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The Impact of Using E-learning Based on Blackboard Applications upon the Achievement and Skill of Solving Mathematical Problems among Preparatory Year Female Students at Najran University

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Abstract: *This study aims to measure the impact of using e-learning based on blackboard applications upon the achievement and skill of solving mathematical problems among Preparatory Year female students at Najran University. The sample consisted of (83) Preparatory Year female students. Only (40) participants constituted the experimental group that was taught using blackboard applications, while the control group was (43) and they were taught using the traditional methodologies of teaching. The present study resulted that there were statistically significant differences at the level of (a=0.05) for the impact of the teaching strategy adopted in the post achievement test and the skill of solving mathematical problems in favor of the experimental group students.*

Keywords:*E-learning, blackboard, achievement, mathematical problems*

I. Introduction

E-learning is recently regarded as one of the most innovative method of teaching, which contributes to increasing the performance and efficiency of learners. It allows learners to take more responsibility since e-learning provides students with the chance to discover, analyze, and synthesize as well as it helps them to acquire high learning and thinking skills. Educators, like Rabon, have emphasized that using gadgets of new technology in education enriches learning process with achieving its objectives as technology confirms positivity and activeness of learners. Using technology in education also contributes to increasing learners' ability to learn more information, and developing high learning and thinking skills (Shirbini&Tantawi, 2001).

The blackboard system is regarded as a kind of e-learning. It is an online application to manage teaching and learning process. It was designed to help and support both teachers and students to interact in the virtual classes and to learn using the electronic materials online as a kind of integration for the given activities and material face to face on campus classes. The blackboard also provides teachers with the chance to present the content of the course, make conferences, chat, make discussion, and give assignments or automated tests online on the Internet.

The capability of problem solving is regarded as one of the basic skills which must be learnt and used effectively by the learner in the contemporary time. The importance of this ability arises from its relation to the effective and productive thinking. It is also a suitable practice for the learner to be able to solve his problems in his daily life and in the future as well (Abu Zeinah, 2003).

Al Jarf (2006) conducted a study, which aimed at identifying e-learning efficiency in teaching English language for university students in the Kingdom of Saudi Arabia. The findings indicated that the students of the experimental group who studied using both e- learning and traditional classes gained more marks in the achievement assessment in comparison with those who were in the control group. This means that e-learning is more effective than the conventional ways of teaching.

Dwaidy (2005) conducted a study that aimed to identify the range of the actual use of the Internet by female post graduate students in King Abdul Aziz University. The study discussed the characteristics of students who use and those who do not use the Internet as well as the obstacles of using the Internet which include English language as a major obstacle and the computer skills of surfing the Net seemed as a minor obstacle.

Furthermore, in his study, Al Ghadian (2007) discussed the necessity and the demand to use the blackboard applications in the Saudi universities. The researcher identified the problems and challenges that the Saudi universities face. He recommended using blackboard applications to be regarded as a suitable solution for some of the identified problems and challenges. Since e-learning has become as universal modern trend of teaching, the researcher recommended that using blackboard applications is necessary for all faculty members and students or even the local society. And he also recommended that the universities have to provide the targeted groups with the needed training and facilities.

Abdul Kareem (2008) also conducted a study, which aimed at identifying e-learning at school. She identified the advantages, disadvantages, and styles of e-learning. The most important relevant style to e-learning is the cooperative learning. The advantages of e-learning include promoting the culture of using computer skills, and learning becomes more interesting. Whereas the disadvantages include that parents are not able to use the computer or even not interested in using it at all, and most of the sample agreed that because of the financial shortage, computers cannot be provided for every learner.

In addition, Chao (2001) measured the ability of university Thai students to use the Internet as a new information technology. He also measured the correlation of some variables like age. The findings revealed that learning using the Internet was not spread enough, and age or other individual variables did not have any considerable statistical importance amongst the sample.

Lee & Lime (2007) assessed the e-learning system in the Korean universities. According to this study, two thirds of the Korean universities deliver lectures using e-learning. This study recommended some procedures to encourage universities to compete in this field. These procedures include: supporting faculty members by giving them privileges or promotions, applying criteria to assess the progress of faculty members' use of e-learning, and finally increasing the system support which all lead to improve and support e-learning, and provide faculty members with the chance of interaction in the e-learning environment.

II. Methodology

Sample

The study sample included four sections of (83) Preparatory Year female students, which were randomly distributed into two groups i.e. the experimental group and the control group. Only (40) of the sample constituted the experimental group that was taught using blackboard applications while the (43) of that sample constituted the control group that was taught using the traditional methodologies of teaching.

The two researchers calculated the arithmetic average and the standard deviation of the obtained marks for the students of the two groups, and the results shows that there are no statistical significant differences on the level of ($0.05 = \alpha$) between the two groups. T values have no statistical significant differences, which mean that the students were equal in their previous mathematics achievement level.

The course material:

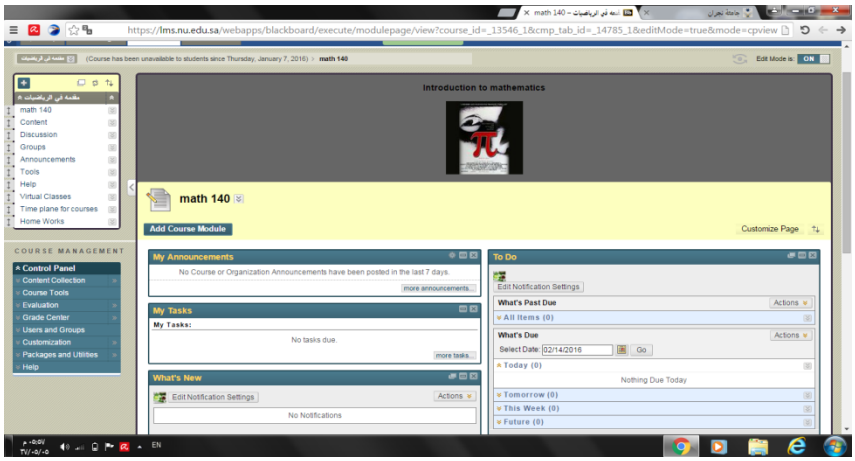
The course is (Introduction to Mathematics) and only two units involved in this study. These two units are "Exponential and Logarithmic Equations" and "Trigonometric functions".

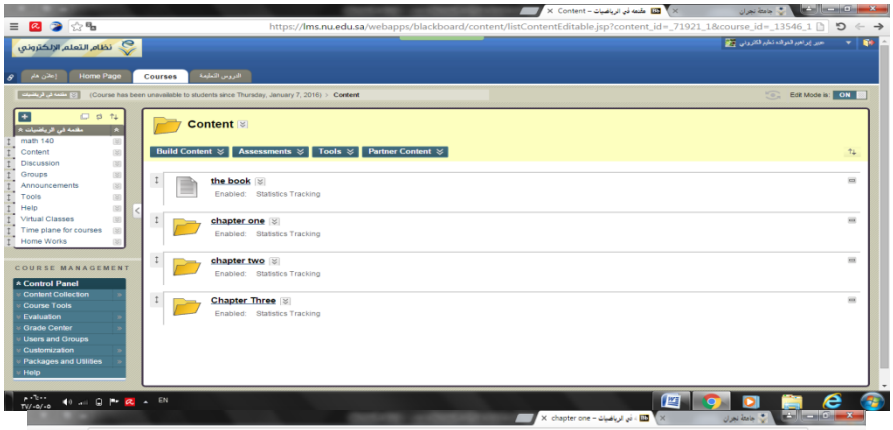
Tools:

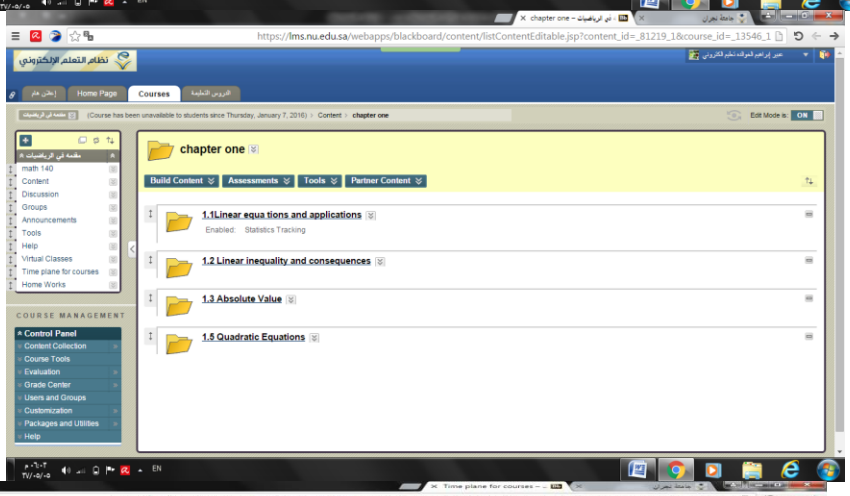
1. An achievement test, which covered the two units. It was constructed by the researcher, and consisted of 13 different types of questions out of 25 marks.
2. Mathematical problem solving ability test.

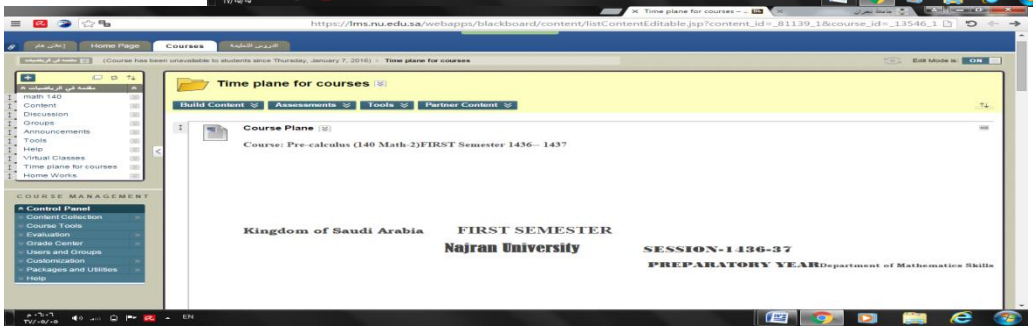
The test conducted in this study designed by Khashaan, 2005. It covered (30) questions. The researcher developed and modified it to be suitable for the level of the students, which became only (20) multiple choice questions test, given to pilot sample of (35) preparatory year female students.

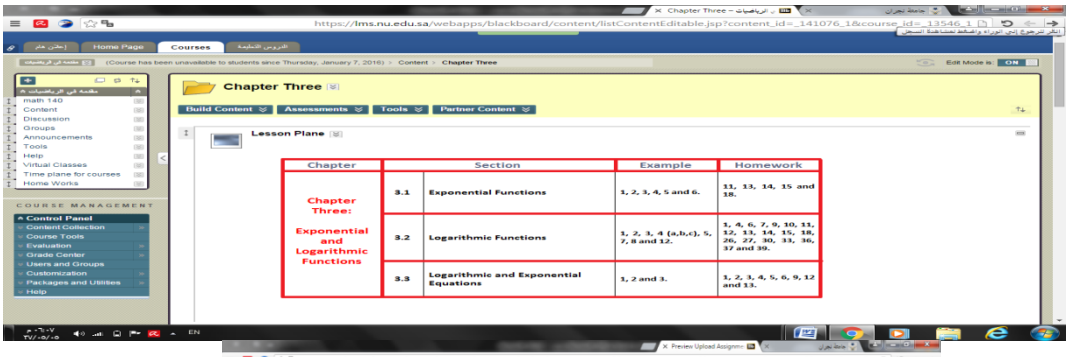
3. Lesson plan and images of the blackboard webpage for the two adopted units to be studied.

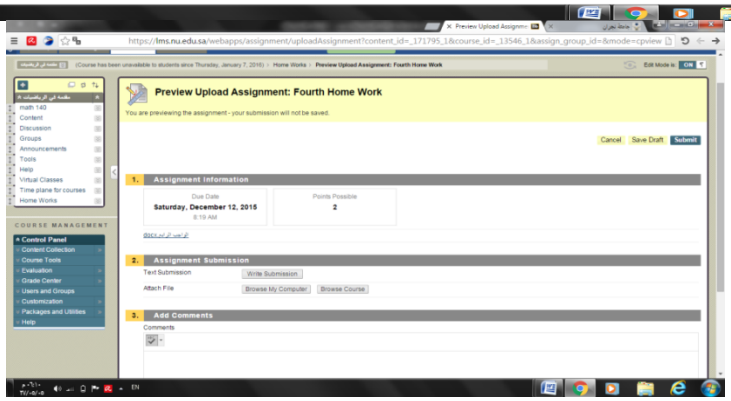

Introduction to mathematics
math 140
Add Course Module
Customize Page
My Announcements
To Do
My Tasks
What's New

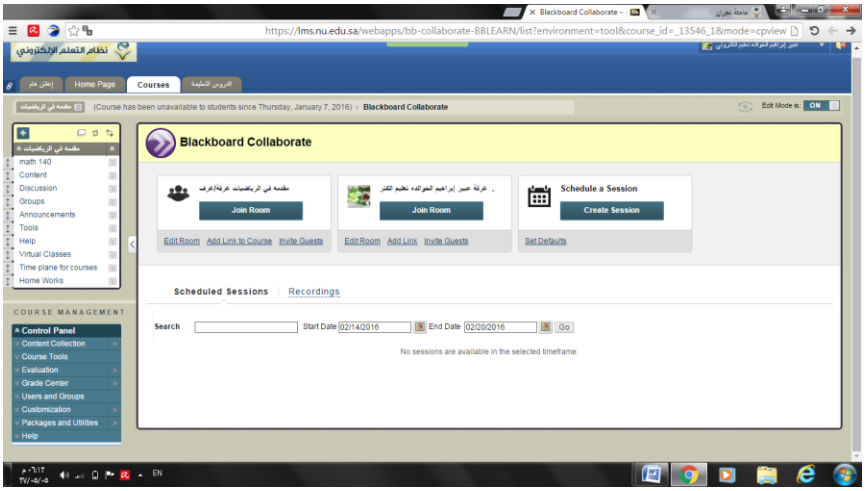

Content
Build Content
Assessments
Tools
Partner Content
the book
chapter one
chapter two
Chapter Three


chapter one
Build Content
Assessments
Tools
Partner Content
1.1Linear equa tions and applications
1.2 Linear inequality and consequences
1.3 Absolute Value
1.5 Quadratic Equations


Time plane for courses
Course Plane
Course: Pre-calculus (140 Math-2)FIRST Semester 1436– 1437
Kingdom of Saudi Arabia
FIRST SEMESTER
Najran University
SESSION-1436-37
PREPARATORY YEARDepartment of Mathematics Skills







Study Design and Statistical Processing

Variables of the study:

1- Independent variable: it is the teaching strategy which has two levels:

a) Blackboard e-learning teaching strategy

b) Traditional way of teaching

With taking in consideration the rating variable, which is the previous level of achievement.

2- Dependent variable, which includes:

a) The achievement

b) Mathematical problem solving

Design and Study

The researcher used the quasi-experimental research design, which is two groups: the experimental and the control. This design was used through the pre-application of the two study toolsas shown from the following:

G1: A1 X1 O1 O2

G2: A1 XO O1 O2

That is to say:
That is to say:
G1: means experimental group.
G2: means control group.
A1: means achievement of students in the previous mathematical test.
X1: means e-learning as a proposed style of learning.
XO: means traditional way of teaching.
O1: means post achievement test.
O2: means ability to do mathematical problems.

Statistical analysis of study results

Results related to the achievement:

As an answer of the two questions of the achievement, the researcher used ANOVA, taking in consideration that the experimental and the control groups are equal in the previous achievement as well as the same teacher for them as shown in this table:

Table (1): The Significance of the Differences in Averages for the Post-achievement of Individuals of the Study

Source of Variance	*Total of Squares*	*Freedom Degrees*	*Mean of total squares*	*F Value*	*Significance Level*
Strategy	897.425	1	897.425	49.985	0.00
Level of previous achievement	1974.218	2	987.109	54.980	0.00
Strategy X Level of previous achievement	18.648	2	9.324	0.519	0.510
Error	1382.462	77	17.954		
Total	4272.753	82			

The table shows that F value is (49.985) for the impact of the used strategy of achievement, which is statistically significant at the level of (0.05=α).This means that there is a significant difference between the averages of marks in the post-achievement test for the Individuals of the two groups of the Study (the experimental and the control). This difference is in favor of the students of the experimental group. Thus, the first zero hypothesis is rejected, and the second alternative hypothesis is accepted, which means that there is a significant difference at the level of (α=0.05) between the averages of marks in the post-achievement test for the Individuals of the two groups of the Study (the experimental and the control). This difference is in favor of the students of the experimental group.

As shown in table (1) shown above, F value in accordance with the impact of the previous achievement of the female students is (54.980), which is a statistical function at the level of (α=0.05**) .**This means that there are differences of a statistical significance between the averages of marks in the post-achievement test for the Individuals of the two groups of the Study (the experimental and the control), in accordance with the level of the mathematical previous achievement. That is to say, there are differences of statistical significance at the level of (α=0.05**)** between the averages of marks in the post-achievement test for the Individuals of the two groups of the Study, in accordance with the level of the mathematical previous achievement.

According to Table 1, there is no impact of a statistical significance of interaction between the teaching strategy and previous achievement level, in which (F) Value is (0.519) which has no statistical significance at the level of (α=0.05).

The results related to mathematical problem solving ability test

As an answer of question three and question four related to mathematical problem solving ability and interaction, the researcher used ANOVA to find substantial differences between averages of the sample individuals 'grades according to the teaching strategy and previous achievement level, as well as between the interaction and the

teaching strategy and previous achievement level in the mathematical problem solving ability test as shown in this table:

Table (2): The significant differences between averages of the sample individuals in Mathematical Problem Solving Ability Test

Source of Variance	***Total of Squares***	***Freedom Degrees***	***Mean of total squares***	***F Value***	***Significance Level***
Strategy	*645.478*	*1*	*645.478*	*98.970*	*0.00*
Level of previous achievement	*140.486*	*2*	*70.243*	*10.77*	*0.00*
Strategy X Level of previous achievement	*9.232*	*2*	*4.616*	*0.708*	*0.345*
Error	*502.162*	*77*	*6.522*		
Total	*1297.358*	*82*			

Table (2) shows that F value is (98.970) for the impact of the used strategy of achievement, which is statisticallysignificant at the level of (α=0.05) .This means that there is a substantial difference between the averages of grades in the achievement test for the Individuals of the two groups of the Study (the experimental and the control) in the mathematical problem solving ability test. This difference is in favor of the students of the experimental group. Thus, the third zero hypothesis is rejected, and the alternative hypothesis is accepted, which means that there is a substantial difference at the level of (α=0.05) between the averages of grades in the ability of the mathematical problem solving test for the Individuals of the two groups of the Study (the experimental and the control). This difference is in favor of the students of the experimental group.

As also shown in table II, F value in accordance with the impact of the previous achievement of the female students is (10.77), which is statisticallysignificant at the level of (α=0.05**)**.This means that there are significant differences between the averages of the grades in the test of the mathematical problem solving ability for the Individuals of the two groups of the Study (the experimental and the control), in accordance with the level of the mathematical previous achievement. That is to say, there are substantial differences at the level of (α=0.05**)** between the averages of the grades in the test of the mathematical problem solving ability for the Individuals of the two groups of the study, in accordance with the level of the mathematical previous achievement.

According to Table (2), there is no impact of a statistical significance of interaction between the teaching strategy and previous achievement level, in which (F) Value is (0.708) which has no statistical significance at the level of (α=0.05).

III. Discussion And Results

- The interaction between the students and the course through the electronic forums, announcements, tasks, assignments, and test, which eases and facilitates the teaching-learning process for both the teacher and students.
- The system of the Blackboard applications provided the students with the choice of the suitable place and time of study.
- The system of the Blackboard applications considers individual learner differences by giving the students more than one attempt to do their assignments.
- The system of the Blackboard applications also provides geographically far students with the chance of joining the university through distance learning.

Recommendations

In the light of the findings, this study suggests the following recommendations, which may contribute to the improvement of teaching mathematics:

- Providing training sessions for the faculty since the study findings show that this strategy has a positive impact on the achievement and mathematical problem solving.
- Conducting more studies based on other variables rather than the achievement and mathematical problem solving.
- Adopting e-learning through Blackboard applications to be used in teaching other courses.
- Adopting e-learning through Blackboard applications to be used in other universities.
- Providing students with the required training for e-learning before they join universities.

IV. Conclusion

Applying the system of e-learning through Blackboard applications makes the teaching-learning process easier for the preparatory year female students in Najran University. The findings of the study revealed that there is a substantial difference in the students' achievement and ability of doing mathematical problems in favor of the experimental group.

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