

Effect of Multimedia Presentation on Achievement in Mathematics of Elementary School Students in Relation to their Intelligence

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Abstract

The greatest contribution of Information technology is the development of computer and its use in all sectors of life. They have become more powerful (i.e., able to process and store much more data), faster, cheaper, portable, easy to use and more convenient. Personal computers (PCs) and laptop are now within the reach of even ordinary people. In recent years, accessories such as- hard disk, CD- ROMs, flash drive, printers used with computers had also developed rapidly. Using these, a computer program can handle sound, picture and video along with text. "Multimedia" is a buzzword today in the field of computer. Multimedia involves combining text, sounds, still pictures and video etc. This means that the world of computers is getting easier to the world of human beings. In, education, multimedia presentations means presentations consisting of words and pictures that are designed to foster meaning leaving, Mayer (2001). Variety and newness of multimedia presentation motivates students for learning both at participation stages and promote learning. It is essential for the effective realization of learning objectives. It provides learning environment in which students take active part in learning process. It helps in achieving student's involvement and participation and therefore facilitates learning. It is learner-centred in sense that it can accommodate learner's need and interest.

In the present research, Power point presentations in mathematics using Ms Office 2007 prepared by investigator to improve the achievement of students in mathematics are termed as multimedia presentation.

Mathematics as a subject is seen as the queen of all sciences and the fulcrum on which all science subjects revolve. Mathematics education is very useful in the development of creative thinking and self-confidence; it also contributes immensely in the development of problem solving ability among students. The number of failures in mathematics in high school level of examination is more as compared to that of other subjects because mathematics is a highly abstract subject (Senthamaria-Kannan, Sivapragasam & Senthikumar; 2015). Teachers are not left out in this situation as they find it difficult to impart mathematical knowledge due to application of ineffective methods of teaching.

Teachers of mathematics need to adopt innovative strategies which are student centred to develop their interest in the subject. These among others include, use of technology driven strategies such as multimedia instructional approach. The recent developments in educational technology call for a more holistic and pragmatic approach to the educational process..

Review: Wiksten and Spanjer (2002) examined the effectiveness of using multimedia technology in an introductory athletic training laboratory class as a supplement to traditional lecture instruction among under graduate students. Attitudes towards the usefulness of the multimedia programme were also examined. No significant

difference was found between both the groups. Abu Nadar (2003) in his study showed significant differences between the average grade of the experimental group students and the average grade of the control group students in the academic achievement in favour of the experimental group.

Angadi (2010) found that through multimedia instruction students secured higher score, comprehended and retained the information for longer duration as compared to the conventional method of teaching. There was no gender difference in learning through neither the multimedia instruction nor the conventional way. Amboucarassy (2010) while open ended responses suggested that students felt more engaged in the course sections where more media were used, a quantitative analysis of surveys results did not show significant differences. Eedemir (2011) explored that the students at experimental group who participated in lectures supported by power point presentations had higher grades than the control group who were solely taught through traditional lectures and concluded that the “intelligence use” of power point presentations in physics instruction is capable of increasing the student’s success.

Buchko and Meyer (2012) used multiple forms of power point format like - words only, images only, words and images, and a control condition. Results showed that the use of power point had no significant effect on subject’s ability to recall information.

Kaur, Sharma and Singh (2015) explored that the academic achievement scores in English of boys as well as of girl students through Multimedia is better than the students taught through Conventional Method. Similarly the academic achievement scores of urban students taught through Multimedia is better than the urban students taught through Conventional Method.

Intelligence is the capacity for correct discrimination, attention and adjustment to the situation which is a prerequisite to learning and general development.

Hypotheses of the Study

The objectives would be achieved by framing the following hypotheses:

1. There exists no significant difference between the mean achievement scores in mathematics of students of experimental group (taught with multimedia presentations) and control group (taught with traditional method of teaching).
2. There exists no significant difference in the mean achievement scores in mathematics of students of experimental group in relation to their intelligence.
3. There exists no significant difference between mean achievement scores in mathematics of boys and girls of experimental group.

Sample

The present study falls under the domain of experimental research. Purposive, random sampling technique was used to select sample. A sample of 200 students of VIII standard was involved in the study.

Design of the Study

For the present investigation, pre-test and post-test design were employed. Experimental group was taught through multimedia presentations and controlled group was taught through traditional method of teaching.

Tools

1. Intelligence Test by *R.K. Ojha and K.Ray Choudhury* (2009) was used by the investigator.
2. Achievement Test in mathematics (pre-test and post-test) was prepared by the investigator.
3. Lesson plans based on Multimedia Presentations (MS-office 2007) was prepared by the investigator to teach the experimental group.
4. Lesson plans based on traditional method of teaching was prepared by the investigator to teach the control group.

| Grade | Groups | N | Mean | S.D | S.E _D | Mean Difference (D) | df | t-ratio |
|--------|------------|-----|------|-------|------------------|---------------------|-----|---------|
| VIIIth | Control | 100 | 7.76 | 2.644 | .373 | .900 | 198 | 2.410* |
| | Experiment | 100 | 6.86 | 2.636 | | | | |

Hypothesis-1

There is no significant difference between the mean achievement scores in mathematics of students of experimental group (taught with multimedia presentations) and control group (taught with traditional method of teaching).

TABLE 4.1. Showing ‘t’ values of the mean achievement scores of experimental and controlled group in mathematics

*Significant at 0.01 level of significance and at 0.05 level of significance.

** Critical value is 1.98 at 0.05 level of significance and 2.63 at 0.01 level of significance.

It may be observed from the table 4.1 that the mean scores of experimental group is 6.86 and of control group is 7.76. the ‘t’ value (t=2.410), which in comparison to the table value is found to be significant at 0.01 level and 0.05 level of significance which shows significant difference in the achievement of students in mathematics of experimental group and controlled group exists. Thus, first hypothesis namely “There is no significant difference between the mean achievement scores in mathematics of students of experimental group (taught with multimedia presentations) and control group (taught with traditional method of teaching)” is rejected. The result indicated that the students taught through multimedia presentation show better performance as compared to students taught through traditional method of teaching

Similar results have been reported by Dr. Satyaprakasha and Sudhanshu (2014) through their study in which they compared multimedia teaching for teaching biology to students of IXth grade was more effective than traditional method. Achievements of the experimental group were higher than the controlled group

Hypothesis- II

There will be no significant difference in the mean achievement scores in mathematics of students of experimental group in relation to their intelligence.

Table 4.2 Showing ‘t’ values of the mean achievement scores of mathematics in intelligence

| High & Low Intelligence | N | Mean | S.D | S.E _D | Mean difference | t –ratio |
|-------------------------|----|------|-------|------------------|-----------------|----------|
| High achievers | 17 | 7.88 | 2.690 | .524 | 2.016 | 2.366* |
| Low achievers | 15 | 5.87 | 2.031 | .524 | | |

* Significant at 0.01 level of significance and 0.05 level of significance.

** Critical value is 2.04 at 0.05 level of significance and 2.75 at 0.01 level of significance.

It may be observed from the table 4.2 that the mean intelligence scores of high achievers is 7.88 and of low achievers is 5.87 of experimental group. The ‘t’ value (t=2.366), which in comparison to the table value is found to be significant at 0.01 level and 0.05 level of significance which shows significant difference in the mean achievement scores in mathematics of students of experimental group in relation to their intelligence.

Hence, second hypothesis namely, “There will be no significant difference in the mean achievement scores in mathematics of students of experimental group in relation to their intelligence” is rejected.

Hypothesis-III

| Groups | N | Mean | S.D | S.E _D | Mean difference | t –ratio |
|--------|----|------|-------|------------------|-----------------|----------|
| Boys | 50 | 7.00 | 2.491 | .529 | .280 | .529* |
| Girls | 50 | 6.72 | 2.792 | .529 | | |

There is no significant difference between mean achievement scores in mathematics of boys and girls of experimental group.

Table 4.3 Showing ‘t’ values of boys and girls of experimental group

*Insignificant difference at 0.05 level of significance

** Critical value is 1.98 at 0.05 level of significance and 2.63 at 0.01 level of significance, df=98

It may be observed from the table 4.3 that the mean gain scores of boys is 7.00 and girls is 6.72. The 't' value ($t=.529$), which in comparison to the table value is found to be insignificant at 0.01 level and 0.05 level of significance which shows that boys and girls do not differ significantly in their mean gain scores when taught through multimedia presentations. Hence, the third hypothesis namely, "There is no significant difference between mean achievement scores in mathematics of boys and girls of experimental group" stands accepted.

This is suspected to be as a result of equal learning opportunity which that strategy brought into play. The result is in tandem with that of Abidoeye (2015), Ofodu (2010) and Abidoeye and Oguniyi (2012) which showed that the performance of male and female students exposed to multimedia instructional package were similar and not significantly different.

Findings

The findings of the study are as follows –

1. There is significant difference in the achievement in mathematics among students taught through multimedia presentation and through traditional methods of teaching.
2. There is significant difference in the achievement in mathematics of experimental group students with high and low intelligence.
3. There is no significant difference in the achievement in mathematics of boy and girl students of experimental group.

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