INFLUENCE OF MULTIMEDIA IN ENHANCING ACHIEVEMENT IN CHEMISTRY OF STUDENTS OF IX STANDARD

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Abstract

Science develops in students the qualities like truthfulness, honesty, open-mindedness and goodness. It makes him free from false – beliefs and superstitions. Because of the above-mentioned values of science, it finds a very important place in today's high school curriculum. Every body is expected to study science up to high school level. The development of scientific qualities depends on the way of teaching of the science subjects to the students. The approach and style of presenting the science instructions to the students is much more responsible for the development of scientific qualities students should be given opportunity to participate in the teaching learning process. They should arrange their experimental work themselves by participating in different scientific activities and through various other science programmes like science fairs, science clubs and scientific excursions. Science is the creative response to the curiosity and capacity to wonder present amongst every human being. Learning of Science in schools augments the spirit of enquiry, creativity and objectivity along with aesthetic sensibility. It aims to develop well-defined abilities of knowing, doing and being. It also nurtures the ability to explore and seek solution of the problems related to environment and daily life situations and to question the existing beliefs, prejudices and practices in society. Science concerns itself with the fundamental knowledge of universe, world and it environment. Science is universal and its principles and laws can be verified anywhere. The technology takes appropriate shapes depending upon various factors including economic, geographical, social and political conditions. The twenty first century citizens will have to acquire the basics of scientific and technological literacy.. It would help them discover the relationship between science and technology in these areas besides acquiring problem – solving and decision making skills.

Keywords: scientific qualities, teaching learning process, scientific activities, Multimedia, Interactive Computing , academic achievement

Multimedia

Creating multimedia documents is a rewarding, but complex and challenging task. The Center for Highly Interactive Computing in Education provides some excellent examples of interactive, multimedia documents designed to be used by students and

teachers. Giving students an opportunity to produce documents of their own provides several educational advantages.

- Students that experience the technical steps needed to produce effective multimedia documents become better consumers of multimedia documents produced by others.
- Students indicate they learn the material included in their presentation at a much greater depth than in traditional writing projects.
- Students work with the same information from four perspectives: 1) as researcher, they must locate and select the information needed to understand the chosen topic; 2) as authors, they must consider their intended audience and decide what amount of information is needed to give their readers an understanding of the topic; 3) as designers, they must select the appropriate media to share the concepts selected; and 4) as writers, they must find a way to fit the information to the container including the manner of linking the information for others to retrieve (Smith, 1993). All of these contribute to student learning and help to explain the improved student learning that is often associated with IT-assisted PBL.

Significance of the Study

The technique, stranger faces, methods, media used for giving instructions and helping any learning site has come under in situational technology. Under Instructional Technology (IT), a number of media are now being used for instructional and learning purposes. Instructional media simply transmit instruction. According to Held (1989). 1. Media maintain the flow of information in the learning process. Any technique of software used by a teacher in face to face teaching or through Audiotape, Radio, Television and Videotape, different types of projectors, computer and similar medium enriches teaching. Lg process creations (1994).Rayed states that complicated subjects are easily understood by learners through media. (1988).

Problem Stated

The problem of the study pertains to the following area:

I. To what extent acquisition of Multi Media skill shall be useful in enhancing the academic achievement of the students in Chemistry?.

Sample Design

The sample consists of 100 respondents for pilot study for the purpose of standardization of Achievement test in Chemistry. The sample for final study consists of 70 students of which 35 students belong to the control group and the remaining 35 constituted experimental group.

Instrumentation

The investigator employed the tool "Achievement test in Chemistry" for this study. The researcher constructed an Achievement test consisting of 100 items.

Objectives of the Study

1. To study Achievement in Chemistry.
2. To study the differences in Achievement with respect to control groups and experimental group.

Hypothesis of the Study

1. There will be a significant difference between the pre-test performance among control and experimental group
2. There will be no significant difference between the pre-test and post-test performance in control group.
3. There will be no significant difference between the Pre-test and Post–test performance in experimental group.
4. There will be a significant difference between the post-test performance among control and experimental group.
5. Gap closure in the experimental group will be greater than that of the control group

Procedure

The present study is an attempt to study the achievement in Cchemistry at Standard XI Level in Schools chosen for the study. It essentially needs a procedure for selecting samples and constructing and validating as achievement test. This section furnishes a detailed report on sampling and instrumentation

Sampling

In the present context, Krishnagiri was chosen for the study. Students of Standard XI Standard in all schools constitute the population to this study.

S. No.	Name of the School	No.of Boys	No. of Girls	Total
1	Govt. Hr. Sec. School	27	23	50
2	Managementi Hr.Sec. School	29	21	50
	Total	56	44	100

For the Final study 70 pupils were chosen as a sampling population. In the final study sampling procedure led to select by purposive sampling method which is one Government school and one Management school.

Tools of Research

The present study needed a validated achievement test to serve as the tool of research, to evaluate the pupils' mastery of all the concepts of Science at Standard XI level; belonging to the cognitive domain. But there are no standard achievement tests of Science available. Hence there was a need to construct and validate a test for the purpose of present study. Since the study was on students with English medium of instructions, the achievement test was conducted in English.

The Refined Tool

Items in the refined tool consists of 100 multiple items for each cognitive level viz., knowledge, understanding and application. Among the 120 multiple choice items in

the tryout tool, only 100 multiple choice items were selected on the basis of higher values of discrimination indices.

Final Study: Procedure

As the method of this research was diagnostic in research, the investigator had to select the case study procedures to observe the cause and effect. So the investigator selected the experimental method. In educational research experimental researches are adopted in social context. Therefore there is necessity to control the group of pupils selected. Parallel or Equivalent group experimentation is selected for this research. This is the classical experimental design, more complex than the one group experiment, but accurate too. The experimental method involves two groups. Experimental and control group. Both groups are to be selected such that these subjects must be equivalent in all significant respects. The remedial programes are to be implemented to the experimental group for a specified period of times. Control group is not subjected to treatment, if there is any progress in the experimental group at the end of the remedial programme. It is assumed that it may be due to the introduction of experimental factor. Main steps in the parallel group method are the following:

1. Securing equivalent groups
2. Applying the experimental factor and
3. Comparing the results. There steps were followed in the design.

Experimental Design

A pre-test was conducted to the two samples of XI std. The pre test answer scripts were valued. The mean standard deviation of the test and 't' test was calculated between the two samples. It was found that there was no significant mean difference statistically. The group which had the less mean score was chosen as the experimental group for giving remedial teaching to improve the Multi Media ability in Chemistry. The refined tool (test) was administered to the final sample of 70 students of Standard XI drawn from city schools. An answer sheet with a coding proforma was provided to each student. The time allotted was 90 minutes. The investigator administered the final test and collected the answer scripts. Scoring of the responses was done by the investigator based on to scoring key already prepared for that purpose. Data was analyzed later by employing suitable statistical technique.

Hypothesis 1

Null Hypothesis (H_O): There will be a significant difference between the pre-test performance among control and experimental group.

Table 1: Control vs Experimental Group (Pre-test)

Unit	Control Pre-test		Experimental Pre-test		"t" Value	Level of significance
	Mean	S.D	Mean	S.D		
1	12.57	3.62	12.95	3.41	0.45	NS
2	13.17	3.39	12.89	3.67	0.33	NS
3	12.83	3.22	13.54	4.83	0.81	NS
4	13.63	3.72	14.76	4.48	1.15	NS
Global	13.05	3.49	13.52	3.32	0.55	NS

df = 68 $t_{(0.05)} = 1.96$ $t_{(0.01)} = 2.58$

From the table 1, it is informed that there is no significant difference between control and experimental group in pre-test performance. Based on the analysis of the relevant data (Table 1) null hypothesis is accepted and research hypothesis is rejected.

Hypothesis 2

Null Hypothesis (Ho): There will be no significant difference between the pre-test and post-test performance in control group.

Table 2: Pre test Vs Post test (Control Group)

Unit	Control Pre-test		Control Post-test		"t" Value	Significance
	Mean	S.D	Mean	S.D		
1	12.57	3.52	13.83	3.54	1.47	NS
2	13.17	3.33	14.23	3.18	1.35	NS
3	12.83	3.22	14.37	3.12	2.04	NS
4	13.63	3.72	14.14	2096	0.64	Ns
Global	13.05	3.49	14.14	3.20	1.36	NS

df = 68 $t_{(0.05)}$ = 1.96 $t_{(0.01)}$ = 2.58

Hypothesis 3L Null Hypothesis (Ho): There will be no significant difference between the Pre-test and Post – test performance in experimental group.

Table 3: Pre test Vs Post test (Experimental Group)

Unit	Experimental Pre-test		Experimental Post-test		"t" Value	significance
	Mean	S.D	Mean	S.D		
1	12.95	3.41	17.24	2.87	5.70	S
2	12.89	3.67	18.19	3.29	6.37	S
3	13.54	4.09	19.11	2.66	6.76	S
4	14.76	4.48	20.89	2.25	7.22	S
Global	14.14	3.82	18.86	2.77	5.82	S

Hypothesis 4: Null Hypothesis (Ho): There will be a significant difference between the post-test performance among control and experimental group.

Table 4: Control VS Experimental Group (Post Test)

Unit	Control Post-test		Control Post-test		"t" Value	Significance
	Mean	S.D	Mean	S.D		
1	13.83	3.54	17.24	2.87	4.43	S
2	14.23	3.18	18.19	3.29	5.12	S
3	14.37	3.12	19.11	2.66	6.85	S
4	14.14	2.96	20.96	2.25	9.20	S
Global	14.14	3.20	18.86	2.77	6.60	S

Gap Closure

Gap is the difference between the mean scores obtained by the group and the maximum score, called perfect score. The closing score is the percentage up to which the gap towards perfection gets closed for a group. Percent gap closed is defined by a variable which might be termed "percentage of ignorance gap closed" and stated as

$$Gap = \frac{Post\,test\,score - Pretest\,score}{Pretest\,possible\,point - Pretest\,score}$$

By measuring the 'gap closure' we washout any effects of difference in the knowledge of the subject to the course.

The above said formula for calculating gap is modified to suit our needs as under.

$$\text{Gap Closure} = \frac{\text{Post test mean} - \text{Pr etest mean}}{\text{Perfect score} - \text{Pr etest mean}}$$

Perfect Score = Pretest possible points

This technique is used to compare the achievement scores of the two groups. The following table furnishes details regarding the perfect scores for each of the tests.

Table 5: Perfect Score

Unit 1	Unit 2	Unit 3	Unit 4
25	25	25	25

This section outlines the gap closure for the students of control and experimental groups.

Table 6: Control Group – Gap Closure

Unit	Pre-test Mean	Post-test Mean	Percentage of Gap closure
1	12.57	13.83	10.13
2	13.17	14.23	8.36
3	12.83	14.37	13.79
4	13.63	14.14	4.49
Global	13.05	14.14	9.12

It is clear that from the table the gap closure in the tests are in the range of 4.49 to 13.79 control group.

Table 7: Experimental Group – Gap Closure

Unit	Pre-test Mean	Post-test Mean	Percentage of Gap closure
1	12.95	17.24	35.60
2	12.89	18.19	43.76
3	13.54	19.11	48.60
4	14.76	20.89	59.86
Global	14.14	18.86	43.46

An inspection of the table above reveals that the gap closure in the unit test is in the range of 35.60 to 59.86 for the experimental group.

Hypothesis 5

The gap closure for the experimental group will not be greater than that of the control group.

Table 8: Contol Vs Experimental – Gap Closure

Unit	Control Group	Experimental Group
1	1013	35.60
2	8.86	43.26
3	13.79	48.60
4	4.49	59.86

The table 8 reveals that the gap closure for the experimental group is greater than those for the control group.

Interpretation

An interpretation of data analysis in this section is attempted here in. There is significant difference between the control and the experimental groups in the post-test performance. The difference is in favour of experimental group. The 't' values are significant at 0.01 levels. This is strong evidence in favour of using Multi Media. Multi Media approach is more effective than the traditional method of teaching Science to the pupils. There is significant difference between the control groups and experimental groups in gap closure. Gap closure in experimental group is greater than that of control group.

Findings of the Study

1. There is no significant difference between the mean scores for pre-test among the experimental group and control group
2. There is no significant difference between the pre-test and post-test performance in control group.

3. There is a significant difference between the pre-test and post-test performance in experimental group.
4. There is a significant difference the post-test performance among the control and the experimental group.
5. The gap closure of the experimental group is greater than that of the control group.

Recommendations for Further Study

1. Similar studies may be undertaken for Mathematics, Botany and Zoology sciences.
2. Studies on Achievements in Chemistry, Botany and Zoology sciences, may be made for students of different standards.
3. Training programmes may be conducted for teachers at post graduate level to high light the salient features of problem solving technique.
4. Research on problem solving skills associated with creativity may be under taken.

Implications

1. Concept attainment plays a vital role in fostering concepts in science.
2. Through problem solving skill cause and effect relationship is established.
3. Concept attainment strategies develop one's power of critical thinking.
4. Concept attainment inculcates scientific attitude which indirectly helps one to become a scientist.
5. Through Concept attainment whatever that is learnt gets reinforced. Everything learnt gets set well in memory.
6. The scientific skills of the learners such as manipulation of the instruments, arranging things in an array, calculation, observation, tabulation and inference etc are nourished through problem solving skill. The things highlighted above are the antecedent skills for a   blossoming scientist.

Conclusion

The performance of the experimental group was found to be better than that of the performance of the control group. The learner's interest was sustained throughout. The learner's level of thinking at reflective level also was traceable. There is a warm welcome among the learners for learning science through experimentation.

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