Videos that Click:

Helping Bridging Mathematics Students Make the Connection

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CQUniversity's Mathematics Learning Centre (MLC) Head, Antony Dekkers, commenced using a Tablet PC in 2003. Initially its use was limited to in-class instruction and the occasional marking of tests. Now the technology enables the development of instructional videos to support bridging mathematics textbooks and undergraduate students. It also facilitates the marking of external tests, the majority of which are submitted, marked and returned electronically, creating almost paperless courses. The use of Tablet PC technology within the MLC has evolved in a way that not only actively engages bridging mathematics students but enhances their learning irrespective of the mode of delivery. This paper provides a brief overview of the preparatory programs offered at CQUniversity; an outline of the history of Tablet PC use by the MLC; and a detailed explanation of how the Tablet PC is currently utilised to enhance the delivery of the suite of mathematics bridging courses offered. It is clearly evident that the MLC has embraced eLearning as a powerful learning and teaching strategy, facilitating the active learning, engagement and subsequent success of bridging mathematics students. As this success is recognised across the university, others are incorporating it into their programs. A rollout of Tablet PCs has recently occurred within Academic Learning Services, with Language and Learning colleagues currently investigating methods of use in their courses. Additionally, the Tablet PC is now being utilised by the Engineering Department – a direct result the successful use of the Tablet PC in the MLC.

1. Background

CQUniversity Australia has six campuses in Central Queensland – covering an area three-to-four times the size of Victoria, with 65% of its 11626 students studying externally (by distance) (CQUniversity Dashboard, 1/8/10, 18:12). With the recent appointment of a Pro-Vice Chancellor of Learning and Teaching, CQUniversity has demonstrated its commitment to a Learning Paradigm (Barr & Tagg, 1995). Rather than simply providing programs of study, CQUniversity's goal is to produce student learning through flexible learning environments and personalised support. As noted by Barr and Tagg (1995, p. 13), a university's "purpose is not to transfer knowledge but to create environments and experiences that bring students to discover and construct knowledge for themselves, to make students members of communities of learners that make discoveries and solve problems". 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".

1.1 CQUniACCESS

CQUniACCESS is a suite of free preparatory programs that have been developed by CQUniversity to assist prospective students with gaining entry into undergraduate programs. CQUniACCESS provides an alternative pathway for people wanting to achieve their educational goals by giving them the opportunity to gain the confidence, knowledge and skills required to successfully study at university. Regardless of prior academic achievement, cultural background or socioeconomic status, CQUniversity has a program to meet the needs of prospective students, including the flexibility of delivery options to suit the student's lifestyle. The virtue of these programs has been recognised by other institutions. At the Second Annual Social Inclusion in Education Conference, Mazzolini (2010, p. 3) highlighted CQUniversity Access programs as best practice within the Australian university sector commenting on the "impressive suite of free preparatory programs".

1.2 The STEPS Program

Skills for Tertiary Education Preparatory Studies (STEPS) is a CQUniACCESS program that commenced in 1986. The program was initiated at the Capricornia Institute of Advanced Education (later to become CQUniversity Australia), Rockhampton, Queensland, Australia in response to, and funded by, a government grant aimed at bridging the gap between tertiary education and under-represented groups of people – which included Aborigines, migrants,

women, and people from low socio-economic backgrounds and those from isolated areas (Doyle, 2006).

The success of this program has spread and it is now run on five CQUniversity campuses in several different modes and also as an external program. According to Adams and Hayes (2009, p. 2) "the program has evolved to meet the changing needs of people who have not been able to attain their educational goals through traditional educational pathways". In addition to providing the academic knowledge required for an undergraduate degree, students believe it increases their self-confidence (Adams & Hayes, 2009).

1.3 The Mathematics Learning Centre (MLC)

One of the central roles of CQUniversity's MLC is the delivery of bridging mathematics courses through CQUniACCESS programs. The MLC offers the following suite of mathematics courses:

- ***Transition Mathematics 1 (TM1)*** – a course in elementary mathematics designed to have the student commence work on the foundation concepts, rules and methods of basic mathematics. The main aim of this course is to provide a refresher course in those fundamentals of basic mathematics which are necessary to develop mathematics as a unified body of knowledge. Modules include: the study of mathematics; operations; percentages; algebra; solving algebraic equations; statistics; exponents; graphs and linear equations; and units and conversions.
- ***Transition Mathematics + (TM+)*** – an intermediate preparatory course designed to follow on from TM1 and a co-requisite for TM2. TM+ contains five core and four elective modules with the choice of electives governed by students' future study plans. Modules include: simultaneous equations; inequalities; quadratics; logarithms; functions; geometry; trigonometry; series and sequences; variation, ratio and proportion; statistics and standard deviation; probability; finance; and annuities.
- ***Transition Mathematics 2 (TM2)*** – a technical preparatory course designed to follow on from TM+. TM2 meets the prerequisite requirements for engineering and applied science. The combination of TM+ and TM2 provides a mathematical foundation equivalent to Queensland Mathematics B. Modules include: additional algebra; trigonometric functions, ratios and graphs; plane and analytical geometry; vectors; differentiation; and integration.

One significant issue faced by the MLC staff is catering for the diverse mathematical backgrounds of students. This is particularly difficult when delivering programs externally, which is the only mode of delivery for TM+ and TM2. Although students are provided with extensive resources in the form of Study Guides and detailed textbooks, it is extremely difficult for some students to learn from text-based materials, especially when their mathematical background is limited. Additionally, many bridging students struggle with learning mathematics externally and miss having a teacher. "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 overcome known difficulties and provide a quality learning environment, MLC course developers are guided by the Seven Principles for Good Practice in Undergraduate Education (Chickering & Gamsen, 1987) that are endorsed by the CQUniversity Academic Board. According to the Seven Principles, good practice in undergraduate education:

1. Encourages contact between students and staff
2. Develops reciprocity and cooperation among students
3. Encourages active learning
4. Gives prompt feedback
5. Emphasises time on task
6. Communicates high expectations
7. Respects diverse talents and ways of learning.

Principles 1 and 2 are not only easily achieved with internal classes, but through the use of discussion forums set up on the Learning Management System (LMS) and through regular email contact from markers and course coordinators, external students are also fully supported as well. TM1 external students often seek the support of fellow students and ask questions via discussion forums. The forums are also regularly monitored by MLC staff to answer queries and check that student responses, when provided, are correct.

In regard to Principle 3, the MLC adopts a constructivist approach, viewing the learner as the centre of knowledge creation with knowledge being constructed through the learner's experiences, actions and activities (Oliver, 2004; Hadjerrouit, 2007; Lee, 2009). In the MLC bridging programs, learners are driven by tasks and problems to engage with the content and discover things themselves. Course coordinators and lecturers serve as guides providing a

supportive learning environment and activities that engage students with learning. This is achieved through the utilisation of the Tablet PC.

2. Tablet PC Use in the MLC

2.1 History

A Tablet PC is a laptop computer that is equipped with a touch screen and stylus (pen) enabling the user to annotate (write on) the screen. Antony Dekkers introduced the Tablet PC into his classroom in 2003. This early instruction included using the Tablet PC in combination with Windows Journal® to annotate Microsoft PowerPoint® slides, very similar to how other MLC staff use the Tablet PC in-class today. He also experimented with the use of the Tablet PC for marking and the creation of teaching videos. In 2006 the first external STEPS class commenced. This program proved to be pivotal in how we use Tablet PCs. In an attempt to overcome the isolation associated with external study and to provide students with step-by-step instructions, as would be given in a classroom, Nadine Adams and Antony Dekkers created videos to coincide with the textbook. Initially these videos were only available to the external students via the LMS. They were created using a combination of Microsoft PowerPoint®, Windows Journal® and Camtasia®, with the Microsoft PowerPoint® slides made available to students to encourage note taking as they watched the videos. The comments received from the students in this initial year were very encouraging:

> *The Tablet was great. It allowed us to see exactly how to solve the problem, step by step, and allowed the teacher to explain his thinking as he went along. It is always better to see it worked out in front of you than to look at the already made answer and try to decipher it (TM1 external student, 2006).*

Later in that same year Sharon Cohalan developed videos for all of the sample assessment pieces. The following year compact discs (CDs), containing the complete course, were provided to all students both internal and external. This overcame the problems associated with viewing videos over slow internet connections. Internal students were provided with a way to review material before and after class.

The first external class relied on paper based marking of formative tests to provide students with feedback on their progression in the course. A significant issue arising from this was the

lengthy turnaround time for returning marked tests to students. It would take approximately three days for the test to arrive at the MLC central office in Rockhampton, two to five days for the test to be marked and then another three days for the test to be returned. This meant that students would not receive feedback on their performance for almost two weeks. Since Antony Dekkers and Nadine Adams, who were totally responsible for this initial class, were on two different campuses the problem was exacerbated. As the fourth principle of good practice is to give prompt feedback it was essential that this issue was addressed, which is why the MLC moved to electronic marking before the end of 2006. Students were invited to submit their assessments by post, fax or e-mail. E-mail submissions were converted to a Portable Document File (PDF) (as required), paper submissions were scanned and saved as PDFs and faxes were automatically received as a PDF. These PDFs were then saved to the student's folder, ready for marking by MLC staff on any of the six campuses. All marked tests, regardless of form of submission, were e-mailed back to the student via their CQUniversity e-mail account. This is the procedure currently used for all mathematics bridging courses, resulting in a turnaround time of two to five days, dependent on staff workloads.

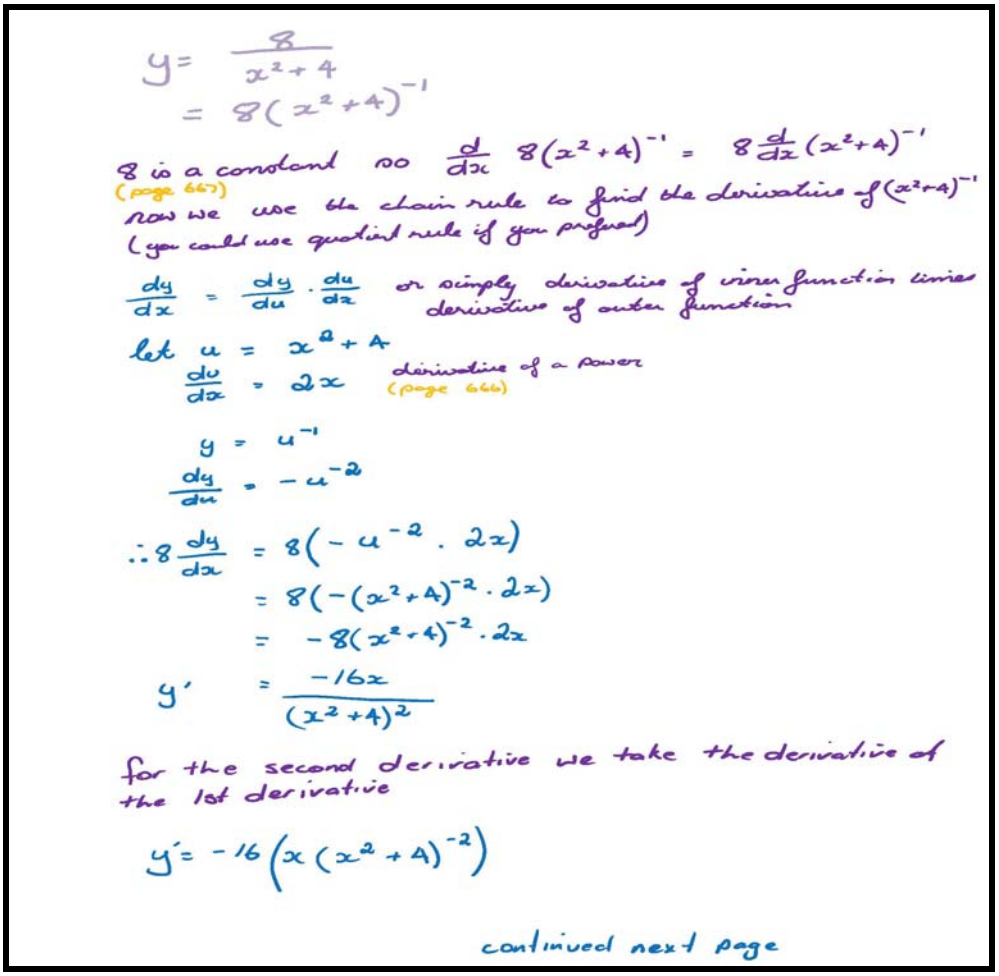
Whilst the first videos created used Microsoft PowerPoint® as the base document, most are now created using Microsoft Word®. These documents are then converted to PDF and PDF Annotator® is used to 'ink' on the document. Adobe® has now created Adobe Acrobat Pro® that allows direct 'inking' onto PDFs.

Encouraged by the success of videos for the TM1 course, MLC staff are compiling videos for all transition mathematics courses. It is envisaged that in the near future all courses will be supported with a full complement of videos.

2.2 Annotated Documents

Mathematics can be difficult and time consuming to type. Often in the MLC, external students will e-mail staff members with a mathematics problem they are either unable to perform or which requires further explanation. If the problem is not too involved, staff will use their Tablet PCs to write the solution, complete with annotations, as shown in Figure 1. Different colours are used to aid readability. Regardless of the program used to create the document (usually Windows Journal®) we have found it is always advisable to convert it to a PDF before e-mailing the student. For more complex questions videos are more appropriate.

Figure 1: An annotated solution to a student problem



Prepared by Nadine Adams

2.3 Creating Videos

There are two types of videos created by the MLC:

a) ***Quick videos to address student questions as they arise.*** These videos are often created when a student contacts an MLC staff member for help with a problem that cannot be easily explained over the phone or via e-mail. The MLC staff member will often use Windows Journal® and Camtasia® to create a video that will walk the student through the solution to the problem in question. Windows Journal® allows the staff member to ink directly on the screen. Camtasia® is used to record the screen and sound as the staff member writes and explains the solution (for the base document staff have also experimented with using Microsoft Word® and its built-in annotating functions or converting the students e-mail to PDF). Once the video has been

recorded it is rendered as a Flash® or Windows Media Player® file and e-mailed to the student.

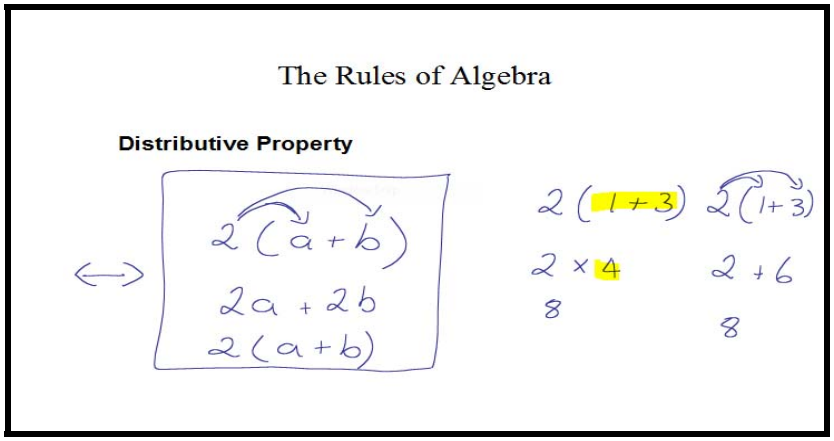
These videos are relatively quick and easy to make as they require virtually no preparation, rarely require editing and can be e-mailed directly to the student, thus enabling external students to be provided with help within a very short time (usually within 48 hours) of contacting the MLC. This capability of the Tablet PC is extremely powerful as the student is able to see and hear the solution unfold, step-by-step, as if they were seeking help face-to-face. Additionally, these videos are created not only for external bridging mathematics students but also for undergraduate students experiencing problems with a mathematical component of their program. Therefore, as the number of distance students at Universities across the world increases, this capability has extensive benefits not only in mathematics but in other disciplines as well. Harry (2003) notes that in many countries during the past thirty years external study has moved into the mainstream of higher education. According to MacKeogh and Fox (2009, p. 147) "one vision of the future of universities is that virtualisation and remote working technologies will enable us to study at any university in the world, from home". As universities are pressured to implement eLearning technologies into mainstream higher education, the Tablet PC provides the opportunity to achieve this.

b) ***Professional videos to support the content covered in CQUniversity's bridging mathematics textbooks.*** Microsoft PowerPoint® or Microsoft Word® are used to create the video slides. Although some believe that it is more authentic to have handwritten slides (Harrison, Pidcock & Ward, 2009), it is less time consuming to use the textbook files to create the outline of the slides. The staff member then converts these slides to an Adobe® PDF document and inks directly onto the slides (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 2.

Whereas some staff choose to record the sound simultaneously, others add the sound as a narration after the video has been created. Once the video has been created, any necessary editing is conducted and the video is rendered as a Flash® or Windows Media Player® file. These videos are provided to students via the LMS or on a CD.

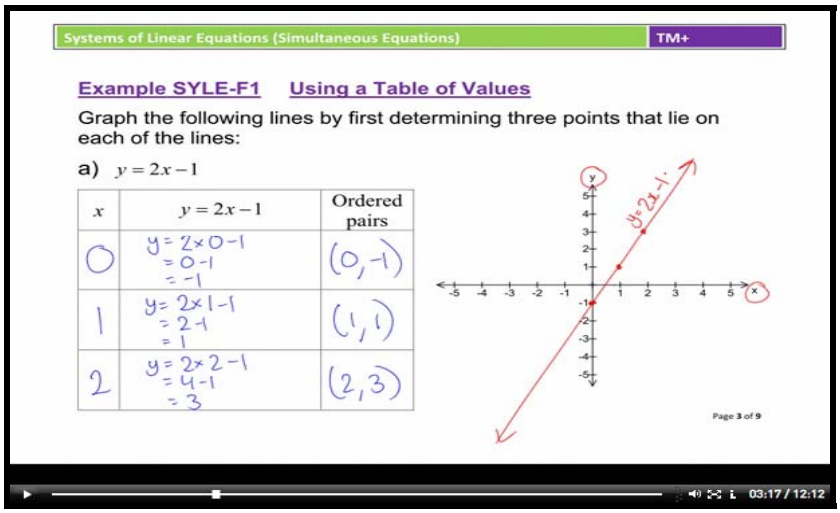
One added benefit of creating slides using Microsoft PowerPoint® or Microsoft Word® is that they can be used for face-to-face lectures as well. The lecturer simply inks directly onto the pre-prepared slides when instructing the students and students can even participate by inking on the slides. Additionally, using a program such as Microsoft Word® to create the slides allows the capability to make them visually stimulating, whilst also allowing for the creation of a theme for the different modules (through the use of headers, footers and the use of colour). A Microsoft Word® slide with annotations is provided in Figure 3 and can be compared with a previous version in Figure 2.

Figure 2: An example of a Microsoft PowerPoint® slide, with annotations, prepared for TM1 (2007).



Developed by Antony Dekkers, Annotated by Nadine Adams

Figure 3: An example of a Microsoft Word slide, with annotations, prepared for TM+ (2010).



Developed and Annotated by Sherie Elliott

3. Enhancing Learning with a Tablet PC

3.1 Learning Resources

Each of the bridging mathematics courses is supported by a:

- Course Profile;
- Study Guide outlining the requirements of the course, including a study schedule, a detailed explanation of the assessment and sample tests for all assessment;
- Textbook, developed by the MLC, that provides excellent course notes, fully worked examples, exercises and fully worked solutions for each of the modules covered in the course;
- LMS website that contains all of the materials outlined above in addition to lecture slides and videos supporting the text (where available); videos supporting the sample tests; and module forums, facilitating collaboration and discussion amongst students.

3.2 External Delivery

Universities have traditionally used Tablet PCs to enhance lectures in engineering, mathematics, computing and chemistry (Galligan, Loch, McDonald & Taylor, 2010). Whilst attending the Australasian Tablets in Education Conference (ATiEC) in 2009 we discovered most institutions use a single Tablet PC, with the lecturer delivering the material; others use a single Tablet PC coupled with interactive clickers that enable the students to interact with the lecturer; while other wealthy institutions require all students to purchase a Tablet PC, with the Tablets connected thus creating interactivity in the lecture. Unfortunately, although all of these methods are worthwhile, none cater for the increasing number of university students who are studying externally.

In 2009 approximately 63% of all students enrolled at CQUniversity were enrolled in an external mode (CQUniversity Dashboard, 24/7/10, 15:20). These students had a pass rate of 77% while students enrolled internally had a pass rate of 86% (CQUniversity Dashboard, 24/7/10, 15:20). Our records indicate that there has been a 5% increase in the pass rate of external students in the past four years. We can only speculate the reasons for the increase but assume it is partially due to the university's current practice of recording video-conferenced lectures and making them available to all students via the LMS.

Approximately 78% of students enrol in the CQUniversity bridging mathematics courses externally. Following a similar trend to the rest of the university, pass rates within bridging courses have experienced a slight rise over the past few years. If comments such as the following are any indication, it is envisaged that the development of supporting videos for the suite of bridging mathematics programs will further increase the pass rate:

> *I would like to thank you for putting together such an interesting and challenging course. 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).*

Currently all TM1 students are provided with extensive video support for their learning. Videos are provided for all of the modules covered, all sample End of Module tests, all sample Assessment tests and the sample End of Course test. TM+ students are provided with videos for their core modules only and students have been commenting that they miss having videos for all of the modules:

> *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).*

It is envisaged that TM+ will have a full set of videos at the commencement of Term 1 2011 and TM2 will have a set by the end of 2011 (TM2 has recently undergone a total rewrite) with both courses having the same video support as is available in TM1.

3.3 Internal Delivery

TM1 is delivered internally into the STEPS CQUniACCESS program and the majority of MLC staff use a Tablet PC to facilitate their teaching in the classroom. STEPS classes are not like traditional university lectures as "students find the lecture-tutorial approach too different from what they were used to at school" (Harrison, Pidcock, & Ward, 2009, p. 167). Therefore, in order to support students, lectures are more like classroom lessons, with many lecturers preparing classes in advance, either using the slides that were developed for the instructional videos or creating new slides to support the material to be covered. The pre-prepared slides not only provide structure for the lesson but students can print them

beforehand, thus facilitating their note taking. The Tablet PC then allows the lecturer to explain step-by-step solutions, draw pictures, complete graphs, change colours for emphasis and highlight sections of importance. When necessary, lecturers can also add blank pages to the pre-prepared slides. This may be required if it is discovered that students are struggling with a concept and need it explained further, or if they need more practise of a particular skill.

Lectures can be further enhanced with a wireless projector, which allows the lecturer to move around the classroom with the Tablet PC. This means that students are able to answer questions on the Tablet PC, thus actively engaging in the material. Additionally, as many students lack the confidence to go to the whiteboard to answer questions, they are more comfortable completing solutions on the Table PC.

Whilst classes are not recorded with the Tablet PC (mainly due to the time required to render two hour classes and the size of the resulting video files) the annotations can be saved as a record. Students are still able to go home and watch the corresponding video that is provided on the LMS or CD. Additionally, students can prepare for class by viewing the video beforehand.

3.4 Marking and Feedback

In a discussion on creating a paperless course Hayes and Adams (2009) question how, in a society that demands instant gratification, assessment turn-around time of several weeks can still exist? The electronic marking system adopted by CQUniversity's MLC is quick and virtually paperless. The choice of submission method (mail, e-mail, fax), ensures that no student is disadvantaged due to the requirement of expensive equipment. All items are converted to PDF and placed in the student's folder for marking and through the use of a shared drive; these files are immediately available to the marker. Marking is completed with the Tablet PC and annotations provide the student with valuable feedback in a timely manner. Some scholars such as Hume (2001) find that the writing surface of the Tablet PC produces poor quality writing and has the effect of making bad writing worse. This seems a poor excuse considering the marker has control over their writing and that with practise, the readability will improve (as illustrated in Figures 1 to 3). Additionally, the pros far outweigh the cons as it is vital for students to have quality feedback returned quickly, regardless of the quality of writing. It was noted by Siozos, Palaigeorgiou, Triantafyllakos & Despotakis (2009), in a discussion on computer based assessment (CBA), that feedback is an important

element of the learning process and regardless of the sophistication of the feedback system, CBA is unable to replace a teacher's comprehensive ability to provide personalised feedback. Siozos, Palaigeorgiou, Triantafyllakos & Despotakis (2008), while recognising that those in favour of CBA believe in its pedagogical nature, claiming that it provides immediate detailed feedback, increases the breadth of assessment and encourages regular study and autonomous learning, found these tests to be objective and, as such, more beneficial to the teachers. Smith and Kimball (2010) found that not only does feedback work as an error correction mechanism but timely feedback can reinforce correct responses and promote long-term retention. The following comment indicates the importance of quick feedback to students and staff alike:

> *Thanks for all the assistance you have given the WIST students who are enrolled in Transition Maths 1 this year. The increasing numbers of students who are submitting work and who are then completing is certainly evidence of your dedication. The quick turnaround of students' submitted work is also one of the key contributors to their success – being able to e-mail in their scanned work and then having it returned so promptly is a great initiative. Our WIST students have had a very successful year and we thank you for your contribution to their success, Regards Robyn Donovan (Coordinator, Women in Science and Technology, CQU, 2007).*

French (2007) explains how the Tablet PC can be used by the instructor when marking assignments to ink and save Microsoft Word® documents which can then be viewed on any LMS 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 fact some courses at CQUniversity are completely paperless. All teaching resources, assessments, course profiles, student submissions and feedback are contained in a LMS. The information is stored electronically and at the completion of the course the entire course, can be compressed onto a single CD.

3.5 Undergraduate Students

In addition to delivering bridging mathematics programs, the MLC is also available to assist undergraduate students with any mathematical component of their program. Given that 65% of CQUniversity students study externally, many students are unable to attend a campus for assistance (CQUniversity Dashboard, 24/7/10, 15:20). The Tablet PC has proven extremely valuable for catering for these students. Whereas it can be extremely difficult explaining concepts and solutions to students over the phone, the Tablet PC allows MLC staff members

to prepare hand-written solutions or to develop quick videos for students in need. These are of a small file size and can be e-mailed directly to the student. For video solutions, students are able to see and hear the solution, thus enhancing their understanding of the problem. One significant advantage of this method of assistance is that students are able to contact the MLC at any time (24/7), and when the video is e-mailed to them, they are able to view it at their convenience. Therefore, not only does the technology allow the MLC to help CQUniversity students across Australia and the world, it also provides assistance to the increasing numbers of university students who are working full-time and unable to access the MLC on campus. Additionally, if it is discovered that a student lacks an understanding of some basic components of mathematics that are covered in one of the suite of bridging programs, MLC staff are also able to provide modules to assist them. These modules are also provided on the MLC website[1].

MLC staff have also discussed the advantages of using Tablet PCs to provide assistance to internal students. Using the Tablet PC to provide worked solutions to students using the MLC on-campus could prevent having to repeat the same solution numerous times. Once the solution has been worked it is only a matter of saving the file then printing and explaining it when the next student has the same query. The use of a wireless network and remote connection to a printer means that the Tablet PC is as portable as any pencil and notepad.

4. Beyond the MLC

Although this paper's key focus has been on using the Tablet PC to assist bridging mathematics, the technology is in no way limited in its application to this discipline. The college of Science, Engineering and Technology at Murray State University have been using a "single Tablet lecture model" to provide chemistry instruction since 2005 (Rogers & Cox, 2008, p.34). Within our own institution the Tablet PC has been used in, but not limited to, Statistics, Surveying, Structures and other engineering applications. As indicated by the following comments, Antony Dekkers has assisted lecturers in the Engineering Department in the use of the Tablet PC and demonstrated success in the integration of the technology into his own classes:

[1] Mathematics Learning Centre website: http://mlc.cqu.edu.au/FCWViewer/view.do?site=20

Over the last couple of years Antony has greatly helped the engineering college and myself to adopt tablet technology and integrate this technology into the engineering curriculum. His research activities have lead to a number of engineering lecturers now producing video for distance students and integrating this into the learning management system. Antony has not only been a driver for new technologies in the curriculum but is also an excellent mentor (Adam Thomson, Associate Director Electrical Engineering, Faculty of Science, Engineering and Health, CQUniversity, 2008).

It was an excellent way of teaching, step by step example worked through, more than enough examples. I'd definitely love to see it next year!!! (Engineering Mathematics internal student, 2004).

In an attempt to share our knowledge within Academic Learning Services, Sherie Elliott demonstrated the use of the Tablet PC to our Communication Learning Centre (CLC) colleagues. This demonstration has resulted in a rollout of Tablet PCs across all campuses for use by these staff members. MLC staff members on each campus will provide CLC staff with advice on using this equipment and how to apply best practice to their teaching.

5. Conclusion

The Standards of Excellence in Teaching Mathematics in Australian Schools states that excellent teachers of mathematics need to "establish an environment that maximises students' learning opportunities", empowering them "to become independent learners" by modelling "mathematical thinking and reasoning" and providing "purposeful and timely feedback" (The Australian Association of Mathematics Teachers Inc., 2006, Sec 3). The Tablet PC has enabled the MLC to fulfil these requirements at a tertiary level, providing an invaluable resource and subsequent opportunity to enhance the learning experience of CQUniversity students. Since its adoption in 2003, Tablet PC technology has greatly enhanced the services offered by the MLC. The capability of video creation has enabled the MLC staff to actively engage external students, providing them with the opportunity to see and hear the logical progression of mathematical solutions. Undergraduate students have also benefited as they are able to seek help irrespective of their location and work commitments. Additionally, being able to mark electronically has significantly reduced the turnaround time of assessment, providing informative feedback to students, thus supporting their learning. As a full set of

videos are developed for the suite of bridging mathematics programs, the success of students can only be enhanced.

Research investigating the effectiveness of Tablet PC technology is almost non-existent. Although the MLC has a collection of student comments praising the use of the Tablet PC by the MLC, these responses do not represent conclusive evidence that the technology is effective. A more detailed study is required to hopefully correlate the utilisation of Tablet PC resources with student success. In particular, as CQUniversity is a leader in using the Tablet PC to develop videos to support course content, it is imperative that research is conducted to evaluate its effectiveness.

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