EFFECT ON E-CONTENT LEARNING PACKAGE IN MATHEMATICS EDUCATION FOR THE PROSPECTIVE TEACHERS

By

D. R. ROBERT JOAN

Assistant Professor, M.Ed Department, M.E.T. College of Education, Chenbagaramanputhoor, Tamilnadu, India.

ABSTRACT

E-content learning package will progress the learning process of students in formal or informal setting. It allows us to sort out the information to analyse and make meaning for conceptualization and applications which is suitable for individual learners. The objectives of the study was to measure the effectiveness of the E-content learning package in learning Mathematics for prospective teachers and the experimental research is essential for finding out the effective from the population of prospective teachers. The investigator selected 30 students from a college of education in Tamil Nadu. Tools used were E-content learning package for Mathematics prospective teachers developed by the investigator and pre-test in Mathematics developed by the investigator. In the experimental group, students learn the subject Mathematics by using this E-content learning package for Mathematics. The control group student teachers were taught using conventional method. Findings of the study showed that there was significant difference between pre-test and post-test scores for the experimental group in learning Mathematics. That is experimental group Prospective Teachers have achieved high in post- test than the Pre-test. And also there was significant difference in the Post-test Scores of the experimental and control group. That is experimental group Prospective Teachers have achieved high in post- test than the control group Prospective Teachers. The investigator concludes that the experimental group is more effective than the control group. Thus E-content learning package in Mathematics Education for the prospective teachers is more effective.

Keywords: E-content, E-content Learning Package, Conventional Method, Per-test Scores, Post-test Scores.

INTRODUCTION

Education gives lots of possibilities and opportunities which is covered deep within each individual. Education helps one to realize the possibilities expected to change the values and attitudes of people. Education starts in the birth of an individual and then it goes on till the last day of the individual. Education makes an individual as real human being and an essential human virtue. In recent time new inventions are carried out every day as continuous and complex process. Education has been split up in to different stages like pre-primary, primary, secondary, higher secondary and higher education.

Need and significance of the study

The qualities of the individual denote how important the technology is needed for the effective learning of the prospective teachers. Every institution demands effective and efficient professionals for the expansion of its growth. As Jesus (Mathew, 724: 9, 37) symbolically says, "The harvest is plentiful but the workers are few," there needs to be more competent teacher educators to turn out prospective teachers equipped not only with knowledge of their domain but also with the latest technological skills. In the present days many of the teacher educators do not take interest in technology. Only very few among them are able to operate the equipments very efficiently. Most of the students are not even able to understand anything in the traditional classroom but technology gives visual effect for better understanding.

E-content

E-Content is a content management system that allows organizations to more efficiently create and manage Web sites. Designed to run on any operating system that supports Java, E-Content enables development of design, content and code in parallel, decreasing the overall time

needed to develop and update content. E-Content allows a wide range of users within an enterprise to monitor, update and administer prescribed areas of an enterprise's content over the Internet and other digital networks in an easy to use, secure and centrally controlled process.

Uses of E-Content

- Departmental Information, i.e. Accounting
- Decision Support System
- Table of contents for each department, i.e. finance, accounting, operations.
- Human Resources System tied into tighter security user authentication
- Internet Catalog (tied into ecommerce solution)
- Information Subscription System on Internet
- Customer Support Services on Extranet

Teacher education

An educationist says that present teacher education remains a non essential but potentially useful exercise that can contribute to the education of some teachers, at some time and for some purpose. There is so much valuation among all programmes in visions of good teaching, of subject matter preparation, what is taught and what is learned, character of supervised clinical experience, and quality of evaluation compared to any other academic profession (Marilyn Cochran-Smith, Sharon Feiman-Nemser, D. John McIntyre, Kelly E. Demers, 2008). Only meticulous and conscientious teacher-educators can perform a pivotal part in administering their teaching programmes effectively to student-teachers with a view to making them proficient in Mathematics.

Teacher-educators

The teacher educators have to function as grassroots developers, responding to the special needs and interests of trainees. Their prime sense of duty is to act as a catalyst in bringing about changes in a social structure and promote changes in the entire system of education. The two essential attributes of a good teacher-educator are the ability to motivate the lost student-teacher and the ability to reach out to the unreachable in the class.

Statement of the problem

"Effect on E-content learning package in Mathematics Education for the prospective teachers.

Operational definition of the key terms

a) Effect

To find the effect denotes that to the development anticipated by the treatment to be administrated.

b) E-content

E-Content it is the digital text and images designed for display on web pages.

c) Learning package

A learning package is used in e-learning to define some learning content or an assessment that can be delivered. The learning package consists of lesson with supporting activities and materials for the prospective teachers to help their learning. Here the learning package is to be developed by the investigator for an unit in Mathematics for prospective teachers by using digital text and images.

d) Mathematics education

Mathematics education is the practice of teaching and learning mathematics and it deals with the Mathematics revised syllabus in College of Education.

e) Prospective teachers

Prospective teachers are the student-teachers educated by teacher educators in colleges of education for the period of one year to become a professional teacher.

Objectives of the study

1. To find out the significant difference, if any, in the pretest scores of the control group and experimental group.
2. To find out the significant difference between the pretest and posttest scores of the control group.
3. To find out the significant difference between the pretest and posttest scores of the experimental group.
4. To find out the significant difference, if any, in the posttest scores of the control group and experimental group.

Hypotheses of the study

1. There is significant difference between the pretest

scores of the control group and experimental group.

2. There is significant difference between the pretest and posttest scores of the control group.
3. There is significant difference between the pretest and posttest scores of the experimental group.
4. There is significant difference between the posttest scores of the control group and experimental group.

Plan and procedure in brief

This study intends to measure the Effect on E-content learning package in Mathematics Education for the prospective teachers, the experimental research is essential for analyzing the facts or information. All the Prospective Teachers are the population; from the population the investigator selected 40 Prospective Teachers as sample from B.Ed. colleges. For this research, the investigator had developed an E-content learning package; it was the digital text and images designed for display on web pages. By implementing this, the experimental group students were taught Mathematics through learning package and the control group students were taught using conventional method which is the present method of teaching. Before and after this treatment, pre-tests and post-tests were conducted for both the groups and marks were tabulated. Using 't' test the investigator obtained the mean score differences separately for the control and experimental group students.

Literature Review of related studies

A careful review of the research Journals, books, dissertation, thesis and other source of information on the problem to be investigated is one of the important steps in planning of any research study. A summary of writing of reorganized authorities and of previous research provides evidence, that researcher is familiar with what is already known and what is still unknown and untested. Since effective research is based upon past knowledge this step helps to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestions for significant investigation.

Manouselis (2002) conducted a research on "Dynamic Educational E-Content Selection Using Multiple Criteria in Web-Based Personalized Learning Environments."

This paper focuses on the way a multi-criteria decision making methodology is applied in the case of agent-based selection of offered learning objects. The problem of selection is modeled as a decision making one, with the decision variables being the learner model and the learning objects' educational description. In this way, selection of educational content is based on dynamic data input collected at the time of the decision. This methodology is studied in the context of an agent-based E-market for educational content brokering, and is engaged by the broker agents recommending learning objects to learners, according to their cognitive style.

Celik & Serkan (2012) conducted a research on Development of Usability Criteria for E-Learning Content Development Software."

Revolutionary advancements have been observed in e-learning technologies though an amalgamated evaluation methodology for new generation e-learning content development tools. The evaluation of educational software for online use must consider its usability and as well as its pedagogic effectiveness. This study is a first step towards the definition of criteria for evaluating e-learning tools. A preliminary user study involving a group of pre-service instructional designers, observed during their interaction with e-learning tools, is reported. Throughout the study, specific usability attributes of these e-learning tools were identified. Participants were assigned to rate the importance of functional and pedagogical competences proposed during the criteria development phase. The findings of the study revealed 31 evaluation criteria under the headings of technical, media, and assessment competences. Among the groups of benchmarks proposed and rated by the users, assessment was considered as the most important one while technical and media features were even. The following step was actual implementation of the usability criteria into evaluation of fifteen leading software used in e-learning across the world. Mostly, tools were observed as having limitations in terms of capabilities. Comparing to the other software, Captivate, Softchalk, and Lectora were regarded as outstanding tools by the participants. Following the discussion on the

limitations of the study, some implications for further research were proposed.

Cady, J. & Kristin T. Rearden (2011) conducted a study on "E-Learning Environments for Math and Science Teachers".

The shortage of mathematics and science teachers, especially in rural areas, makes recruitment and retention an issue. However, online courses can provide professional development for these teachers that counteract the feeling of isolation. This article describes online courses that promote the development of learning communities and enhance the pedagogical content knowledge of participants. An emphasis is placed on the instructions, models, and curricula chosen for these courses. The sample consists of 84 teachers in various districts. In finding we saw a trend that shows participants had more positive attitudes in the math courses than they did in the science course.

Thiyagu & Muthuchamy (2012) conducted a study on "Effectiveness of E-content in learning Mathematics among secondary teacher trainees."

This study found out the Effectiveness of E-content in learning Mathematics among secondary teacher trainees. The study was conducted to develop a e-content for the methods of teaching mathematics and experimenting the same with set of trainees studying and finding out its effectiveness over the conventional method of teaching. Two equivalent group experimental designs are employed for this study. The investigator has chosen 26 B.Ed. trainees for the study. On the basis of their score in the pretest, 13 students were chosen as control group and 13 students were chosen as experimental group. Finally the investigator concluded that, there was significant difference between control and experimental group students in their gain scores, that is the experimental group students are better than the control group students in their gain score and there was significant difference between control and experimental group in their gain scores for attainment of the knowledge, understanding, and application objectives.

Methodology of the study

Method

Experimental method was selected for the present study. Such a type of experimental method uses two equivalent groups. One group is known as the experimental group and the other is the control group. Thus the investigator plans to use experimental method to find out the effectiveness of e-content learning package on the mathematical learning for the prospective teachers. Hence experimental design is adopted.

Population

Population of the present study consists of the prospective teachers who are studying in B.Ed. colleges in Kanyakumari district.

Sample

A sample of 40 students is proposed to be drawn from different B.Ed. colleges with 20 prospective teachers in the experimental group and 20 prospective teachers in the control group.

Tools

The tools that the investigator used for the experimental study were the following:

1. Self-constructed bio-data form
2. E-content learning package developed by the investigator.
3. Pre-test & Post-test Questionnaires prepared by the investigator.

Design of the study

In this study, the Equivalent Group Design study (Best & Kahn, 2006) was followed to test the effectiveness of e-content learning package for mathematics education to the prospective teachers.

Data collection and processing

The experimental method will be employed for the collection of data. The investigator visited the selected schools with the permission of heads of institutions. After self introduction, the investigator applied the experimental method.

Statistical Techniques

The major statistical techniques are:

1. Arithmetic Mean
2. Standard Deviation

3. Correlation
4. Pearson's product-moment correlation (r),
5. t'-test

Development of multimedia package (for experimental group)

The E-content learning package was prepared for 2 units. It consists of 50 slides with animations, pictures, video and audio as web link.

Development of lesson plan (for control group)

Teachers should follow certain specific steps in writing lesson plan based on conventional method.

Preparation of statements

Pre-test and Post-test was constructed and validated by the investigator. Content validity and item validity were established for the tools. The preliminary draft of Pre-test and Post-test, consisting of 70 statements was given to the experts for establishing content validity and 05 statements were deleted and some of them were modified and the final draft of Pre-test and Post-test had only 65 statements. The investigator simplified the statements for better understanding of the target group. Then the tool was administered to the prospective teachers of colleges of education for item validation. This tool was used as Pre-test and Post-test to find the Achievement of prospective teachers.

Keeping these aspects into consideration, a large number of statements were written. The investigator had to collect the items from his area which has thought for the selected group. Certain items were modified with the help of specialists and experts in the field of education. Thus 65 Pre-test and Post-test items were taken, and finally the draft tool of Pre-test and Post-test was printed. Item analysis should be made as per the directions given in Anastasi and Urbina (2009). After the item analysis the tool consists of 55 items. Thus the final tool was printed and used for the data collection.

The reliability of Pre-test and Post-test was established by split-half method. Split-half reliability refers to the correlation within a single test of two similar parts of the test (Jain, 2003).

In the split-half method, the whole items are divided into two sets by considering all the odd numbered items as a set and the even numbered items as a separate set. If the two sets of scores were highly correlated with each other, this can be taken as the evidence of the index's reliability. Thus the test was divided into two equivalent halves and the correlation (r) was found for this half-test using Karl Pearson's formula and the value of r was found to be 0.77.

From the self-correlation of the half-test, the reliability coefficient of the whole test (r') is given by the Spearman-Brown prophecy formula (Garrett, 2009). The value of r' was found to be 0.87 which indicates that the tool is highly reliable (Best & Kahn, 2006).

Scoring procedure of pre-test and post-test

The scoring was done in the following way. The respondents had to choose any one of the four multiple choices in the items. A score of 1 was given for the right response and a score of 0 was given for the wrong response. If there is no answer, the score given was 0. Thus the score of Pre-test and Post-test was administrated and the total scores obtained by the scores of all the items were computed.

Framing the final tool of pre-test and post-test

The final tool of Pre-test and Post-test had 55 items. The items were neatly printed and administered to the prospective teachers to record their opinion. Thus the final tool is done for the present study.

Analysis of the data

Hypothesis – 1

There is no significant difference in the pre-test scores of the control and experimental group.

Table 1 shows that the Mean and Standard Deviation (SD) for the control group (N= 20) is 59.5 and 9.21 respectively. The Mean and Standard Deviation for the experimental group (N=20) is 60.00 and 8.97 respectively. Here the calculated 't' value (0.191) was found to be less than the table value (1.96) at 0.05 level of significance. The 't' was not significant statistically. Therefore, the Hypothesis-1 that,

Groups Compared	N	Mean	SD	SEM	Calculated t' value	Standard error of difference
Control	20	59.5	9.21	2.06	0.191	2.875
Experimental	20	60.0	8.97	2.01		

Table 1. Data and results of t- test for the comparison of pre-test scores of control and experimental group

"There is no significant difference in the pre-test scores of the experimental and control group" was accepted.

Hypothesis -2

There is no significant difference between the pre-test and post-test scores of the control group

Table 2 shows that the Mean and Standard Deviation for the pre-test of control group is 59.45 and 9.21 respectively. The Mean and Standard Deviation for the Post- test of control group is 70.70 and 9.28 respectively. Here the calculated 't' value (3.85) was found to be greater than the table value (1.96) at 0.05 level of significance. The 't' was significant statistically. Therefore, the Hypothesis-2 that, "There no is significant difference between the pre-test and post-test scores of the control group" was rejected.

Hypothesis – 3

There is no significant difference between the pre-test and post-test scores of the experimental group

Table 3 shows that the Mean and Standard Deviation for the pre-test of experimental group are 60.00 and 8.97 respectively. The Mean and Standard Deviation for the post- test of experimental group is 90.25 and 6.09 respectively. Here the calculated 't' value (12.47) was found to be greater than the table value (1.96) at 0.05 level of significance. The 't' was significant statistically. Therefore, the Hypothesis-3 that, "There is no significant difference between the pre-test and post-test scores of the experimental group" was rejected.

Hypothesis – 4

There is no significant difference in the post-test scores of the control and experimental group

Groups Compared	N	Mean	SD	SEM	Calculated t' value	Standard error of difference
Pre-test	20	59.5	9.21	2.06	3.85	2.923
Post-test	20	70.70	9.28	2.08		

Table 2. Data and results of t- test for the comparison of pre- test and post-test scores of the control group

Groups Compared	N	Mean	SD	SEM	Calculated t' value	Standard error of difference
Pre-test	20	59.5	8.97	2.01	12.47	2.425
Post-test	20	90.25	6.09	1.36		

Table 3. Data and results of t-test for the comparison of pre-test and post-test scores of the experimental group

Table 4 shows that the Mean and Standard Deviation for the control group (N= 20) is 70.70 and 9.28 respectively. The Mean and Standard Deviation for the experimental group (N=20) is 90.25 and 6.09 respectively. Here the calculated 't' value (7.87) was found to be greater than the table value (1.96) at 0.05 level of significance. The 't' was significant statistically. Therefore, the Hypothesis-4 that, "There is no significant difference in the Post-test scores of the control and experimental group" was rejected.

Findings

- There was no significant difference in the Pre-test scores of the experimental and control group students.
- There was significant difference between the Pre-test and post-test scores of the control group.
- There was significant difference between the Pre-test and Post-test achievement scores of the experimental group. That is experimental group Prospective Teachers have achieved high in post- test than the Pre-test.
- There was significant difference in the Post-test Scores of the experimental and control group. That is experimental group Prospective Teachers have achieved high in post- test than the control group Prospective Teachers.

Educational implications of the study

The results of the study proved that E-content learning package is more effective than the conventional method in learning Mathematics to the Prospective Teachers.

The present study revealed that the experimental group was better than the control group in their achievement. This may be due to the fact that E-content learning package with pictures, animation and explanations of the concepts in Mathematics helped the learners to understand the concepts clearly.

Recommendations

The colleges of education should produce proficient and

Groups Compared	N	Mean	SD	SEM	Calculated t' value	Standard error of difference
Control	20	70.70	9.28	2.08	7.87	2.481
Experimental	20	90.25	6.09	1.36		

Table 4. Data and results of t- test for the comparison of post-test scores of control and experimental group

effective teachers in Mathematics. They should give sufficient training to the prospective teachers in utilizing the technological equipment. They should conduct special programmes on preparing E-content for prospective teachers. The teacher educators may prepare E-content package for the prospective teachers so as to promote their skills in Mathematics.

Conclusion

Control group and experimental group do not differ significantly in their pre-test scores. Control group and experimental group students differ significantly in their post-test scores. Control groups students differ significantly in their pre-test and post-test scores. Also Experimental group students differ significantly in their pre-test and post-test scores. The investigator concludes that the experimental group is more effective than the control group. Thus E-content learning package in Mathematics Education for the prospective teachers is more effective.

References

[1]. Anastasi, A., & Urbina, S. (2009). *Psychological testing.* New Delhi: Prentice Hall of India Pvt. Ltd.,

[2]. Best, J.W., & Kahn, J.V. (2006). *Research in education* (9th ed.). New Delhi: Prentice Hall of India.

[3]. Celik., & Serkan. (2012). Development of Usability Criteria for E-Learning Content Development Software. *Turkish online Journal of distance education,* 13(2), 336-345.

[4]. Smith, M.C., Nemser, S.F., McIntyre, D.J., & Demers, K. E. (2008). *Teacher education and the education of teachers*. New York: Routledge.

[5]. Garrett., & Henry, E. (2009). *Statistics in psychology and education.* New Delhi: Paragon International Publishers, ISBN 81-89253-00-X.

[6]. Jain., & Atul. (2003). *Computer in education.* New Delhi: Isha books.

[7]. Cady, J., Kristin, T., & Rearden. (2011). E-Learning Environments for Math and Science Teachers. *Journal of curriculum and instruction,* 5(1), 17-33, ISSN 1937-3929.

[8]. Manouselis. (2002). *Dynamic Educational e-Content Selection Using Multiple Criteria in Web-Based Personalized Learning Environments*. Retrieved from http://www.eric.ed. gov

[9]. Mathew, (1978). *The Holy Bible,* Bombay: Bharat Bible League.

[10]. Thiyagu., & Muthuchamy. (2012). Effectiveness of E-content in learning Mathematics among secondary teacher trainees. *Research and Reflection on education,* 10(4), ISSN 0974-648X.

ABOUT THE AUTHOR

Mr. D.R. Robert Joan, M.Sc., M.Phil., (Maths), M.Ed., M.B.A., M.Sc., (Psy.), NET (Edn.), PGDCA., (Ph.D.)., is working as an Assistant Professor, M.Ed. Department, M.E.T. College of Education, Chenbagaramanputhoor, Tamilnadu, India. He has four years of experience in the Colleges of Education and he has presented thirteen papers at National level seminars and three Journals. He also participated in five days Workshop organised by UGC-Academic Staff College, Bharathiar University, Coimbatore, Tamilnadu, India, in the topic "E-Content Development".