Use of Tablet PCs at CQUniversity to Create a Paperless Environment for Courses

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Tablet PCs and Learning Management Systems have provided the platform for the transition of multi-mode and multi-campus courses into a paperless environment. This has greatly improved efficiency in coordination and delivery of courses.

This presentation seeks to explore best practices in a case study of the running of CQUniversity’s bridging mathematics course. The university’s Transition Mathematics 1 (TM1) bridging course currently has enrolments in excess of 1000 per year. This includes enrolments of on-campus attendance in 1 or 2 semesters across 5 campuses, and of external/off-campus attendance over 1 or 2 semesters or self paced (up to 2 years to complete).

Due to the inherent nature and level of the course, full working must be shown on assessment items, which results in paper based assessment items. External students submit assessment via mail, fax or email (scanned). Distributing workload across the five campuses presents disadvantages to (external) students in turn-around time for the return of assessment.

Our use of tablet PCs creates a paperless environment, which allows the assessment items, once processed, to be available essentially instantaneously to the lecturers on the campuses. The electronic format allows for the return of the assessment and feedback via email, also substantially reducing turn-around time. This yields a turn around time of two/three days on assessment feedback, as well as providing copies for moderation and accreditation archiving. The tablet PC has also substantially increased the moderation turn-around time of assessment items for internal students, making tablet PCs tremendously beneficial regardless of the mode of delivery of the course.

Introduction

In today’s society where information is obtained at the click of a button, and instant satisfaction is expected, turn around times of several weeks still exist at many universities. While many universities move to online courses and costly technology, many students can be disadvantaged. At CQUniversity the Mathematics Learning Centre (MLC) has adopted a paperless method of processing students’ assessments without increased cost or any disadvantage to the student. Upon receipt, assessments are converted to PDF format and
stored electronically – making them immediately available to MLC staff for marking. All marking is completed using tablet PCs. The tablet PC enables the marker to annotate the document providing valuable feedback back to the student in a timely manner. Despite negative opinions of some scholars such as Hume (2001) of the writing surface and the quality of writing produced by the tablet PC students find being able to have quality feedback returned promptly invaluable.

**Literature Review**

Much of the Literature involving tablet PCs discusses the advantages, disadvantages or implementation of the tablet PC as a teaching aid. We were unable to locate literature that discussed the benefits of the tablet PC as an administrative aid. Though there were those that highlighted the benefits of the tablet PC for marking.

The tablet PC has a beneficial use in education both inside and outside of the classroom (French, 2007). When marking assignments, French (2007) explains how the tablet PC can be used by the instructor to ink and save Word documents which can then be viewed on any Course Management System by the student. The tablet PC enables teachers to send students an electronic copy of feedback which contains hand written annotations (Neal & Davidson, 2008). Another benefit of ‘e-marking’ as seen by Chester (2008) is the reduction in the amount of paper required to be handled when evaluating students.

In a discussion on computer based assessment (CBA) Siozos et al (2009) note that feedback is an important element of the learning process and regardless of the sophistication of the feedback system, CBA is unable to replace teachers’ comprehensive ability to provide personalised feedback. Those in favour of CBA argue its pedagogical nature claiming that it provides immediate detailed feedback increases the breadth of assessment and encourages regular study and autonomous learning (Siozos et al, 2008). But these tests are objective and as such more beneficial to the teachers.

**Bridging Programs**

CQUniversity commenced offering bridging programs in 1986, at the then Capricornia Institute of Advanced Education. Today, CQUniversity offers several bridging programs to meet the changing needs of people who have not been able to attain their educational goals through traditional educational pathways, often referred to as ‘second chance learners’. Many CQUniversity bridging students are from low socio-economic or disadvantaged backgrounds and have had limited computer exposure. Not only does the program equip students with academic knowledge required to commence an undergraduate degree but is considered to increase self-confidence.
Transition Mathematics

The mathematics component of the bridging programs at CQUiUniversity is Transition Mathematics 1 (TM1). Transition Mathematics 1 is an elementary mathematics bridging course designed to cover the basic concepts of mathematics, including number types, fractions, decimals, inequalities, percentages, basic algebra, (including rules of precedence, simple factorisation, exponents (indices), scientific notation, linear equations and algebraic manipulation), and coordinate geometry of a straight line and introductory statistics. It provides a mathematical foundation for students to further build upon should the need arise. Students wishing to enter mathematics based undergraduate degrees, such as engineering, are required to complete further preparatory courses to meet the appropriate prerequisite. Transition Mathematics + (TM+) and Transition Mathematics 2 (TM2) are offered to meet this prerequisite.

TM1 is offered in several different modes of delivery, depending on the bridging program in which the student is enrolled. Modes of offer are: internal on any of the five available campuses over 1 or 2 semesters of study; external/distance over 1 or 2 semesters; or in an un-timed/self-paced mode. In excess of 1000 students are enrolled in a typical year in the Transition Mathematics 1 course, with approximately 600 in the external modes.

TM+ and TM2 are only available via external/distance mode. Approximately 120 students per year enrol in these courses.

Assessment

Assessment for all Transition Mathematics courses in all modes consists of three main components:

- End of Module Tests – formative assignments, due every 1-2 weeks depending on the mode of enrolment;
- Assessment Tests A and B – either supervised tests or assignments, depending on the mode of enrolment, and are pass/fail only;
- End of Course Test – optional graded supervised exam.

Due to the inherent nature and level of the course, full working must be shown on assessment items, requiring paper based assessment. On-line quizzes were considered as an option to replace the End of Module Tests but were rejected for several reasons. Even though on-line quizzes provide immediate results, their feedback is limited. Even the most sophisticated system cannot provide the personalised feedback that is such an import element in the learning process (Siozos et al 2009). Bridging students need to receive detailed instructive feedback, revealing the exact error(s) in their work, including setting out. It has been noted by Boston (2002) that feedback given as part of formative assessment assists students to bridge the gaps between their present knowledge and required knowledge. It is the quality of feedback received that is crucial in improving learning (Sadler 1998). None of the LMS available to CQUiUniversity have this ability. Sample tests with fully worked solutions and videos thereof are provided for all students. Also, the level of computing of the
majority of our bridging students coupled with ‘down-time’ of the LMS would impede their learning experience.

For formative assessment to be effective, a minimal turn-around time is required to correct students’ fundamental errors prior to them commencing subsequent topics, which build on this mathematical knowledge. The need for timely feedback is supported by Irons (2007) who acknowledges its importance in the student learning process. Traditionally, submission by external students of all paper-based assessment was processed and recorded in a central location. From here assessments were distributed to the course coordinator, who then distributed the assessment to the assigned markers. These markers could be on any one of the five campuses. Once the assessment has been marked the whole process was reversed before the assessment was returned to the student. As this internal process was reliant on Australia Post it could take up to two weeks and was an obvious disadvantage to external students. Added to the excessive turn-around time was the increased risk of assessments disappearing as they are posted from point to point. Tablet PCs have removed the need to physically send assessments from point to point thus eliminating the associated problems.

Paperless Environment

External students are given three options for submission of their tests – mail, fax and email. If the student opts to submit their test by mail the administrative assistant processes the test by scanning it and converting it to PDF format. For students choosing to submit their assessment by fax, the fax system produces an electronic image in an email. Assessment submitted by email arrives either in PDF format, Microsoft Word or as individual image files. These electronic files are processed by the administrative assistant and converted to PDF format. The electronic version of the test is stored in a folder, specifically created for the individual student, on a shared network drive. The administrative assistant then adds the students name to an electronic list, available to all staff, on the shared network drive. Tests are thus immediately available for marking in electronic format with the use of tablet PCs. For most programs in which this course is offered, assessment is returned to students via email. In these programs students are instructed in the use of email at the commencement of the bridging program in the computing course. Students enrolled in a program not containing a computer component can elect whether their assessment is returned via post or email. Only a small number of students choose to have their assessments returned by post. Electronic submission and storage and the ability of markers to immediately access and mark tests through a shared drive, regardless of location, has reduced the turn-around time taken to process assessment from 1 – 2 weeks to 2 – 3 days.

Advantages

The major advantage of converting to a paperless process is the speed in which students receive their marks and valuable feedback. Other advantages include:
- Reduction in the number of assessments that go astray in the post;
- Electronic copies of assessments and grades are readily available to all MLC staff regardless of location;
- Electronic copies can be viewed instantaneously by the lecturer if the student requires further feedback;
- Ability to provide personalised feedback in a timely manner;
- Reduction in moderation time;
- Permanent copies remain available for archiving and accreditation purposes.

**Conclusion**

The Mathematics Learning Centre at CQUniversity has adopted an electronic storage system for all assessment submitted by external students. Assessment can be submitted electronically or in hard copy but regardless of the submission format, the storage method is the same. Electronic storage enables staff from varying physical locations to immediately access and mark a student’s assessment using tablet PCs, substantially reducing the turn-round time of assessment items. ‘Digital ink’ provides for personalised feedback on each student’s assessment piece.

**References**


