THE EFFECT OF COOPERATIVE LEARNING ON STUDENTS’ PERFORMANCE IN COMPUTER COURSE USING BLACKBOARD

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ABSTRACT
Cooperative Learning is one of the most successful strategies used to develop class performance [1]. This procedure involves groups of students working together to complete a given task. The presented strategy helps students with low level (weak students) of abilities to increase their understanding of a topic and then improve their grades in the exam. The purpose of this study is to explore the use of face-to-face and e-learning (Blackboard) environments used by students to communicate and collaborate with each other. Clear instructions were providing to all students in order to be part of this study. During the achievement of this strategy, students realized that each person’s work benefits not only that individual but the member of the same group as well.

Keywords: Cooperative Learning, Face-to-Face and Online Environments, Learning Management Systems (LMS), E-learning Technology, Students’ Performance, and Instructions.

I. INTRODUCTION
The aim of this project is to examine the effects of cooperative learning on students’ performance in a computer course class. This study was conducted over two semesters of lectures in Foundation Program at Qatar University. It was tested at the computer labs as a face-to-face environment and also tested by applying the Learning Management System Blackboard as an asynchronous online environment [2]. To verify and validate the results of the strategy presented in this paper, the project took place over two semesters: spring 2007 and fall 2010. Two classes participated in the current study and each class consisted of 8 to 9 groups of two students per group. The results of another class which didn’t participate are included in this study for purpose of results comparison. Classes which had participated and which had not participated in this study had the opportunity to use blackboard. Students’ reorganization was the only difference between these classes. In addition, clear instructions were provided to students who participated in this study in order to follow. These guidelines consist mainly of attendance rate which should be 75% or above per semester, and the number of assignments (homework and quizzes) done per a student should be more than 2. The creation and formation of groups was done according to the midterm exam’s marks. Each group was formed by two students one with low and the other with high midterm exam marks.

This paper will first provide a brief introduction to the course content used in this study, the participants (Students), the instructions, the LMS used by students to communicate with each other, and finally an analysis and discussion of the results obtained. The paper will end with conclusion and references.

II. COURSE DESCRIPTION
The course selected for the current study is computing for foundation level 1. This course is designed to provide students with learning environments to master fundamentals of computer skills. The course content is divided into three main subjects as mentioned below and it focuses on basic computing skills both theoretical (computer concepts) and practical (using operating system such as Windows XP and Microsoft Word 2003 and 2007).

a. Computer Concepts:
   - Computer components, basic computer architecture, basic networking concepts, security and legal issues associated with computers.

b. Working with Windows XP and File Management:
   - Introduction to the basic functions with other important concepts of an operating system, and skills to manage and organize files, folders and disk drives.

c. Word Processing:
   - Basic operations to create, edit, format, and enhance word processing documents for distribution.

III. GROUPS
Group-based learning creates an environment in which students can practice, increase, and improve their skills [3]. Advanced students can gain leadership, improve their communication and social environment. In the current study, two classes were selected; one male class (016 - spring 2007) and one female class (120 – fall 2010) to participate in this cooperative learning analysis. The results of another male class (021 – spring 2007) presented in figure (1) is included in this study in order to be compared with the other results for purpose of comparison and validation.

The participants were new students to the university coming from different high schools with different level of skills and with different majors as shown in table 1. Each class consisted of 18 to 19 students. Table 1 shows an example of one male class (M16 – spring 2007) with serial number, students’ university Identification number (Student ID), specialty, and midterm exam marks out of 100.
IV.  INSTRUCTIONS

As stated, instructions were circulated to all students and it consists of:

a. A student’s attendance rate should be 75% or above
b. Student should take at least 2 Quizzes and 2 Homework
c. Students should respect all ideas and thoughts expressed by the other member of the group
d. Students should prepare the topic before the lecture
e. Students should participate online through discussion board as part of LMS
f. Students should cooperate with other members of the group
g. Students should be online through Blackboard for at least one hour per day after each lecture
h. The participation to a discussion board is mandatory
i. Students should answer questions and put their own questions related to the topic of the lecture
j. Students should use office hours on weekly basis
k. Students should respect their assigned groups during the achievement of the project

Table 1: Class List (RAW DATA)

<table>
<thead>
<tr>
<th>Serial</th>
<th>Student ID</th>
<th>Specialty</th>
<th>Midterm Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200607977</td>
<td>Science</td>
<td>93.0</td>
</tr>
<tr>
<td>2</td>
<td>200601051</td>
<td>Business</td>
<td>61.5</td>
</tr>
<tr>
<td>3</td>
<td>200600312</td>
<td>Science</td>
<td>82.0</td>
</tr>
<tr>
<td>4</td>
<td>200607771</td>
<td>Eng.</td>
<td>86.0</td>
</tr>
<tr>
<td>5</td>
<td>200604026</td>
<td>Law</td>
<td>77.5</td>
</tr>
<tr>
<td>6</td>
<td>200603403</td>
<td>Art</td>
<td>57.5</td>
</tr>
<tr>
<td>7</td>
<td>200607144</td>
<td>Eng.</td>
<td>85.0</td>
</tr>
<tr>
<td>8</td>
<td>200603575</td>
<td>Business</td>
<td>89.5</td>
</tr>
<tr>
<td>9</td>
<td>200600554</td>
<td>Art</td>
<td>70.5</td>
</tr>
<tr>
<td>10</td>
<td>200604957</td>
<td>Business</td>
<td>80.5</td>
</tr>
<tr>
<td>11</td>
<td>200607289</td>
<td>Eng.</td>
<td>89.5</td>
</tr>
<tr>
<td>12</td>
<td>200606891</td>
<td>Business</td>
<td>74.5</td>
</tr>
<tr>
<td>13</td>
<td>200607191</td>
<td>Business</td>
<td>88.5</td>
</tr>
<tr>
<td>14</td>
<td>200607331</td>
<td>Business</td>
<td>92.5</td>
</tr>
<tr>
<td>15</td>
<td>200602344</td>
<td>Business</td>
<td>94.0</td>
</tr>
<tr>
<td>16</td>
<td>200602925</td>
<td>Business</td>
<td>84.5</td>
</tr>
<tr>
<td>17</td>
<td>200607108</td>
<td>Business</td>
<td>69.5</td>
</tr>
<tr>
<td>18</td>
<td>200608099</td>
<td>Business</td>
<td>85.0</td>
</tr>
</tbody>
</table>

V.  LEARNING MANAGEMENT SYSTEM (LMS)

E-learning systems have become one of the main components to implement effective education systems, especially in higher education institutions [4]. This study investigated the use of computer technologies as electronic learning tools. Therefore, an online environment strategy was adopted in this study as an e-learning system. Students who participated in this cooperative learning approach were asked to use Blackboard as an asynchronous learning environment tool [5, 6]. Figure (1) is a snapshot of blackboard used with class 120 during fall 2010. A discussion board feature from blackboard was used by all groups in order to share skills and knowledge after the class meeting. Also, after each lecture, a thread was posted by the teacher in blackboard to keep students active after the lecture.

VI.  GROUPS’ SELECTION METHOD

Table 1 shows a midterm grades for male class 016. According to Qatar University regulations regarding the attendance rate, students with serial numbers 11 and 14 were barred from the class. The absence rate of these two students exceeded 25%. For that reason their marks were not part of the current study and not shown in table 1. The method used to reorganize and create group was to start by sorting the students’ list as shown in table 2. The following steps describe the way used to select and reorganize the groups:

Step 1:
Sort the list in ascending order (Smallest to Largest) according to midterm marks as shown in table 2.

Step 2:
Divide the list into two equal sets as shown in table 2. The first set of grades will be assigned to lowest marks starting from the smallest mark at the beginning of the list and ending at the middle of the list. While the second set of grades will be given to the highest marks beginning from the middle of the list and ending to the last mark in the list.

\[ Set_1 = \{ \text{min}_1, ..., \text{min}_n \} \]
\[ Set_2 = \{ \text{max}_1, ..., \text{max}_m \} \]

Step 3:
Create groups with pair of maximum and minimum marks as shown in table 3.

\[ G_1 = [\text{max}_n, \text{min}_1]; \]
\[ G_2 = [\text{max}_{n-1}, \text{min}_2]; \]
\[ . \]
\[ . \]
\[ G_{m-1} = [\text{max}_2, \text{min}_{m-1}]; \]
\[ G_m = [\text{max}_1, \text{min}_n]. \]

n is the number of students
m is the number of groups
This included in the current document.

A formula used to calculate the percentage mentioned on the graphs is given by the following equation Eq. (1).

\[
\text{Percentage} \% = 1 - \left( \frac{\text{Student's total number } - \text{Improved students}}{\text{Students' total number}} \right) \times 100 \quad \text{Eq. (1)}
\]

Table 4 summarizes the results given on each graph.

<table>
<thead>
<tr>
<th>Class</th>
<th>Total Number</th>
<th>Improved students</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>021</td>
<td>14</td>
<td>4</td>
<td>28.57%</td>
</tr>
<tr>
<td>016</td>
<td>16</td>
<td>11</td>
<td>68.57%</td>
</tr>
<tr>
<td>120</td>
<td>17</td>
<td>15</td>
<td>88%</td>
</tr>
</tbody>
</table>

Table 4: Students' improvements (%)

VIII. CONCLUSION

The aim of this study was to investigate on the effect of the cooperative learning approach by reorganizing students in computer labs after the midterm exam. This goal necessitated the implication of three classes over two semesters and the use of Blackboard as an asynchronous online tool.

This current study with cooperative learning using face-to-face and online environments was positive to the achievement of almost all students. This technique will be improved and applied with other groups in the coming semesters.

IX. Acknowledgements

I would like to thank all students who contributed in this study. This contribution made the development and achievement of this research feasible and successful.
Only 28.57% from the total number of students improved their marks.

Figure (2): Midterm vs. Final Exam Male class [021] - Group not included in the study - spring 2007

68.75% from the total number of students improved their marks.

Figure (3): Midterm vs. Final Exam Male class [016] - Group part of the study - spring 2007
Figure (4): Midterm vs. Final Exam Female class [120] - Group part of the study - Fall 2010

88.3% of students improved their grades in the final exam

X. REFERENCES


