

Blended Assessment: A Strategy for Classroom Management

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Abstract: *The classroom is an environment where teachers constantly need to make decisions on planning instructional activities, monitoring students' progress and evaluating teaching effectiveness. One way to monitor students' progress is by giving assessment. Assessments which can be formal or informal, are used to gather information about students' achievement. Previously, lecturers used the traditional paper-and-pencil assessment which proved to be tedious and time consuming for large classes. To facilitate a more efficient and quicker marking and to provide feedback to students immediately, the researchers looked into the potential of blended assessment in Probability and Statistics which comprised of 500-600 second year engineering students at Universiti Teknologi Petronas. Implemented in this course for January 2009 semester, blended assessment is the use of technology specifically the Wiley Plus and MOODLE combined with the traditional mode of testing. Findings of this study revealed that this method has significantly reduced the number of hours spent on marking and enabled immediate feedback for students.*

1. Introduction

Assessments are activities undertaken by teachers and by their students in assessing themselves, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged [1]. These could include tests and non-tests. Teachers when giving assessment must take into account that students in the information age face a world that demands new knowledge and abilities. In this information age, the integration of technology into teaching and learning impacts every aspect of instruction, from course content to teaching methods and assessment [2]. It must be characterized by including achievement of skills, knowledge, attitudes needed for success and recognition that takes place in many modes and places [1]. Information technology has substantially influenced education and also, it has revolutionized the way people present and gather information across various fields. In education, technology has played vital role in pursuing pedagogical goals in different teaching-learning contexts.

Universiti Teknologi PETRONAS is a private institution located in Perak, Malaysia. It offers engineering, computer and business information technology programs to students. For engineering students, one of the courses taken in their second year second semester is Probability and Statistics with 3 credits. It has 42 total lecture hours or equivalent to 3-hour lecture with 1-hour tutorial session per week. Its coursework components are assignments, quizzes and tests. There are five programmes for engineering and in each programme the number of students is between 80 to 150. For the past semesters, only the traditional mode of assessments, i.e., all written tests, quizzes, or assignments, were used by the instructors and marking of papers took a lot of time where immediate results or feedback cannot be determined by the students and lecturers. Other than lecturing, tutoring and assessing students, instructors often serve as resource persons, as evaluators of students work and do research work. For January 2009 semester, there were 574 students enrolled in the course. Two instructors were assigned to teach the course assisted by two graduate

assistants in tutoring. The traditional way of giving assessment limits the instructors to do other academic activities other than teaching and more so knowing tests results and feedback to the students is not immediate. In an attempt to provide immediate feedback to the students and reduce the workload of the instructors in the marking of papers, blended assessment was implemented in the course.

Managing big classes has several major challenges, these are distribution of information i.e., giving resources or notes, communication, time and place for discussion or presentation of feedback to students [3]. Concerning teaching and assessing students in large classes as mentioned in [4, 5] the inability to get to know students, inability to reduce students feeling of anonymity, how to create interest and interaction in class, managing marking loads and maintaining consistency, dealing with email scheduling office hours for consultation, assigning homework or tutorial materials, recording grades, how to effectively communicate the subject material are problems encountered by teachers to manage their classes. A course management system is a web-based system with database back end and its purpose is to assist in getting resources up on the web to facilitate a typical course activity [6] to mention a few, WebBoard, WebCt and Blackboard, and MOODLE (Modular Object Dynamic Learning Environment). The advantages of web-based course management systems are: accessibility of course resources to students, timely communication between instructor and students, and reduced paper usage [7].

This paper discusses the use of blended assessment by the instructors on assessing students' performance in Probability and Statistics from a large class in order to monitor their achievement. It further illustrates the advantages of the method for efficient use of instructor's time by reducing hours spent on marking, knowing immediate results and feedback to students.

2. What is Blended Assessment?

The dictionary defines *blended* as a mixed or combined [8] while *assessment* is any of a variety of techniques for measuring student achievement [9]. From these two words, *blended assessment* is formed. Blended assessment is a combination of using technology specifically the Wiley Plus and MOODLE and the traditional paper and pencil written tests. Figure 1 shows blended assessment whereby students used the computer in order to access the on-line quizzes and assignments while traditional method is the paper and pencil written form of tests and assignments by group.

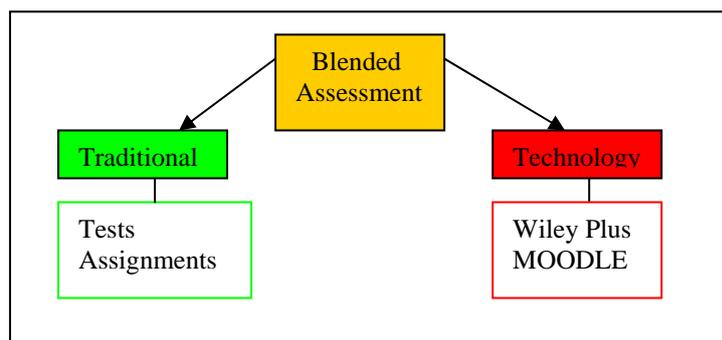


Figure 1 Blended assessment

3. Related Work

A test or an examination is often administered on paper or on a computer to measure a test taker's (often student) knowledge, skills, aptitude and beliefs while an assignment is a task to be

undertaken by an individual or by members of a group [10]. Giving regular formative assessments makes a significant impact on achievement, and that the same is true for on-line assessment. Formative assessments are part of instruction designed to give feedback for teachers and students. Its results inform teachers of what has been taught well and informed students of what they have learned well. Its goal is to improve the teaching and learning process. Likewise, the on-line assessment result determines the students' level and progress, and it guides the teachers what to teach [11].

Technology has dual roles: it helps facilitate assessment and supportive social and peer processes, by providing students with familiar tools like computers and flexible ways of interacting with each other. Technology supports teachers by providing them tools to monitor group interaction as it happens on-line [12]. Computer based assessment becomes popular to instructors as educators face pressure such as increasing number of students and workload, and the need to reduce cost but yet improve the quality and accountability of the assessment process [4]. Among the various formats of test item, Multiple-Choice has been heavily used in computer based assessment due to ability of computer to be programmed to enable automatic and easy retrieval of test scores and feedback [13]. According to [4], technology for assessment is a more economical use of teachers' time and it helps avoid over teaching. As mentioned by [14], assessment questions can shift the emphasis to the teaching of higher order thinking skills such as interpretation rather than procedural skills of drawing graphs when the students use the graphing calculator. The graphing calculator allows students to quickly generate graphs from algebraic and numerical data. Previously, by the time students had drawn a graph, the class was nearly over- now they can talk about what it means [14].

The Wiley Plus is built around students' activities performed in the class. It has several features like the assignment, gradebook, class section information, prepare and present, read, study and practice. In the assignment, the course administrator can automate the assigning and grading of homework or quizzes by using the provided question banks. Questions can be selected according to chapter and level of difficulty.

| Student Name | Class Section Name | Total Scc (Graded) | Assignment ID | | | | | | | | |
|--------------------------------|----------------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | Ch.1 | Ch.3 | Ch.2 | Ch.4 | Ch.5 | Ch.6 | Ch.7 | Ch.8 | Ch.9 |
| 1. Batz, Larry | Math 101 - Section B | 40.00 / 40 | 1. 3/3 | 4/4 | 4/4 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 |
| 2. Bray, Nicholas | Math 101 - Section B | 35.00 / 40 | 2. 3/3 | 3/4 | 4/4 | 3/3 | 3/3 | 2/3 | 3/3 | 3/3 | 2/3 |
| 3. Burke, Mark | Math 101 - Section B | 40.00 / 40 | 3. 3/3 | 4/4 | 4/4 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 |
| 4. Costlow, Mark | Math 101 - Section B | 36.00 / 40 | 4. 2/3 | 4/4 | 4/4 | 3/3 | 3/3 | 2/3 | 3/3 | 2/3 | 3/3 |
| 5. Cox, Brenda | Math 101 - Section B | 36.00 / 40 | 5. 3/3 | 4/4 | 4/4 | 3/3 | 3/3 | 2/3 | 3/3 | 3/3 | 3/3 |
| 6. Crafton, Jay | Math 101 - Section B | 38.00 / 40 | 6. 3/3 | 3/4 | 4/4 | 3/3 | 3/3 | 3/3 | 3/3 | 2/3 | 3/3 |
| 7. Davidson, Jason | Math 101 - Section B | 40.00 / 40 | 7. 3/3 | 4/4 | 4/4 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 |
| 8. Epperson, Terrence | Math 101 - Section B | 37.00 / 40 | 8. 3/3 | 4/4 | 3/4 | 3/3 | 3/3 | 2/3 | 3/3 | 3/3 | 3/3 |
| 9. Hays, Ian | Math 101 - Section B | 40.00 / 40 | 9. 3/3 | 4/4 | 4/4 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 |
| 10. Huffman, Sean | Math 101 - Section B | 39.00 / 40 | 10. 3/3 | 4/4 | 4/4 | 3/3 | 3/3 | 3/3 | 3/3 | 2/3 | 3/3 |
| Class Section Averages: | | 33.95/40 | 2.73/3 | 3.42/4 | 3.62/4 | 2.73/3 | 2.69/3 | 2.35/3 | 2.73/3 | 2.62/3 | 2.69/3 |

Figure 2 Wiley Plus gradebook

Keeping track of students' progress, can be done via an instructor's gradebook [15]. This section allows the instructor to analyze individual and overall class results. Each student can also monitor his/her own progress throughout the semester at anytime. In Figure 2, opposite the name of each student is the total score.

MOODLE is an acronym for Modular Object Oriented Dynamic Learning Environment and has been widely used by educational institutions. The activities commonly used are quiz, chat, forum, choice and assignment. For the students to have an access to it on site, each student is given an account and password. Instructors teaching the subject are registered as users and they can edit the course site, change the students' activities and grading system Figure 3 shows an example of a quiz in MOODLE.

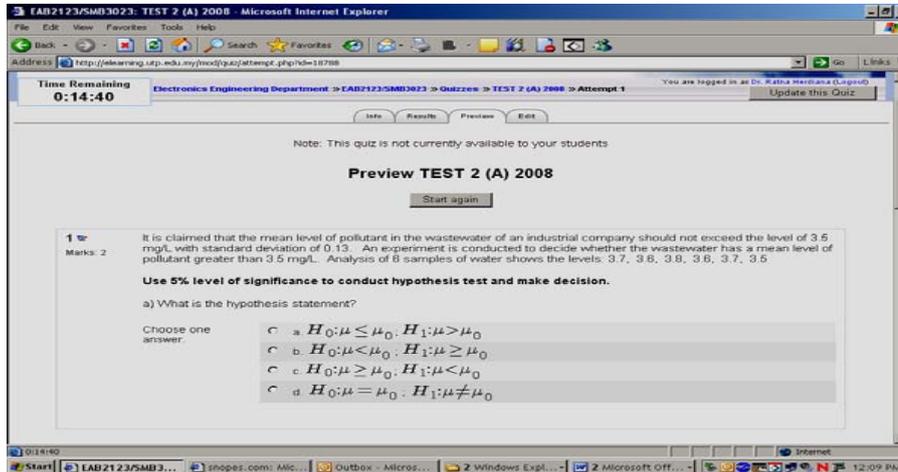


Figure 3 Example of a quiz item in MOODLE

Both the Wiley Plus and the MOODLE can generate test items, performance of students can be known immediately by the teachers and students, and both can be accessed on-line.

To assess students' performance in Probability and Statistics, a database software using MATLAB with a graphical interface was developed. It can easily obtain the overall performance of a particular student as well as the performance of the whole class. The assessment software uses basic statistical options that can help educators [16].

As mentioned in [17], an intelligent diagnostic assessment tool for middle school mathematics using Bayesian Networks with quiz generator was implemented. It is a diagnostic assessment through e-learning which allows educators to assess student's skills and progress. It provides diagnosis of students' strengths and weaknesses. The tool helps for automatic generation of quizzes and the quizzes generated infer the level of each mathematical skill or ability of the student; therefore the student can follow a learning strategy that is suitable for him/her in order to reinforce his weak skills or abilities.

The above readings show that technology could be a partner to teachers for classroom management; hence, this paper discusses the uses and effectiveness of blended assessment for classroom management specifically for monitoring student performance in Probability and Statistics for January 2009 semester.

3. Methodology

At the beginning of the semester, the students were given instruction by the course administrator to register on line to EAB 2123-Probability and Statistics, where each student was given an account and created their own password. Doing so, the student could now access the course through MOODLE via e-learning. In the MOODLE, the set of questions given to the students was prepared by the course administrator and saved in a test bank. The questions were MCQ type or problems answerable in words or numerals. Two quizzes were given through MOODLE, quiz 1 and quiz 2 in

the 4th week and 10th week of the semester respectively. Each program was given different dates to do the quiz. Immediately after doing the quiz, the students could know their marks. The quizzes were done within limited time.

For the Wiley Plus, students were told to purchase the Engineering Statistics textbook and in it is their registration code which is needed for them to log in and access the on-line resources using the URL given by the course administrator. Three homeworks given were, 1st, 2nd and 3rd in Weeks 5, 9 and 13 of the semester respectively and done within limited time.

To facilitate the on-line assessments, i.e., MOODLE and Wiley Plus, three computer laboratories with 35 computers were opened for students' use at a specific time and date. Students could also do the on-line activities for the course by using the computers available in the IRC (Information Resource Center-Library). Some students used their own computers from their hostel in the campus if they were connected to wi-fi or do it from the cyber cafe located outside the campus. For the on-line assessments, students could open their books and lecture notes and immediately after doing each activity, grades were known since marking is done automatically through the system also, monitoring of students' performance is hastened.

The traditional forms of assessment given to the students are of two types. First, the written closed notes formal tests were the students need to go to the test rooms at a fixed date and time. Two tests were given to the students, Test 1 in the 7th week and Test 2 in the 12th week this is so to give enough time for instructors to mark and return papers for students' to see results. The lecturers were assisted by 6 graduate assistants for invigilation see Figure 4(a). Three questions were given to each test and students are required to answer all in one hour. There were 574 answer scripts and were marked by the instructors for 2 weeks.

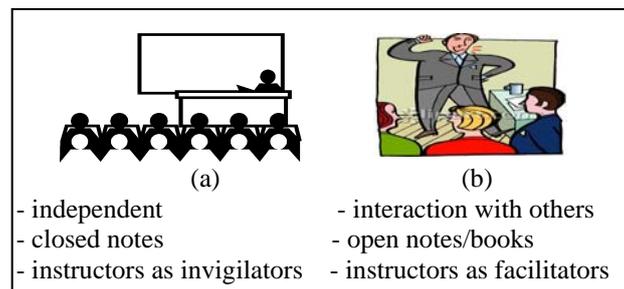


Figure 4 Traditional form of assessment

The second form of traditional test used was the written group assignment. It was done during tutorial session where each group is provided with one question by the tutor. The tutor acted only as a facilitator see Figure 4(b). At the end of the one-hour tutorial session, the group's work is submitted. For the duration of the semester, two assignments were given, one on the 8th week and the second in the 14th week. Members of each group could discuss among themselves the solution, and books and notes could be opened by the students. There were 110 groups with 5 or 6 members in a group. The assignments were marked for one week by the 2 graduate assistants.

Using the students' scores taken from the results of the traditional (written tests and grouped assignments) and on-line form of assessments (MOODLE & Wiley Plus) the average scores were determined. Feedbacks concerning the use of blended assessment as a classroom management strategy in monitoring student's achievement were gathered using a survey form.

4. Results and Discussions

From the scores of the students for each type of assessment, the average was computed. Figure 5 shows the result for the Wiley Plus (1) is the highest, 72.5 while for the group assignment (4), 72.1

with a difference of 0.4. For these two types of assessments, students can access their books and notes and see solutions similar to the given problems. The test's (3) average result is 63.7 and 49.75 for MOODLE (2), quite low compared to the first 3 modes of assessments despite students being able to open their notes and books. The reason could be that the students were not familiar in using the on-line assessment.

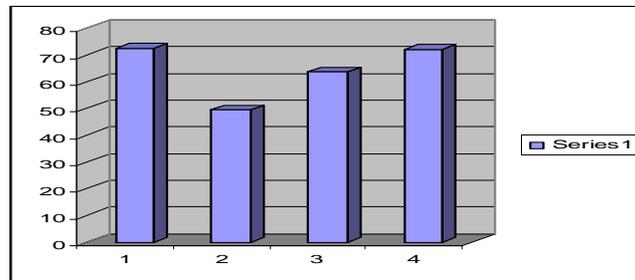


Figure 5 Blended assessments' average results

Table 1 shows the total number of 8 assessments in the form of quizzes, assignments and tests given to 574 students. Only two sets of tests (1 & 2) were marked by the 2 lecturers or 574 scripts each at different time. In two weeks time, they gave the results to the students. Feedbacks concerning the use of on-line assessment and difficulties encountered by the students were gathered. Students commented that the on-line assessment was good, new idea, and gave immediate feedback however, they emphasized that more time be given for on-line activities, and internet connection must be improved. For the traditional form of assessments, they said written test is simple and better than on-line and discussion done for the group assignment enhanced understanding the course.

From the instructors' views, the use of blended assessment was helpful, it minimized the marking hours spent since the system automatically marked the students' works on-line. Monitoring of students' performance was done at ease by using the gradebook and teachers have more time to do other academic activities.

Table 1: Students' feedback on blended assessment

| Type | Quantity | Typical comment | Atypical comment |
|----------------------------|----------|---|--|
| test | 2 | Simple; good; better than online test | |
| assignment | 2 | Group discussion is good and gives better understanding the problem. | Difficult ; time is not sufficient |
| on-line (Wiley + & MOODLE) | 4 | New idea; good; give accurate result/answer; immediate monitoring of all marks at anytime | Improve internet connection its slow; too expensive; provide Celcom broadband for free to students' access Wiley+; add Wiley + server in UTP; give more time for MOODLE activities |

5. Conclusion

The main purpose of this paper is to discuss the use of blended assessment as a strategy to manage large class specifically for monitoring students' performance in Probability and Statistics. With Wiley Plus and MOODLE, it was shown that the time spent by the instructors in marking answer scripts were reduced since the system automatically checked and marked the student's

submitted work on line. Immediate results for each activity were known by the teachers and students, and the whole section/programme monitoring could also be done. It was shown that blended assessment was helpful to instructors hence its use will be continued for efficient use of teacher's time. For future work, the lecturers may look into how effective the on-line system in differentiating the high achiever from the low achiever and provide a measure to enhance learning the course. Furthermore, the use of technology as an assessment should not only be limited to Wiley Plus and MOODLE, other web-based assessment could be used.

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