

Using a Tablet PC to facilitate the engagement and success of students

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Abstract

Never has higher education been more important. As a result of Government initiatives implemented to increase student engagement in learning, universities are striving to increase their mature-aged and low socio-economic student numbers. As these students are often the most vulnerable to dropping out, it is vital that they are provided with the necessary guidance and support required for a successful learning journey. The Mathematics Learning Centre (MLC) at CQUniversity Australia is utilising technology to not only enhance the delivery of bridging mathematics courses but to also provide the necessary support for students once they enter their undergraduate degrees. The Tablet PC is being used to create instructional videos to support and engage external (distance) bridging mathematics students; and to create short videos to help external undergraduate students with the mathematical content in their courses.

Introduction

Australia's changing social and economic environment has emphasised the importance of higher education (DEEWR, 2008). The key objectives of the Council of Australian Governments (COAG) National Partnership Agreement on Youth Attainment are to increase educational participation and improve transition to work outcomes for young people aged 15 to 24 years (DEEWR, 2010; COAG, 2009). Additionally, the Review of Higher Education (Bradley Report) recommended "that the Australian Government set a national target of at least 40 per cent of 25 to 34 year-olds having attained a qualification at bachelor level or above by 2020" (Bradley, Noonan, Nugent & Scales, 2008, p. xviii).

CQUniversity Australia (CQU) "serves regions with high proportions of low socio-economic students (LSES) and almost half of its domestic students are from LSES-designated schools" (CQU, 2010). CQU has been recognised as having the highest participation rates for LSES of any Australian university and was awarded five stars for indigenous participation and cultural diversity of the student body (Good Universities Guide, 2011). As noted by the Vice Chancellor, Scott Bowman (n.d.), "CQUniversity has supported mature learners for decades and recognises a range of qualifications and life experience". The necessary support and assistance for the transition of LSES and mature-aged students into CQU is provided by: a suite of bridging programmes (CQUniACCESS) to prepare students for entry into undergraduate studies (regardless of their former skills and educational achievements); dedicated support centres to assist undergraduate students with writing and mathematics; and in 2011 the university introduced a programme to identify and assist 'at risk' first year students.

The Mathematics Learning Centre (MLC)

The MLC delivers three levels of bridging mathematics courses into the CQUniACCESS programmes: Transition Mathematics 1 (TM1), Transition Mathematics + (TM+) and Transition Mathematics 2 (TM2). The combination of TM+ and TM2 provides a mathematical foundation equivalent to Queensland Mathematics B, a prerequisite for many engineering and science programmes.

Accommodating the diverse mathematical backgrounds of bridging students is a major issue faced by the MLC staff, especially when some students have not even completed Year 9 mathematics. This is exacerbated when courses are delivered externally, which is the only mode of delivery for TM+ and TM2 (Adams, Elliott & Dekkers, 2010). Although students are provided with comprehensive resources (including Study Guides and detailed textbooks), it is extremely difficult for some students to learn from text-based materials, especially as “the nature of mathematical sciences dictates that students need to hear the instructor explain the concepts and ideas” (Amin & Li, 2010, p. 47). In order to cater for the unique needs of these students, the MLC has embraced the innovation afforded by the use of the Tablet PC.

What is a Tablet PC?

The Tablet PC is essentially a laptop computer that enables the user, through pen technology, to annotate (write) on the screen. There was much excitement surrounding the technology in the late 1980s, reaching a peak by 1991 (Blickenstorfer, 2005). It was envisaged that this technology would eventually replace the mouse and keyboard, but they were difficult to use and the handwriting recognition was inadequate (Blickenstorfer, 2005). Fortunately, improved computer technology has resulted in greater functionality with the newer versions. Tablet PCs are now lighter, more efficient and more affordable; processors are faster; resolution is finer; and the handwriting recognition software has been vastly improved (Jones, n.d). Additionally, no attempt has been made to replace the mouse and keyboard in the current Tablet PCs and although handwriting recognition is still a feature, “digital inking” (allowing the user to annotate on the computer using a stylus or pen) proves to be its strength.

Instructional Videos for Bridging Mathematics Courses

TM1 and TM+ students are provided with a full suite of instructional videos covering all concepts in the textbooks, with TM2 videos currently being developed. The videos are provided via the university learning management system (Moodle) and on cd. Although some believe that it is more authentic to have handwritten slides (Harrison, Pidcock & Ward, 2009), MLC staff create slide templates with Microsoft PowerPoint® or Word®, using the textbook files to create the outline of the slides. This is not only less time consuming but also provides a link between the textbook and the videos, thus facilitating student engagement. The slides are converted to an Adobe® PDF document and the creator annotates directly onto them (using PDF Annotator® or Adobe Acrobat Pro®), whilst recording the screen using Camtasia®. An example of a slide template with annotations is provided in Figure 1. As can be observed, these slides also provide an excellent template for the internal delivery of material. As expected, the majority of students find the instructional videos to be extremely beneficial to their understanding of the material:

I found the videos an invaluable resource for me personally and I believe other external students would feel the same. The videos are the reason, I believe, why I have exceeded my personal expectations in the maths component of this course (TM1 external student, 2006).

I loved having the videos for the first few modules of TM+ and really miss them now I have moved on. The videos really helped me understand some of the more difficult concepts and it was great hearing the explanations and solutions, rather than just reading them from the book (TM+ external student, 2010).

Your course definitely had the support that is required and your videos were very helpful. Hopefully that kind of support will be available for TM2 soon (TM+ external student, 2011).

I have to say these videos are an exceptional assistance in completing these modules and you should be congratulated for taking the time to make them. I for one learn better when shown examples and being able to watch these examples and rewind as required is great (TM+ external student, 2011).

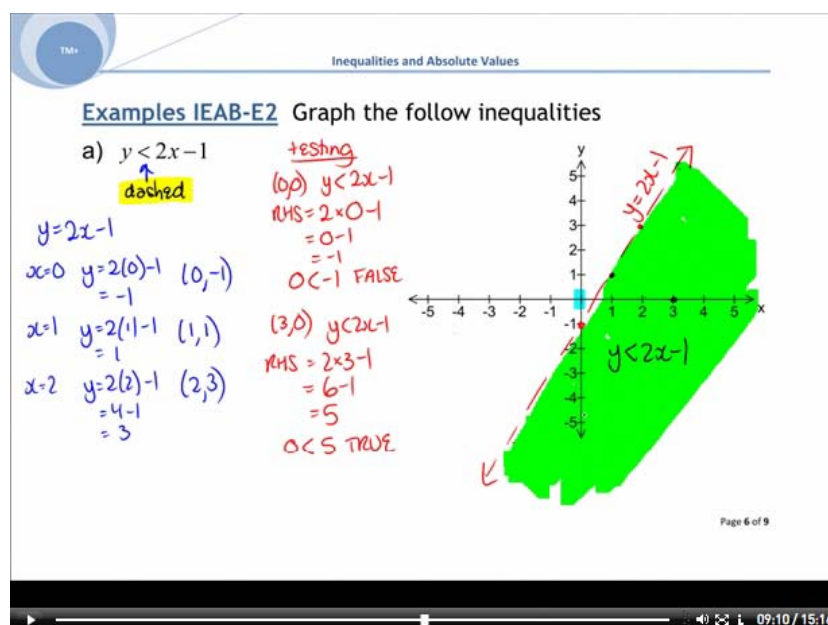


Figure 1: An example of a TM+ video slide (created by Elliott, 2010).

Videos for undergraduate students

MLC staff are available to assist undergraduate students with the mathematical component of their undergraduate programmes. The Tablet PC has proven invaluable for assisting external students who are unable to attend a campus. MLC staff can create a short video using Windows Journal[®] and Camtasia[®]. The aim of the video is to walk the student through the solution to the problem in question. Once the video has been recorded it is rendered as a Flash[®] or Windows Media Player[®] file and emailed to the student. Students can then see and hear the solution, just as if they were asking for assistance in person. Responses are mostly tailored to meet the individual enquiry but as staff build up a library of videos and worked solutions it is possible to reuse some. Additionally, in contrast to the instructional videos, which are more detailed and professional, creating these videos is quick and easy, even if you are away from the office. The following comments received from students demonstrate their appreciation of the short videos:

That is excellent. Thank you so much. (External undergraduate student, 2011).

Thank you, it all makes so much sense when you do it! I certainly didn't expect an answer on a Saturday, boy am I glad you were at work...That did help a lot, thanks again, (External undergraduate student, 2010).

BE Successful 2011

In 2011 CQU initiated a pilot programme to assist first year undergraduate students at risk of either failing or dropping out. Although the university currently has a Monitoring Academic Progress (MAP) programme, providing counselling and assistance to students who have failed undergraduate courses, it was recognised that waiting until students failed decreased retention. As part of the pilot study, students were invited to complete a Student Readiness Questionnaire prior to the commencement of their studies. If a student was identified to be at risk they were offered programmes to assist with preparing for tertiary study, academic writing or mathematics (dependent on their needs). For mathematics, students were provided with Transition Mathematics modules and instructional videos to assist with their undergraduate programme.

Conclusion

As universities aim to increase student enrolments, especially LSES and mature-aged students, efforts must be made to ensure that they are adequately prepared and supported. It is not acceptable to increase enrolments if the result is to either have students fail or have the quality of degrees decrease in order to maintain retention. With the aid of the Tablet PC, the MLC has been consistently creating and improving resources in order to increase engagement, thereby increasing the success of students.

The MLC is planning to survey bridging mathematics and “BE successful” students to verify that the instructional videos are effective in increasing students’ mathematics confidence, engagement and subsequent success, whilst identifying any areas still requiring improvement. The MLC hopes to report on the results in the near future, with the aim of also facilitating other universities with their support services.

Nuts and Bolts Session Outline

Presenters: (5 minutes) Overview of the Tablet PC and how it is being used by the MLC to actively engage bridging mathematics students and to help undergraduate students.

Presenters: (10 minutes) Brief demonstration of how to create an instructional video and short video using the Tablet PC.

Whole group discussion: (15 minutes) Open up discussion from the audience focussing on how the technology could be used to:

- Assist students across universities with the possibility of sharing resources;
- Assist students in disciplines other than mathematics; and
- Support students who may be lacking the basic concepts and knowledge required for their undergraduate course or programme.

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