

Original Article

A Study on Effect of E-Learning and Traditional Learning on Achievement in Mathematics

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ABSTRACT

This study examines the effect of e-learning and traditional learning on achievement in mathematics. This study provides descriptive data on students' achievement in mathematics from their learning (e-learning/traditional). The sample constitute of 266 students drawn from five schools from Pondicherry. Random sampling technique is adopted to select the sample. The researcher was conducted pre-test on four concepts in mathematics. Based on the pre-test score, students were divided into two groups, students learning by Traditional method (group A) and students following the E-learning method (group B). Group A was subjected to the traditional class room teaching and group B was exposed to E-learning process. After teaching, the researcher conducted the post-test for all the 266 students. The answer scripts were evaluated and the scores obtained by each individual were tabulated concept wise and also for the entire questions covering all four concepts. The findings of the study indicate that E-learning students performed better than the traditional learning students in their post-test total mean scores. There is significant difference between E-learning and Traditional learning methods. Comparing the performance of English and Tamil medium students following the e-learning method, it is found that the English medium students performed better than Tamil medium students

Key words: E-learning, traditional learning

INTRODUCTION

Mathematics is the foundation of science and technology that have made our life more rapid, sophisticated and of comfort. Mathematics is used in a number of areas, because it provides a precise way to describe complicated situation and analyses difficult problems. That is why Kothari Commission (1966) rightly recommended the study of mathematics compulsory for all, for the first ten years of schooling.

The Second International Congress of Mathematical Education held on commemoration of Einstein's Birth Centenary (1933-43) has come out with the statement that

These fortunate beings who find Mathematics is a joy and fascination will probably get on, whatever be the standard of teaching. It requires real genius of light a flicker if understanding in the minds of those, to whom Mathematics is a clouded mystery. The subject is so vitally important for everyone in this technological age that any advance in the techniques of teaching is to be welcomed

(Bhimasankaran, C.V., 1981, P.1)

Mathematics has its roots deep in the soil of everyday life and is basic in our highest technological achievements. Even though almost everything of a concrete character is Mathematics, it is reputed to be and actually is the most abstract and the most hypothetical of sciences. In fact, Mathematics is a man made science. It is the numerical and calculation part of man's life and knowledge. It helps the man to give exact interpretation to his ideas and conclusions. It deals with quantitative facts and relationships as well as with problems involving spaces and form. So the mathematic excellence of the student depends purely on teaching. The digital age guidelines stress clearly on the need to use new media for effective teaching. It has be noticed the higher secondary students have a lot difficulties in learning mathematical concepts. There is an urgent need to study and use the new technologies in mathematics.

Technology has had a significant effect on the education system for many years. Earlier, computer in education concentrated on individual instruction involving computer assisted instruction. The recent developments in educational technology call for a more holistic and integrated model and approach to the educational process. The new technologies have brought about changes in

pedagogy and curriculum content and have been instrumented in increased academic productivity and teaching effectiveness.

E-learning from end to end the web world has opened up a lot of opportunities for the people. There are more than a few benefits associated with e-learning. For students it acts as boon in getting knack of easier said than done topics as well as saving time. For teachers e-learning helps in learning the right skill required to teach students. Many schools nowadays are turning up the web world and teaching students online which has changed the entire spectrum of teaching methods. The Education/Tools that e-learning provides surpass all other forms of learning methods. This medium of e-learning has made studying very easy. One can study at their own set time and place. There is no limitation of time in addition to people can even learn while on move. The mobile devices help in learning while traveling to places. It is acting as a boon to people who cannot attend classroom lectures to hectic work schedule. In many institutions and colleges good attendance is the first criterion to sit for exams. The online medium has eliminated all these issues of attendance due to the flexibility of choosing one's own desired time to study online. The online Teaching methods are unique and help in understanding the texts easily. Many schools are adopting this method of education/tools to make learning fun among children. E-learning thus has made it easy for people to pursue studies while working. Further the online learning is economical and one learns while they earn. Anyone can pursue studies with the online methods of learning. There are no hard and fast rules of learning through online medium. These are truly convenient and help teachers, students and all other people who use e-learning of education.

NEED OF THE STUDY

The most important fact that emerges out of the state schools is that usual complaint that children find mathematics learning to be most difficult and most significant. In this competitive world the parents tend to go from pillar to post, to find mathematics experts to provide extra guidance and coaching to their wards. Most of the time, parents face high financial expenditure. With the high expectations of their children securing top marks in subjects like mathematics. At all levels mathematics teaching develops spirit of enquiry required for any walk of life. In our country, the parents are very particular to send their children to professional courses like engineering, medicine, chartered accountancy, master of business administration, etc. The school, the parent and the significant others keep thinking only of these professions for themselves, whatever may be the marks secured in mathematics and the other relevant subjects.

Mainly for some professional courses like engineering, the high scores are very essential. The future of the child depends on the ranks secured in Mathematics at higher secondary school level. In addition to a general need for a continuous evaluation, there seems special requirement for the Indian children to keep on par with the students in the developed countries in academic excellence, as parents with some educational background feel different about their children's future in this country, realizing the population explosion on one side and perennial financial deficiency indicating increase in problems of employment.

The first and the most important reason for not learning mathematics is poor teaching. Teaching is ineffective because it is inadequately planned and sometimes exhibit violations of learning. Some teachers are poorly motivated. Some teachers teach the subject (Mathematics) rapidly without giving time to think. Some teachers ignore the fact that pupils are individuals with varied backgrounds, talents and interests and attempt to teach everyone the same material, the same rate, in the same way. In this age of rapid change and uncertainty, teachers need to adapt to change if they are to survive and keep pace with new methods and technologies.

OBJECTIVES

To study the differences in the achievement in mathematics of the students with respect to the method of teaching (E-learning/Traditional)

To study the mathematics achievement of the students with respect to gender

To study the differences in the mathematics achievement of the students with respect to the medium of instruction (English/Tamil)

To study the interaction effect of method of teaching and gender of the XI standard students on their post test scores in mathematics

To study the interaction effect of method of teaching and medium of instruction of the XI standard students on their post test scores in mathematics.

HYPOTHESES

There is significant difference in the total and concept wise post test scores of the XI standard students studying through Traditional and E-learning mode

There is significant difference in the total and concept wise post test scores of boys and girls of XI standard students in mathematics

There is significant difference in the total and concept wise post test scores of English and Tamil medium of XI standard students in mathematics

There is interaction type of learning and gender of students on their post test scores in mathematics

There is interaction type of learning and medium of instruction of students on their post test scores in mathematics

Limitations

1. The study is restricted to a sample chosen only from Pondicherry
2. The investigation is restricted to XI standard students
3. The pre-test and post-test questionnaire is prepared by the investigator

DESIGN OF THE STUDY

Descriptive method of research is appropriate to study the Effect of E-learning and Traditional learning on achievement in mathematics of XI standard students.

Sample

The sample constitute of 266 students drawn from five schools from Pondicherry. Random sampling technique is adopted to select the sample.

Tools Used

The investigator adopted the questionnaire method which falls under the preview of inquiry method.

1. Study material – XI standard mathematics text book by government of Tamil Nadu
2. For the pre-test and post-test, the investigator used the questionnaire method
3. The investigator also collected the personal information of the students using questionnaire method

Collection of data

The reformulated test paper was administered to all 266 students based on four concepts namely Trigonometrical equations, Properties of triangles, Solutions of triangles, Inverse trigonometrical functions. The researcher evaluated all the answer scripts carefully. The scores obtain were tabulated systematically for each student, considering the scores obtained concept-wise and also the total score for all the four concepts taken together. Based on the pre-test score students were divided into two groups, students learning by Traditional method (group A) and students following the E-learning method (group B)

Group A was subjected to the traditional class room teaching, revolving around the lecture method and group B was exposed to E-learning process which was basically “interactive” in nature with total multimedia support. The E-learning students had the advantage of acquiring more knowledge related to the topic. After teaching, the researcher conducted the post-test for all the 266 students. The answer scripts were evaluated and the scores obtained by each individual were tabulated concept wise and also for the entire questions (40) covering all four concepts.

Analysis of data

The entire data collected in order to study the Effect of E-learning and Traditional learning on achievement in mathematics of XI standard students with respect to gender, medium of instruction. The data were analyzed with the help of mean, standard deviation, t-test, F-test techniques of the statistics. The descriptive analysis, differential analysis and two-way ANOVA were carried out based on the objectives and hypotheses of the study.

The above table shows that there is significant interaction between the method of learning and medium of instruction on the post test total scores of the students

Major Findings of the Study

1. E-learning students performed better than the traditional learning students in their post-test total mean scores. There is significant difference between E-learning and Traditional

learning methods. Hence it can be inferred that the achievement level of the students depends upon the method of teaching and learning. The achievement level of E-learning students is more than that of the traditional learning XI standard students in mathematics.

Table: 1 Consolidated post-test results with respect to method of learning

Post test total scores	Method	
	E-learning	Traditional learning
N	131	135
Mean	20.97	19.96
SD	5.786	5.364
t	1.96*	
Significance	0.05	

The above table shows that there is no significant differences in post test total mean score of the students in traditional learning and e-learning at 0.05 level of significance

Table 2: Consolidated post-test results with respect to gender

Post test total scores	Gender	
	Girls	Boys
N	95	171
Mean	20.30	20.59
SD	5.235	5.843
t	0.548	
Significance	NS	

The above table shows that there is no significant differences in post test total mean score of the boys and girls at 0.05 level of significance

Table: 3 Consolidated post-test results with respect to Medium of instruction

Post test total scores	Medium	
	English	Tamil
N	129	137
Mean	22.68	18.33
SD	5.385	4.91
t	9.100**	
Significance	0.01	

The above table shows that there is significant differences in post test total mean score mean score of the English medium and Tamil medium students at 0.01 level of significance

Table: 4 Interaction between the method of learning and gender on the post-test total scores of the students

Source	df	Sum of squares	Mean Square	F	Significance
Method	1	234.91	234.91	7.33	Sig
Gender	1	20.55	20.55	0.64	NS
Method&Gender	1	234.91	234.91	7.33	Sig
Error	262	14808.11	32.05		
Total	265	14711.897			

The above table shows that there is significant interaction between the method of learning and gender on the post test total scores of the students

Table: 5- Interaction between method of learning and medium of instruction on the post-test total scores of the students

Source	df	Sum of squares	Mean Square	F	Significance
Method	1	70.88	70.88	2.714	Sig
Medium of Instruction	1	2164.11	2164.11	82.85	Sig
Method & Medium of Instruction	1	3758.57	3758.57	143.90	Sig
Error	262	12065.99	26.12		
Total	265	14546.94			

2. Achievement level of XI standard students in learning a topic in mathematics is irrespective of gender difference
3. Comparing the performance of English and Tamil medium students following the e-learning method it is found that the English medium students performed better than Tamil medium students
4. Comparing the performance of English and Tamil medium students following the traditional learning method it is found that the English medium students performed better than Tamil medium students
5. E-learning English medium students performed better than the English medium students following Traditional method

EDUCATIONAL IMPLICATIONS OF THE STUDY

Need to provide e-learning facility

The findings of the study revealed that the achievement level of XI standard students in learning a topic in mathematics depends very much on the method of teaching. In order to improve the quality of learning Mathematics and other subjects, the government should be urge to provide e-learning facilities in all schools.

Need to translate into Tamil

The findings of the study revealed that the English medium students followed e-learning method performed better. Hence there is an urgent need to translate to Tamil to improve the achievement level of Tamil medium students

Need to reduce the dropouts

E-learning is an effective method of the learning by doing approach. This method can reduce the dropouts and stagnation in schools. Hence the government must implement e-learning facilities to teach the dropouts

Need to reduce the burden of government on education

The e-learning approach will also reduce the burden on government to provide text books and other materials required for the students and teachers. Hence to reduce the educational expense of government, e-learning facilities must be implemented throughout the state

Need to make learning student centred

The e-learning approach will also reduce the pressure on teachers to be “all in all” (A to Z) source of knowledge, information and instruction to the students. Hence there is a need to implement e-learning in all the schools which will make learning more student-centred

Need to extend learning beyond time and space

Web based learning approach will help the teachers and parents to involve more effectively in the learning process of students even from a distance, anytime, anywhere. Hence there is a need to implement web based e-learning to make learning process a joyful experience

CONCLUSION

E-learning is an essential tool for learning mathematics in the 21st century, and all schools must ensure that all their students have access to technology. Effective teachers maximize the potential of e-learning to develop students’ understanding, stimulate their interest, and increase their proficiency in mathematics. When e-learning is used strategically, it can provide access to mathematics for all students. It may be concluded that the achievement level of the XI standard students in mathematics depends heavily upon the method of teaching. It has been inferred by this study, to improve the achievement level of the XI standard students in mathematics, e-learning must be implemented in teaching learning process. This study shows that the achievement level of girls is higher in e-learning and boys in traditional learning. It can also be concluded that the achievement level of students in e-learning does not depend on gender difference. The finding of the study also shows that, on the whole, the achievement level of English medium students is higher than the Tamil medium students. There is an urgent need to improve the achievement level of the school students’ particularly Tamil medium schools, using the major findings of the study, supported by e-learning and other web-based teaching-learning technique.

REFERENCES

1. Bates, T. (2001). National strategies for e-learning in post secondary education & training. Paris:UNESCO
2. Becker,J.,& Ravitz,J. (1999). The influence of computer &Internet use on teachers' pedagogical practices and perceptions. *Journal of research on computing in Education*. 31(4), 356-84
3. Best, J.W (1997). Research in education. New Delhi Prentice – Hall of India Private Limited.
4. Collis, B (1985b). Sex related differences in attitudes towards computers: Implications for counselors. *The school Counselor*, 22(2), 120-130
5. Dereshiwsky, M.I. (2001). Identifying online assessment practices & perceptions. *Education at a Distance*, 15(10).Retrieved from <http://www.us.Dia.org/ED magazine/illuminactive/JANOI ISSUE/ticle 02. html>.
6. Dhankar,R. (2000). Challenges of Information and Communication Technologies. *Journal of All India Association for Educational Research*.
7. Ettiger,A., & Holton, V.(2004). E-learning – the findings and future. Berkhamsted Ashridge Virtual Learning Resource Centre.
8. George,K.J., (2007) Relative effect of e-learning traditional learning on achievement in Physics of 11th standard students.
9. Gotschell, M. (2000). E-learning strategies for executive education & corporate training. *Fortune*, 141(10), S5-S59.
10. IDC Worldwide corporate e-learning market forecast and analysis, 1999-2001. Retrieved September 29, 2001.<http://www.idc.com:8080/services/press/PR/GSV 02270/pv.stm>.
11. Jayanthi, M.L.N., & Padmanaban.T. (October 2007). Education through e-learning. *Edutracks*, 7(2).
12. Kathuia,R. (2007). Maths the e-learning way. *Teacher plus* 1(15)
13. Koper, E.J.R. (2003). A Sustainable Approach to e-learning. London kogan.
14. Lokesh Koul, (1993). Methodology of Educational Research. New Delhi, Vikas Publications Houst Pvt. Ltd.
15. Megrall,C. (1999). Multimedia- Understanding its uses. <http://www.suite101.com/ article.cfm/video scripting/ 23572>
16. Morrison,D. (2003). E-learning strategies: how to get implementation and delivery right first time. Chichester Wiley
17. National Policy on Education, (1992 a). New Delhi. Department of Education, Ministry of Human Development.
18. Perraton,H. (2000). Information & Communication Technologies for Education in the South, (pp. 4-5). DFID, Cambridge
19. Porter, L.R. (1997). Creating virtual classroom: Distance learning with the Intrnet. Newyork. J.Willey & sons
20. Rajeshwari, & Mohan, (1996). Important factors that have a bearing on the development of multi-media instructionalstrategy. *Edutracks*.
21. Rpblyer, M.D., Castine, W.H., & King, F.J. (1988). Assessing the impact of Computer based instruction: New York: Haworth press.
22. Shashikala,P.(2001). Research on Multimedia. *Journal of Indian Education*, May.
23. U.S. Department of Education, National Centre for Education Statistics. (2001). The condition of education. Washington, DC.US. Government Printing Office.
24. Jainik,N.M. (2000). The Potential of the Advanced Internet Project for India proceedings of the Annual Conference of the Computer Society of India, September, Chennai, India, published by Allied Publishers Ltd.
25. Jainik,N.M. (2001). E-learning technologies for rural India.
26. Zahm,S. (2000). A quick history of the e-learning evolution, *E-learning*, 1(1), 44-47.