₹ 200 ISSN - 2249-555X
Volume : 1 Issue : 7 April 2012

Indian Journal Of Applied Research

Journal for All Subjects

www.ijar.in
Listed in International ISSN Directory, Paris.

ISSN - 2249-555X

Indian Journal of Applied Research

Journal for All Subjects

Editor,
Indian Journal Of Applied Research
8-A, Banans, Opp. SLU Girls College, New Congres Bhavan, Paldi,
Ahmedabad-380006, Gujarat, INDIA
Contact.: +91-9824097643 E-mail : editor@ijar.in

INDEX

Volume : 1 | Issue : 7 | April 2012 ISSN - 2249-555X

Research Paper Psychology

Using E-Content In Science Class: The Effect Of Treatment, Gender, And Their Interaction On Science Achievement

* Suman Rani

* Assistant Professor, Government College of Education, Chandigarh

ABSTRACT

The benefit of "E-Content" is diminished by factors such as Gender stereotyping .Therefore, the study was an attempt to investigate the effect of Treatment, gender, and their interaction on Science Achievement by considering Pre Science Achievement as covariate. It was a Pre-test Post-test Control group Design. Using E-Content, the experimental group was taught eight science lessons, while the control group was taught without E-Content using Conventional teaching strategy. The study was guided by three objectives and three hypotheses. An 80-item multiple choice question type Achievement Test was constructed by the researcher and used for both pre-test and post-test. Validation of the Achievement Test was achieved against the criterion of Content Validity, and a reliability coefficient of 0.94 was realised using Split-Half methodology. Data collected were analysed using t-test and ANCOVA. Results showed that the E-Content has improved Science Achievement significantly higher in comparison to Conventional Strategy when groups are matched on Pre-Achievement in Science. Further, no significant effect of interaction between Treatment and Gender was found on Achievement in Science when Pre-Achievement in Science was taken as covariate. Therefore, 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. The study therefore recommended continued use of E-Content in schools, and government with other stakeholders should provide more computers and train teachers to further enhance computer integration in classrooms.

Keywords : E-Content, Gender, E-Content Strategy, Conventional Strategy

INTRODUCTION

Today the raw material of our age is information. We use it to create products like newspapers, books, plans, web sites, computer software etc. The process of teaching and learning in the Information Age will be geared to developing the learner's skills of seeking, sorting, shaping and showing information. A successful e-learning model will require quality information sources, well-developed information skills and effective learning tasks. Our achievements to date are in developing infrastructure and teaching skills. The next step will be in building electronic libraries of E-content and ensuring that students are taught the range of skills associated with using information as a raw material.

The main emphasis to ICT developments over the last few years has necessarily been based on the provision of ICT resources, networking and Internet connections. In recent times, emphasis has been placed on the training needs of teachers in using ICT. Current school developments in using Broadband technology will mean that schools will have more speedy access to the Internet.

Another component and a potentially limiting factor on some schools' current ICT work across subjects is the extent to which the school can make available digital curriculum content and online course materials. Historically, computers in ICT rooms are typically set up to provide information tools like word processor and spreadsheet applications, but usually offered relatively few electronic sources relevant to a given subject. This would be analogous to going into a library and finding a photocopier and a pair of scissors, but no books.

Becta (The British Educational Communications and Technology Agency) suggests that school development plans should address how the school will:"ensure that the infrastructure enables staff to access valuable content – the information and resources for teaching and administration, including tools for planning, assessment and recording as well as productivity tools and curriculum materials."

The next key area for development of ICT in schools will be the development and use of digital learning resources, or 'E-content'. E-content has a major contribution to all aspects of teaching and learning:

- E-content can make a significant contribution to teaching and learning across all subjects and ages, inside and outside the curriculum;
- E-content can provide opportunities to engage and motivate children and young people and meet their individual learning needs;
- E-content can help link school and home by providing access to teaching and learning materials, and to assessment and attendance data, from home;
- E-content can enable schools to share information and good practice in networked learning communities;

According to Yusuf and Afolabi (2010) CAI has been found to enhance students' performance than conventional method. Similarly, Nimavathi, V. and Gnanadevan, R. (2008) found that a Multimedia Program is effective in improving students' understanding of academic material. In addition, these findings are consistent with Jayaraman, S. (2006), who found that the computer based Multimedia Learning Packages were effective on performance and behavioural outcomes of students of different age groups.

The E-Content Strategy has promoted learning because it encourages students to take an active role in the learning process and have better control over their education. However, the overall value of E-Content in schools depends on: level of education; cost; availability of support, maintenance, and software; suitability and availability of curriculum; national

E-Content strategy and commitment.

Full potential of E-Content in assisting or managing instruction are yet to be exploited in India. Many factors have been identified as controlling factors to the effectiveness of E-Content use in schools. Among these are intelligence, learning style, self-confidence and gender. Studies have shown relationship between sex and achievement level.

According to the study carried out by Rose, A. and Stella, V. (1992) who conducted the study regarding effectiveness of Computer Assisted Instruction, concluded that there was no relationship between the post treatment scores and the variables 'sex', and 'achievement level'. Yusuf and Afolabi (2010) concluded that gender has no influence in the academic performance of male and female students exposed to CAI either individually or co-operatively. This study therefore investigated not only the effect of gender and its interaction on the achievement of students in science but also the relative effectiveness of E-Content strategy in comparison to conventional strategy.

OBJECTIVES of the study

1. To compare mean scores of Science achievement at pre and post stages of the E-content Group.

2. To compare the adjusted mean scores on Science Achievement of the E-Content Group and Conventional Strategy Group by considering Pre Science Achievement as covariate.

3. To study the effect of Treatment, Gender and their interaction on Science Achievement by considering Pre Science Achievement as covariate.

HYPOTHESES

1. There is no significant difference between mean scores of Science achievement at pre and post stages of the developed E-Content Group.

2. There is no significant difference between adjusted mean scores of Science Achievement of the E-Content Group and Conventional Strategy Group by considering Pre Science Achievement as covariate.

3. There is no significant effect of Treatment, Gender and their interaction on Science Achievement by considering Pre Science Achievement as covariate.

EXPERIMENTAL PROCEDURE

The experimental procedure was executed. One experimental and one control group was formed. The E-content group as experimental group was taught Science with the supplement of E-content, the control group was taught Science through Conventional Strategy. The design had comprised three stages: the first stage has involved pre-testing of all the students of two groups on the Science Achievement Test. The second stage has involved treatment of six months. The experimental treatment was consisted of teaching Science to VI class with E-content to experimental and through Conventional Strategy to control group. During the third stage i.e. post-test stage, the students ware post-tested on achievement in Science just after the treatment so as to determine the effect of treatment. A detailed description of the design of the experiment has been given in the table.

Table 1.1: Experimental Procedure

S. No.	Phase	Duration	Experimental Group	Control Group
1.	Pre-Test	1 Week	1.Science Achievement Test	1. Science Achievement Test
2.	Treatment	6 Months	Teaching Science with E-content	Teaching Science through Conventional Strategy
3.	Post-Test	1 Day	Science Achievement Test	Science Achievement Test

RESULTS

Objective 1: EFFECTIVENESS OF E-CONTENT ON THE BASIS OF ACHIEVEMENT IN SCIENCE

The first objective was to compare mean score of Achievement in Science of Pre and Post stages of E-

Content Group. The data were analyzed with the help of correlated t-test. The results are given in Table 1.2

Table 1.2: Testing-wise M, SE, r and Correlated t- values of Achievement in Science

Testing	Mean	SE	r	Correlated t- value
Pre-test	46.63	1.76	0.98	31.10 **
Post-test	63.63	1.31		

** Significant at 0.01 level

From Table 1.2, it is evident that the correlated t-value is 31.10 which is significant at 0.01 level with df = 29. It reflects that the mean scores of Achievement in Science at Pre-test and Post-Test stages of E-Content Group differ significant. Thus, the null hypothesis, namely, there is no significant 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 Posttest stage is 63.63 which is significantly higher than the mean score of Achievement in Science at Pre-test stage which is 46.63. It may, therefore, be concluded that the E-Content was found to enhance Achievement in Science of students.

Objective 2: COMPARISON OF ADJUSTED MEAN SCORES OF ACHIEVEMENT IN SCIENCE OF E-CONTENT GROUP & CONVENTIONAL STRATEGY GROUP BY CONSIDERING PRE-ACHIEVEMENT IN SCIENCE AS COVARIATE

The second objective was to compare adjusted mean scores of Achievement in Science of E-Content Group and Conventional Strategy Group by considering Pre- Achievement in Science as covariate. The data were analyzed with the help of One Way ANCOVA. The results are given in Table 1.3.

Table 1.3: Summary of One Way ANCOVA of Achievement in Science by considering Pre-Achievement in Science as covariate

Source of Variance	Df	SSy.x	MSSy.x	Fy.x – Value
Treatment	1	2147.36	2147.36	372.38**
Error	57	328.70	5.77	
Total	59			

** Significant at 0.01 level

From Table 1.3, it is evident that the Adjusted F – Value is 372.38 which is significant at 0.01 level with df = 1 / 57. 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 Strategy differ significantly when groups were matched with respect to Pre – Achievement in Science. 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 –Achievement in Science is taken as covariate is rejected. Further, the adjusted mean score of Achievement in Science of E-Content Group is 62.35 which is significantly higher than those of Conventional Strategy Group whose adjusted mean score of Achievement in Science is 50.25. It may, therefore, be said that the E-Content was found to improve Achievement in Science significantly higher in comparison to Conventional Strategy when groups were matched on Pre- Achievement in Science.

Objective 3: EFFECT OF TREATMENT, GENDER & THEIR INTERACTION ON ACHIEVEMENT IN SCIENCE BY CONSIDERING PRE–ACHIEVEMENT IN SCIENCE AS COVARIATE

The third objective was to study the effect of Treatment, Gender and their interaction on Achievement in Science by considering Pre – Achievement in Science as covariate. There were two levels of Treatment, namely, E-Content and Conventional Strategy. The Males and Females were two levels of Gender. Thus, the data were analyzed with the help of 2×2 Factorial Design ANCOVA. The results are given in Table 1.4.

Table 1.4: Summary of One Way ANCOVA of Achievement in Science by considering Pre-Achievement in Science as covariate

Source of Variance	Df	SSy.x	MSSy.x	Fy.x - Value
Treatment	1	1926.76	1926.76	324.94**
Gender	1	0.55	0.55	0.09
Treatment x Gender	1	2.23	2.23	0.38
Error	55	326.13	5.93	
Total	59			

** Significant at 0.01 level

Effect of Treatment on Achievement in Science
From Table 1.4, it is evident that the Adjusted F–Value is 324.94 which is significant at 0.01 level with df = 1 / 55. 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 Strategy differ significantly when groups were matched with respect to Pre-Achievement in Science. Thus, the null hypothesis that there is no significant effect of treatment on Achievement in Science of students when groups were matched with respect to Pre-Achievement in Science is rejected. It may, therefore, be said that the E-Content was found to improve Achievement in Science significantly higher in comparison to Conventional Strategy when groups were matched on Pre- Achievement in Science.

Effect of Gender on Achievement in Science
From Table 1.4, it is evident that the adjusted F – Value for Gender is 0.09 which is not significant. It shows that the adjusted mean score of Achievement in Science of Males and Females did not differ significantly when Pre-Achievement in Science was considered as covariate. So there was no significant effect of Gender on Achievement in Science when groups were matched with respect to Pre- Achievement in Science. In this context, the null hypothesis that there is no significant effect of Gender on Achievement in Science of students when groups were matched with respect to Pre–Achievement in Science is not rejected. It may, therefore, be said that both Male and Female students were found to have Achievement in Science to the same extent when groups were matched in respect of Achievement in Science.

Effect of Interaction between Treatment and Gender on Achievement in Science
From Table 1.4, it is evident that the adjusted F-Value for Interaction between Treatment and Gender is 0.38 which is not significant when Pre-Achievement in Science was taken as covariate. It indicates that there was no significant effect of Interaction between Treatment and Gender on Achievement in Science when Pre-Achievement in Science was taken as covariate. Thus, the null hypothesis that there is no significant effect of interaction between Treatment and Gender on Achievement in Science when Pre-Achievement in Science was taken as covariate is not rejected. 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.

DISCUSSION OF THE RESULTS
The purpose of the study was to compare student learning of general science through two modes of instruction i.e. E-Content and Conventional Strategy of teaching. Two groups matched by their pre-achievement in science were randomly assigned to Experimental and Control groups to teach through E-Content Strategy and Conventional Strategy respectively. Student learning was measured in terms of scores on post achievement test. Findings of the experiment revealed that students of the E-Content group outperformed the matched students of the Conventional Strategy group. Students who taught through E-Content Strategy learned more than those who taught through Conventional Strategy of teaching.

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. This study's finding is supported by the findings of previous studies in which students learned academic material (subjects) using Multimedia Program performed significantly better than those taught using the Conventional Strategy, Nimavathi, V. and Gnanadevan, R. (2008) found that a Multimedia Program was effective in improving students' understanding of academic material. Also, Jyothi, K.B.S. (2007) claimed that Computer Based Learning had a significantly better effect than Traditional Instruction on learning. In addition, these findings are consistent with Jayaraman, S. (2006), who found that the computer based Multimedia Learning Packages were effective on performance and behavioral outcomes of students of different age groups, Sharma, A. and Sansanwal, D.N. (2002) who found that Video-based Instructional Strategies for Teaching Science were effective on achievement in science of class IX students, Panda, S.C and Chaudhury, J. (2000) who found that Computer Assisted Learning (CAL) was very effective in Achieving Higher Cognitive Skills among students. 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 better control over their education. However, the overall value of E-Content in schools depends on: level of education; cost; availability of support, maintenance, and software; suitability and availability of curriculum; and national E-Content strategy and commitment.

The findings of the present study shows 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, A. and Stella, V. (1992) who conducted the study regarding effectiveness of Computer Assisted Instruction, concluded that there was no relationship between the post treatment scores and the variables 'sex', and 'achievement level'. Similarly Rajaswaminathan, B. (1998) also found no interaction between treatment and gender in his study "Impact of Multi-media Package on the Teaching of Commerce with Reference to Select Variables". An explanation for this according to researcher is that because students were matched on their pre-achievement level in the start of experiment and other intervening variables were taken as covariates so both male and female students were having the achievement to the same extent when taught through different strategies. Hence there is no need to consider gender factor in mind while selecting the strategy of teaching science when groups are matched on their pre-achievement level in science.

CONCLUSIONS AND SUGGESTIONS
The study showed that the E-Content strategy has enhanced the achievement of students in science of E-Content group. Further E-Content has improved the achievement significantly higher in comparison to Conventional Strategy when groups were matched on pre-achievement in science and both male as well as female were benefited to the same extent.

In India, the use of E-Content in education has remained almost completely unexplored. very few numbers of studies

have been conducted in this direction. Based on the findings of the current study, some of the suggestions in the area of E-Content are identified as follows:

- **Suggestions for Planners**

1. Potential of E-Content should be utilized to enhance quality of education at school level.

2. Government should also establish E-Content portal in various organisations such as Institutes of Education and Research, Curriculum Wing, Test Book Boards, Curriculum Research and development Centers, and Education University. These departments may conduct research studies and make efforts to develop E-Content software.

3. Private organizations can step forward to educational software development if copyright act prevails and a system to check the software piracy is established.

4. Government should offer incentives for teachers who increase their proficiency in computer studies and contribute to enhance E-Content.

- **Suggestions for Optimizing Usages of ICT**

1. Teachers should be aware of preparation of ICT, motivate themselves to use ICT, should have faith in recent innovations in ICT and should actively participate in training related to ICT.

2. Personal with expertise in pedagogy and computer programming are needed to benefit from E-Content. Hence teacher education institutions are required to introduce courses to prepare teachers equipped with pedagogy and computer programming skills.

3. In-service teachers should be given computer literacy training through refresher courses. It is necessary to develop a culture for better utilization of computer in teaching learning process.

4. Institutions should have appropriate ICT and good physical facilities for using ICT.

5. Students should be allowed to use computers with Internet facility and information technology course should be a part of curriculum.

- **General Suggestions**

1. Parents should encourage their children to utilize educational software available in the market.

2. Non-Government Organizations (NGOs) should also recognize the potential of E-Content. They may utilize this powerful mode of instruction to education masses regarding various social issues. NGOs may contribute to enhance use of E-Content in schools. NGOs may also contribute to develop quality educational software.

REFERENCES

Becta (2005). Becta Consultancy Services Framework – Assignment for ICT in Education, Press Release Retrieved on 2006, 10-31. | Best, W. John (1977). Research in Education, Englewood Cliffs, New Jersey: Prentice Hall Inc. | Bloom, B.S. (ed.) (1956). Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook 1 : Cognitive Domain. | Dahiya S. Surender (2004). Educational Technology: Towards Better Teacher Performance, New Delhi: Shipra Publications. | Henry E. Garrett and Woodworth, R.S. (1981). Statistics in Psychology and Education. New York: David MacKay Company. | Jayaraman, S.(2006). Developing a Computer Software for Learning Chemistry at Standard IX", Ph.D. Thesis, MSU, Baroda. | Jyothi, K.B.S. (2007). "Impact of Computer-Based Learning on Students of Chemistry" Edu Tracks, Vol. 6, No.8, April, 2007, pp. 26-29. | Nimavathi, V. and Gnanadevan, R. (2008). "Effectiveness of Multimedia Programme in Teaching Science", EDU TRACKS, Vol. 7, No.8, April, pp. 27-29. | Panda, S.C. and Chaudhury, J. (2000). "Effect of Computer Assisted Learning (CAL) in Achieving Higher Cognitive Skills" Journals of All India Association for Educational Research, Vol. 12, No. 3 & 4, pp. 25-30. | Rajaswaminathan, B. (1998). "Impact of Multimedia Package on the Teaching of Commerce with Reference to Selective Variables", Ph.D. Education, Bharathidasan University", Indian Educational Abstract, Vol 2, No. 1, Jan. 2002. | Rose, Antony and Stella, V. (1992). "Effectiveness of Computer Assisted Instruction with Special Reference to Underachievers", Ph.D. Education, Bharathidasan University. | Sharma, A. and Sansanwal, D.N. (2002). "Comparison among Video-based Instructional Strategies for Teaching Science at Class IX Level in Terms of Achievement", Indian Educational Abstracts, NCERT, Vol. 3, No.1, Jan., pp. 31-32. | Yusuf MO, Afolabi AO (2010). Effects of Computer Assisted Instruction(CAI) on Secondary School Students' Performance in Biology. TheTurk. Online J. Educ. Technol., 9(1): 62-69. Retrieved on 15/05/2011 from http://www.tojet.net/articles/918.ptf.

Sara Publishing Academy
Indian Journal Of Applied Research
Journal for All Subjects

Editor,
Indian Journal Of Applied Research
8-A, Banans, Opp. SLU Girls College,
New Congres Bhavan, Paldi, Ahmedabad-380006.
Contact.: +91-9824097643 E-mail : editor@ijar.in

Printed at Unique Offset, Novatsing Rupam Estate, Opp. Abhay Estate, Tavdipura, Shahibaug, Ahmedabad