

Students' Perceptions of MyMathLab: An Online Learning Management System

Check-Yee Law ¹⁺, Lik-Neo Ng ¹, Wei-Wei Goh ¹, Cheng-Lan Tay ¹ and Yong-Wee Sek ²

¹ Centre for Foundation Studies & Extension Education, Multimedia University, Melaka, Malaysia

² Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka, Melaka, Malaysia

Abstract. With the evolution of web-based technologies, technology-based instructions have been partially or fully incorporated into teaching and learning activities. This study analyzes students' perceptions of the use of MyMathLab (MML) as a supplement in a mathematics course. Overall, students were satisfied with the use of MML in their studies. Although students only rated the system marginally positive, it had provided them with their first hand experience in using online learning and assessment tools.

Keywords: online learning, perception, MyMathlab, mathematics, pre-university

1. Introduction

It takes practice to enhance problem solving skills especially in mathematics subjects. Thus homework and assignments are important components of Pre-Calculus instruction at the pre-university level. In a traditional delivery classroom, it has been a setting where an instructor gives lecture and students listen and copy down notes. As for assessments, it has always been conducted with the use of paper and pencil, and using questioning techniques, such as true false, multiple choices, fill in the blank, structured and essay items. With the evolution of web-based technologies and the wide availability of technology devices such as PDAs, computers, laptops and mobile phones, technology-based instructions have been partially or fully incorporated into the teaching and learning of various subjects for students' accessibility of learning materials anywhere and anytime. Such an approach, known by many writers as "web-based learning", "e-learning", "online learning" and "internet-based learning".

According to Kazmer and Haythornthwaite [1], online education has become an integral part of both distance and on-campus teaching. As technology inextricably penetrates into our daily lives, it entails different opportunities and challenges for teaching and learning to meet students' needs. This study analyzes students' perceptions of the use of an online learning and assessment tool called MyMathLab (MML) as a supplement in their mathematics course.

2. Literature Review

According to Long [2], the four reasons for the acceptance, development and expansion of online learning are due to (i) international business, where the trend towards global business has opened the path for the delivery of learning and training through the electronic media, (ii) speed of development and delivery, where electronic-based materials can meet the just-in-time learning needs, (iii) flexibility, where online learners can learn according to their own schedules and locations, and (iv) cost saving measures, where travel expenses, course fees and other inefficiencies of classroom instruction can be avoided. However, online learners may be confronted with irritating obstacles when using web-based technology, generally

⁺ Corresponding author. Tel.: 606-252 3556; fax: 606-231 8799.
E-mail address: cylaw@mmu.edu.my

ranging from an insufficiency of computer knowledge and skills to technical problems caused by the computers or the learning management system. In addition, learners may not have good time management skills to be successful in their online learning sessions (Davidson-Shivers & Rasmussen [3]). Even though some of the disadvantages are naturally of great importance to the adoption and implementation of online learning, there may be ways to reduce the negative effects. Chickering and Ehrmann [4] attributed failures in using computers in teaching and learning to inappropriate strategies, not to the technology. Kazmer and Haythornthwaite [1] believed that it is important to face the challenges of online learning and learn as much as we can about how to utilise it properly since technology has increasingly interwoven into our daily lives.

Research has shown students' favorable and unfavorable perceptions on online learning. O'Malley and McCraw [5] found that students' perception of online learning had significant advantages such as saving them more time, helping them to plan their schedules better and enabling them to take more courses. However, students were doubtful whether they were able to contribute to class discussions and whether they could learn more in this environment. Hong et al. [6] had similar finding as some of the students felt isolated learning in the web environment and expressed a need for some face-to-face lectures, while some students felt that they were unable to contribute to or learn from the asynchronous web-based conferences. Therefore, Casey [7] emphasized that web-based learning need to include a significant element of human interaction. As a result, on-going staffing costs will probably increase as staff will need to work around the limitations of the medium to establish and maintain viable teacher-student relationship.

Lin [8] found that students preferred online resources not only because they could save money from the pricey textbooks, but the online resources could enrich their learning experience and were effective in helping them finish their projects. Kazmer [9] indicated that technology skills and knowledge developed during online learning are useful to departing students who are graduating as they can incorporate technological expertise into their home and working lives. On the other hand, Smart and Cappel [10] found that only fair or somewhat disappointing results were achieved in their attempt to integrate online modules in a traditional class.

Glass and Sue [11] noted that online environment offered students with an extensive, flexible and rich learning experience with homework emerged as the factor students preferred and had the greatest impact on their learning. Hong et al. [6] found that majority of the students were satisfied with web-based learning, and they could achieve comparable learning outcomes compared to students in face-to-face mode. Students appreciated the flexibility of anytime and anywhere learning.

Since Pearson, a textbook publishing company developed MML, more than 30 universities, colleges and community colleges in United States of America (USA) had piloted MML from 2004 to 2009. The report published by Pearson showed that the use of MML had resulted in an impressive success in teaching and learning mathematics [12]. Among all case studies, Ivy Tech Community College, Quinsigamond Community College, Central Texas College and Florida State College at Jacksonville had reported the improvements in students' success and retention [12]. The data from Augusta State University indicated a significant increase of ABC rates and decrease in Drop/Fail/Withdraw rates. In addition, Cleveland State Community College and Florence-Darlington Technical College found that the completion rates in mathematics increased.

Instructional developer and designer are inextricably tied to the cultural differences when an internet-based learning method is developed and designed (Bentley et al. [13]). Therefore, although a lot of researches on the use of MML have been conducted in USA, research has to be carried out outside USA as well. The main aim of this research is to better understand students' perceptions of the use of MML as a supplementary learning and assessment tool.

3. Methodology

The participants for this research were pre-university students who enrolled in Pre-Calculus course during the first trimester of the 2010/2011 academic year at Multimedia University. Students could access MML system by using the code attached in the textbook. For the learning unit, students were given unlimited attempts as to encourage them to work through the Study Plan which was designed to reinforce practice.

They could practice the questions with or without the online help (Help Me Solve This / View an Example). As for the assessment unit, 3 quizzes and 3 assignments were created by the instructor. Students were given 3 attempts to solve each quiz and assignment within two weeks. MML contributed 30 percent to a student's final course grade.

A 22-item survey related to the perception of the online learning was administered to the 450 students at the end of the trimester. Participation for this survey was voluntary. A five-point Likert scale questionnaire with (5) strongly agree, (4) agree, (3) neutral, (2) disagree and (1) strongly disagree as anchoring points which was adapted from "Making The Grade, V.3" [14] was used. The data collected were then categorized into 4 aspects: students' perceptions of learning unit, students' perceptions of assessment unit, change of attitude of study and expectation, and overall satisfaction. Means and percentage of descriptive statistics were used for data analysis to determine the level of students' perceptions on each item.

4. Results and Discussion

This study provides data on an initial attempt to incorporate online learning in a traditional face-to-face class, shifting to the mode of blended learning. In this research, encouraging results were obtained as participants rated the use of MML quite positively. They felt that MML system had changed their attitude towards their studies. Overall, participants were quite satisfied with the system.

Table 1 shows some important measures of students' perceptions of the online learning unit. As shown in the summarized means presented at the right column of the table, students rated the online learning unit relatively positive from a high score of 4.02 to a low score of 3.42.

Table 1: Students' Perceptions of Online Learning Unit

Survey Items	5	4	3	2	1	Mean
Did not increase my understanding.(R)	20.7	47.5	16.4	12.7	2.7	3.71
Helped me learn the material.	13.1	36.9	45.8	2.4	1.8	3.60
Became a better problem solver.	38.5	35.6	2.4	6.2	17.3	3.72
Helped me learn mathematics	46.0	35.1	4.0	5.1	9.8	4.02
Easy to use.	30.9	31.8	5.3	12.4	19.6	3.42

(R) Indicates a reverse coded question and is presented in a positive way in this table to ease the comparison of all the items.

The user friendly interface and easy to access features in MML had enabled students to grasp the program quickly and advance through the pedagogical content confidently [12]. In this study, majority of the students (>60%) agreed that the online system was easy to use, and it increased their understanding of the material in the mathematics course. As high as 81.11% of them found that the system had helped them learn mathematics while 74% said that they had become better problem solvers. In addition, with wide array of questions in Study Plan, 50% of the students said that this feature had helped them learn the course materials.

Table 2 indicates the level of students' perceptions on the online assessment units which ranged from a high score of 4.40 for the item "It is helpful that I can rework on the problems that I did wrongly to improve my score" to a low score of 2.66 (marginally disagree) for the item "I sometimes get help from the Help buttons to work on the quizzes and assignments".

Similar findings have been reported in other case study by using MyStatLab [12], 76.89% of students appreciated the online feedback feature and viewed their results in online assessment, this enabled students to have immediate access to their progress in the context of learning. As high as 91.33% and 85.78% of the students liked the feature which they could rework on the problems and they could know their specific mistakes upon submission. These would help them to avoid repeating the same mistakes during tests or examinations, and prepare them for future assessment [12]. Fast, timely feedback, and ease of operation are some main advantages of online assessment [15].

Table 2: Students' Perceptions of Online Assessment Unit

Survey Items	5	4	3	2	1	Mean
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Did not increase my performance.(R)	12.7	47.5	35.8	2.7	1.3	3.68
Online feedback and results is helpful.	29.8	47.1	21.8	1.1	0.2	4.10
Sometimes get help from Help buttons.	19.1	19.8	6.0	18.7	36.4	2.66
Helpful to rework the wrong problems.	54.0	37.3	4.7	2.2	1.8	4.40
Helpful to know mistake upon submission.	52.9	32.9	11.1	2.9	0.2	4.35

60.23% of the students felt that the online assessment units had increased their performance in mathematics. A case study reported in [12] discovered that unlimited practice offered by online assessments motivated students to do more mathematics exercises, thereby increasing not just students' success but mastery. The online help available in MML was useful as it guided students to solve a problem step-by-step through examples [12]. Nevertheless, in this study, only 38.89% (mean=2.66) of the students got help from the help features. This can be due to the ambiguous word "sometimes" that made students to be uncertain about the statement. Students might have used the help feature in a more frequent manner that led most of them to disagree with this statement.

As can be seen from Table 3, the system managed to provoke positive study attitudes among the students to be responsible, independent, confident and motivated towards their studies. Overall, students rated the change in their study attitude in a rather positive light with the scores ranging from 3.53 to 4.10. 55.11% of them claimed that they devoted more time and effort to the mathematics course. Majority of them (>60%) said that MML had enabled them to choose their own time for studies, helped them to keep up with their work, encouraged them to be independent, to work harder and to be responsible for their learning, and they were more confident in learning mathematics.

Table 3: Change of The Attitude of Study and Expectation

Survey Items	5	4	3	2	1	Mean
Devoted more time and effort.	16.9	38.2	36.9	5.1	2.9	3.60
Choose own time to study.	35.8	39.3	22.0	1.3	1.6	4.10
Helped keep up with work.	25.1	41.3	27.6	3.8	2.2	3.80
Encouraged to be responsible for own learning.	18.2	48.9	30.9	1.8	0.2	3.80
Encouraged to search for answers myself.	18.4	47.3	30.7	2.7	0.9	3.80
More confident.	37.8	24.7	8.4	11.1	18.0	3.53
Try hard to solve math problems.	43.6	26.9	9.3	8.0	12.2	3.82

Students' overall satisfaction on the use of MML is shown in Table 4. Generally, students rated the online learning unit marginally positive with the scores ranging from 3.60 to 3.79.

49.55% of students agreed that the online learning had helped them to achieve a higher grade, and 63.33% of them felt that the online system had helped them to understand the subject matter better. Moreover, they were satisfied with the use of MML in their mathematics course. More than two thirds of them hoped that they could proceed with the next mathematics course by using this system, and they will recommend this online system to other students too.

Table 4: Students' Overall Satisfaction

Survey Items	5	4	3	2	1	Mean
Achieve a higher grade.	13.1	36.5	45.3	3.1	2.0	3.60
Understand the subject better.	12.7	50.7	32.4	2.4	1.8	3.70
Satisfied.	8.0	55.3	30.0	4.7	2.0	3.60
Will use MML in next course.	41.5	28.7	8.7	6.9	14.2	3.76
Will recommend to other students.	42.5	28.5	8.4	7.3	13.3	3.79

Due to the user friendliness, ease of use and flexibility of the system, students are not only be able to persevere and reinforce their belief in their abilities, but they have become more confident in their mathematics abilities, and obtained tremendous improvement in their studies [12]. This may be the reasons, that in general, students in this research were quite satisfied with the use of the online system in their learning and had rated it rather positively, despite the fact that it was their first hand experience using an online tool as a supplement to learn mathematics.

5. Limitation

This study was solely based on a self-reported survey where all the respondents were from one university. Thus, the results cannot be generalized to students in other universities. Moreover, it focused mainly on the learning and assessment units of the online management system. Other features such as the communication tools (discussion board, message, email, etc.) were not within the scope of this study.

6. Conclusion

In overall, students were satisfied with the use of MML in their studies. Although students only rated the system marginally positive, they admitted that it had provided them with their first experience using online learning and assessment tools. The experience gained from this learning environment may be of great help to them in their future studies. Future research should include students from other universities so that the results can be generalized at a wider scale. It would also be useful to evaluate the communication tools available to see how interaction among all parties can be advocated: students, peers and instructors. Finally extensive research should be conducted to further evaluate other aspects of the system if it is to be fully adopted in mathematics courses.

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