

E-LEARNING STRATEGY TO ENHANCE THE ACHIEVEMENTS OF ELEMENTARY SCHOOL STUDENTS IN SCIENCE

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In the present technological and scientific era, since the traditional teaching strategies are not enough to stimulate the interest among the scholars and do not meet to the emotional, psychological and intellectual requirements of the scholars within the new millennium, therefore the strategies of teaching science need to be changed. This study was conducted to assess the effect of e-content strategy as compared with conventional strategy on Science achievement of grade school students. The procedure was executed by employing pre-test-post-test control group design. A sample of 80 pupils of Class VII was taken from a government school in Patiala district of Punjab through cluster sampling technique. One experimental and one control group was formed. Experimental group was taught with the supplement of e-content, the control group was taught Science through conventional method. The info were analysed with the assistance of correlated t-test, one-way and two-way ANCOVA. The results of the study revealed that e-content significantly enhances science achievement of Class school students as compared to those taught with conventional method. A big main effect of treatment on achievement in science was found. However, no significant effect of gender was found on achievement of grade school students in science when pre-achievement in science was taken as a covariate. Thus, within the field of education, e-content have the potential of proving an alternate and really effective teaching and learning tool. The utilisation of e-content within the classrooms attended make the training enjoyable and long-lasting in numerous ways resulting into the enhancement of educational achievement significantly.

Key Words: *e-learning, e-Content strategy, Science Achievement, Conventional Strategy, Gender.*

Introduction

Technological development and therefore the internet have changed people's lives on different scales including as an example teaching and learning. The internet has become one among the channels of learning that opens the door for people round the world to access education free of charge, or for lesser costs. A number of the foremost important developments in education have happened since the launch of the Web. These days learners are well versed with the use of smartphones, text messaging and using the Web— so participating in and running a Web course has become an easy affair.

Message boards, social media and various other means of online communication allow learners to stay abreast and discuss course related matters. Within the fast-paced world of e-learning the available technologies to form a new and exciting course are always changing, and course content can and will be updated quickly to offer students the very latest information.

In the age of cyberspace in the twenty-first century, calculation, composition and communication on paper alone may be a fractional, impoverished and increasingly outdated concept and practice for thinking and communication. To create on the accomplishments of paper technology, a

digital infrastructure must be in situ. At present, e-Content is being included in most subjects within the field of education. It has been proposed to be used as a tool where and when considered useful. By integrating e-Content into standard learning material, by offering e-Content module cases and by integrating the utilisation of e-Content within the different subject areas, different types of actions are taken or planned, to make sure that e-Content is going to be a real part of the curriculum by supporting software development. If we are to deal with the varied challenges of the swiftly changing society or environment and make use of latest opportunities offered by e-Content, plans need to be realised giving learners, teachers and educators access to necessary equipments. The foremost competence to be built is the development of pedagogical methods, which will happen only when long-standing competence programmes can work along side real-life experience, where educators, teachers and learners use e-Content in their day-to-day life and learning experiences. Use of e-Content encourages self-expression and discovery by means of its interactive non-linear access of data. Students are going to be more motivated to find out since a multimedia lesson can provide near-real information through its sort of available media elements (text, audio, video and animation). The learners may learn by using their multiple senses, which provide innovative, new and enriched experiences. The training process is going to be a lively one, leaving the learners to find out by their own. From the review of related literature associated with the effectiveness of e-Content, it had been concluded that e-Content strategy has improved the tutorial

achievement of the scholars significantly more than compared to standard strategy (Rose and Stella, 1992; Proctor and Richardson, 1995; Kumar, 1998; Yadav, 2000; Nimavathi and Gnanadevan, 2008; Hughes, 2009; Kavitha and Sundharavadivel, 2012; Rohendi, 2012; Pio, 2017; Jasmin, 2017).

This study was conducted to assess the effectiveness of e-Content strategy as compared with conventional strategy of teaching science to the grade school students. The aim of the study was twofold, firstly the event of e-Content and secondly to assess the effectiveness of such e-Content. Comparison of e-Content strategy and traditional strategy of teaching is not only a comparison of two modes of instruction but of two theoretical paradigms. Conventional strategy represents a paradigm whereby knowledge is transmitted from teacher to student. The teacher plays a lively part during this mode of instruction. E content represents a paradigm where the knowledge is constructed by the learner. The learner plays a lively role within the learning process. Learning is individualised, self-paced and hands on. During the past 12 to 15 years, the utilisation of computers in education has increased dramatically and a good range of educational computer programs are now widely available for individual and classroom use. However, there has been little or no research reported on the effectiveness of such use. At elementary level, it was difficult for the scholars to know the concepts in science, because the abstract content matters are boring to the learners and induce disinterest. Abstract learning needs more sensory integration to repair up within the future memory. So attention must be focussed on the integrative efforts of data

processing approach, transformation between short term memory and future memory and accelerating cognitive strategies. The utilisation of e-Content in teaching of science produces more integrated sensory output in learning science subject.

Objectives of the Study

Following were the objectives of the study:

1. To study the achievement of grade school students in Science at pre- and post-test stages of the e-Content group.
2. To compare the adjusted mean scores on achievement in science of the grade school students within the e-Content group and traditional strategy group by considering pre science achievement as covariate.
3. To study the effect of treatment, gender and their interaction on achievement in science of grade school students by considering pre science achievement as covariate.

Hypotheses of the Study

1. There is not any significant difference between mean science achievement score of grade school students at pre and post stages of the experimental group.
2. There is not any significant difference between adjusted mean science achievement score of grade school students within the e-Content group and traditional method group by considering pre-test science achievement score as covariate.
3. There is not any significant effect of treatment, gender and their interaction

on achievement in science of grade school students by considering pre-test science achievement score as covariate.

Delimitations of the Study

1. The study was delimited to the topic of science only.
2. The content of Sophistication VII Science are going to be taken from the text book of NCERT only.

Operational Definition of Terms Used

(a) e-Content Strategy

e-Content Strategy of teaching is the strategy during which the digital contents are presented to the learners within the integrated sort of text, graphics, animation, audio, video and also provide interactivity with the learner.

(b) Achievement in Science

Achievement in Science refers to accomplishment of proficiency of performance within the subject of Science. It signifies successfully administered performance by a private or a gaggle assessed after the completion of a task. Here during this study, achievement in Science was considered in terms of marks obtained by the scholars in Science achievement test at pre and post test stages of experiment.

(c) Elementary School Students

Elementary school students refer to the scholars studying in Classes I to VII. Here during this study, Class VII students were considered as grade school students.

Research Design

This study was experimental in nature. The

investigator has employed pre-test post-test Control Group design. This is often also called the Classic Controlled Experimental design because it: Controls the assignment of subjects to experimental and control group through the utilisation of table of random numbers; Controls all other conditions under which the experiment takes place.

Sample of the Study

A small representative portion of population is named sample. For choosing samples, the investigator has employed sampling technique. This study was conducted on a sample of 80 pupils studying in Class VII of state grade school from Patiala district of Punjab. One section formed experimental group and one section formed the controlled group.

Research Tools Used

For every research problem, the investigator uses some devices to collect new facts. The devices which the investigator uses for data collection are referred to as research tools. In the present study, Science Achievement Test developed by the investigator was used to measure the achievement of seventh grade students in science at the pre-test and post-test stage.

Conducting the Study

The procedure was executed. One experimental and one control group was formed. The experimental e-Content group was taught science with the supplement of e-Content, the control group was taught science through conventional method. The planning had comprised three stages: the primary stage involved pre-testing of all the scholars of two groups on the Science Achievement Test. The second stage involved

treatment of two months. The experimental treatment consisted of teaching Science to Class VII with e-Content to experimental and through conventional method to regulate group. During the third stage, i.e., post-test stage, the scholars were post-tested on achievement in Science just after the treatment in order to determine the effect of treatment.

Pre-Test

Before the commencement of the experiment, the groups were administered a science achievement test. Before administering the test, instructions were explained verbally to the themes by the investigator. Both the groups of subjects were administered their test. The administration of the test was administered as per the norms and directions. After administering the above test, they were scored as per the scoring procedure. Thus, pre-test score were obtained on achievement in Science for both groups.

The Treatment

To seek out the efficacy of the independent variables, the experimental variables were manipulated within the sort of teaching supported e-Content and traditional method. The experimental group was taught through e-Content and control group was taught through conventional method. The method was administered for two months. Same topics were taught to both the groups. The treatment was conducted by the investigator himself in both groups to avoid teacher variable and maximum precision.

Post-test

Immediately after the treatment was over, the themes were administered the post-test.

An equivalent criterion test as in pre-test was taken. Both the groups of sampled students were subjected to the post-test. In this way, post-test scores were obtained on achievement test in science of both the groups.

Results of the Study

The aim of the study was to match the effect of conventional strategy versus those of e-Content strategy on achievement in science of grade school students across gender. Mean, variance, correlated t-test and One-way ANCOVA was employed to seek out the effectiveness of e-Content strategy on achievement in Science of grade school students. The results of study of knowledge are presented below:

Effectiveness of e-Content on the Idea of Accomplishment in Science

The first objective of the study was to match achievement in science of grade school students within the experimental group at the pre-test and post-test stages. The results of correlated t-test are presented within the Table 1.

Table 1

Comparison of Achievement in Science of Elementary School Students in the Experimental Group at the Pre-test and Post-test Stages

Testing	N	Mean	SD	Correlated t-value
Pre-test	40	47.20	8.47	21.31**
Post-test	40	60.43	6.74	

* $p < 0.01$

From Table 1, it is evident that the correlated t-value is 21.31 which is significant at 0.01 level. It reflects that the mean scores of

achievement in science at pre-test and post-test stages of e-Content group differ significantly. Thus, the null hypothesis— that there is no significant difference between mean scores of achievement in science at pre-test and post-test stages of e-Content group— is rejected. Further, the mean score of achievement in science at post-test stage is 60.43 which is significantly higher than the mean score of achievement in Science at pre-test stage which is 47.20. It may, therefore, be concluded that teaching science through e-content significantly enhanced achievement of students in science.

Comparison of Adjusted Mean Scores of Achievement in Science of e-Content Group and Conventional method Group by Considering Pre-Science Achievement as Covariate

The second objective of the study was to compare adjusted mean score of achievement in Science of e-Content group and conventional method group by considering Pre-Science achievement as covariate. The data were analysed with the help of one-way ANCOVA. The results are given in Table 2.

Table 2

Summary of the Results of Analysis of Covariance for the Effect of Treatment on Achievement in Science

Source	SS	df	MS	F-value
Pre-test	3322.243	1	3322.243	345.17**
Treat-ment	1338.607	1	1338.607	139.08**
Error	741.132	77	9.625	
Total	6195.487	79		

** $p < 0.01$

From Table 2, it is evident that the adjusted F-value for the effect of treatment on the achievement in science is 139.08 which is significant at 0.01 level. It shows that the adjusted mean score of achievement in science of students taught science through e-Content and those taught the same topics through conventional method differ significantly when pre-science achievement was taken as a covariate. Thus, the null hypothesis that there is no significant difference in adjusted mean scores of achievement in Science of e-content group and Conventional group when pre-science achievement is taken as covariate is rejected. The adjusted means of achievement in Science of experimental and control groups along with pre-test and post-test mean scores are presented in the Table 3.

Table 3
Mean Achievement in Science Scores of Elementary School Students of Experimental and Control Groups and t-value

Source	SS	df	MS	F-value
Pre-test	3322.243	1	3322.243	345.17**
Treat-ment	1338.607	1	1338.607	139.08**
Error	741.132	77	9.625	
Total	6195.487	79		

** $p < 0.01$

It may be observed from the Table 3 that the adjusted mean achievement in Science scores for the e-Content group and conventional method group are 59.40 and 51.12 respectively. Further, the t-value testing the significance of mean difference in the adjusted mean scores of the experimental and control group came out to be 5.13 which

is significant at .01 level. It may, therefore, be said that the teaching Science through e-Content strategy was found to significant enhance Science achievement in comparison to conventional method when groups were matched on Pre-Science achievement.

It was found that the mean score of achievement in Science at post-test stage was significantly higher than the mean score of achievement in Science at Pre- test stage of experimental group. Therefore, the e-Content strategy was found to significantly enhance Science achievement of students of e-Content group.

Effect of Treatment, Gender and their Interaction on Achievement in Science by considering Pre-Science Achievement as Covariate

The third objective was to study the effect of treatment, gender and their interaction on achievement in Science by considering pre-science achievement as covariate. There were two levels of treatment, namely, e-Content and conventional method. The data were analysed with the help of 2x2 Factorial Design ANCOVA. The results are given in Table 4.

Table 4

Summary of Analysis of Covariance of Interaction Effect of Treatment x Gender for Achievement in Science

Source	SS	df	MS	F-value
Pre-test	3322.243	1	3322.243	345.17**
Treat-ment	1338.607	1	1338.607	139.08**
Error	741.132	77	9.625	
Total	6195.487	79		

** $p < 0.01$

Effect of Treatment on Achievement in Science

From Table 4, it is evident that the adjusted F-value for the main effect of treatment on the achievement in science came out to be 136.93 which is significant at 0.01 level. It shows that the adjusted mean score of achievement of students in science taught Science through e-Content and those taught the same topics through conventional method differ significantly when groups were matched with respect to pre-science achievement. It may, therefore, be said that the e-Content was found to improve achievement in science significantly higher in comparison to conventional method when groups were matched on pre-science achievement.

Effect of Gender on Achievement in Science

From Table 4, it is evident that the adjusted F-value for the main effect of gender on achievement in Science turned out to be 0.15 which is not significant even at .05 level. It indicates that both male and female students do not differ significantly on achievement in Science when groups were matched in respect of pre-science achievement.

Effect of Interaction between Treatment and Gender on Achievement in Science

It may be seen from the Table 4, that the adjusted F-value for interaction between treatment and gender turned out to be 0.55 which is not significant even at .05 level when pre-science achievement was taken as covariate. It indicates that there was no significant interaction effect of treatment and gender on achievement in science when pre-science achievement was taken as covariate. It may, therefore, be said that gender may not

be kept in mind while selecting the strategy of teaching science when groups were matched with respect to pre- achievement in science as both male and female students were found to have achievement in science to the same extent when groups were matched in respect of pre-science achievement.

Table 5 shows the adjusted mean achievement in science scores of male and female elementary school students in the experimental and control groups.

Table 5

Adjusted Mean Achievement in Science Scores of Elementary School Students

Source	SS	df	MS	F-value
Pre-test	3322.243	1	3322.243	345.17**
Treat- ment	1338.607	1	1338.607	139.08**
Error	741.132	77	9.625	
Total	6195.487	79		

**** $p < 0.01$**

It may be observed from Table 5, that the adjusted mean achievement in science scores of the male students of the experimental and control groups are 59.08 and 51.25 with SD of 6.50 and 7.64 respectively. The t-value testing the significance of mean difference came out to be 3.71 which is significant at .01 level. It indicates that there is a significant difference in adjusted mean science achievement scores of male students of experimental and control groups. Further, the perusal of Table 5 indicates that the adjusted mean Science achievement scores of female students of the experimental and control group are 59.88 and 51.00 with SD of 6.92 and 7.70 respectively. The t-value testing the significance of mean

difference turned out to be 3.56 which is significant at .01 level indicating that there is a significant difference in the adjusted mean Science achievement scores female students of the experimental and control groups of students. It may be concluded that there is significant difference in the adjusted mean scores of achievement in science of experimental and control groups across gender.

Discussion of Results

The present study showed that the e-Content improve achievement in Science significantly higher in comparison to Conventional strategy when groups were matched on pre-achievement in Science. The findings of the study supported by the previous studies in which students learned academic material/subjects using multimedia program performed significantly better than those taught using conventional strategy. Panda and Chaudhary (2000) observed that computer assisted learning was very effective in achieving higher cognitive skills among students. Also, Sharma and Sansanwal (2002) found that video based instructional strategies for teaching science were effective on achievement in science of Class IX students. In addition, these findings are consistent with Jayaraman (2006) and Nimavathi and Gnanadevan (2008) who found that the computer based multimedia learning packages were effective on performance, behavioural outcomes and understanding of academic material for students at different age groups. Also, Jyothi (2007) claimed that computer based learning had a significantly better effect than traditional instruction on learning. The findings from the present study are also in agreement with the research by

Kavitha and Sundharavadivel (2012) indicated that e-learning students performed better than the traditional learning students in their post-test total mean scores and there is a significant difference between e-learning and traditional learning methods. Rohendi (2012) found that e-learning which was based on animation content not only had significant effect on mathematical connection abilities but also been able to improve students' mathematical connection abilities far better than that of conventional approach.

Also, Owino (2013) and Robert (2013) found e-Content learning package in science education for the prospective teachers to be more effective than traditional method of teaching. In addition, these findings are consistent with Jaleel (2015), who showed that the e-Content in Science is effective over activity oriented method on developing Mathematical Thinking of Students at secondary level. The research by Awasya and Singh (2015) suggested that e-Content can be used to teach Environmental Management to undergraduate students as it is helpful in enhancing the knowledge as well as making the attitude favorable. Similarly, Amutha (2016) also found that e-Content strategy enhances the achievement of the students at tertiary level. In addition, the results of the present study are also in consistent with the results of the research by Jasmin (2017) who established the effectiveness of the e-Content learning package in learning Tamil subject for students who are studying in English medium schools. The researcher gives the fact that the e-Content strategy has promoted learning because it encourages students to take an active role in the learning process and have a better control over their education. Muthukumari and Ramakrishnan

(2017) concluded that use of e-Content way of teaching has significant impact on enhancing the achievement in history among the Class IX elementary school students. Further, Mishra et al. (2017) also concluded that e-Content proves to be is very useful tool for teaching green consumerism at secondary level. On the contrary, Lin et al. (2014) reported that e-learning strategy is not different from the traditional learning method in terms of achievement in accounting for freshman students in college.

The findings of present study showed no significant effect of gender and their interaction on achievement in Science when groups were matched with respect to their pre-achievement in Science which is in agreement with the findings of the research by Rose and Stella (1992) found that there was no significant relationship between the post treatment scores of gender and achievement. Similarly, Rajaswaminathan (1998) also found no interaction between treatment and gender in his study on the impact of multi-media package on the teaching of commerce with reference to select variables.

Implications

1. The results of the study revealed that the e-Content significantly enhance science achievement of students, so it is

suggested that with the implementation of e-Content in the schools, the students will develop keen interest in their course of study and will be able to explore their abilities and hidden talents

2. The results of the study revealed that there is no significant effect of Interaction between treatment and gender on achievement in science, therefore, it is suggested that gender may not be kept in mind while selecting the strategy of teaching science.
3. The achievement level of the students can be significantly enhanced especially in the subject of Science if the conventional strategy of teaching is supplemented with the e-Content.
4. The more use of e-Content in the educational institutions leads to further positive attitude towards computers, by the virtue of which when the students are taught with the help of computers or e-Content, the achievement of the students significantly enhanced as the students feel much more involved in their studies.
5. The e-Content strategy needs to be introduced for teaching Science as it will significantly enhance academic achievement of the students.

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