To study the status of science laboratory in secondary schools of Vadodara city in terms of a) Location; b) Layout; c) Equipment available; d) Space requirement; e) Furniture; f) Lighting; g) Supervision; h) Safety; i) Flexibility; j) Staff; k) Flexibility; l) Functioning
2. To study the problem faced by the teachers teaching science and technology subject in the secondary schools of Vadodara city.
3. To study the suggestions for improving science laboratory, provided by the teachers teaching science and technology subject in the secondary schools of Vadodara city.

Delimitation of the Study

The present study was delimited to the schools following Gujarat Secondary and Higher Secondary Education Board (GSHSEB) of Vadodara city during the academic year 2010–2011.

Research design

A survey method was employed for conducting the present study. To achieve the objectives of the study, a systematic and scientific approach was followed.

Population

There are 265 schools having secondary sections in Vadodara city. All the schools form the population for the present study. All the teachers teaching science and technology subject in secondary schools of Vadodara city following GSHSEB syllabus of the academic year 2010–2011 constituted the population.

Sample

Out of the 265 schools, initially 30% of the schools were selected using stratified random sampling technique, various strata covered were type of school by management, medium of instruction and representation from various Shala Vikas Sankul (SVS). But in the initial visits

and telephonic conversation, it was realised that all the schools selected in the sampling science laboratory were not available. Thus, to cover the schools having science laboratory, 176 schools (66% from the population) were contacted, out of which 52 schools have been identified having general science laboratory for the secondary classes. Thus, in the whole process, the sampling technique was progressively evolved. All the teachers teaching science classes and sharing the responsibility of the science laboratory form the sample for interview to know the functioning part of the laboratory.

Tools and technique

For the purpose of collecting data to study the status of science laboratory, the following tools and techniques were employed.

Laboratory assessment tool was developed to observe the various dimensions of the science laboratory in schools such as location, layout, equipment available, space requirement, furniture, lighting, supervision, safety, flexibility, staff, flexibility, functioning and others.

Questionnaire for science teachers was prepared by the investigator to know the use and functioning of the science laboratory in schools.

Data Collection

Data collection was carried out by personally visiting the laboratory and observing it with prior permission of the school principals. The teachers who are taking care of laboratory/ laboratory-in-charge were interviewed after the observation, and scheduled questions were asked of them to extract more detailed information on objective numbers three and four.

Data analysis

The data collected through lab assessment tool were analysed using frequency and percentage. The data collected through questionnaire were analysed using content analysis technique from qualitative responses, and for quantifiable responses frequency percentage were calculated, details of which are presented below:

Major Findings of the Study

The analysis is presented in the following diagram as per the objectives of the study which indicates the two dimensions

1. Physical facilities of the laboratory and
2. Use of the laboratory by teachers to teach science.

In the second and third objectives, problems faced by the science teachers in teaching science and the suggestions to improve the laboratory are discussed.

A. Out of the 176 schools visited, only 52 (29.54%) schools have secondary science laboratory in Vadodara city as indicated in Figure 1.

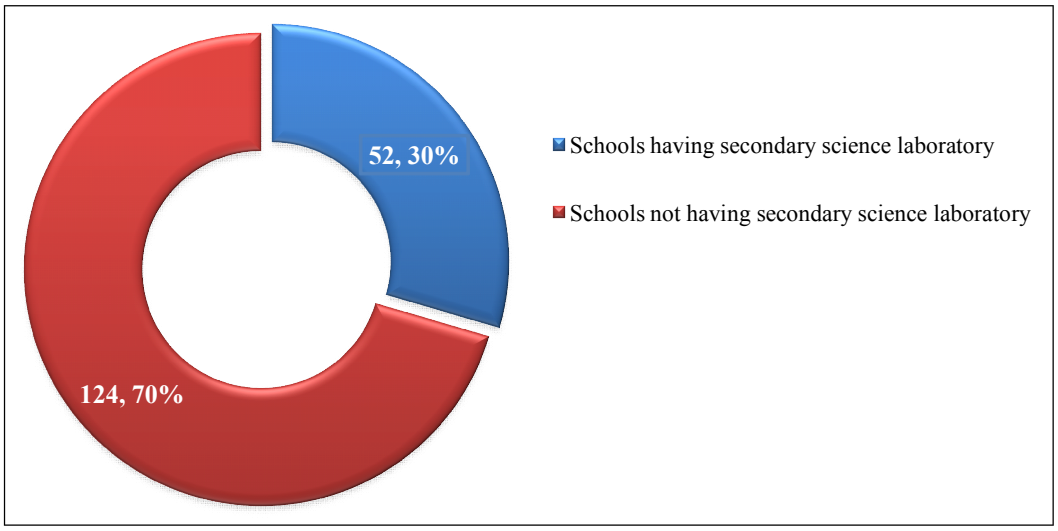

Figure 1: Status of science laboratory in Vadodara city

B. To maintain the laboratory, there should be appointment of the full-time teachers/laboratory attendant in the school but no one of the school under observation has the laboratory attendant but the science teachers who are teaching science in the school who are made responsible their qualification is mentioned as laboratory-in-charge in Figure 2. This indicates that majority of the teachers are qualified except 4% who are PTC (Certification in Primary Teaching) science and one teacher who was commerce graduate.

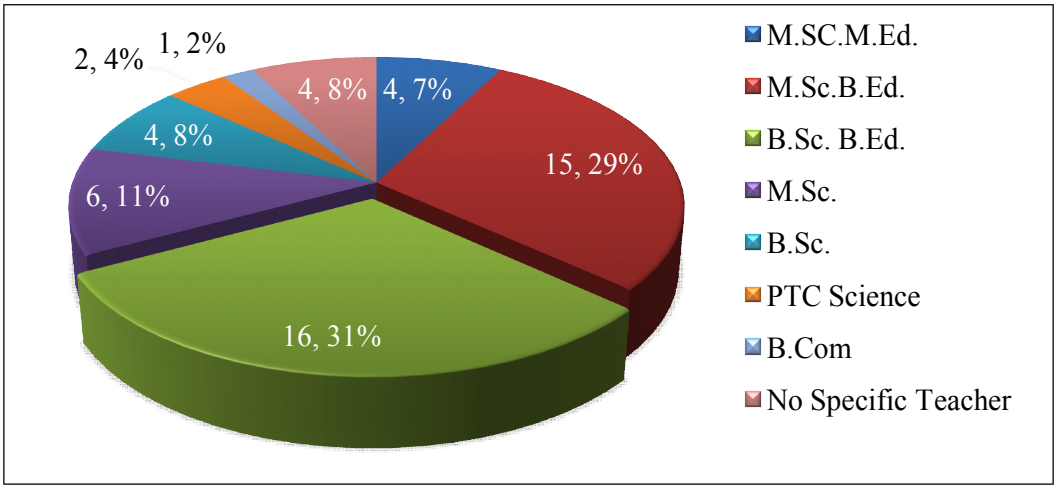

Figure 2: Qualification of laboratory in charge

C. It is suggested in the criteria for the establishment of science laboratory that the location should be on the ground floor to be safe and easy to exit in case of an emergency situation. But in the actual situation, 29% schools are on ground floor, and in the rest of the schools,

laboratories are situated on first floor (31%), second floor (25%), third floor (11%) and fourth floor (2%), respectively. It is pictorially presented Figure 3.

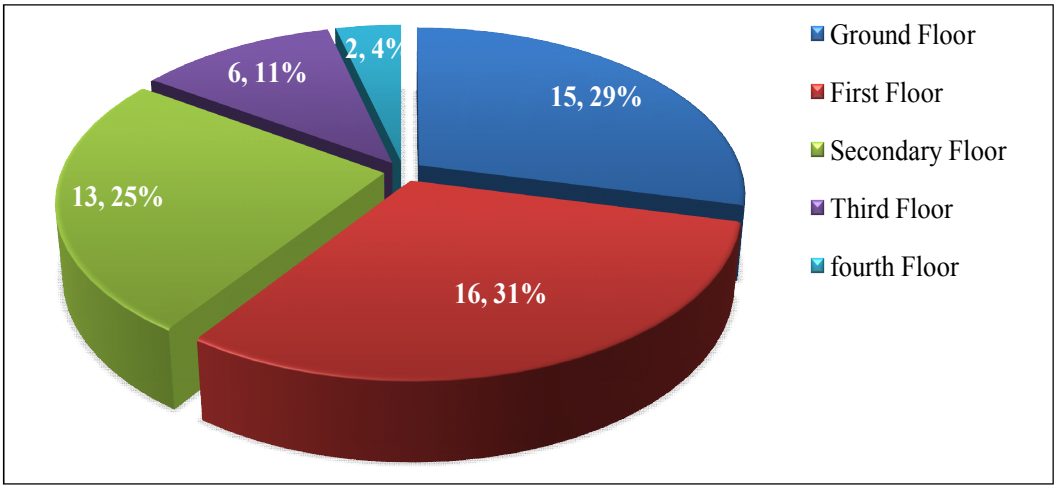

Figure 3: Location of the science laboratory in the schools

D. The normal student–teacher ratio in schools is a minimum 1:40 in secondary schools, and thus the laboratory should have capacity of accommodating 40 students at a time. But it can be seen in Figure 4 that there were fewer schools (16%) having laboratory capacity of accommodating more than 40 students (34%), rest of the schools have science laboratory having less capacity, 14% schools having capacity of 10–19 students and 31% schools have capacity of 20–29 students.

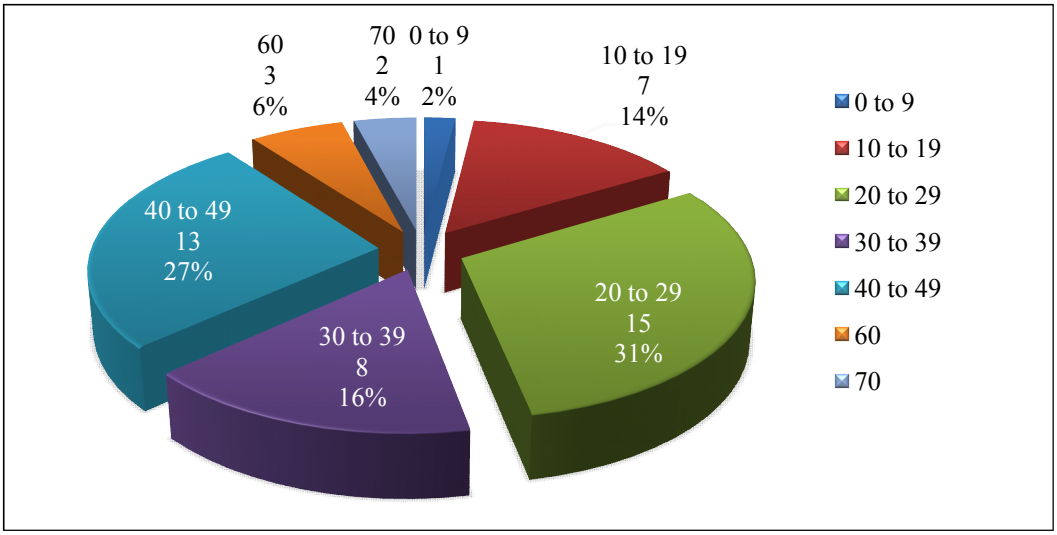

Figure 4: Number of students' accommodation in science laboratory

E. To study the layout of the laboratory, various specified physical facilities were studied by visiting the laboratory details which are presented below:

1. Square feet area: it was found that 29 (55%) schools have laboratories having less than 500 SF area, 11 schools are having more than 501 and less than 1,000 square feet area of science laboratory, five of them (9.43%) have square feet area between 1,001 and 1,500 and only three science laboratories have square feet area more than 2,000 square feet area.

2. Number of rooms: out of the 52 schools, 46 schools (89.79%) have only one room as laboratory without any store room, darkroom and others, in three schools (5.66%) three rooms are there, in one school one lecture hall and storeroom were there, and only one school has two rooms and one store room facility.

3 Dark room facility: in secondary classes, there are topics on light and its reflection–refraction and lens. For this, darkroom facility is required, only four laboratories (8%) were having dark room facility and the rest of the 48 (92%) schools were not having darkroom facility.

4 Direct sun light facilities: for the biology practicals where use of microscope is necessary, direct natural sunlight is required. It is clear from Figure 5 that out of the 50 school laboratories visited, in 42 (81%) schools there was access to direct sunlight, and in 10 schools (19%) it was not possible to have sunlight.

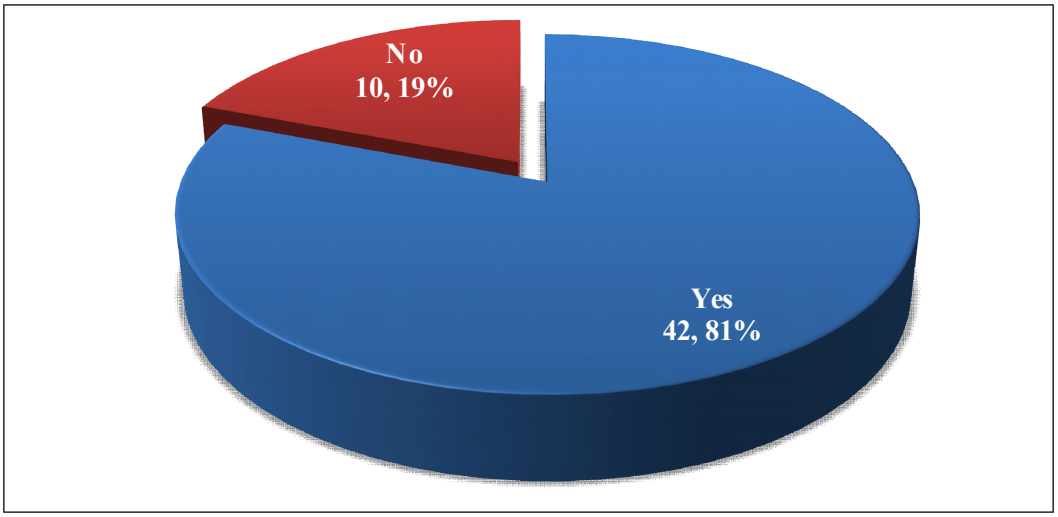

Figure 5: Laboratories having arrangement for direct sunlight

5 Ventilation and exhaust fan facility: any laboratory should be located such that it has air circulation facilities such as ventilation and exhaust fan. It is seen from Figure 6 that out of the sampled schools, 44 laboratories (83%) have ventilation facility and nine schools (17%) were not having ventilation facility in them. In 43 schools, exhaust fan was not found, whereas only nine schools lacked an exhaust fan.

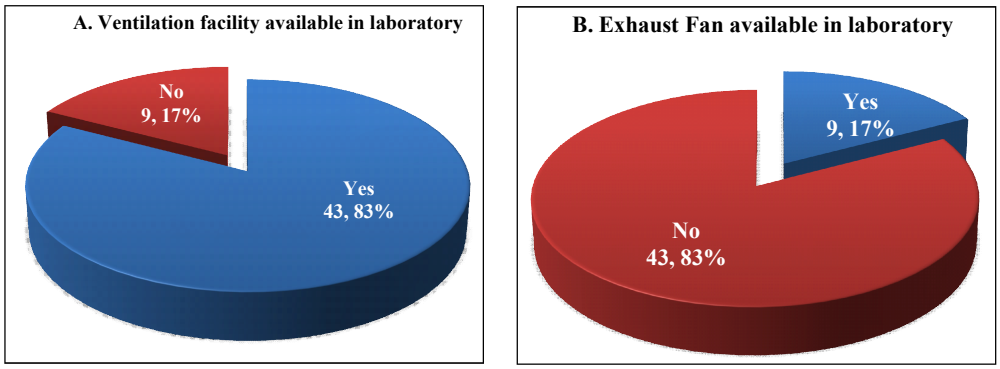

Figure 6: Ventilation and exhaust facilities available in science laboratory

6 Electricity supply: there are only four (7.54%) schools that reported having laboratories with no electric supply, and rest of the 49 (92.45%) laboratories were having electric supply.

7 Gas supply: there are 10 schools (18.86%) which have the functional gas connection for the laboratory, whereas 43 (81.13) laboratories have no functional gas connection.

8 Water supply: there are 27 (52%) laboratories with no water supply, and 25 of them (48%) reported having water supply.

9 Almirah: for any science experiment, various apparatus, material and solutions are needed as per the nature of the experiment. To store all these, having glass-faced almirah is required. The detailed analysis of number of almirahs in schools laboratories is presented in Figure 7. These reflect that the laboratories have the adequate storage facilities in many of the schools. In five schools, there was no almirah reflecting the lack of equipment in laboratory. In many schools, it was observed that almirahs were stored with office files and maps.

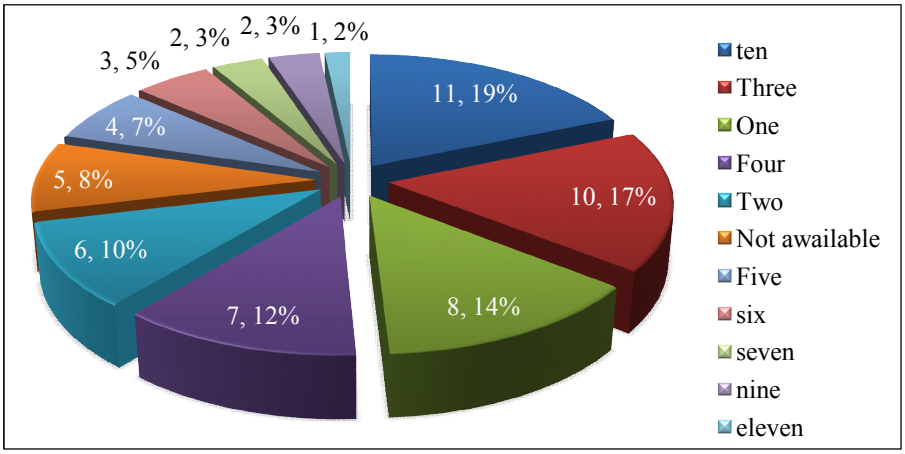

Figure 7: Number of almirahs in school laboratories

10 Store room facility: it was observed it that in 36 schools (69%), laboratories have no store room attached to it. There were nine schools (17%) with one store room facility, and there was only one school having two storerooms attached to the laboratories (Figure 8).

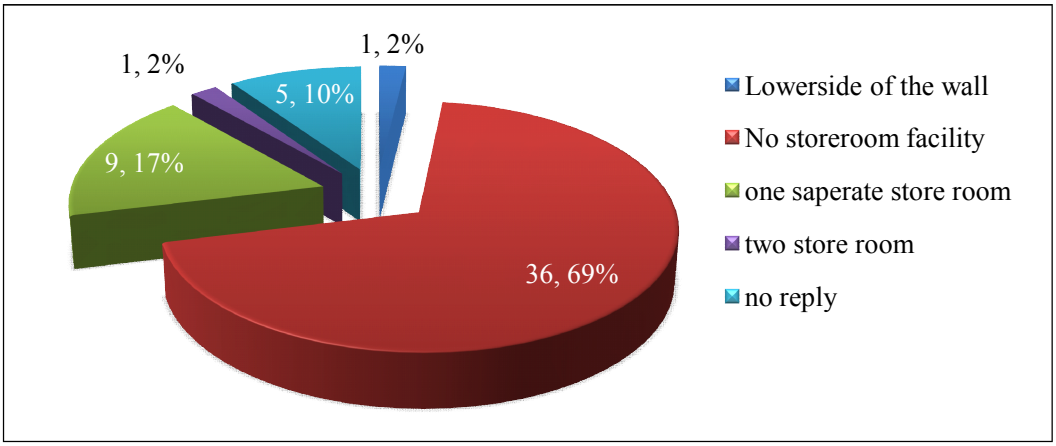

Figure 8: Storeroom facilities

11 It was observed that in 34 (66%) laboratories, there was one demonstration table, whereas in six (12%), there was no demonstration table available. There was only one school which has six small demonstration tables for students to perform the experiment (Figure 9).

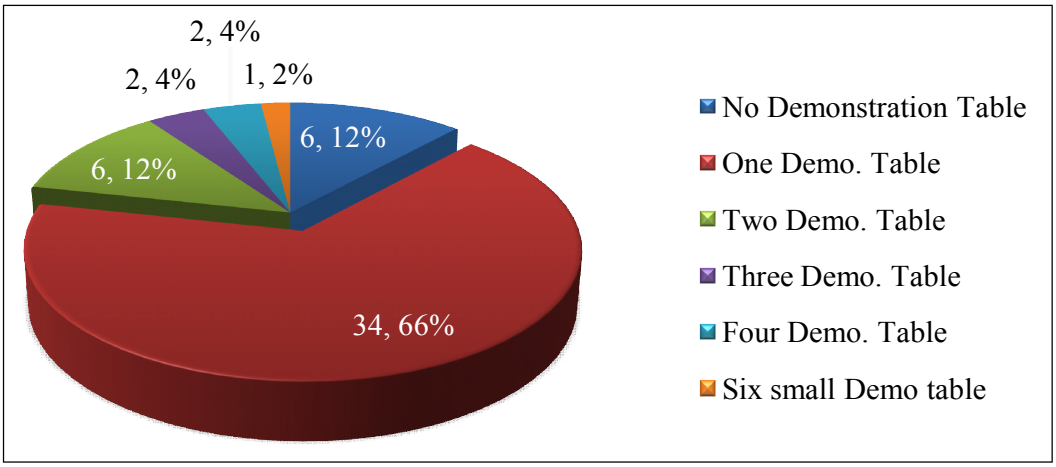

Figure 9: Availability of demonstration table

12 Seating arrangement: it was observed that in 15 laboratories (28%), there was no seating arrangement for students. In 11 schools (21%), there were stools for students to seat, whereas five schools have benches in the laboratory, 10 schools' laboratories have circular seating arrangement. One school has circular seating arrangement in small group (Figure 10).

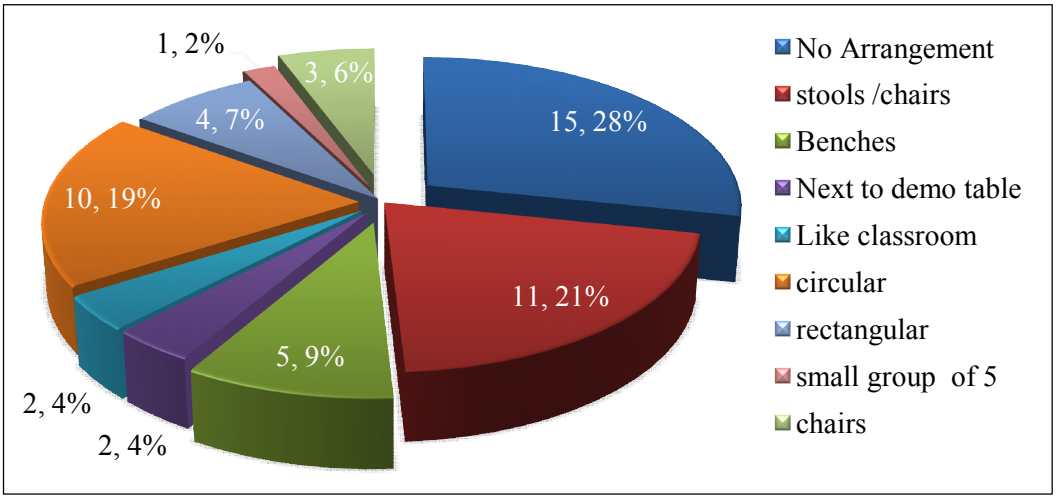

Figure 10: Details of seating arrangement for students in laboratory

F. ICT facility in the secondary science laboratory.

1 Computers: it was observed that in 38 laboratories, there were no computer facilities, only 14 laboratories have computer facilities out of which only 7 (12%) laboratories have functional computers (Figure 11).

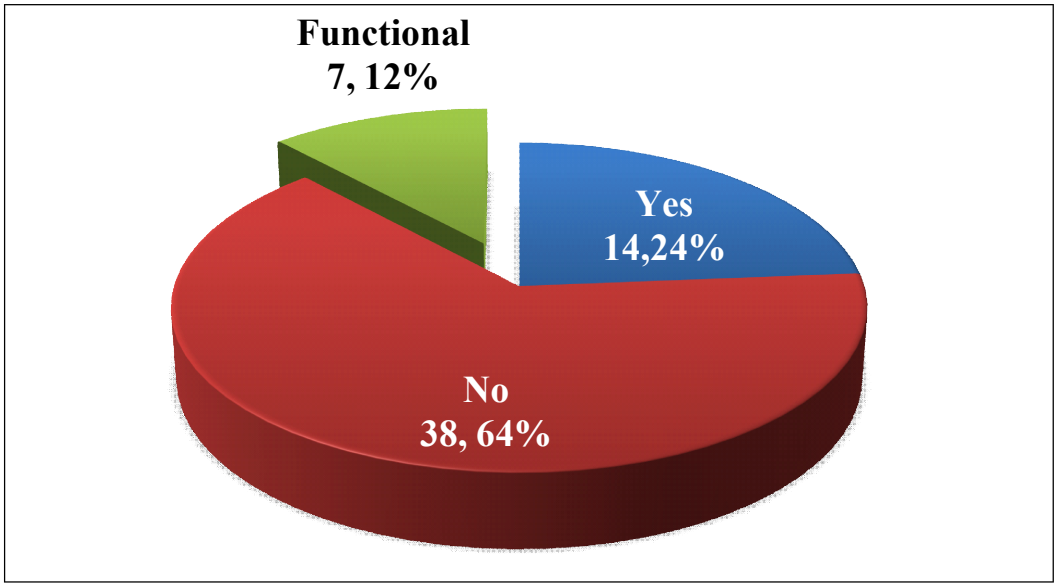

Figure 11: Status of computers in science laboratory

2 Internet facilities: it was observed that in 42 science laboratories, there were no internet facilities and only 10 schools have internet access in the laboratories (Figure 12).

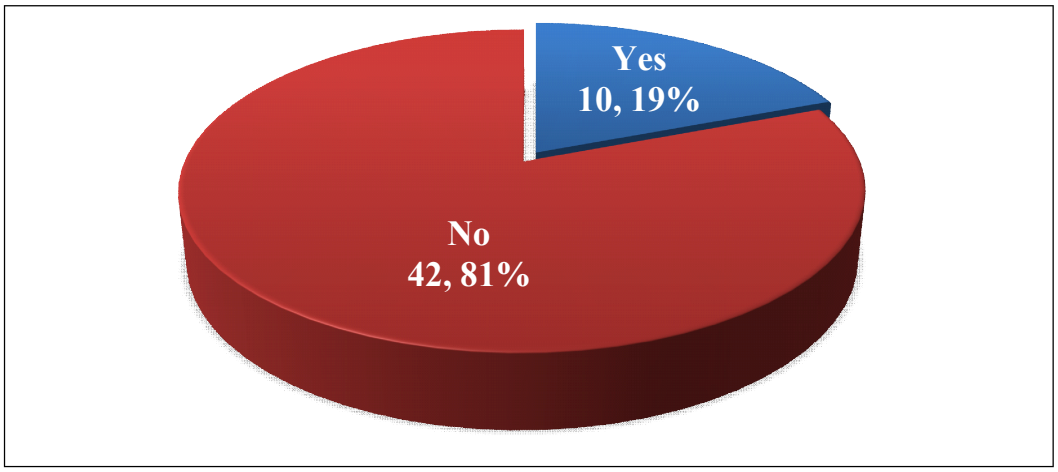

Figure 12: Internet facilities available in science laboratory

3 LCD projectors: it was observed that in 40 schools (77%), there were no LCD projectors separately for laboratories and 12 schools' (23%) laboratories have LCD affixed in the room itself (Figure 13).

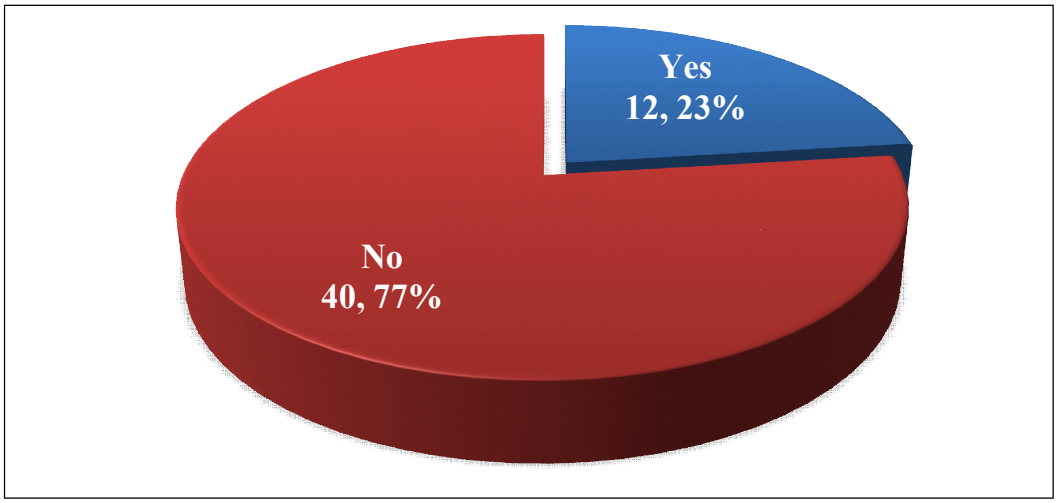

Figure 13: LCD projector facility available in science laboratory

After the visit to the laboratory, teachers teaching science and technology subject and responsible for the management of the laboratory were interviewed with a set of structured questions.

- In response to the question 'Do you take your students to science laboratory for teaching science?', 48 teachers out of 52 (94%) responded that they take their students to the science laboratory whereas 4 teachers (6%) do not take their students to the science laboratory. When probed further, these teachers said that there is no weightage of practical work, so taking them to the laboratory is wastage of time.

- With respect to the frequency of the usage of the Science laboratory, they were asked the question 'How frequently do you take your students to science laboratory?' Forty per cent of them reported that they take students to the laboratory once in a week, 19% of them take students once in 15 days, 12% told that they take students to the laboratory once in a month and 10% teachers responded that they rarely take their students to the science laboratory may be once in a year. There are 10% of the teachers who said that they never take their students to science laboratory rather they bring the objects of apparatus in the classroom to explain the concept (Figure 14).

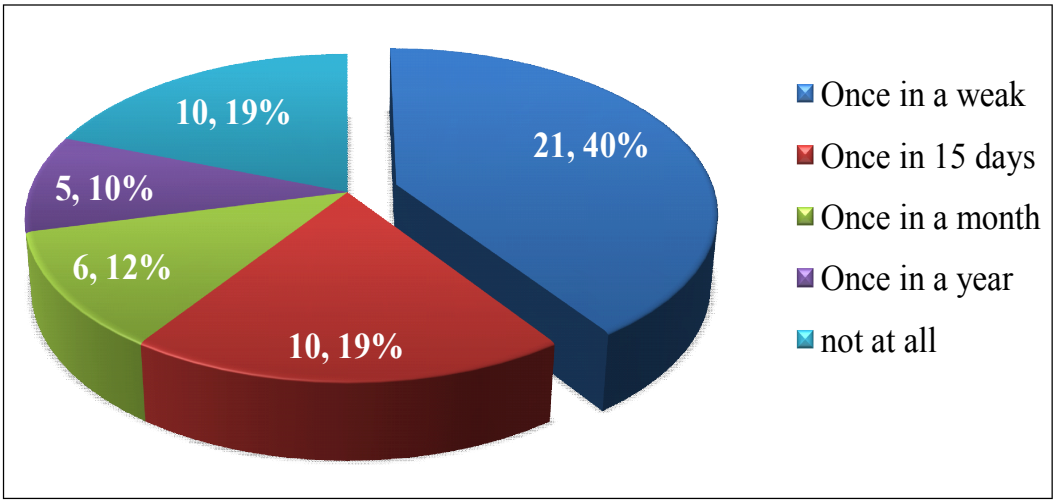

Figure 14: Frequency of visit to the laboratory by secondary students

- When asked about the topics for which laboratory is used by the teachers, almost all the topics of secondary science curriculum have arrived as cumulative response. But when the same is discussed with the students, there was a contradictory view in some of the schools.
- Further, a link question was asked that what are the other topics for which there is scope of using laboratory and you have not yet used it. Here also a long list of the topics which are included in science curriculum was given by the teachers.

When asked about 'Do you allow students to experiment in the laboratory?' Twenty nine of them (56%) refused saying that they do not allow students to experiment by themselves for the safety purpose and saving the time. Twenty three of them (44%) responded that they allow their students to experiment in the laboratory. When further asked about details of it they said that the experiments which are safe and does not have risk of being injured were performed by the students. Majority of them who leave their students to perform the experiment have said that lens magnetic field, reflection, Ohms' law, prism, onion cell, chloroplast of the plant were the experiments students could do in group after the demonstration of teachers (Figure 15).

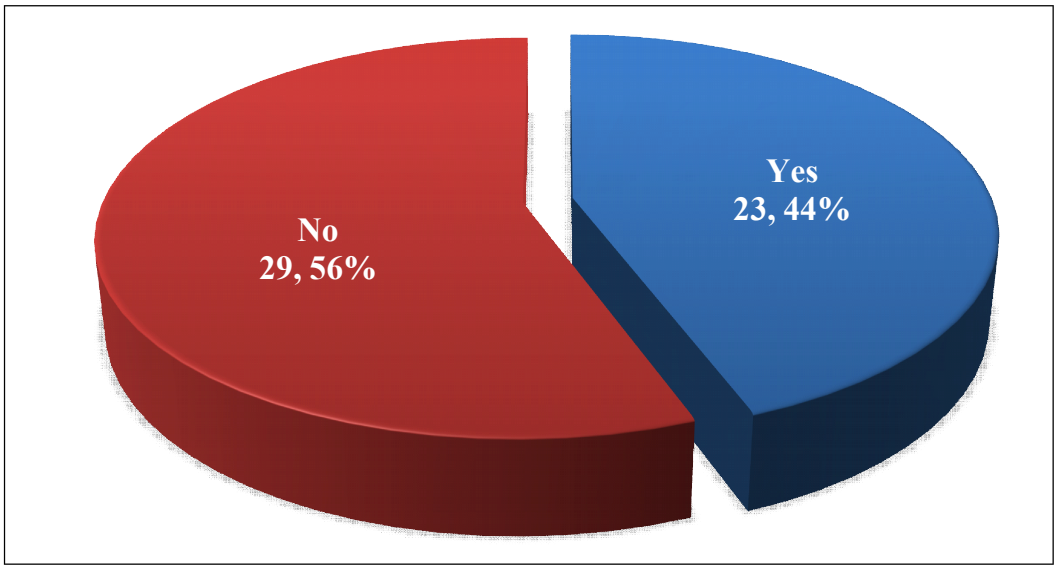

Figure 15: Use of laboratory by the students for conducting science experiment

- In response to the question about the teaching methodology followed by teachers while teaching in science laboratory, 27 of them responded that demonstration cum lecture method is used, 14 of them said that they conduct demonstration followed by discussion on the demonstration shown, six of them said that they perform the demonstration then students were allowed to perform the experiment, one teacher responded that there should be an activity by students after the demonstration by teachers related to topic. Four teachers responded that after the demonstration if required, they take students to the botanical garden, nearby, dairy or make them visit the Community Science Centre (Figure 16).

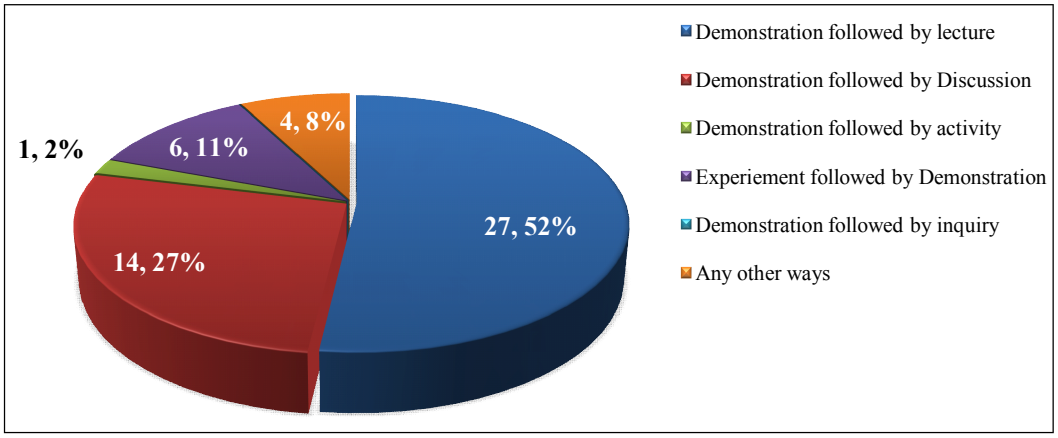

Figure 16: Methodology used for science laboratory

- In response to the question about whether practical examination for science is conducted in their school, out of 54 only 9 (17%) of the teachers said that practical examination is conducted in their school whereas 43 (83%) of them said that there is no practical examination for the science in their school. When asked about their wish whether practical exam should be there or not, all of them unanimously said that there should be practical exam not only at school level but in the board examination also, some weightage to the practicals should be given (Figure 17).

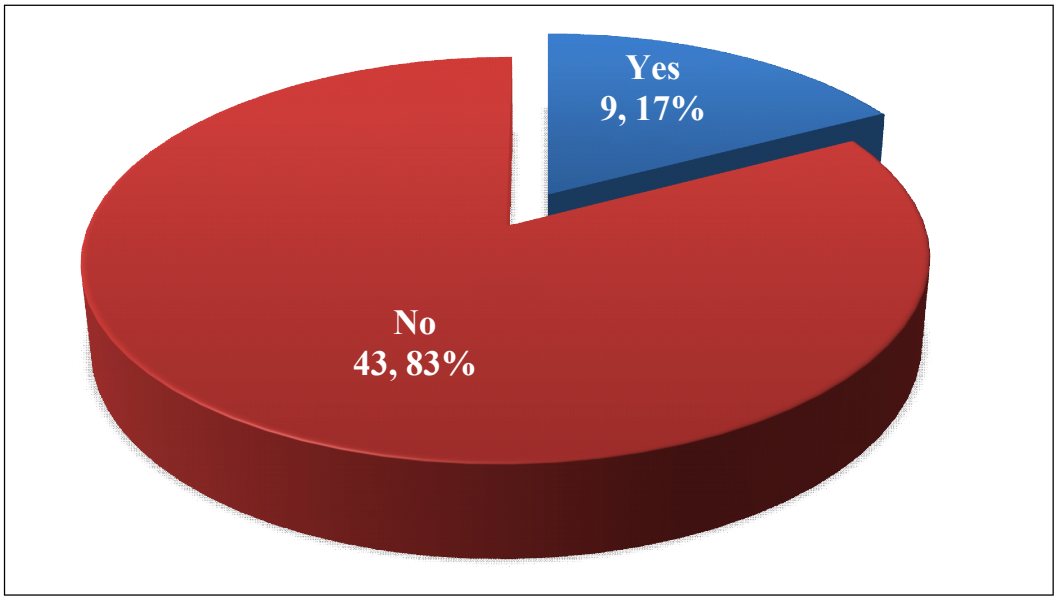

Figure 17: Status of practical examination for science in school

- Science teachers were asked whether they are facing any problem in using the science laboratory while teaching science. Following were the varied problems discussed by the teachers, few of them are school specific but few of the problems are common in many of the schools under observation.

1. Thirteen teachers said that they do not face any problem in using science laboratory for secondary classes.
2. Twelve teachers reported that laboratory does not have enough space for student's experimentation and seating arrangement is also not proper.
3. Six of them reported that science and technology curriculum of grade nine is very lengthy and they have scarcity of time.
4. There is no specific time for laboratory and it is difficult to manage time with other science teachers as the number of students is more as per one teacher.
5. One teacher felt that students are not mature enough to be exposed and work in the laboratory.

6. Four of them accepted that they are not capable of managing the students when practicals are going on and that cause indiscipline.
7. Three of them find it difficult to perform the experiment and get accurate result to explain to the students hence they avoid using laboratory.
8. There were problems related to physical facility such as gas supply, water supply, electric supply and water disposal facilities are not functional in each of the schools.
9. Advanced instruments are not available for newly added topics as per three teacher's views.
10. Materials needed are not available such as chemicals, materials are outdated or not available, equipments are broken and no maintenance grant is provided and so teacher do not provide costly instruments to the students to handle.
11. Proper storage facility is not available and many of the models, charts remained untouched on the shelves because they are not handy and easy to use.

- Suggestions for the improvement and optimum utilisation of science laboratory for teaching science at secondary school level were collected.

1. Three of them said that there should be a separate teacher responsible for laboratory management.
2. There should be separate science timetable for practical work as per five teachers.
3. Six of them said that learning by performing experiments should be emphasised more in laboratory to provide students opportunity to use the apparatus.
4. Practical exams should be conducted in each school and their marks should be counted.
5. Five of them responded that management should allow the teacher to permit students to experiment.
6. Four of them said that laboratory method should be used by the teacher and training to be provided by the government to secondary teachers.

CONCLUSION

Science laboratories are the backbone of the science education. Its status is worth studying and discovering the interests in this field is necessary. Science laboratory schools should be empowered with well-equipped variety of things. If status of science laboratory is enhanced, it will definitely help the students.

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