

The Impact of Proper Use of Learning System on Students' Performance

Case Study of Using MyMathLab

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Abstract: In Summer 2012, the Foundation Program Unit of Qatar University has started implementing new ways of teaching Math by introducing MML (MyMathLab) as an innovative interactive tool to support standard teaching. MML is used to enhance learning and motivate students to be engaged outside the classroom in the learning process. In this paper, we focused on the effect of proper use of one of the component of MML the Study Plan on students performance. Authors investigated the results of students in Pre-calculus course during Fall 2012 in Foundation Program and in Business Mathematics during Spring 2013 at Qatar University. The results showed that there was a strong correlation between students' results in study plan and final course grade results in Pre-Calculus course and how Business Math students benefited in using Study plan in MML to improve their Math skills. Also in this paper, we included the survey's results on the use of MML.

1 INTRODUCTION

In this decade, the traditional ways of teaching have almost disappeared. In many fields of life, there is a huge evidence demonstrating that technology-enhanced instruction will definitely improve the student learning outcomes. It will also utilize the resources available to instructors and educational stakeholders. Josten's Learning Corp and the American Association of School Administrators conducted a study of 1,000 teachers and found out that 94% of instructors and school superintendents believe computers have improved teaching and learning (Law et al., ; Tapscott, 2005).

It is also revealed that the use of technology in education expands course offerings and learning materials in addition to increasing student engagement and motivation. Moreover, it will support learning 24 hours a day, 7 days a week.

In our study, we highlight a tool called MyMathLab (MML) which is an online interactive and educational system. It covers courses from basic math through calculus and statistics, as well as math for business and future educators. It is designed mainly for learners who seek more opportunity for practice, immediate feedback, and automated grading. It was developed by Pearson, a textbook publishing company. It is claimed by the company that since it

was released, it has been used by 9 million students at 1,900 colleges in the United States. According to a Pearson survey, 80% of students who used this tool have reported that MML has helped them to succeed (Speckler, 2010).

Section 2 includes a literature review of some e-learning systems. Section 3 mainly focuses on the Study Plan component of MyMathLab. Section 4 discusses the results and finding of the study. Conclusions and recommendations are presented in Section 5.

2 LITERATURE REVIEW

Many studies were done in the field of integrating technology with Math learning and teaching. In 2001, Souters research study observed five algebra classes involving four teachers and 92 ninth-grade students. He concluded that using integrating technology into mathematics can increase student achievement and motivation which will lead to enhancing students overall performance (Raines and Clark, 2011).

Moreover, some studies have approved that when the student uses graphical calculator during their learning process, then it makes it easier to decide the best technique to solve the questions which will lead to better learning outcomes. Several other re-

search studies have inspected the impact of technology on student learning and found its use is associated with skill development, content mastery, and increased exam scores (Strayhorn, 2006; Hofmann, 2002).

One of the well known tools that aims at self-regulatory skills during learning about complex and challenging topics when using open-ended learning environments is hypermedia (Azevedo, 2005). The advantage the MML has over this tool is the auto-generated questions by the study plan in the areas the student face difficulties with.

Furthermore, the use of technology will make it easier for the instructor to use the e-assessment tools. This will enable faster decision making in the matter of tracking students levels and skills, with greater validity, and a lower cost compared to the traditional assessment procedure.

3 MYMATHLAB: 'STUDY PLAN'

In Summer 2012, the Foundation Program Unit of Qatar University has started implementing new ways of teaching Math by introducing MML as an innovative interactive tool to support standard teaching. Our main focus in this study is the 'Study Plan' component of MML. Study Plan is designed for students to improve their skills wherever they face difficulties with in homework, Quiz or Test. After completing each assigned question, Study Plan will generate questions that focus on each learning objective that the student have struggled with.

We have focused on two groups of students, those enrolled in Pre-Calculus course and those who are enrolled in Business Mathematics course. In Pre-Calculus for Fall 2012, the total number of students enrolled was 179 female student and 107 male students, as shown in Table 1. The average number of hours that the students engaged outside the classroom was 18.77 hours for female students and 12.09 hours for male students.

For Business Mathematics students, MML was

Table 1: Total Hours Spent on Study Plan - Pre-Calculus.

Factor	Female	Male
Max	116.75	73.87
Min	0.0	0.0
Median	13.03	7.93
Average	18.77	12.09
Std. Deviation	19.34	13.29
Total	3359.84	1293.62
Students Enrolled	179	107

piloted by one female and one male group. The number of students involved in this piloting were 41 female students and 31 male students. In this study, students performance who used MML was compared to those who did not use MML of total 241 female and 65 male students.

4 RESULTS AND DISCUSSIONS

4.1 Pre-Calculus Students Results

In our study we used the coefficient of correlation r to determine whether there is a correlation between effective use of the study plan and students' performance for Fall 2012 students. We computed $r = 0.94$ which indicated that there was a strong correlation between completing the required questions in the study plan and a good student's performance in the course.

Similar study was conducted in summer 2012 for a smaller sample and we found $r = 0.92$ which confirmed the beneficially of the effective use of the Study Plan on learners. The relation between the percentage of completing the required Study Plan and the students' overall grades is shown in Figure 1.

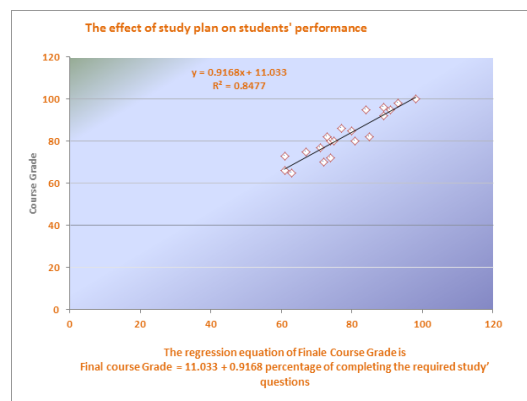


Figure 1: The effect of study plan on performance of students

4.2 Business Mathematics Students Results

Since we do not have mixed classes at Qatar University, the study was carried out on separate groups of female and male students. MML was not used from the beginning of the semester for Business Mathematics students. It was heavily used after Quiz4 and

Test1 and Figure 2 shows the effect MML on students progress. From the chart, there was an improvement for student performance after Quiz4 through the final exam. For the intermediate tests, the students grades have improved from 55% in Test1 (without using MML) to 75% in Test2 after using MML.

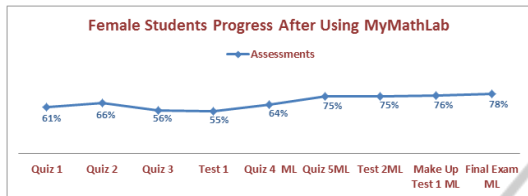


Figure 2: Female Students Progress After Using MML in Business Math Course.

Figure 3 compares the grades of students who used MML versus those who did not. It was clear that those who used the tool scored higher than those who did not. 18% of students who used the tool got an 'A' while only 4% of those who did not use MML got an 'A'. The failure rate for those who did not use MML was much higher than those who did use it, 31% versus 60%.

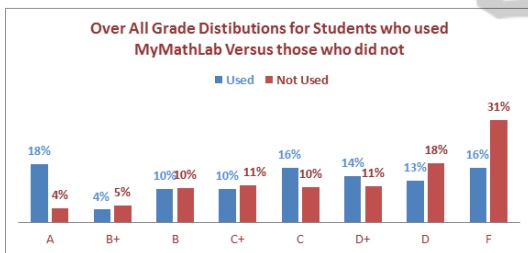


Figure 3: Students Grades in Business Math Course.

Figures 4 and 5 show the distribution of female and male students who used MML with those who did not. Among the results we got, the failure rate for female students who did not use MML was 30% versus only 12% for those who used it. Also, for male students, the percentages for students who got an 'A' for those who used and those who did not were 26% and 0%, respectively.

Figure 6 shows the pass and fail rates of students versus those who used MML with those who did not. 84% of those who used MML passed the course while only 69% of those who did not used it passed the course.

4.3 Students Feedback

A survey was conducted for students who used the MML. In the survey, we included several questions regarding the use of MML. In this paper, we focus

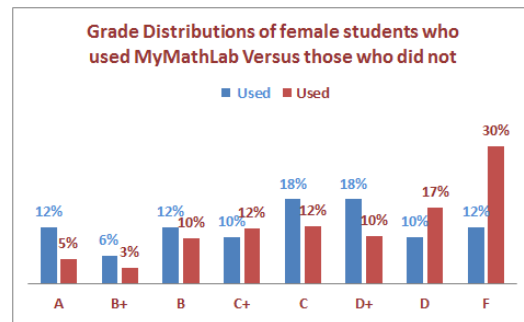


Figure 4: Grades Distribution of Female Students Used and Did Not Use MML in Business Math Course.

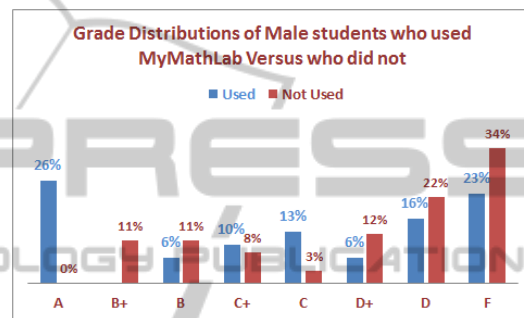


Figure 5: Grades Distribution of Male Students Used and Did Not Use MML in Business Math Course.

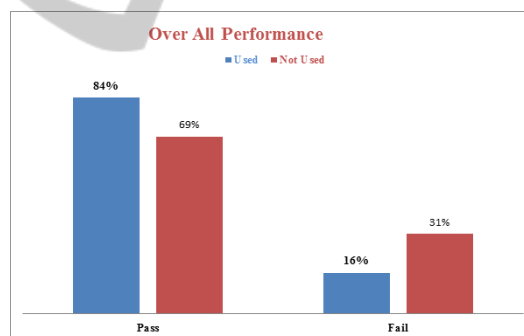


Figure 6: Students Overall Performance in Business Math Course.

only on two aspects: The first question, whether or not the students were satisfied with the use of MML and the second question was how much the Study Plan component of MML had helped students to improve their math skills.

The survey showed for question one, 87% claimed that they were very satisfied while only 13% said they were not satisfied with the MML.

The second question showed that 92% of students who took the survey found Study Plan Component was very useful for them versus 8% found that Study Plan was not helpful during their learning process. The survey results are showing in the Figures 7 and 8 respectively.

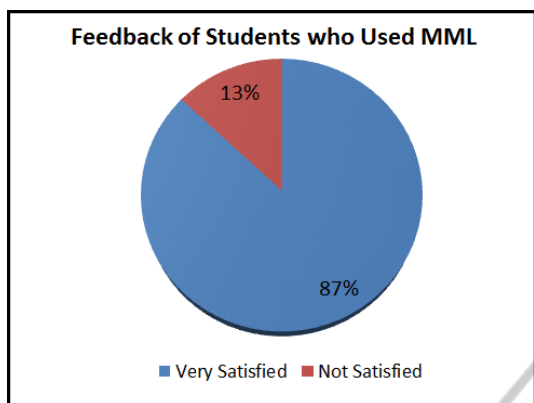


Figure 7: Students Feedback about MML.

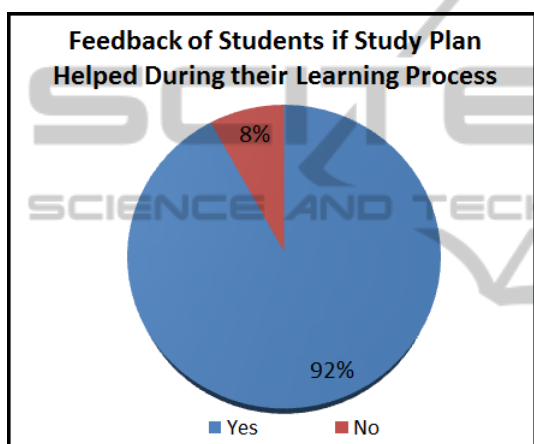


Figure 8: Students Feedback about Study Plan.

- Use study Plan results as early indicators of students at risk.
- In assessment method we should put more weight in study plan by increasing it by 5% at least.
- Repeat the conduct similar study for Fall 2013 as well as Spring 2014.

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5 CONCLUSIONS

Our study showed that there was a very strong positive correlation between completing the required questions in the study plan and students final course grade in the Pre-Calculus course also the effect of the use of study plan on Business Math students in improving their performance. Consequently, Study Plan helped students to improve their math skill and it is the key component of MML. We believe that more time the student spend in Study Plan and Homework, the higher chance he or she will pass the course with higher grade. Based on students results we recommend the following:

- All instructors should emphasize to their students the importance of use of Study Plan and its effect on their performance.
- Continuing monitoring students performance in study plan to alter those who are scoring poorly in the study plan for early intervention.