Improving teaching productivity and learning efficiency using online assessments and clickers

Faculty of AgriSciences | Department of Forest and Wood Science

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Learning activity:
Improve teaching productivity and learning efficiency

Learning technology:
Clickers, online assessments

Context

Background Overview

The Department of Forest and Wood Science has developed a number of blended learning courses over the past decade. The objectives for using blended learning varied with the different courses. In 2004 a blended learning forest engineering course was developed which formed part of the undergraduate programs of forestry at the University of Stellenbosch, the NMMU forestry program in Saasveld, and the forestry program of Freiburg University in Germany. This was part of the PhD project of a student to evaluate the efficiency of this type of learning. From 2006 to 2009 seven blended learning Wood Products Science courses were developed in co-operation with the University of British Columbia, Canada. The main objective of this project was to allow part-time industry learners to enrol for these under-graduate courses. Courses consisted of a 3-month online theoretical component and a one-week practical period on the campus.

Possible advantages associated with the integration of technology

The latest blended learning development in the Department is a project to increase the use of online assessments and in-class clicker assessments in a number of the modules. This project has been running from 2013. The motivation for using these assessment methods differs for each lecturer, but the following are the major reasons:

- Improving teaching productivity
- Improving learning efficiency
- As a normal student assessment method (to grade students)

For the department teaching productivity was especially important as the lecturers have very high teaching loads per lecturer but they do not want to reduce the number of modules that they present.

Project progress

The first module for which on-line assessments were developed was Wood Products Science 414 in 2013. The assessments consist of a weekly quiz for the full duration of the module over one semester. Since then assessments were developed for 5 other modules in the department. In 2014 the department purchased 40 clickers and for some modules the on-line assessments were changed to clicker tests that were completed in the class.

Project results

Improving teaching productivity

Teaching productivity was improved in two ways. Firstly, for some modules with very good self-study resources, the number of classes could be reduced. For instance, in the Wood Products Science 414 module the classes were reduced from 3 per week to 1 per week for a large part of the semester. Every week students were then required to study a certain section of the work themselves and write an online assessment or quiz on that work during the first 10 minutes of class in a computer use area. The remaining 40 minutes of the class were used to review and discuss the work for the week. The online assessments were later replaced by clicker assessments which meant that classes did not have to be in a computer use area. The time spent on class-room teaching was reduced by 67% per week for this module (not all weeks).

The second way that teaching productivity was improved, was the reduction in the time required for assessments. With normal tests, the printing, marking and capturing of marks take up quite a lot of time – even if it is only a quiz. With both the online and clicker quizzes marks were automatically captured for students.

Improving learning efficiency

Learning efficiency was improved in several ways.

- The regular assessments of students give timely indication of how well

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students understand work. In the case of Wood Products Science 414 a review class followed every assessment. Since results were immediately available, the lecturer could then spend more time on sections where students did not perform that well.

- In some classes, such as Forest Science 171, clicker assessments were used to gauge how well students understand concepts that were just explained. If the assessment showed that a significant number of students did not understand the work, the lecturer could spend more time on explaining it. In this case assessment marks were not captured.
- Where assessments were captured every week such as with Wood Products Science 414, the students continually get results throughout the semester and know when they need to spend more time on the module.
- The weekly self-study section and assessment that preceded the review class in Wood Products Science 414 ensured that the review class and discussion was productive and time could be spent only on problem areas.
- Weekly assessments that were captured and count towards the class mark of the students forced the students to work regularly throughout the semester.

As a normal student assessment method (to grade students)

For some modules the online and clicker assessments counted towards the final mark and were a way of evaluating and grading a student.

Student feedback

Student feedback on the two modules where assessments were already regularly used over the last three years was extremely positive varying between 79% and 85%. In all cases the student comments were positive about the self-study method and some students noted it as the best aspect of the module. There were mixed feedback regarding regular quizzes. Some students noted it as the best aspect of the module whereas others thought it was too short and not enough time were allowed for its completion. The format, time and length of quizzes were adapted over time to improve its efficiency and lecturers are still trying to improve this aspect.

General comments

Blended learning using a combination of self-study and online assessments significantly improved the teaching productivity and learning efficiency of the modules where it was used. However, to set up a module for this type of teaching was very time consuming in the beginning. Very good self-study material such as class notes, handbooks and in some cases multimedia material was required. Initial setup of quizzes was also quite a lot of work. Fortunately, the lecturers were supported by their faculty who funded some of the setup costs.