Computer Multimedia Instruction versus Traditional Instruction:An Experimental Study

Education

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ABSTRACT *This study investigated the effect of Computer Multimedia instruction on academic achievement of students. Eighty students studying in two sections of 7th class of "The Sunshine Sr. Sec. School, Rohtak" were used as subjects of the study. Multimedia Instruction was utilized in the experimental group while the traditional instruction method was used for the control group. This study utilized the pre-test, post-test, control group Quasi-Experimental design with a purposive sample in the form of intact sections and 't' test was employed for testing the significance of difference between the means of pupils' achievement on pre-test, post-test and mean gain scores. Results show that the two groups in pre-test were almost equal in their level of knowledge before introduc¬ing any treatment but difference was found in mean scores and mean gain scores of two groups in post-test. Experimental group (exposed to Computer Multimedia Instruction) achieved higher mean scores and mean gain scores than the control group (exposed to traditional instruction) on achievement at post-test stage. This implies that subjects exposed to Computer Multimedia Instruction were found to be higher on achievement in comparison to those exposed to traditional instruction.*

Introduction

The promise of educational benefits, anticipated since the early days of computer use, has accelerated with the increased availability of computers in schools. The widespread proliferation of computers in schools is based on the assumption that computers have a significant role to play in education and that their use can and will result in the advancement of education (Drenoyianni, 1998). Students are expected to learn more through computer use: test scores can rise, and students would learn at a faster rate (Hokanson, & Hooper, 2000). Moreover, computer-assisted education could assist students in their preparation to enter and compete in a modern, global workforce (Oppenheimer, 1997). A relatively new educational innovation in classrooms entitled, "multimedia" possesses the potential to influence student learning and knowledge acquisition. Viewed by Halal and Liebowitz (1994, p.21) as the technological key to future education, multimedia is defined as "a powerful combination of earlier technologies that constitutes an extraordinary advance in the capability of machines to assist the educational process. Multimedia is a multi-faceted approach. It is the exciting combination of computer hardware and software that allows integration of multiple media elements (audio, video, graphics, text, animation etc.) into one synergetic and symbiotic whole that results in more benefits for the end user than any one of the media element can provide individually.

Multimedia in Education has been extremely effective in teaching individuals a wide range of subjects. Multimedia enables students to represent information using several different media. Some students learn by interpreting text, while others require more graphical or aural representations, allows for self-pacing and discovery. Thus a multi-sensory experience can be created for the audience, which in turn, elicits positive attitudes towards its application (Neo and Neo, 2000). Multimedia has also been shown to elicit the highest rate of information retention and result in shorter learning time (Ng and Komiya, 2000). Thus Student's exposure to such technologies results in better teaching-learning as compared to traditional method. With multimedia, the process of learning becomes more goal oriented, more participatory, flexible in time and space, unaffected by distances and tailored to individual learning styles, and increased collaboration between teachers and students. Multimedia makes learning friendly and fun-oriented without fear of inadequacies or failure. Multimedia encourages users to embrace, internalize, and learn more from information because users can attack the information from multiple directions. In other words, users of multimedia applications have an opportunity to read about information, and to see it, hear it, and watch it move.

Review of Literature:

A review of the research literature shows that the trends of research have undergone tremendous shift especially with the introduction of multimedia use. It has been observed lately that applications of multimedia have resulted into higher strides of achievement for the learners. Studies conducted by Adegoke (2011) examined the effect of multimedia instruction on senior secondary school students' and found that students under multimedia instruction performed better than the lecture group. Aloraini (2012) also find out the positive impact of multimedia on students' academic achievement. Maree, *et al.* (2013) showed significant effect of Multimedia Instructional Strategy on academic achievement. Satyaprakasha & Sudhanshu (2014) found that Multimedia significantly promoted achievement with respect to knowledge, understanding, application and total achievement. The literature related with the use of multimedia suggests that Multimedia learning is a sense-making activity in which the learner seeks to build a coherent mental representation from the presented material. Unlike information, which is an objective commodity, that can be moved from exact form, from one mind to another. This is why two learners can be presented with the same multimedia message and come away with different learning outcomes. Sensing the vast capabilities of multimedia in the educational realm, computer companies have developed multimedia software packages that can be used as teaching tools by instructors.

Objectives:

The study was designed to attain the following objectives:
1. To compare the pre test achievement scores of Control and Experimental group.
2. To compare the post test achievement scores of Control and Experimental group.
3. To compare the mean gain achievement scores of Control and Experimental group.

Hypotheses:

The following hypotheses were formulated and tested:
1. There is no significant difference in pre-test achievement scores of Control and Experimental group.
2. There is no significant difference in post-test achievement scores of Control and Experimental group.
3. There is no significant difference in mean gain achievement scores of Control and Experimental group.

Method:

In the present study, pre-test-post-test control group quasi experimental design was employed with a purposive sample in the form of intact sections (equated on intelligence). The sample

comprised of 80 students studying in two sections of Class 7th of "The Sunshine Sr. Sec. School, Rohtak". One section formed the control group and the other section formed the experimental group.

Tools:

For the present investigation, two Standardized Tools & one self developed tool was used. For measuring the intelligence of students Group Test of Intelligence by Ahuja (2011) was used. This test consists of 135 items under eight sub-tests. To present educational content in multimedia form, TeachNext Multimedia Software by Next Education India Pvt. Ltd. (2010) was used. Since no specific achievement test in the selected topic was available, so, an achievement test in English grammar for 7th class was prepared by the investigator herself. Achievement test was prepared consisting of 75 multiple choice questions in total. As a result of item analysis 15 items were dropped from the achievement test and finally 60 items were retained out of 75 items in the final draft of the achievement test.

Procedure:

Procedure of the experiment comprised of two main stages, that is, selection of the sample and conducting the experiment. In the first stage sample of 80 students of Class 7th was selected from "The Sunshine Sr. Sec. School, Rohtak". There were 40 students in control group and 40 students in experimental group. In the second stage the experiment was conducted in the following three phases:

Table 1
Phases of the Study

Stages	Treatments	
	Experimental Group	Control Group
Pre-testing	Measurement of Student's 1. Intelligence 2.Achievement in English Grammar	Measurement of Student's 1.Intelligence 2.Achievemnt in English Grammar
Treatment	Teaching English Grammar through Computer Multimedia Instruction	Teaching English Grammar through Traditional Instruction
Post- testing	Measurement of Student's Achievement in English Grammar	Measurement of Student's Achievement in English Grammar

Statistical Techniques:
The following statistical techniques were used to analyze the data:
1. Descriptive statistics such as mean and S.D worked out on the score of achievement in English Grammar.
2. 't' value was computed in order to adjudge pupil's intelligence.
3. 't' test was employed for testing the significance of difference between the means of pupils' achievement in English Grammar on pre-test, post-test and gain scores.

Results:
The pre-and post-test scores of experimental group and control group were obtained through an Achievement Test and were analyzed and described by using descriptive and inferential statistics. The data were analyzed for the total Achievement scores for both the groups.

Table 2
t-value for difference in the pre -test mean achievement scores of experimental group and control group

	Groups	N	Mean	SD	S.EM	't' value
Pre-test	Control Group	40	24.15	4.32	0.683	
	Experi-mental Group	40	24.97	4.07	0.643	0.878[NS]

NS=Not Significant

Table 2 shows the t-value of 0.878 for the difference in mean achievement scores of experimental and control group before the experiment is not significant at any level of significance. Hence, the hypothesis 1 framed earlier, "There is no significant difference in pre-test scores of control and experimental group" is **RETAINED.**

Table 3
t-value for difference in the post-test mean achievement scores of experimental and control group

	Groups	N	Mean	SD	S.EM	't' value
Post Test	Control Group	40	25.67	4.09	0.646	
	Experi-mental Group	40	33.12	4.84	0.766	7.428**

**Significant at .01 level

Table 3 reveals that experimental group achieved higher mean score (M= 33.12) than the control group (M=25.67) on achievement at post-test stage. It is evident that the 't' value 7.428 for difference in the mean scores of achievement of students of experimental group and control group is significant at 0.01 levels. Thus, the subject exposed to computer multimedia instruction achieved significantly higher mean level of achievement in comparison to the subjects taught through traditional method. Hence, the hypothesis 2 framed earlier, "There is no significant difference in post-test scores of control and experimental group" is **REJECTED.**

Table 4
t - value for difference in the post-test mean gain achievement scores of experimental group and control group

	Groups	N	Mean	SD	S.EM	't' value
Mean Gain	Control Group	40	1.62	0.58	0.092	
	Experi-mental Group	40	8.15	1.21	0.191	30.699**

**Significant at .01 level

Table 4 reveals that experimental group achieved higher mean gain score (M=8.15) than the control group (M=1.62) on achievement at post-test stage. It is evident that the 't' value 30.699 for difference in the mean gain scores of achievement of students of experimental group and control group is significant at 0.01 level. Thus, the subjects exposed to computer multimedia instruction method achieved significantly higher mean gain level of achievement in comparison to that in the traditional method. In other words, computer multimedia instruction method is found to be more effective in increasing the achievement of students in English grammar. Hence, the hypothesis 3 framed earlier, "There is no significant difference in mean-gain scores of control and experimental group" is **REJECTED.**

Discussion of the Results
Findings of the study clearly indicate that computer multimedia instructions significantly improve students' performance on the achievement test. For decades there have been many studies, which ultimately have come to the same basic conclusion that students taught through multimedia instructions, learn and achieve more than other instructional methods. In the present

study no significant difference was found in pre-test scores of students of control and experimental group, but significant difference was found in post-test scores and mean gain scores of students of control and experimental group. The students taught through computer multimedia instruction achieve better than the students taught through traditional method. The finding of the present study is in consonance with the findings of Aloraini (2012) who observed impact of multimedia on students' academic achievement and found no statistically significant difference in the pre-test scores, which in turn proves the equivalence of the two groups. Meanwhile, the analysis result of the post test showed statistically significant differences between the experimental group and the control group. The findings of the present study also supported by the findings of Maree, *et al.* (2013) investigated significant effect of Multimedia Instructional Strategy on academic achievement. Satyaprakasha & Sudhanshu (2014) also found that Multimedia significantly promoted achievement with respect to knowledge, understanding, application and total achievement.

Conclusion:

The present study shows that in changing from a traditional 'chalk and talk' method to Computer Multimedia Instruction not simply enriches class room teaching, it also significantly improves academic achievement. Computer multimedia instruction can be perceived as a big change for uplifting the quality of education and there is lot of scope for research in this field. So educationists need to develop more sophisticated understandings of the conditions, circumstances, means and mechanisms through which computer multimedia instructions can be closely connected to the young learners and teacher educators as well.

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