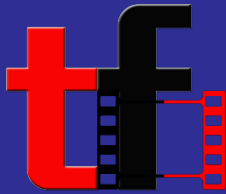


The Impact of Blended Learning Instructional Approach on Secondary School Students Academic Achievement in Mathematics



ABSTRACT

The study examined the Impact of blended learning instructional approach on students' academic achievement in mathematics in Kapurthala city. Two research hypotheses were generated to guide the study. A total of 100 senior secondary students were used in the study. Two instruments used in the study are mathematics student achievement test (MSAT) and blended learning package (BLP). The findings of the study revealed that blended learning instructional approach was more effective in enhancing students' achievement in mathematics than conventional teaching method.

Keywords: *Blended learning, Academic achievement*

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INTRODUCTION

One of the major goals of today's education is to make the students gain the thinking skills and strategies which they will use throughout their lives, rather than storing information. A good education should be able to equip students on how to learn, how to remember, how to motivate themselves and how to control their own learning. The information technology revolution has led to rapid expansion across a wide range of areas in the modern world. This has made it an essential requirement for schools, universities and other educational institutions to identify potential benefits from these changes so as to improve teaching and learning environments as well as cope with an ever increase demand for education and training. One of the innovations of technology is the internet. The internet is formed by enjoying two words that imply an international network: (international) and net (network) (Salamh, 2005). The educational system has also benefited from the advantages brought by the internet. The internet, which offers learner access to information and the opportunity of written, audio and video communication, has entered into a very rapid development process all over the world. New internet bases education techniques have removed traditional place and time obstacles and have provided students access to information whenever and wherever they want (Murphy, 2003).

Salamh (2005) pointed that web based education is a new education model which can be used to support the acquisition of the new information skills and for the enrichment of students leaning habit and experiences. Many education techniques such as presentations, discussions, demonstrations, answer-questions, brainstorming, case study, cooperative leaning, problem centered leaning can be conducted in a web-based environments. This way is possible for the leaners to gain experiences such as researching, writing, observing, listening and performing tasks (Picciano, 2006). It could be argued that as a result of the increasing prevalence of computer and the internet in particular, online learning-teaching environments are rapidly becoming more widespread. However, online teaching-learning environment lack many advantages that face-to-face environment have, which led to the motion of blended learning.

Ross and Gage (2006) concluded that online higher education student tend to be less satisfied with totally online courses when compared to traditional courses. Therefore, a combination of online learning and traditional learning environment could be much more useful in solving educational problem and meeting educational needs (Murphy, 2003). Furthermore, Graham, (2006) pointed that blended learning was developed for its potential advantages in offering a more effective education, convenience and access to teaching-learning environment.

Blended learning is referred to as hybrid learning and mixed learning and it is used in very different ways by many researches. Throne (2003) defines blended learning as an education model which can integrate e-learning which has improved in parallel with new and technologic development with traditional learning which provides the integration in the classroom. Graham (2006) also discuss blended learning approach as a combination of face to face with computer mediated instruction. While Young (2002) describes blended learning as a method of instruction that combines online with face to face learning activities that are integrated in a planned, pedagogically valuable way and where some of the face to face is replaced by online activities. Blended learning is a new type of education prepared for a certain group by combining the positive aspects of different learning approaches. Blended learning will provide a big convenience for the course to achieve its target by combing the face to face interaction in traditional learning and time; place and material richness provided by web-based learning.

Mathematics is one of the compulsory subjects of secondary education. 'Mathematics is essentially a program of education that fosters higher-order mental processes such as questioning, reasoning, analyzing, inducing and logical thinking'(Mishra & Jain, 2013)..

Furthermore, gender disparities have been noticed and reported by various researchers as concerning enrolment and poor learning outcomes in mathematics. Abidoeye and Ogunniyi (2012) concluded in their studies for poor female enrolment in mathematics as fear of the subject and the belief that mathematics is wide in scope. Research findings indicate that male students are better academically than female students (Adebayo, 1997). In contrast, to this, some other studies reported that female students are academically better than male students. There are also a growing number of studies that revealed that gender differences in academic performance does not exist (Abidoeye, 2009). Schools of information age are also expected to

develop positive student attitudes both towards academic and social issues. To develop positive student attitudes towards mathematics course and improve their academic achievement, teachers need to have positive attitude and a sound information background, and to use technology along with modern instruction method. Therefore, this study examines the effect of blended learning approach on students' academic achievement in mathematics in Kapurthala city schools.

Objectives of the study

1. To study the difference between the academic achievements of the students taught with blended learning and traditional teaching method.
2. To study the difference between academic achievement of male and female students taught with blended learning approach.

RESEARCH HYPOTHESIS

The following research hypotheses were formulated for the study.

H1. There is no significant difference between the academic achievements of students taught with blended learning approach and their counterparts taught with traditional teaching methods.

H2. There is no significant difference between academic achievement of male and female students taught with blended learning approach.

Tool Used

Mathematics Student's Achievement Test

This is a response instruments. It aims at measuring the acquisition level of students on the mathematics contents. The instrument has consisted of 20 multiple choice items. The instrument was validated through experts review. Two lecturers in the Department of Education in GND University, Amritsar and two experienced secondary school mathematics teachers went through the draft of the instrument. Based on their comments and observations, some items were modified why some were completely eliminated. The instrument was later administered on 30 students from a secondary school not used for the study. The reliability coefficient of 0.84 was obtained using crombach Alfa. And this was considered to be high enough for the instrument to be used for the study.

Blended Learning Package

This is a stimulus response. It consists of mathematics contents linked with website and which can be accessed through internet via computer systems. The package was validated by two experts in the computer Department in GND University. Two lecturers in the Education department were also gone through the package. Based on their comments the package was reviewed and all the necessary adjustments were made to the package before finally used.

RESEARCH METHODOLOGY

Table-1. T-test analysis of post-test scores of both experimental and control groups.

Instructional strategies	N	Mean(X)	S.D.	df	t-value	Significance
Experimental group	50	13.63	2.58	98	4.69	.0001
Control groups	50	11.19	2.62			

Significant at 0.01 level ,df 98

The study adopts pre-test post-test control group quasi-experimental research design. The experimental design allows the research to manipulate the independent variable (blended learning) in order to determine its effects on the dependent variable (academic achievement). The population of the study consists of all mathematics students in 10 Senior Secondary Schools in Kapurthala city. Four secondary schools were randomly selected from all secondary school in Kapurthala. Two intact classes were used in each of the four selected secondary schools. Samples of 100 students were selected. They were later sub-divided into experimental and control groups. The schools were selected based on the following criteria. The school must have a minimum of two qualified mathematics teachers teaching the 10+2 class. The school must have a well-equipped computer laboratory with internet facilities. Two instruments were used in the study, and they are mathematics student achievement Test (MSAT) and Blended learning package. (BLP)

RESULTS

Hypothesis1. There is no significant difference between the academic achievement of students taught with blended learning approach and their counterparts taught with traditional teaching

method. As shown in Table 1, the calculated probability value .0001 is less than the declared probability value of .05. The null hypothesis which states that there is no significant difference between the academic achievement of students taught with blended learning approach and those students taught with traditional teaching method is hereby rejected. This implies that there is a significant effect of blended learning approach on student academic achievement in mathematics.

Table-2. T-test analysis of post-test scores of male and female students taught with blended learning approach.

Gender	N	Mean(x)	SD	DF	t-Value	Significance
Male	30	13.60	2.91	48	0.107	.915
Female	20	13.68	1.99			

Hypothesis 2. There is no significant difference between the academic achievement of male and female students taught with blended learning approach. Table 2 shows that the calculated p-value .915 for gender was greater than the alpha level .05. Hence the null hypothesis 2 which states that there is no significant difference between academic achievement of male and female students taught with blended learning approach is hereby accepted. This indicates that there exist no significant differences between the academic performance of male and female mathematics students when taught with blended learning approach.

RECOMMENDATION

Based on the findings of this study, the following recommendation were made

1. Blended learning approach should be adopted and implemented during the instructional process in view of its enhancing effect on students' achievement.
2. Both male and female mathematic students should be encouraged to study mathematics together as both are equally good in the subject.
3. In-service training and seminars on the use of computer and internet facilities should be organized for secondary school teachers.

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