Key Results

The availability of online learning aids, the immediate feedback and grading of the system as well as the flexible and numerous trials that students get to improve their performance scores had encouraged, motivated, and engaged students in their learning.

Text

*Intro To Probability And Statistics (*custom text based on McClave/*Statistics for Business and Economics)*

Course Background

A survey was carried out during the third trimester of the 2011/2012 academic year at Multimedia University to measure the pre-university students' attitudes towards the use of e-assessment in the study of Probability and Statistics course. The e-assessment site, known as MyStatLab (MSL), is designed by Pearson to be used along with the company's textbook. Students can access MSL system by using the code attached in the textbook. Previous research had shown that students were quite satisfied with the use of MSL as an online learning tool in their studies. The system provides formative assessment with built-in learning aids, feedback, and grading system.

Assessment

In this research, the formative e-assessment consisted of 15 multiple choice and short answer questions. It was carried out through ubiquitous learning environment where students could access the online assessment system in campus or at home at their convenient time. Each test was timed 300 minutes, and students were given 5 attempts to repeat and improve their scores for each test. Online learning aids were available to students as they solved the questions in the e-assessment. Students were required to take three online tests. All students had never used other e-assessment system in their study prior to this, and it was their first experience using e-assessment system.

A 20-item questionnaire with five-point Likert scale of (5) strongly agree, (4) agree, (3) neutral, (2) disagree and (1) strongly disagree regarding the formative use of e-assessment and future intention to use e-assessment was administered to a total of 317 students at the end of the trimester. Two negatively worded items were reversed and presented in a positive way so that positive and negative ratings could be combined and compared sensibly. There were no missing data. Statistical Package for the Social Sciences (SPSS) software was used to determine the internal consistency of the scales and to generate the descriptive statistics for the data collected. Cronbach's alpha was calculated to determine the internal consistency of the two dimension scales, which are the formative use of e-assessment and future intention to use e-assessment respectively. The percentage and means of descriptive statistics were used for data analysis to determine the level of students' perceptions on each surveyed item.

Results and Discussion

There were quite high levels of consistency for each dimension scale. The Cronbach's alpha for the formative use of e-assessment scale was 0.889 and for future intention to use e-assessment scale was 0.876. This suggests that the constructs underlying these two dimensions have high internal consistency. The means of the individual indicators in formative use of e-assessment and future intention to use the e-assessment scales are shown in Table 1 and Table 2 respectively. On the 5-point scale, all indicators in the questionnaire received positive responses with mean > 3.0 and with a composite mean of 3.56 and 3.40 for the formative use of e-assessment and future intention to use e-assessment respectively, as shown at the bottom right column of the tables. This indicates that students in general agreed that the e-assessment adopted in their course served the formative purpose, and they intended to continue the use of e-assessment in their future studies.

Although there were respondents (ranging from 14.8%–30.9%) who did not feel strongly either way as well as a minority of respondents (ranging from 7%–27.1%) who had negative perceptions, the survey results show a normal range of distribution of formative use of e-assessment and future intention to use e-assessment, with the majority (ranging from 47.0%–78.3%) of the respondents' scores were greater than 3.0, indicating a positive inclination towards the formative use of e-assessment. Therefore, we can conclude that students were quite satisfied with the formative e-assessment system used in their studies which had provided learning aids, immediate feedback and grading as well as several trials for them to improve their performance scores. They were also willing to continue using e-assessment in their studies for mathematics and other courses.

Table 1. Students' perceptions of formative use of e-assessment

Survey items	5	4	3	2	1	μ
1. Feedback feature was redundant. (R)	10.4	39.7	30.9	15.5	3.5	3.38
2. Feedback feature helped me to learn.	12.6	50.8	23.3	12.0	1.3	3.62
3. Feedback feature engaged me in learning.	14.2	44.5	23.0	17.0	1.3	3.53
4. Feedback feature enhanced my strength in maths.	13.2	50.8	21.1	13.9	0.9	3.62
5. Feedback feature helped overcome my weakness in maths.	12.9	49.2	23.7	12.9	1.3	3.60
6. Immediate result and feedback motivated me to learn.	23.7	47.0	17.4	10.4	1.6	3.81
7. Progress and results can be easily tracked.	19.9	58.4	14.8	5.4	1.6	3.90
8. With MML e-assessment, I tried hard to solve maths problem.	19.6	42.3	25.2	12.0	0.9	3.68
9. With MML, my curiosity on maths was stimulated.	9.1	41.6	30.6	16.1	2.5	3.39
10. With MML, I am more confident to study maths now.	13.6	37.9	28.1	18.9	1.6	3.43
11. With MML, I am more responsible in managing time now.	13.9	38.8	20.2	24.0	3.2	3.36
12. With MML, I was ready to take test anytime.	11.7	35.3	25.9	23.3	3.8	3.28

Survey items	5	4	3	2	1	μ
13. MML did not improve my learning performance. (R)	12.3	47.0	22.7	15.8	2.2	3.51
14. MML enhanced my effectiveness in learning.	13.2	47.9	22.7	14.5	1.6	3.57
15. MML increased my learning productivity.	12.9	49.5	20.8	14.8	1.9	3.57
16. MML helped me to prepare maths exams and obtain final grade.	22.7	38.2	23.0	15.1	0.9	3.67
						3.56

(R) Indicates a reverse coded question

Table 2. Students' perceptions of future intention to use e-assessment

Survey items	5	4	3	2	1	μ
1. Intend to take MML e-assessment for next maths course.	12.6	42.0	25.2	14.8	5.4	3.42
2. Intend to take more courses with e-assessment in future.	11.0	42.3	23.7	17.4	5.7	3.36
3. Will recommend MML to others.	8.8	43.5	30.0	14.8	2.8	3.41
4. Will recommend e-assessment to others.	8.5	45.7	26.2	16.1	3.5	3.40
						3.40

Limitation

This research is mainly descriptive and the content is subjective. Data were collected from survey questionnaires. Besides that, the formative use of e-assessment which was carried out at students' convenient time through ubiquitous learning environment was subjected to the student dishonesty issue. We can take steps to prevent such issues by encouraging students to use online learning aids which are a click away, to get help. We can also create awareness among the students of what is acceptable and unacceptable behavior in formative e-assessment. However, its feasibility and effectiveness truly depends on the learners.

Conclusion

This survey aims to gather students' perceptions of the formative use of e-assessment in learning Mathematics. Overall, students rated the formative use of e-assessment and future intention to use e-assessment as marginally positive. The availability of online learning aids, the immediate feedback and grading of the system as well as the flexible and numerous trials that students get to improve their performance scores had encouraged, motivated, and engaged students in their learning.

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