Providing Regular Assessments and Earlier Feedback on Moodle in an Introductory Computer Science Course: A User Study

Natalia NEHRING, Simon DACEY & Nilufar BAGHAEI

Department of Computer Science, Unitec Institute of Technology, Auckland 1025, New Zealand

nnehring@unitec.ac.nz

Abstract: Formal feedback on assessments is given to students half way through the semester for a lot of tertiary level courses. For some students, it can be too late to change their study habits and they might not have realised that they were struggling before getting the feedback. Receiving late feedback can also result in lowering learner's motivation as well. The aim of this study is to determine the effect of providing regular feedback on students' academic achievement. The sample group included 92 students from semester 2 2016 and 57 students from semester 1 2017. They were the first-year Bachelor Computer Science students at UNITEC Institute of Technology, New Zealand, doing an introductory database course. The course had three assessments in 2016 including two computers based tests and a final exam on paper. Weekly quizzes were introduced in 2017 with the aim of providing early regular feedback to students. Preliminary results show that providing this feedback early on did not significantly improve the results of their first formal assessment. More studies are needed to examine the effectiveness of weekly quizzes on students' performance throughout the semester. Subjective evaluation showed that majority of students liked getting regular feedback in form of quizzes and found it valuable for their learning.

Keywords: regular feedback, designing quiz, quiz as formal assessment, LMS

Introduction

Usually first formal assessment takes place after six weeks of delivering the course materials in a lot of tertiary institutions, and then another week or two before students get any feedback on the assessment. For some students, it can be too late to change their study habits and they might not have realised that they were struggling before getting the feedback. Receiving late feedback can also result in lowering learner's motivation as well (Auvinen et al, 2015). Studies have recommended routine quizzes to be introduced in any course in which objective learning goals need to be assessed. This is to improve students' motivation and their self-assessment capabilities. (Balter, et al, 2013; Kenis, 2011). For example, Balter, Enstrom, and Klingenberg (2013) reported that that the students' results had improved after introducing early feedback in form of quizzes.

Online learning management systems (LMSs) are extensively used by tertiary institutions for course delivery and are highly popular (Conde et al, 2014). One of the widely used open source platforms is Moodle (www.moodle.com). It is an open source platform that provides a learning space for users to design online courses with flexible content and collaborative activities.

Studies have shown that using LMSs including Moodle can enhance students' performance and/or satisfaction (Smith, 2016; Paechter et al, 2010) due to self-regulated and collaborative learning tools they are provided with.

The course we picked for this study is 'Introduction to Database' – it is offered every semester to first year Unitec students enrolled in a Computer Science degree. It has three assessments including two computer-based tests worth 25% each, and a theory paper-based exam worth 50% of the final grade. With 2016 cohort, the first test happened during week 6, with overall length of the course being 13 weeks.

For 2017 intake, we made some changes to the assessments in that 10% of the total grade was assigned to 10 newly developed quizzes, thus making each quiz worth 1%. Our experience shows that allocating even 1% of total grade to an exercise can encourage students to take it more seriously without worrying them about the assessment weight. Our hypothesis was that providing earlier feedback on Moodle could improve students' learning outcome and encourage them to stay on track.

Research Questions

The research questions we are investigating in this paper are: 1) will regular assessments/quizzes (each worth one percentage of total course grade) improve the learning outcome of our students? 2) What is student perception of doing Moodle quizzes on a weekly basis?

Method

Moodle provides the ability to set up assessments using quizzes. For this project, we developed 10 multi-choice quizzes. Each quiz was set to have one attempt only and had 5 to 10 questions. Quiz questions were based on the previous week's homework and tutorials, which students had been asked to complete in the own time. Quiz time was set from 15 to 20 minutes depending on the number of questions. The scores were shown to students after quiz completion.

A subjective evaluation was also conducted to find out what students think about quizzes. Questions about the user experience were developed, three of which were taken from Balter (2016) research.

Results

For 2016 intake, Test 1 was taken by 92 students. As semester 1 2017 is still in progress, only preliminary results can be reported. The same test was completed by 57 students. The average mark for the test one this semester was 67.4 (with sd 29, CV 43), which is slightly more than the previous semester 66.9 (with sd 25, CV 38.3), but the difference is not statistically significant.

Our hypothesis was that there is a correlation between quizzes marks and the main assessment's marks and it would help to predict results. The results for test one compared to the average quizzes marks show that the standard deviation is 12. For 35% of students, marks are predicted (considering that the difference between test one and the average marks of quizzes is less than 10%). If we consider a 20 mark absolute difference or less, prediction can be done for 61% of students.

The subjective evaluation survey was done in week 9 after students completed 8 quizzes. The number of participants was 43, 74 % from all students enrolled in the course. Most students strongly believed that doing quizzes on a weekly basis improved their study habit (see Figure 1) The average answer is 8 out of 10.

Responses	1	2	3	4	5	6	7	8	9	10	Total
agree from 1 to 10, where 10 is a strongly agree.	1 (2%)	1 (2%)	1 (2%)	0	4 (9%)	0	7 (16%)	8 (19%)	7 (16%)	14 (33%)	43

Figure 1. Response to "Do you believe that every week quizzes affect your study habit?"

Table 1: effect of doing quizzes on study habits. Number and percentage of responses for each option available in Question 1, compared with previous studies described by Balter (2013)

Option	KTH 2009	KTH 2010	Williams 2010	Unitec 2017 (existence of quizzes)	Unitec 2017 (quizzes results)
Yes, I studied harder	25 (25%)	11 (9%)	3 (10%)	19 (44%)	24 (56%)
Yes, I studied less	2 (2%)	5 (4%)	1 (3%)	4 (9%)	6 (14%)
No, I would have studied just as much/little without the tests	61 (60%)	67 (57%)	21 (72%)	14 (33%)	9 (21%)
I did not study more, but earlier	n/a	11 (9%)	2 (7%)	2 (5%)	1 (2%)
I don't know	14 (14%)	23 (20%)	2 (7%)	4 (9%)	3 (7%)

Conclusions & Future Work

In this paper, we investigated the effect of providing regular feedback on students' academic achievement in an introductory database course. Subjective evaluation showed that majority of students liked getting regular feedback in form of quizzes and found it valuable for their learning. More studies are needed to examine the effectiveness of weekly quizzes on students' performance throughout the entire semester.

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