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WEB-BASED INSTRUCTION IN LEARNING OF MATHEMATICS-PARABOLA

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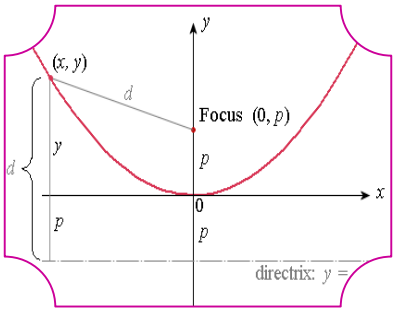

ABSTRACT

The practice of both information and communication technology (ICT) have a plentiful competence to improve teaching and learning process. Currently, computer is measured as a super teaching appliance. Computer based instructional system assimilates inspecting, learning and doing and henceforth, making learning much effectual. Now, software packages are additional accessible and humanizing. Learners can currently learn at their own haste without esteem of the level at which they are supposed to be. Though, these computer programs are mainly beneficial in teaching those topics with which learners typically have problems. This study attempts to find the impact of Web-based instruction in learning of mathematics-parabola among higher secondary students.

KEYWORDS: *Web-Based Instruction, Synchronous, Asynchronous, Criterion-Referenced Tests.*

INTRODUCTION

Current society has been altered quickly by the expansion of scientific technology. Particularly the progression of information & communication technology has made an important and general influence on our society. Web-based learning allows not only the concurrent communication of the conservative preaching system or face-to face talks in class but also non-simultaneous communication outside time and interplanetary and, above all, it has a benefit of obliging many students concurrently without any boundary of education space. Instruction through the Web is based on hypermedia and it is a teaching method that utilizes the features of the Web and the related materials provided through the Web.

TYPES OF WEB BASED INSTRUCTION

There are two different types of Web Based Instruction, namely, synchronous and asynchronous.

a) **Synchronous**: In synchronous type there is synchronization amongst the students and teacher on-line. This synchronous web based education delivers the most developing idea of E leaning. Here the message between the teacher and students straight happens in through live audio-video conferencing or on-line chat room. It lets them correctly to gather at a definite time for interactive with each other concerning the sequence material. Through this a teacher can deliver valued evidence, share one or the other knowledge with his students. Teachers can directly reply to the inquiries and interrogations put to by students. (www.easy-lms.com)

b) **Asynchronous:** In asynchronous the education component is to be connected from a specific website and then can unload it offline on our appliance. In this case there is no joint communication of student with teacher. In this style, the course information of learning experiences are passed to the learners through web pages, web logs, e-mail, discussion forum, blogs, wikis or through the recorded DVD and

CD-ROM. In this teachers and learners do not interact concurrently. Instead, information and materials are sent on a medium or sent as e-mail. At an indefinite time later, a response is provided. (www.easy-lms.com)

NEED AND SIGNIFICANCE OF THE STUDY

As far as the appropriate usage of the technology is concerned, the students may learn mathematics in more depth (Jonassen, Peck, & Wilson, 1999). Mathematics is the basis of science and technology that have completed our world extra fast, urbane and of luxury. Mathematics is used in a number of areas, because it delivers an exact way to define complex state and examine difficult problems. That is why the Kothari Commission (1966) rightly recommended the study of mathematics compulsory for all, for the first ten years of schooling. Current technological advances have formed the option for new ways of teaching and learning. Taking full benefit of the possible of the Web requires teachers to reason about teaching and learning in new ways, as well as to chief the technology itself. The Web-based classroom can sustenance a current teaching method or be used as a spare. The World Wide Web can be used to provide instruction and instructional provision. Web-based instruction offers learners supreme contact to instructional capitals, far outstanding the spread of the outdated classroom. It also makes conceivable learning involvements that are open, supple, and dispersed, providing chances for attractive, collaborating, and well-organized instruction."Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning" (NCTM, 2000, p. 11).

REVIEW OF RELATED LITERATURE

Berger et al. (2009) compared web-based and face to-face training concerning patient education in a hospital system. Post-test results, course evaluation and costs were compared for both methods and it was found that there was no significant difference in course effectiveness or satisfaction between the training methods studied.

Bousbia et al. (2010) studied the relationship between learning styles and navigation behaviour in web-based educational system. The objective was to find out the relationship between learning styles and navigation behaviour in web-based educational system. It was found that significant relationships exist between learning styles and learners' navigation behaviour in Web-based environment.

Erdogan (2008) evaluated web based instruction in view of the tutors and students perspectives. The findings of the study disclose that web based instruction have positive effects on the improvement of student's achievement.

Graff and Lebens (2008) studied EFIT web based tutoring system for lower secondary school mathematics in Germany which met the individual demands of different students. Results of the study indicated that students in the treatment group improved significantly compared to students who received traditional, constructivist-inspired instruction. In contrast to the more traditional Computer Assisted Instruction programs, the web-based EFIT program is characterized by a high degree of adaptability.

Lodree (2005) examined the effect of animated agents with verbal audio in WBI on mathematics achievement and attitudes toward mathematics and computer, using a pretest-posttest control group. It was observed that the presence of animated agents with verbal audio in WBI can improve students' mathematics achievement and attitudes toward mathematics, but not their attitudes toward computer.

Loh (2004) investigated the effects of web-based pitch discrimination training on college music students' achievement. The findings of the study indicated that: (a) Web-based pitch discrimination training had an overall positive effect on achievement in melodic interval discrimination, and (b) the amount of time spent was not a good predictor of achievement due to other possible underlying factors.

Pillala (2010) studied web based lessons of statistical concepts with animations to enhance the effectiveness of learning. It was found that static experimental results indicated that compared to traditional teaching designed web-based lessons significantly improved the effective learning of statistical concepts (by 29.8%) and enhanced students' the learning process (by 19.2%).

STATEMENT OF THE PROBLEM

There are a number of reasons why an educator may choose to use Web-Based Instruction, in mathematics class room for enhancing student learning, providing improved instructional materials, reducing repetitive teaching tasks, spending more time with students working in small groups or one-on-one as Web based instruction frees the students from space and time. The significant element arises that children find mathematics learning to be most problematic and most momentous. In this modest world the paternities incline to go from support to post, to find mathematics specialists to deliver additional guidance and training to their wards. In this stage of fast modification and indecision, teachers need to familiarize to change if they are to endure and keep stride with new approaches and technologies. Based on these circumstances, the study has been entitled *"Web Based Instruction in Learning of Mathematics-Parabola."*

OBJECTIVES OF THE STUDY

- To develop a web-based instructional material to test its effectiveness in realizing the instructional objectives in the context of learning mathematics-parabola.
- To find out the significant difference in the effectiveness of the web-based instruction in the context of studying mathematics-parabola at different levels of cognition viz., knowledge, understanding and application.
- To find out the significant difference in the effectiveness of the web-based instructional modules in the study of mathematics-parabola with respect to different demographical variables of the online learners' viz. sex, age and location of the learners.

HYPOTHESES

1. Web-Based Instruction is not effective in realizing the instructional objectives in the context of learning Online Study of mathematics-Parabola.
2. There is no significant relationship between the post test scores with respect to the cognitive domains namely, Knowledge, Understanding and Application.

Tools

- A web-based e-learning package comprising of five modules, namely, Introduction to Conics, Introduction to Parabola, Study of parabola, Types of Parabola, Practical and Geometrical Applications of Parabola developed by the investigator.
- On-line testing software developed by the investigator to administer the pre-tests to the respondents of the experimental group in all the five modules.
- Five Criterion Referenced Tests were developed by the investigator to assess the terminal behavior of the respondents.
- To validate the web-based instructional materials, how far they comply with technical and pedagogical points of view, an evaluation proforma has been designed with five point scale.

Scope of the Study

This is a techno-pedagogical study in the field of education that brings to the fore, most recent developments. The study may enable researchers, teachers, and experimenters in mathematics education to recognize the difference among the teaching learning approaches.

Delimitations of the Study

- Though in Mathematics, Conics is a vast chapter comprising of Parabola, Ellipse, Hyperbola, Rectangular hyperbola and Degenerate Cone, the researcher has taken only five important areas of Parabola.
- Though the study is conducted through online, the researcher finds it difficult to get data from all sectors of people.

METHODOLOGY

This study adopts a single group, Pretest, Posttest Experimental Design. The whole sample is a composition of 171 higher secondary students from different schools with different physical, social, economical and environmental background. They took Pretests before going through the contents of each module and Post tests were taken at the end of each module. Once they completed all the five modules, the learner was directed to fill the evaluation proforma in order to get his/her opinion of the instructional package in terms of its effectiveness with respect to pedagogical and technical point of view. Also the difficulty levels of each module were rated by the learner after he/she completed all the five modules. The experiment was conducted via the internet and the data so collected were analyzed using appropriate statistical techniques.

Analysis of Data

Table 1: Significance of Difference between Means of Pre-test and Post-Test Scores with regard to Achievement Scores

Source	Pretest		Post test		D	t	p
	M1	SD1	M2	SD2			
Module 1	46.26	14.060	70.63	10.146	24.373	21.927**	.0001**
Module 2	47.31	16.971	76.96	12.560	29.649	18.586**	.0001**
Module 3	44.50	15.384	71.26	10.533	26.759	20.808**	.0001**
Module 4	46.64	13.333	70.79	12.180	24.152	19.142**	.0001**
Module 5	43.90	13.368	71.70	9.561	27.797	26.168**	.0001**
Total	228.61	37.310	361.34	27.397	132.730	42.231**	.0001**

**Significant at 0.01 level

Table-1 shows that the difference between the pretest and post test scores for all the modules is statistically significant. The calculated 'p' values are significant at 0.01 level which supports this fact. Therefore, it is inferred that exposure to Web-Based Instruction modules had enabled the students to obtain higher mean scores in the post test when compared to the pretest. It is noted that Module 2 has the highest mean score difference among all the other modules. Hence, it is concluded that the Web-Based Instruction modules have proved their effectiveness in realizing the educational objectives. The null hypothesis is therefore restated as "Web-Based Instruction is effective in realizing the instructional objectives in the context of learning Online Study of mathematics-parabola."

Table 2: Correlations of Post Test Scores with regard to Cognitive Domain

Cognitive Domain	N	Correlation	Knowledge	Understanding	Application	Total
Knowledge	171	'r'	1	-.098	.066	.546**
		'p'		.201	.390	.0001*
Understanding	171	'r'		1	-.041	.490**
		'p'			.596	.0001*
Application	171	'r'			1	.651**
		'p'				.0001*
Total	171	'r'				1
		'p'	.000	.000	.000	

*Significant at 0.05 level; NS-Not Significant

Table-2 depicts that the relationship of the post test scores with respect to the Knowledge and Understanding domain and that of the Understanding and Application domain as measured by the Pearson's correlation coefficient 'r' is negative. It is found that there exists a positive relationship between the other

domains. The relationship between each cognitive domain viz., Knowledge, Understanding and Application with the total is positive and the 'p' value is equal to .0001 which is statistically significant. It is therefore inferred that there exists a significant relationship between the cognitive domains and the null hypothesis is rejected.

EDUCATIONAL IMPLICATIONS OF THE STUDY

1. Students enjoy the learning process when exposed to Web-based instruction which brings about an improvement in learning. It can therefore be well said that students benefit much through Web-based instruction.
2. It facilitates the teaching learning process by helping teachers to use Web-based methods in the classroom and opens up new avenues of research.
3. Web-based instruction can reach a huge number of students which is not possible in a traditional classroom.

SUGGESTIONS FOR FURTHER RESEARCH

1. Web-based instruction is an ever-growing concept. New technologies are being evolved every day. The usage of these technologies in the classroom has to be researched to check their compatibility.
2. Action researches may be undertaken among the students at levels of education by implementing Web-based instructional methods.
3. Video-conferencing, digital videos, internet, television, Web casts, and other such devices and accessories are being used in education recently. Each of these techniques has its own merits and demerits. The effect of these Web-based tools should be tested regularly to ensure proper utilization of these methods.

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