# Reframing e-assessment: building professional nursing and academic attributes in a first year nursing course

This paper documents the relationships between pedagogy and e-assessment in two nursing courses offered at the University of Southern Queensland, Australia. The courses are designed to build the academic, numeracy and technological attributes student nurses need if they are to succeed at university and in the nursing profession. The paper first outlines the management systems supporting the two courses and how they intersect with the e-learning and e-assessment components of course design. These pedagogical choices are then reviewed. While there are lessons to be learnt and improvements to be made, preliminary results suggest students and staff are extremely supportive of the courses. The e-assessment is very positively received with students reporting increased confidence and competency in numeracy, as well as IT, academic, research and communication skills.

Introduction

This paper outlines the relationships between pedagogy and e-assessment in the new nursing program offered at the University of Southern Queensland to approximately 250 first year on campus undergraduates. The paper focuses on two courses; *Building Professional Nursing Attributes A* (CMS1008, or CMS) and *Building Professional Nursing Attributes B* (MAT1008, or MAT). These courses are the first major stages in a design to build the academic, numeracy and technological attributes student nurses need to demonstrate at university and in the workplace. The aim was to develop these skills by embedding aspects of parallel nursing courses taken in the students' first semester whilst also being mindful of courses taken later in the program. In the year preceding the first offer, the CMS/MAT team met with the other first year, first semester course leaders to plan and develop the courses. Throughout the design and delivery of the courses a standard method of evaluation and program development is used (Taylor & Galligan 2002, developed from Guba & Stufflebeam 1970, see Figure 1). This model incorporates evaluation priorities in each cycle, for example, a needs assessment was included in the pre-program design. This is described in more detail later.

Figure 1: Model of program development
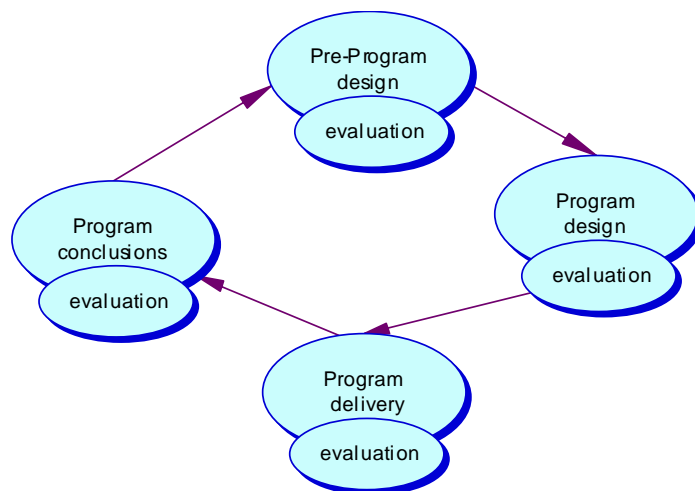
The paper describes the management, e-learning and e-assessment decisions made by the design team. It then reviews these pedagogical and e-assessment choices by examining the

feedback obtained though electronic discussion groups on the Bulletin Board, reflections in assignments, emails and an end of semester online survey. And finally, the paper outlines lessons learnt from this approach which lead to suggestions for further improvements for the next offer of the two courses.

Background

In the past, topics covered in the two new courses were taught through two other courses (communication and computing) and a mathematics workshop. Communication skills rather than professional attributes were covered in the Faculty of Arts course, which did not utilize IT components such as electronic submission or discussion groups. In the computing course, there were complaints from nursing students that the course was not set in a nursing context, as it catered for students across faculties, and covered unpopular topics such as the history and the social context of computing. Mathematical skills were refreshed in a pre-semester workshop for self selected students and further support was offered on a one-to-one basis through a Learning Centre. In 2006 the Nursing Department was being reaccredited with a national body and it was decided that two new courses were needed: one combined mathematics and computing course and the other a communication course, both specifically designed for nursing students and with a focus on e-learning. The development of these two courses is described in this paper.

Course design was informed by the research literature on transition, retention and the first year experience (FYE) as well as the theoretical perspectives stemming from educational and critical discourse literature. The literature shows that both FYE and transition are complex phenomena (Krause 2005); that students experience social and personal as well as academic transitions (Scott 2005); that interactions between students and other individuals in the university community and students' interpretations of these contacts affect their transition (Tinto 2005) and that student outcomes can be improved when institutions adapt their cultures to meet their students' needs (Burton & Dowling 2005). Furthermore, transition is influenced by students' perceptions of how well their cultural attributes are valued and accommodated (Zepke, Leach & Prebble 2003) and how well any differences between these and the university culture are addressed/bridged (Braxton & Hirschy 2005). From educational literature the courses incorporate the importance of a student focused curriculum (Prosser & Trigwell 1999). From critical discourse and multiliteracy theory (New London Group 1996), the goal is to facilitate students' engagement, mastery and demonstration of the academic and numeracy, computing, communication, learning and information literacies they need if they are to succeed at university. The courses also took into account a growing discourse on interdisciplinary or 'pluridisciplinarity' higher education, which sees value in two or more disciplines combining their expertise to jointly address an area of common concern (Davies & Devlin 2007), in this case the complexities involved in students' transitions both to university and to future professional nursing practice in an increasingly multifaceted world.

The new courses

The communication course, CMS1008, is still conducted through the Faculty of Arts. It aims to develop students' academic and information literacies and learning, research and communication competencies. The course is underpinned by research on facilitating learners' transitions to university (Lawrence 2005); on formative assessment (Kiernan, Lawrence & Sankey 2006); on engaging first year students (Lawrence 2006); on addressing student diversity (Lawrence 2005); and on embedding and making explicit academic literacies (Lawrence 2003). Main design objectives are to embed key university and discipline literacies and to scaffold learning (Pea 2004).

The aims of the mathematics and computing course MAT1008, conducted through the Faculty of Sciences and the Learning and Teaching Support Unit, are to develop students' numeracy and computing skills directly linked to their degree. The numeracy component is based on material developed over more than 14 years: on nursing errors (Galligan 2001); developing integrated programs (Galligan 2004); metacognition (Galligan & Pigozzo 2002); academic numeracy (Galligan & Taylor 2005); and program development (Surman & Kamel 1994) using situated cognition (Hoyles et al. 1999) and the Keimig model of university support (Keimig 1983). The computing component of MAT1008 is drawn partially from the computing service course previously offered to students from all faculties. Only the practical content from this original course are kept, as well as the highly successful integration and use of IT in the course design and delivery. While three of the MAT1008 assignments are based on previous assessment, they are put in a nursing context to increase relevance.
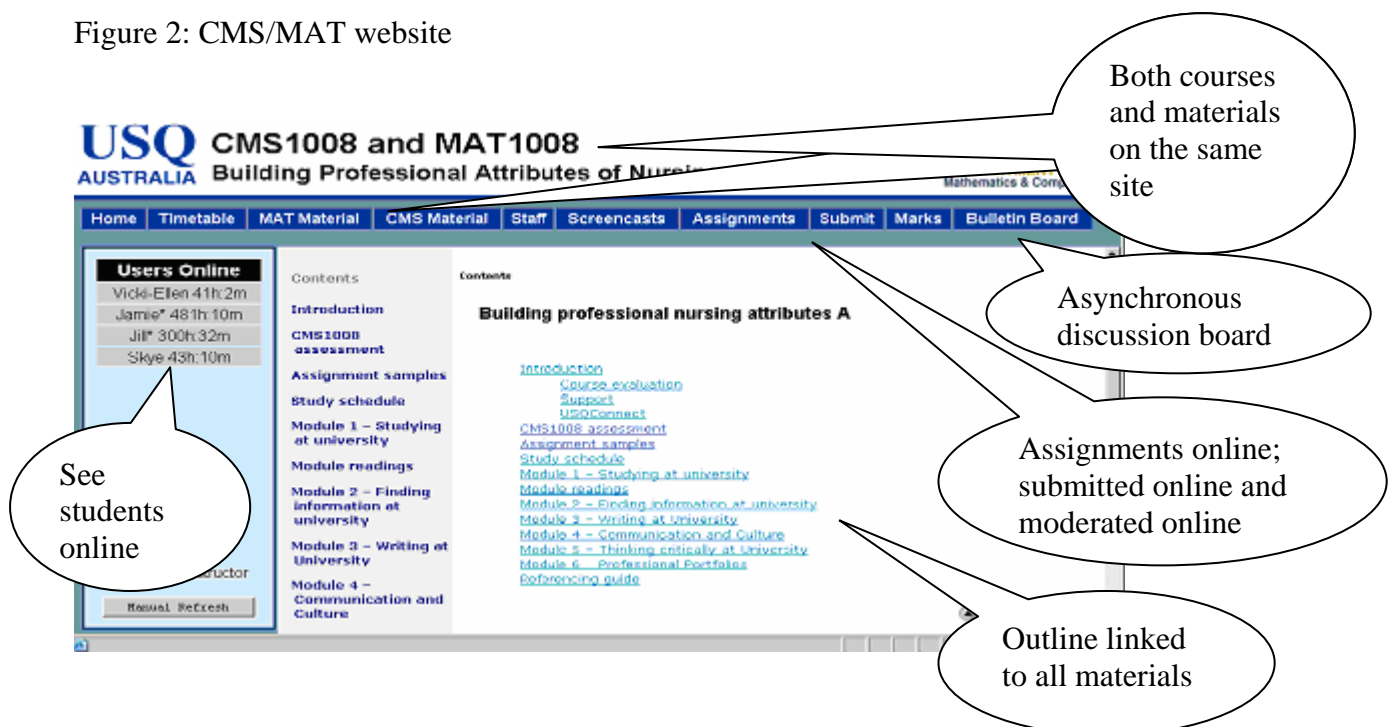
Management systems

Two systems, one a learning management system and the second, a content and authoring management system, support the two courses. Since computing competencies are part of MAT1008, it was decided to structure the two courses around the development of students' e-learning and computing skills.

Learning management systems

One website for both courses was developed to enhance the courses' integrative approach. The site and all its features had been custom written in C++ for the previous cross-faculty computing course, by a lecturer in the Department of Mathematics and Computing (de Raadt et al. 2005). This website (see Figure 2), whilst not as sophisticated as content management systems such as WebCT or Moodle, has a clear structure and offers all essential features such as showing online presence, announcements, facilitated electronic submission of assignments and checking marks, and a Bulletin Board for discussion of course content and further topics. An innovative feature of the website is its interdisciplinary nature. For example, the one Bulletin Board, assignment and screen cast sites operate for both courses, contributing the holistic quality of the website Students exposed to WebCT in other nursing courses commented that the simple course site for CMS/MAT was easier to use and more reliable than their other course sites.

Figure 2: CMS/MAT website

Content and authoring management system

The material for both courses was generated through an in-house content creation system and written in multi-modal form (html for the web and CD, PDF for print). All material is made available only online through the course website which also allowed for last-minute updates on the announcement page (see Figure 3) to cater for student diversity and flexibility and to attend to any teething problems as they arose, an important characteristic for a first course offer.

Figure 3: CMS/MAT announcements in week 14

The assessment

IT is embedded throughout both courses, and assignments for MAT and CMS have an IT component. Table 1 describes the assignments for the two courses as well as their e-components and the pedagogy underlying the assessment. Some assignments require students to complete peer reviews using the automated system available through the website (de Raadt et al. 2005). As the courses are process orientated and geared towards and facilitating students' demonstration of key university literacies, the course team prioritised progressive assessment rather than exams; and a workshop format, rather than lectures for course delivery.

Table 1: MAT1008 and CMS1008 assessment

	MAT1008 description	E-assessment tools	Pedagogy
1	Post a message on the Bulletin Board; Send the message with an attachment via email to tutor; Mathematical Skills Audit. Reflections for e-portfolio.	Bulletin Board; email; Self-test	Ensure all students have basic skills of email and posting messages and are aware of their mathematical skills (formative and self audit); ensure all students engage early with material and with tutor
2	Format and develop a resume and paste into e-portfolio; submit the assignment electronically; complete peer review of others' assignments	Peer review	Develop students' nursing resume capabilities and word processing skills
3	Article review/critique (this assignment is also submitted to CMS1008 as assignment 1)	Peer review	Facilitate students' development of advanced word processing skills as well as graph interpretation skills
4	Create a spreadsheet with formulae	Peer review	Develop students' interdisciplinary

	and create a graph		skills in linking their graphing skills across courses with the use of spreadsheets
5	Create a power point presentation to describe a drug and its administration	Peer review	Ensure students know and master and demonstrate the principles of effective power point presentations and understand the basic principles of drug administration
6	Redo Self-test	Computer Marked Assessment (CMA)	Enhance students' awareness of their developing capabilities by repeating the self-test as a CMA assessment in Assignment 1

	CMS1008 description	E-assessment tools	Pedagogy
1	Article review/critique (this assignment is also submitted to MAT1008 as assignment 3)	Databases Peer review	Facilitate students' engagement/mastery/demonstration of academic, communication, learning, research and information discourses
2	Proposal/draft for NUR1120 Social Determinants of Health or NUR1140 Responsible Nursing Practice assignments (Formative assessment)	Email and track changes (formative assessment)	Develop students' academic, referencing and research skills and ensure that they are able to apply them across different disciplines and subject areas
3	Professional e-portfolio	Undergraduate learning profile inventory; e-portfolio	Develop students reflective, learning and evidence-building skills. Develop and build students' graduate attributes, career development, life-wide and lifelong learning skills as well as their nursing competencies.

MAT1008

In MAT1008, there are six short assignments, starting with the very basics of computer, internet and email use, as well as a self-reflection on current mathematical skills. The second assignment is put into the nursing context, asking students to compose a resume to apply for a nursing position, and at the same time, practice word processing skills. This and the following three assignments ask students to critically reflect on other students' work by completing two peer reviews after submission of their own work. These assignments require students to demonstrate computing skills in particular areas, for example word processing, spreadsheets, presentations and use of databases, all in the context of nursing. The final MAT1008 assignment is linked to the first assignment by repeating the self-test to validate student learning.

CMS1008

CMS1008 assignment 1 is also MAT1008 assignment 3, the article review/critique. This joint assignment links into other nursing courses in that the topic of the article stems from the assignment topics in the parallel nursing courses. Students are asked to: select a research article from the academic databases (after participating in information literacy classes); summarise the article (using learning skills made explicit in the workshops); evaluate its structure (after being introduced to positivist, interpretive and critical paradigms and qualitative/quantitative research methodologies); critically evaluate the article's authority, accuracy, currency, relevance, objectivity and stability; conduct electronic peer reviews of other students' assignments; write the article in appropriate correct word format; and correctly insert a graph from the article into the assignment and critique the graph. These last two objectives are assessed in MAT1008.

CMS assignment 2 comprises the plan/draft for a parallel nursing assignment. Students submit their drafts electronically, suggested changes are tracked and the document is returned, also electronically, to students so that they can utilize the feedback provided when writing their parallel nursing assignments.

Assignment 3, the e-portfolio, includes pieces from the other courses being studied, for example, the MAT assignment 1 reflections and assignment 2 resume as well as students' nursing competencies developed in the *Responsible Nursing Practice* course. Whereas the portfolio was submitted as a word document in the first offer, it is planned to provide a web portal for development and submission in the future, courtesy of a university-wide e-portfolio initiative.
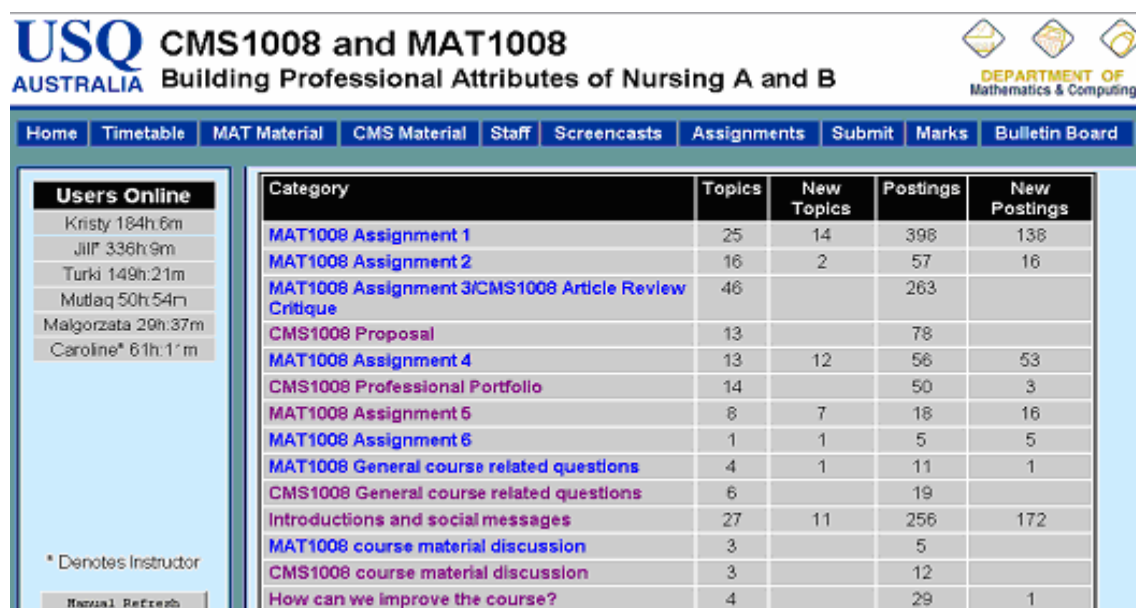
E-assessment tools

The following e-assessment learning tools, outlined in Table 1, are used in the courses. These tools have two purposes. One is directly linked to assessment, the other is to enhance and scaffold learning. While these tools were developed and successfully trialed individually by others, in our two courses two new aspects emerge. We have integrated and adapted the tools to suit the nursing context and allowed for joint assignments across courses. The interrelationships between the two courses and parallel nursing courses are also innovative.

Bulletin Board

The Bulletin Board (see Figure 4) is used as an assessment tool where students are required to post their reflections (MAT assignment 1). It is also the forum to address students' queries and build their confidence about their assessment practices across the two courses. These resources facilitate students' sense of connection/learning and give them opportunities to develop their study groups, learning circles and networks. In addition it provides feedback to staff about the efficacy of their e-assessment and pedagogical decisions (see later section).

Figure 4: CMS/MAT Bulletin Board overview in week 14

USQ AUSTRALIA CMS1008 and MAT1008 — Building Professional Attributes of Nursing A and B — **DEPARTMENT OF Mathematics & Computing**

Home | Timetable | MAT Material | CMS Material | Staff | Screencasts | Assignments | Submit | Marks | Bulletin Board

Users Online
Kristy 184h:6m
Jill 336h:9m
Turki 149h:21m
Mutlaq 50h:54m
Malgorzata 29h:37m
Caroline* 61h:1'm

* Denotes Instructor

Manual Refresh

Category	Topics	New Topics	Postings	New Postings
MAT1008 Assignment 1	25	14	398	138
MAT1008 Assignment 2	16	2	57	16
MAT1008 Assignment 3/CMS1008 Article Review Critique	46		263	
CMS1008 Proposal	13		78	
MAT1008 Assignment 4	13	12	56	53
CMS1008 Professional Portfolio	14		50	3
MAT1008 Assignment 5	8	7	18	16
MAT1008 Assignment 6	1	1	5	5
MAT1008 General course related questions	4	1	11	1
CMS1008 General course related questions	6		19	
Introductions and social messages	27	11	256	172
MAT1008 course material discussion	3		5	
CMS1008 course material discussion	3		12	
How can we improve the course?	4		29	1

Where it became apparent that a large number of students struggled with an assignment concept for the computing component and asked for help through Bulletin Board and/or

email, screencast videos were recorded for appropriate topics to provide an audio/visual explanation to all students, rather than respond text-based. For instance screencasts covered the creation and up-dating of a Table of Contents, required for both the MAT assignment 3/CMS assignment 1 and CMS assignment 3, and the development and analysis of graphs and charts.

E-mail and track changes in assignments

Not all nursing students have used computers, email or the internet before starting study. At this university less than half of nursing students enroll directly from school. Some mature age students need hands on explanation about how to send an email, and struggle with the concept of an email attachment. For this reason, MAT assignment 1 asks students to copy and paste their Bulletin Board message into an email, and attach a file to this email. This enables them to learn how to use communication tools right at the beginning of their study. For others who are comfortable with the technology, this early assignment raises the awareness of social presence of both the instructors and fellow students.

E-mail is also an essential tool in addressing students' queries and building their confidence about their assessment practices in CMS1008. Students' assessment choices in relation to their article selection and the development of their CMS assignments were sent via email, checked, and then returned with changes tracked in a word processing document. Through this approach students are provided with the opportunity to have their draft assignments checked and/or edited as a form of formative assessment designed to enhance students' mastery of academic literacy (Yorke 2004).

Self-test, computer marked assessment and online inventories

Self-test is an online resource designed by a colleague (Taylor 1998) and adapted for nursing students. It is an innovative self assessment package linked with online learning resources. The package is characterised by its open structure (not based on multiple choice questions), its ability to allow students to see a variety of different pathways to a solution to a mathematics question. For each question students are also asked to rank their confidence with their answers. Students mark their work themselves. On the completion of Self-test the package delivers students a plan for future study (online) linked with discipline specific learning modules. Students have to print out this study plan and comment on it for assignment 1 in MAT1008. The Self-test is a formative piece of assessment.

The computer marked assessment (CMA) for Assignment 6 is identical to the mathematical skills test undertaken by the student in assignment 1 (the Self-test) except that it is now a summative assessment item to assist students to acknowledge their progress. It is marked by the computer and consists of 36 questions that were developed in consultation with nursing lecturers and identified as representative of mathematics skills needed in nursing.

The course team understands that there are inter-relationships between students and institutional and pedagogical factors which are critical in students' transition (Lawrence 2006). Moreover, students' success depends on how well differences between these and the university culture are addressed and bridged. A critical first step is students' understanding of their own learning strengths and weaknesses and their academic and numeracy capabilities. The courses integrate formative e-assessment and an on-line inventory of students' competencies and learning approaches to enhance students' self awareness and to assist them to formulate their learning plans and goals. MAT1008 assignment 1 includes students' reflections about their mathematical, computing and communication skills which students post on the CMS/MAT

Bulletin Board and then email (and later use as a reflection in the CMS e-portfolio), and the Self-test, mentioned earlier.

Students also complete an On-Line Learning Style Inventory which helps them understand their learning profiles in relation to their conceptions/applications of knowledge, approaches to study, individual differences (personality, motivation, strategic flexibility and other self-regulatory processes) as well as their development of technological and academic numeracy (see Figure 5). The Learning Inventory is part of a current research study being conducted by a USQ research team. As a result of feedback obtained in 2007 the Learning Inventory process will be improved in 2008, in particular in relation to students' receipt of immediate feedback that is more user friendly to nursing students, unfamiliar with the psychology discourse previously employed by the Inventory feedback.

Figure 5: Undergraduate learning project sample

Please indicate your relative agreement or disagreement with these comments about studying	Agree	Agree somewhat	Unsure	Disagree somewhat	Disagree
When I'm working on a new topic, I try to see in my own mind how all the ideas fit together.	○	○	○	○	○
I often worry about whether I'll ever be able to cope with the work properly.	○	○	○	○	○
Often I find myself questioning things I hear in lectures or read in books.	○	○	○	○	○
I feel that I'm getting on well, and this helps me put more effort into the work	○	○	○	○	○
I concentrate on learning just those bits of information I have to know to pass	○	○	○	○	○
I find that studying academic topics can be quite exciting at times.	○	○	○	○	○
I'm good at following up some of the reading suggested by lecturers or tutors.	○	○	○	○	○
I keep in mind who is going to mark an assignment and what they're likely to be looking for.	○	○	○	○	○
When I look back, I sometimes wonder why I ever decided to come here.	○	○	○	○	○
When I am reading, I stop from time to time to reflect on what I am trying to learn from it.	○	○	○	○	○

Electronic submission and peer review

All CMS and MAT assignments are electronically submitted and moderated through the course site (see Figure 6). Once CMS assignments have been marked they are returned to students via email which facilitates immediate feedback to students. Changes are tracked by the CMS instructor and e-mailed along with the assignment's marking criteria or rubric. MAT assignments are marked using clear marking criteria, and marks and feedback are once again made available through the course website. In addition, for most MAT assignments and one CMS assignment, students are asked to review two other students' assignments. These reviews form part of the assessment in two ways. First, students receive marks for completing other students' reviews. Second, students receive a mark in relation to their own assignment. This mark is moderated by the tutors who check for consistency. In addition, students are able to compare the academic standard of their work through the peer review process. In fact they are placed in the position of the marker who needs to make sense of a student assignment.

Figure 6: CMS assignment 1 moderation page

Databases

The databases are directly linked to assessment in that CMS assignment 1 requires students to select an appropriate article from the electronic databases to assist them build research bases for their parallel nursing assignments. Students' use of the databases also enhances their familiarity and engagement with the demands of research literature as well as the different research methods and referencing styles.

E-portfolio

The e-portfolio comprises an assessment item in CMS1008. Most of the first semester first year assessment items are also incorporated in the portfolio, either as part of the content (for example, the MAT reflections and the *Responsible Nursing* course's development of students' nursing competencies) or in relation to students' reflections about their assessment and learning experiences during the semester.

The e-portfolio however is also included as a learning tool, enhancing and scaffolding students' life-wide and lifelong learning skills as well as the development of their nursing competencies and graduate attributes (European Institute for E-Learning 2007; Stefani, Mason & Pegler 2007). Furthermore the portfolio has other learning benefits for students: it encourages them to set goals for the future and collect evidence of their learning and work experiences which they can then easily access and customise to respond to employment requirements; it facilitates students' development of their learning goals and assists them to document their learning outcomes and achievements; and it helps students to make meta-cognitive connections across the full range of their experiences and learning, enabling them to understand their overall learning experience beyond the confines of individual courses and assessment marking grids (Harper et al. 2007). Moreover, the portfolio encourages students' development of key personal and critical literacies, including reflection and communication skills, information, technological and research skills. It also assists them to collect and build evidence to effectively demonstrate these skills and competencies. Additionally, the portfolio supports students' abilities in using and exploiting technology for professional and personal purposes.

Evaluative feedback of pedagogical approaches and e-assessment choices

Methodology

As foreshadowed in the introduction, an ongoing evaluation (Taylor & Galligan 2002) of the effectiveness of the two courses was conducted throughout the planning stages, during the courses' first offering and in the lead-up to the second course offering (see also Figure 1). At each stage different evaluation strategies were taken, both formative and summative. Table 2 summarises the strategies taken in each stage.

Table 2: Relationship between the evaluation stages and strategies for the Nursing courses MAT1008 & CMS1008.

Evaluation Strategy	Pre-program	Program Design	Program Delivery	Program Conclusion
Use of previous student surveys of courses including those that were replaced by current courses	✓	✓	✓	✓
Weekly then monthly discussions with 1st year nursing lecturers (and as needed)	✓	✓	✓	✓
Reflections in assignments			✓	✓
Survey (83 students)			✓	✓
Student evaluation of teaching (Toowoomba campus CMS n =127 out of 174, MAT n = 23 out of 184 enrolled students.)			✓	✓
Bulletin Board			✓	✓
Debrief with 1st year nursing lecturers & presentations to university				✓

The above evaluation methodology is ongoing and will be repeated for the 2008 offer of the two courses. Examples of evaluation strategies are outlined below.

Pre-program stage
In the pre-program stage, the design team took advantage of their experiences in previous development of curricula for nurses in their respective areas and had extensive feedback from students. For example, each year, evaluations on numeracy workshops had been undertaken and qualitative research on nursing numeracy provided valuable insights into nursing needs (Galligan & Pigozzo 2002) and a mathematics audit had been completed in 2001 (Galligan & Taylor 2004).

Program design stage
Program design was influenced by regular meetings with nursing lecturers to fine tune assignment items and schedules. Ongoing feedback was obtained from the nursing program's first year first semester planning team during the design period, as well as from the program co-coordinator and the leaders of the first year, first semester nursing courses.

Program delivery stage

During delivery, continuous evaluation was conducted, obtained both from structured reflections in assignments and from unsolicited feedback presented in emails and Bulletin Board submissions. Lecturers actively sought student submissions on the Bulletin Board.

Program conclusion stage

Two independent formal student evaluations were carried out at the conclusion of the semester. One was specifically designed by the team, an online end of semester survey of students, and the other, the standard university course survey (SEC).

The on-line survey, situated on the MAT/CMS web site, comprised both quantitative and qualitative items with a sample size of 83 from a cohort of 228/235 students completing the CMS/MAT courses (across both campuses). The online survey was felt to be necessary as the design team needed more specific feedback about the e-learning and e-assessment components of course design, topics not covered in the more standard SEC evaluation, and because of the low response to the MAT SEC.

The SECs were administered, collated and analysed independently by the university's Planning and Quality Office. The CMS attendance (n=127) during evaluation was considerably larger than the MAT response rate (n=23) for three reasons: CMS students were expected to attend tutorials until the end of semester whereas MAT students could finish the course earlier dependent on their levels of computer and maths skills; only two of the MAT classes were evaluated; and some students were on clinical in hospitals.

Staff feedback was collected from the course monitoring teams, who submit a report to the faculty at the end of each course offer, the first semester nursing course teams and peer review. Debriefing meetings with 1st year nursing lecturers were also conducted through out the teaching cycle and in the debriefing and pre-planning stages for the next course offer. A presentation to the wider university, during a *Learning and Teaching Best Practice Showcase Week* held in January 2008, also assisted in the pre-planning stage for the next program cycle.

In this next section we will highlight findings from the ongoing evaluations. The feedback is categorised in relation to the e-assessment and e-learning tools prioritised in course design and delivery: the online management system, the Bulletin Board, e-mail, the CMA, Self-tests and inventories, electronic submission and peer review, databases, and the e-portfolio. We also mention changes that will occur for the next offer of the two courses, guided by our evaluation processes.

Findings

Online management system

In the planning stages the design team was able to seek and utilise feedback from the nursing program as well as build on the strengths of prior courses. Curriculum decisions about the interdisciplinary approach, the interrelatedness of assessment and the e-learning and e-assessment choices were debated by the team and agreed to by staff. Some, for example the incorporation of a Tiki-Wiki based content management system to be used as a social platform for all first year nursing students (driven by the MAT course), or a Drupal online community of practice site for course development and teaching staff, were negatively received by the nursing department and abandoned as a consequence. As the semester progressed staff and student data revealed teething problems which were either resolved immediately or put on hold to be dealt with in the 2008 course offer. For example, while the nursing courses were using the then

university learning management system WebCT, the CMS/MAT site was built on the Department of Mathematics and Computing's simple web platform (de Raadt et al. 2005). This led to initial confusion especially for students confronting online management systems for the first time. As a consequence, students attending MAT classes were explicitly offered support with the WebCT environment. This problem will be resolved in 2008, as the university has moved to the open source platform Moodle and the MAT/CMS site will be integrated in this system.

The e-portfolio[1] provided positive feedback in relation to the online presence. For example:

> When I first started at university I was very surprised with how much on-line content there was. Now that I have come accustomed to it I can see how useful it is. It is very easy to use and contains all of the information that I have required.

The end of semester online survey also yielded positive responses:

> I liked the fact that we could do all of our units online, this was great and very efficient.

> The CMS and MAT website was very helpful. Being able to use this site and access class times, sample assignments and power point's helped an immeasurable amount. Being able to ask questions to other students or instructors at all hours of the night or day was great.

Bulletin board

The extensive use of the Bulletin Board points to its effectiveness as a communication forum: by week 12 of the semester (out of 15 weeks, including the mid-semester break), CMS1008/MAT1008 students had posted 1191 messages. The analysis of Bulletin Board data, more importantly, also suggests that the courses were being positively received, for example in relation to the pedagogical decisions reached by the design team:

> I love how each subject interacts with one another. I am currently working on my NUR1140 assignment, and love how Jill's Proposal draft assignment has helped so much in the layout. And love the advice on using 2-3 references per body paragraph, makes it sound so much smarter.

Bulletin Board data also reveals the students' positive attitudes to, for instance, the web site. The following example posted on the Bulletin Board by a CMS student under the section "How can we improve the course" highlights the importance of the Bulletin Board as a "venting space" across courses:

Hi I am just writing to say that i really like how this course helps out with the other courses we are undertaking. It makes so much more sense to incorporate all courses work together- and especially having CMS help with other assignments! Jill's work during tuts is great and although it must get hard to stay on top of everything- i thank you for your hard work in keeping the site info up to date. Hopefully all is going well with everyone's assignments and workloads- this topic can be our venting space, either good or bad...hope everyone enjoys our upcoming time off!

E-portfolio data also provided evidence about the effectiveness of the Bulletin Board in building students' confidence in relation to the assessment.

> I posted two messages on the Bulletin Board in the final weeks of the semester on my own free will. It was mainly due to an exam [for another course] not opening but once the exam opened I posted a message again to inform the fellow students who were also having difficulty. The Bulletin Board is really handy for checking if students have posed questions I wanted answered.

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[1] The designers recognise the potential for bias with the portfolio data, given that it was an assessment item and that students may feel compelled to write more positive than negative comments.

> I can not fault this website. It has been a constant source of reference and guidance for me throughout this semester. It is also interesting to be able to look into the discussion groups every now and then and have a look at what other students are thinking and feeling about certain things.

The Bulletin Board facilitated trouble shooting as the exchange below demonstrates:

> **Posted by: student 5:42am, Fri 16 Mar, #647**
>
> Hi I think it would be a really great idea if someone could actually help those of us with vista on our home computer. It's a bit different to what you have at uni and therefore very confusing if we are doing assignments at home. Thanks

> **Posted by: Birgit Loch (Instructor), 7:23pm, Fri 16 Mar, #660**
>
> Hi Good point, this is now on the list of improvements for the next offer. From experience, it takes universities a while to adopt a new operating system, and a new version of Microsoft Office (you probably have Office 2007?). If you have specific questions, please ask them here. We may be able to help (blindly), and possibly even get hold of a Vista computer. Birgit

> **Posted by: Birgit Loch (Instructor), 4:09pm, Tue 8 May, #1135**
>
> Hi all, we've just been given access to a Windows Vista/Office 2007 PC, and should be able to give you a hand with these now. Regards, Birgit

Bulletin Boards are not a new concept; however as a tool the Bulletin Board played a vital role in the CMS/MAT courses. Assignment tasks, for example for the computing component, were deliberately not provided with detailed step-by-step instruction. For instance, students were asked to include a header and footer in a word processing document, with no instruction as to how to do this – the course material simply mentioned that it was possible. This lack of detailed instruction led students to experiment and draw on previous skills first, and gave them the opportunity to then either ask a question on the Bulletin Board if they got stuck, or to post an answer to another student's question, as the "expert" who had figured out how to complete the task. This involved students in the Bulletin Board discussion and prompted them to start interacting with each other, rather than wait for an instructor to give a response.

Email and track changes in assignments

The extensive use of e-mail indicates its effectiveness. By week 13 the CMS lecturer had received 1704 email messages from students, including queries about assessment. Drafts sent by students were edited by the lecturer, and changes tracked and e-mailed back to students. Students have also continued to ask for e-mail advice into the next semester, for example:

> Hi Jill. I'm struggling and slightly confused with assignments this semester due to different formats or shorter versions. I'm not sure how to conclude this assignment. We don't have to use the formal way & suggestions have been made that 1 sentence is enough when writing the conclusion. I would be grateful if you could review the attached document please. I realise this is a lame question, but am I on task??? Thanking you.

CMA, self-tests and inventories

These tools were integrated into the portfolio assignment and received positive feedback:

> I found that after completing some on-line learning style tests I recognised the result to be true to me.

In the first MAT1008 assignment students reflected on their previous mathematical and computing skills and emailed their reflections to their tutor. This was later pasted into their portfolio. A student reflected about their developing skills in these areas in their portfolio:

> Through attending the MAT1008 class, I have gained an enormous amount of knowledge. When I first started at uni I did not know how to work a computer, I had no idea even how to turn one on, the MAT class has given me a better understanding and the confidence to try things on the computer, I am no

longer frighten of computers. The drug calculations have also helped me understand maths more easily, and I feel that I will benefit from this knowledge next semester.

Electronic submission and peer review

Electronic submission was very well received as the following portfolio reflections attest, although some constructive feedback was also provided:

> I also liked the idea of electronic submission. The only negative I have regarding this is that most assignments for CMS and MAT the cut off time is 8:59 am where as it is a lot later for other subjects.

> Submitting the assignment for MAT and CMS was quick and easy. When the assignment was finished, by simply hitting submit and uploading the right file the assignment was submitted. No running around and/or attaching a marking sheet. The instructor giving you comments was also a helpful way for me to see where I may have gone wrong.

The online survey feedback was also positive about electronic submission:

> i love online submission! i think every course should have that option! and use this homepage!

Submission difficulties which stemmed from the file sizes of the portfolio and MAT assignment 3/CMS1008 assignment 1 (some reached a few MB due to uncompressed images) were overcome by changing the accepted file format. Already submitted assignments were converted without difficulty.

While in MAT the peer review was generally positively received, which is in line with previous findings (de Raadt et. al. 2005), surprisingly the reverse was true for the CMS peer review. Most comments about the CMS peer review were negative like these from the online survey:

> Peer review showed me what the assignment should look like. It didn't help me with doing my own better.

> I don't think enough information about the peer reviews was given before we had to do them.

Bulletin Board comments about the peer review component were also negative:

> ok, i'm a little annoyed at the fact that i actually put some effort into my reviews suggesting ways of improvement etc when i look at other students having reviewed my work they write 'well done' even if they haven't checked some of the criteria...isn't the whole reviewing thing meant to be a learning curve and how can someone learn if the person doing the reviewing doesn't write why they didn't check 2 of the criteria.

While students were able to identify if a fellow student had included a particular format in a word processing document or created a graph correctly in a spreadsheet, they appeared to be unsure about higher order concepts in the CMS article review/critique, such as whether an article was a literature review or used a quantitative or qualitative methodology (peer review criteria need to be phrased so there is only one correct answer, tick or no tick). In order to complete their reviews, students often ticked boxes incorrectly for CMS and wrote comments that were not aiding the reviewer's learning process. There were some positive remarks however, like those from the portfolio below:

> It has been useful to be able to view other student's assignments. Not only can you view them, but you have the criteria sheet to be able to complete your own assignment correctly. Some of the assignments I have viewed have made me think mine are really good. Others have given me ideas to use in the future.

> The peer reviews were a way to reassess your own work and acknowledge where you may have gone wrong. Giving helpful and positive remarks to others students also helped to give them feedback for future assignments.

The peer review system provided students with the option to flag a review if they were unhappy with it. While this was successful for MAT, CMS students were still unhappy and as a consequence, the peer reviews will remain in MAT for 2008 though not in CMS.

Databases

The portfolio was a fertile source of data about the usefulness of the databases:

> Before I began studying at USQ I had heard of a database but didn't actually know what one was. I completed the beginners' library course which showed me how to access the database and use it at a basic level. At first I didn't like using the database as a source of information as I found it difficult to use the search facility and find the information I was looking for. However, one of my assignments required me to use the database as my main referencing source which forced me to practice using it and become more familiar with the system. Now that I am more familiar with the system, I found that I used the database as a source of information in the majority of my assignments in the later half of the semester. It has therefore proved to be a useful tool.

While we realized the importance of students developing their database literacies, the assignment that required their use was too open to interpretation. Therefore, in 2008, students will be provided with a limited selection of articles each containing a graph to analyse, rather than being asked to find one containing a graph themselves. However they will still be required to copy and paste the graph into their article and demonstrate their database skills by selecting an additional database article for a parallel nursing assignment and writing a brief annotated bibliography of the article.

The e-portfolio

The e-portfolio assignment yielded a great deal of positive feedback, for example:

> The writing of this portfolio has been quite a challenge for me. I thought that it would be straight forward and a lot like writing a resume. As I found out though, it was a lot more complicated and involved reflecting on what I know and what skills I have in the clinical area. It showed me a lot about myself and allowed me to explore areas of difficulty in depth.

> This portfolio has really made me express myself in many ways that I have not expressed myself before. I have reflected a lot and have been able to strive within myself through these reflections. The reflections have shown me how I am able to change and learn from my mistakes and improve in areas that need improving. This also shows that I am able to work with others and change ways in which I work to adapt to others.

However the online survey revealed negative comments in relation to the size of the portfolio and the perceived effort required to complete it:

> The portfolio takes valuable time away from more nursing oriented subjects.

The high student workload across the courses was identified as a problem, particularly as an assessment overview of all first semester courses was summarised on the CMS course content site. In the next offer the portfolio will be refined and in a future semester utilise a new university-wide web template.

More generally the SEC results confirmed the positive anecdotal and other evidence collected. The results for all 17 questions were well above the Faculty and USQ averages. For example, for the question *the assessment tasks were appropriate to the aims of this course*, the class mean for CMS was 4.12/5 (USQ mean = 3.69/5). For MAT the class mean was 4.39/5.

Improvements

The pedagogical and e-assessment feedback obtained though electronic discussion groups on the Bulletin Board, reflections in assignments, emails, the SEC and the end of semester

online survey fed into our ongoing evaluative processes. The lessons we have learnt from this approach were incorporated into both the delivery of the course as it happened and will lead to further improvements in the next offer of the two courses.

Generally: Evidence collected from staff and students suggests that more consideration needs to be given to students who are not enrolled in both courses and those who already have most of the skills in the two courses. It also indicates that the amount of content proved to be too ambitious for a first year semester 1 course and needs to be streamlined. Other improvements were triggered by comments which recommended changes to the CMS criteria marking sheets, the e-portfolio assignment and the class contact time.

MAT content: It was decided to remove the spreadsheet module from the course material, and also reduce the number of assignments by one to reduce workload on students.

MAT type of assessment: For the next offer, regular CMAs will be introduced in mathematics to engage students to more regularly self-reflect on their mathematical skills. This will take the need for mathematical questions out of some of the MAT assignments, where students can then concentrate on the computing component.

Interdisciplinary integration: For the 2008 offer of MAT, it is planned to integrate the presentation assignment more closely with a nursing course. The content of the presentation will draw from the nursing instructions, where the presentation will also be delivered in front of an audience in class. The form and format of the presentation will be assessed in the computing component. This assignment will not be subject to peer review, as students are instructed to work in groups in the nursing course and will have undertaken peer review through collaboration.
The CMS integration with MAT and parallel nursing courses was so successful that students demanded (in the SEC qualitative feedback) that CMS sessions be held weekly to take full advantage of the help that this course offers students. This will be implemented in the next offer.

MAT/CMS article review/critique assignment: In 2008 we will restrict the choice of article for the article review/critique because students' inabilities to choose graphs that were suitable to interpret at their level. However students will still be required to find one additional article, relevant to an assessment item in a parallel nursing course, though without a graph, and write a five line annotated bibliography on the article. Also in 2008 the design team, as a result of feedback about the database related task, has decided to incorporate Willison's (2007 cited in Pierce et al. 2007) research matrix. This matrix maps the development of students' research skills explicitly and is the basis of an Australia-wide project on enhancing the development of students' research literacies. This will mean further changes to be evaluated in the next offer.

CMS e-portfolio: During the first semester of offer, it was necessary to reduce the length and content of the e-portfolio assignment since the initial version was too ambitious for novice university students. This was favorably received by the student cohort. This issue will also be revisited in 2008. In 2008 we will divide the portfolio into two sections. Part A will encompass the preliminary sections like the introduction and a photo, the Learning Inventory results and reflections, and the MAT assignment 1 reflections and will be submitted as assignment 1. It is hoped that this early assessment piece will motivate students to begin the portfolio process and to start their reflections and evidence building at the beginning of the

semester. Part B of the e-portfolio will incorporate Part A as well as progressive reflections and evidence in relation to the USQ graduate qualities and the professional nursing competencies. The course will also take advantage of a university wide web-based portfolio system to be introduced in 2008.

Peer mentoring: The collaborative approach to the development and delivery of the two courses was extremely time-consuming. In 2008, expert students will be invited to assist in mentoring less familiar students, particularly on the online forums.

Discussion and conclusions

This paper has outlined the relationships between pedagogy and e-assessment in the new nursing program. It described and reviewed the continuous methodology; the e-tools; the management system, the lessons and the improvements.

The continuous evaluative processes at the heart of the methodology had a direct impact on our teaching and enabled the design team to respond to issues as they arose and to modify and improve the course in the delivery stages. It also allowed us to respond to our stakeholders – our students, the nursing department and demands of the profession quickly and efficiently.

The e-tools used in assessment, such as peer reviews, Self-test, Bulletin Board, CMAs and inventories were positively received by students. In particular the integration of assessments assisted students in other courses and helped them to think of first year in a more holistic way, not just as an isolated set of five courses.

The management systems assisted the CMS/MAT team's effectiveness in achieving their goals. The content and authoring management system, for example, allowed the authors to easily incorporate multi-media features to support learning. The learning management system was highly praised by the students as being easy to use and helped them to connect with their assessments, material, fellow students and the instructors. The innovative feature of the joint website appeared to work well, both for the students and the tutors. It is hoped that it can be incorporated and extended in the future.

While there are lessons to be learned and improvements to be made, the feedback suggests that students are extremely supportive of the courses. Overall the e-assessment responses and the feedback received suggest that our embedded and scaffolded approach assists students to develop the nursing and academic attributes they need to succeed at university. For instances the pre and post test results in mathematics and pre and post reflective comments (in the online survey, the SEC and the portfolio) by students provide evidence of increased confidence and competence in numeracy, as well as IT, academic, research and communication skills. Teamwork, study and reflective and evidence-building capabilities related to university and discipline requirements were also favorably mentioned in the feedback.

Finally, our collaborative approach was highly rewarding in one further sense. It was a contributing factor in the appointment of one of the authors as Associate Dean (Learning and Teaching) and for her national Carrick award for teaching excellence. The other two authors benefited in the form of a Carrick Citation for student support and a Faculty Teaching award.

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