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The Effectiveness of Online and Mobile Learning for Nursing Students

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Abstract

This study came about as result of a project undertaken at the College of New Caledonia, Prince George, British Columbia. The project in question was designed to look at the effective uses of online and mobile learning for nursing education when teachers and administrators at the college identified a need to develop greater delivery options for students in the Northern Baccalaureate Nursing Program.

The effective uses of online and mobile curriculum content, perceptions and attitudes towards these learning modes were an integral part of this study. The data gathered for this study was derived from surveys of students and of teachers as well as the gathering of teachers’ weekly logs. The participants were invited to respond to an anonymous survey on a weekly basis that charted their usage of the learning management system (WebCT™) in terms of frequency and curriculum content utilized. Both students and teachers were also provided with a self-contained learning module delivered via a Pocket PC mobile device, which included material relevant to their clinical practice at the local hospital during that semester. The mobile material was designed in such a way that the student could review pertinent medical terms, concepts, instructional video clips and then complete a self-assessment quiz all as part of the module created for a Pocket PC.

It was found that the provision of resources for nursing through both online and mobile technologies was beneficial in terms of the greater course access it provided for students as well as increased teaching opportunities for teachers.

The study concluded that the expanded delivery modes of online and mobile content had a positive impact on the experience for the students as well as providing increased opportunity for teachers to use collaborative and constructivist learning techniques through the use of educational technology such as online delivery and mobile devices.
Chapter 1 - Introduction

This study is set in the College of New Caledonia, British Columbia, Canada, which in its strategic planning for 2006 –2010 identified educational technology as a focus for research and development. Up to this time the college had not fully embraced the use of educational technology such as online learning, desktop videoconference tools, and mobile devices for teaching or fully exploited the capacity of learning management systems such as WebCT. The college is striving to keep pace with competing institutions, especially in teaching courses (individual subjects) or entire programs in either blended (a combination of face-to-face and online teaching) or fully online mode. The realities of the increasing competition for students between colleges have forced the college administration to review and implement new educational technologies to enhance the teaching/learning experience for both teachers and students.

The integration of online education has created many challenges, either technical or pedagogical, for teachers and students alike. Students now demand that certain educational technologies such as WebCT be utilized to augment classroom delivery. Such a demand requires increasing resources to deal with this new aspect of educational delivery while technical and course design issues also need to be addressed. In turn, the students also now require assistance in technical areas, to ensure that they posses the skills necessary to use the technology effectively.

This is a study of a project involving the implementation of online and mobile learning for nursing education through the Northern Collaborative Baccalaureate Nursing Program (NCBNP) offered at the College of New Caledonia. The use of Pocket PC devices as a teaching tool is an innovation that allows the students to access instructional video and related curriculum using a portable and affordable technology. Pocket PC mobile devices can be described as handheld computing devices that use a Microsoft operating system, have the capability of containing varying types of software, and can be synchronized to any PC computer. The use of the Pocket PC devices as learning and teaching tools rather than just an electronic referencing tool is an innovative practice that allows the students to access instructional video and related curriculum content using a portable and affordable...
technology. Currently, students in the program use mobile devices only to access electronic reference material such as medical drug guides, dictionaries and diagnostic reference. As a result of the curriculum design and development that has taken place over 2005 to 2006, students have access to both online course content delivered in a blended mode as well as individual self-contained modules delivered on mobile device Pocket PC unit.

**Research Questions**

The main research question driving this study is *How can a blended online component be effectively implemented in clinical based courses?* Sub questions from this are:

- How can teacher’s best integrate the online curriculum to foster collaborative learning for their students?
- What benefits does curriculum delivered by mobile devices have for students in terms of overall access to content?
- What are some of the barriers to integrating both online and mobile curriculum content and how can they be overcome?
- What is the influence on learning for students accessing both the online blended courses and utilizing the Pocket PC mobile devices?
- What additional support is required to maintain both online and mobile technology for students and teachers?

**Issues Related to the Study**

The thematic concern that forms the basis for this inquiry stems from an existing degree program in nursing that is being adapted for both online and mobile delivery. The degree program has been historically taught in a face-to-face setting and the demand for the program combined with the growing need for nursing professionals in British Columbia has necessitated the need for a program delivery review in order to accommodate the growing student base. There are also other larger issues around course delivery:

- Issues relating to meeting student needs for educational access.
- The changing landscape of educational technology in terms of both online and mobile delivery.
- Providing access for students in northern provincial Canadian communities to increase flexibility in delivery.
- Fostering collaborative learning communities within the college.
- Overall perceptions of utilization of online learning management systems by teachers and students.
• The skills and training required for teachers and students to access and utilize online blended delivery courses and Pocket PC mobile devices.

This research project will examine how the current classroom curriculum can be re-designed for online delivery and also for use on a personal digital assistant (PDA). The use of a PDA by nurses to access clinical reference material, drug information and medication dosing is standard practice both in education and industry settings. Students enrolled in the NCBNP program are required to use a PDA as part of a clinical practicum course. The PDA usage aspect includes the production of video segments depicting medical procedures or diagnostic situations, which would then be delivered via the PDA for students to access at any time. As is the case for many students using a PDA in the health care area, they currently use it as a resource tool to access medical journals or drug information; ‘medical students can use PDAs to get medical information during their practice period, instead of consulting bulky, printed books that might not be accessible at the location’ (Strandvall, 2003, p.3). The course curriculum will also be delivered online thus creating greater access to course content, group assignments, and instructor lead discussions through the use of WebCT.

Definition of Key Concepts

• **Online teaching and Learning**
  There are many terms for on-line education. Some of them are virtual education, internet-based education, web-based education, education via computer-mediated communication. Desmond Keegan (1995) provides another definition. He states that distance education and training result from the technological separation of teacher and learner which frees the student from the necessity of traveling to “a fixed place, at a fixed time, to meet a fixed person, in order to be trained” (p.7). Desmond Keegan’s (1988) definition provides insight into the concept of online teaching. It is by:

1. The separation of teachers and learners which distinguishes it from face-to-face education;
2. The influence of an educational organization which distinguishes it from self-study and private tutoring;
3. The use of a computer network to present or distribute some educational content; and
4. The provision of two-way communication via a computer network so that students may benefit from communication with each other, teachers and staff

- **Mobile Devices**
  A mobile device is recognized as a handheld computing unit that is used for a multitude of tasks that are commonly found on desktop computers such as email, wireless web browsing, word processing and time management. Specifically, a Pocket PC mobile device is a handheld computing unit that uses the Microsoft operating system and is also capable of storage of information and playback of video or audio files.

- **Collaboration**
  Collaborative learning can be initiated in a variety of scenarios as a way of increasing students overall involvement in their education. Collaborative learning groups can be formed for many purposes to get students engaged bound up with the subject matter in any discipline. This might happen online, in a laboratory, in the field, in a classroom (Nobel, 2002).
Chapter 2 - Literature Review

Research into the use of both online learning and mobile PDA devices in education extends over many fields of study. For this project, a focus has been the areas of mobile devices utilized by nursing and health care while the research into mobile technology use in a wider field of education has also been reviewed. The broader literature relating to teaching online as well as collaborative learning and instructional design has also been reviewed in this section.

Instructional Design

Universities, colleges and privately funded educational institutions have adopted the online method of delivery to meet the changing demands of their student base. In doing so, educational institutions have needed to solicit assistance from instructional designers, project managers, online curriculum writers and graphic designers. Siemens (2002) defines instructional design as ‘Instructional design is the process by which instructor, computer-based or not, is created. Instructional design provides a framework for the creative process of design, and ensures the learners’ needs are met.’ (p.1). Instructional design is an integral part of educational technology and requires that course contents are organized and extensive planning be undertaken to ensure that the appropriate technology is utilized to best serve the target audience. Panitz (1996) advises that the process of instructional design is something that should not be done in isolation, as the very nature of the process demands that a collaborative approach be adopted.

Does the design and delivery of courses through e-learning present more challenges than would arise when creating a course for classroom delivery? The entire process of online course design can pose many new challenges as noted by Garrison (2003 p.78) “It is important to realize here, that the process of planning a quality e-learning experience is very likely to be more complex and time-consuming than planning a conventional classroom experience.” Without question, there are more stages and overall collaboration required in the e-learning design process than planning for a traditional classroom. However, the initial cost and time associated with e-learning have many long-term benefits that open up new opportunities for learners to access courses thereby fulfilling a need in
society that exists today. Illustrated below (see Fig. 1) are the basic stages or phases associated with the instructional design process; analysis, design, development, implementation and control/evaluation.

As noted by Kemmis and McTaggart (1988), the process of action research needs to be a group effort in order to take full advantage of the dynamic process. This research project will utilize all members of the community (students, nursing teachers, administration and research lead) and follow the action research flow of Plan, Act & Observe, Reflect, Revisit Plan, and repeat the process.

**Media Selection**

The use of media in this project is an integral part of the overall instructional design process and will serve to enhance the experience for the student. For this project it is the non-print media such as video or audio that was considered. An instructional video segment was produced based on the curriculum assessment for courses being developed. The video segments filmed at the Prince George Regional Hospital were representative of medical assessment procedures that the nursing students did as part of the clinical practicum. The use of media for these courses will serve as a dynamic reference tool for the students who are learning online and through use of a PDA, thus helping to bridge the gap from classroom to distance delivery. Panda (2003, p. 139) refers to the process of media selection for distance education can be best assisted by using an established framework, such as the following ACTIONS framework developed by Bates (1995), the acronym standing for:

- **Access**: includes issues surrounding gaining access and flexibility of the media for targeted groups,
- **Costs**: the unit cost for each technology and the direct cost to an institution,
- Teaching/Learning: identifying pedagogical approach that matches needs of the learners,
- Interactivity/User Friendliness: user interface design, interaction provided and ease of use,
- Organization: organizational structure to support technology,
- Novelty: the newness of the technology,
- Speed: how quickly can the courses be produced and revised.

The ACTIONS framework poses questions that help to identify issues in the design of technology and media for a course. Technology or media should not be additional course objectives of a course, but rather a learning object that matches the objectives of the course and also the access for the student and affordability to produce.

**Online Learning by Students**

Salmon (2004, p. 28) has developed a model for adaptation to teach online that is a step-by-step process that aids in increasing the student’s skills and learning outcomes. The five-stage model allows students to learn about the technology at the same time as learning the course content. The five stages are as follows:

1. Initial accessing of the course
2. Encouragement to establish online presence
3. Information exchange
4. Collaborative group discussions
5. Constructivist Learning

Adapting this 5-stage model will assist in the transformation of skills and knowledge for the student from basic access to higher levels of collaboration and constructivist thinking. In addition to using a handheld device in this study to gain access to course content, students will also be utilizing WebCT for the online portion of the course and as the overall computer skill level for students entering this program ranges from minimal experience to intermediate it may necessitate integrating a “building block” approach such as Salmon describes to increase skill levels.
Online/Blended Learning and Collaboration

The atmosphere in a collaborative environment dictates that more involvement in the learning process is taken on by both the student and the teacher. The pedagogical playing field is leveled, thus making the input and actions of students and teacher equal in terms of active learning. It is important to note that in a collaborative setting knowledge is not just a uni-directional process from the teacher, but takes on a different form since the knowledge is created by the group, for its own gain.

A key element in collaborative learning is the synergy (the whole is greater than the parts) that takes place among a group as they move through the stages of common inquiry in learning (Imel, 1991). As they move through these stages, learners create the knowledge base, rather than processing information delivered by a teacher. In many respects, collaborative learning also builds on and develops learners’ existing personal and professional skills, particularly the ability to work in teams or groups to create an end result (Kaye, 1992). As adult learners, we all have a significant amount of personal experience, resources and related knowledge to bring to a collaborative setting where we build on one another’s contributions.

Collaborative learning (CL) has its own structure, and this contributes to a community of learners with the following parameters:

- Both facilitators and learners become active participants in the educational process
- The hierarchy between facilitators and learners is eliminated
- A sense of community is created
- Knowledge is created, not transferred
- Knowledge is considered to be located in the community, rather than in the individual (Imel 1991 p.1)

To elaborate on the points above, the atmosphere in a collaborative environment dictates that more involvement in the learning process is taken on by both the student and the teacher. The pedagogical ‘playing field’ is leveled, thus making the input and actions of students and teacher equal in terms of active learning. It is important to note that in a collaborative setting knowledge is not just a uni-directional process from the teacher, but takes on a different form since the knowledge is created by the group, for its own gain. A key element in collaborative learning is the synergy (the whole is greater than the parts) that takes place among a group as they move through the stages of “common inquiry in
learning” (Imel, 1991 p.1). As they move through these stages, learners create the knowledge base, rather than processing information delivered by a teacher. In many respects, collaborative learning also builds on and develops learners existing personal and professional skills, particularly the ability to work in teams or groups to create an end result (Kaye, 1992). As adult learners, we all have a significant amount of personal experience, resources and related knowledge to bring to a collaborative setting where we build on one another’s contributions.

**E-Learning**

A number of impressive academic, social and psychological benefits have been attributed to collaborative e-learning in current literature (Harasim, Hilz, Teles and Turnoff, 1997; Stacey, 1999). Care, however, needs to be taken as the ‘euphoria should be tempered by the concomitant body of research’ that demonstrates a negative side to collaborative online learning (COL) environments (Karel, Kirschner and Jochems, 2002). While we acknowledge (and will later discuss) the limitations of online collaborative learning, we regard COL as a positive and productive learning process because it can:

- build personalized knowledge;
- motivate;
- facilitate reflective learning;
- bring more meaning into learning by making it situated and authentic;
- foster creativity;
- stimulate interactivity, team work and reduce feelings of isolation;
- promote cross cultural understanding; and
- improve the quality of FODE in general.

Gokhale refers to studies carried out by Johnson and Johnson (1986) who noted that “there is persuasive evidence that cooperative teams achieve at higher levels of thought and retain information longer than students who work quietly as individuals” (Gokhale, 1995 p.1). The same author also mentions Totten et al who expressed their view that “shared learning gives students an opportunity to engage in discussion, take responsibility for their own learning, and thus become critical thinkers” (Gokhale, 1995 p. 1).

Moore & Hart (2004) outlined a study involving a Bachelor of Science Degree with respect to returning professionals already in health care. They identified a need to make available
online classes to allow working professionals more flexible access to courses while juggling a changing work schedule predominate in the health care field. To this end, curriculum was delivered in a fully online environment for RNs (Registered Nurses) to be able to access this science degree. The growth of this program has increased to now include students from all over the U.S. Similar in course design to the College of New Caledonia, these courses include streaming video, online testing, chat room and discussion areas. Another similarity between these two projects is the concentration on grounded instructional design that included clear and concise design, interaction among participants and interaction with instructors, which all contribute to cohesive learning environment. The fundamental element of caring in nursing is examined by Sitman & Leners (2006) in a study that states that caring can be translated into an online environment. Their study focused on RN and BSN students and how instructors convey caring in an online setting. Although this aspect of caring was not officially part of the study at the College of New Caledonia, a common response found in this study at Weber State University identified that frequent feedback by the instructor contributed to a more caring environment. This element of frequent feedback by the instructor to students came to light in the College of New Caledonia study that this is an area that could be improved upon in the future so as to contribute to this caring online atmosphere. The study defined a caring instructor as one who was nonjudgmental, patient, respectful, sensitivity to each student and warm. To conclude, the study suggests that “engaging in best practices for nursing and online education may be one effective way to convey caring to online nursing students” (Sitman & Leners 2006 p. 2).

M-Learning
A PDA used in conjunction with an Internet based course can create greater access and can have a positive effect on the student – teacher interaction. Hollis (2004) points out that in corporate training a handheld device is well suited to a blended learning environment where the user can review material in small sections, then refer to a more detailed version in the online course. This portable technology can influence the learning environment and thereby create an inclusive educational experience (Brown, 2001). To illustrate this, both teachers and students can transfer assignments or files from one PDA to another; know as
beaming. This process of *beaming* is also an opportunity to accelerate student collaboration especially where students are working in teams or groups.

An examination of current trends and literature based on PDA use reveals that they are finding a place in the medical field as suggested in this quote from Whitsed (2004):

“Palmtops address the issues of one-to-one and continuous access to computers by both learner and teacher this is seen to be needed to embed e-learning” (Whitsed, 2004, p.274).

By and large the predominate use of the PDA in a medical setting is that of a resource tool to reference medical data through software programs specially deigned for delivery on the PDA. PDA software for medicine ranges from drug treatment guides to patient charting. The use of a PDA can replace conventional medical resources as Strandvall (2003) explains: “medical students can use PDA’s to get medical information during their practice period, instead of consulting bulky, printed books that might not be accessible at the location.”(p.4)

However, the opportunity to utilize the full potential of a PDA as a learning tool is still in its infancy. Using current models and methods of instructional design the PDA could easily integrated into a program so as to deliver curriculum or training video segments for student access. The health sciences sector provides an environment where students and professionals already use a PDA as a resource; therefore taking the next step to include course content (such as audio, video, or animation) is the next logical step into M-Learning.

Ally (2007), in an editorial for the International Review of Research in Open and Distance Learning, described how the healthcare in particular is an industry that is making use of mobile technologies for accessing information in real-time. He also adds that “younger generation learners will demand course materials be delivered on mobile technologies to be access from anywhere and at anytime” (Ally, 2007, p1). This recent editorial remarks on a paper by John Traxler that claims that with this increase of popularity of mobile technology, “the role of education – especially formal education- is now being challenged, and that the relationships between education, society, and technology are now more dynamic than ever” (Ally, 2007, p 2). In further support of the use of mobile technology in
education, Ally also describes how it increases access to students and that “mobile technology can help in student retention in open and distance education” (Ally, 2007, p2).

**PDA use by Students**

Tooey and Mayo (2004) identify that in a clinical setting the use of a PDA can improve the overall care to patients by making health practitioners more efficient in their function. The students in a program would benefit from this additional training and mirror the use of the technology in their intended workplace. “The goal of the PDA in a clinical setting is to allow the practitioners to create efficient workflow that will allow nurses to spend more time nursing. The ultimate goal is to improve the delivery of healthcare” (Tooey and Mayo, 2004, p.34). Standvall (2003) claims that the use of a PDA can replace conventional medical resources “For example, medical students can use PDAs to get medical information during their practice period, instead of consulting bulky, printed books that might not be accessible at the location” (p.3). Additional benefits for teachers can include less demonstration time in clinic and therefore increase clinical practice time for students with the student being able to preview and review clinical procedures at any time. This should allow for independent student review that will better prepare the student for practice.

Mobile learning also promotes the notion that learning need not take place within the confines of a traditional classroom setting. Kukulska-Hulme (2005) points out that, “learners should be able to engage in educational activities without the constraints of having to do so in a tightly delimited physical location” and that any learning that takes place outside of the classroom requires only “motivation to do so whatever the opportunity arises – from books, electronic resources, places and people” (Kukulska-Hulme 2005, p. 1). Kukulska-Hulme (2005) highlights the way that mobile devices can be present an opportunity for the learner’s own immediate investigation of an issue with instant access to the required information thus creating flexible entry points for knowledge access and processing. The utilization of mobile devices has the capability to augment the traditional classroom delivery and create unique opportunities to enhance student learning and involvement in curriculum. Kukulska-Hulme (2005) adds the notion that the portability of mobile devices has the potential to contribute to “spontaneous communication and
collaboration… Beaming of stored information from device to device” (Kukulska-Hulme 2005, p. 31) by the very nature of the technology.

Roschelle, Sharlesw & Chan (2005), in an article on wireless and mobile technology, describe further emerging concepts about mobile technology. The article is a culmination of paper presented in 2003 by the authors at two different conferences on mobile learning. They identified that the use of a mobile device can extend the learning community and can intensify the connection that students have with one another, teachers and mentors. One study showed that students who were provided with a PDA complete with organizational tools ended up changing the usage patterns over a period of time. The authors concluded that no one organizational tool helped the students manage their learning and that the process of learning management is complex and requires a unique combination of mobile technology and personal assistance. Roschelle et al. (2005) also pointed out the there is evidence to support the notion that mobile usage increases collaborative learning for both teachers and students. The authors put forward the ideas that mobile and wireless learning increase the aspect of collaborative learning for both students and teachers and that a bi-product of mobile technology is collaborative formative assessment.

In another study by Brakken & Cimio (2005) they indicated that the use of a PDA that contained a drug reference guide was utilized by 25 percent of physicians in the United States and information regarding antibiotics was used 50 percent of the time. This study identified that the trends to PDA use by professionals in the field as well as students contributed to making informed decisions regarding patient care. The PDA is capable of replacing an excess amount of reference material normally used in health care. From the perspective of students, practitioners, and clinical residence the integration of a PDA into course curriculum and workflow helps to support evidence-based practice (Brakken & Cimino, 2005).

Many professions are now accessing the use of electronic supports in their daily activities. More and more Post Secondary institutes are implementing the use of technology as they prepare individuals for our future Health care systems as well. One such institution is Duke
University with its Baccalaureate nursing program (White, Alleln, Goodwin, Breckinridge, Dowell and Garvey, 2005). The implementation of wireless lap tops, Smart phones (ie. Blackberrys) and PDA’s are just some of the new and innovative ways of supporting and enhancing patient care at the bedside. The cutting edge utilization of new technology in this one public domain could have a monumental impact on how health care professionals do business now and in the future. The enhancements of direct patient care with the utilization of technology is thought to be endless and is only now becoming explored in more depth by health care providers. Barlow in 2005 stated “Physicians increasingly are using wireless devices, be they personal digital assistants (PDAs) or tablet PCs, to order procedures, prescribe drugs, update patient medical records and maintain schedules, all in the name of preventing medical errors and becoming more efficient and productive” (p. 46).

The profession of Nursing is also beginning to embrace the utilization of PDAs into enhancing direct patient care. Tools for organization, immediate access to assessment, diagnostics and treatment programs loaded onto the PDA are providing the nurses with the most current information possible. Immediate, accurate and highly complex data will be quickly and easily accessed by the professional at the patient’s bedside. This data augments exemplary patient care by allowing the nurses to access information for practical immediate application. The use of technology in this way also provides networking opportunities and collaborative efforts between other health care professionals as information is easily accessed and downloadable to be shared with the entire team of health care professionals.

Such adaptation of PDAs into the existing New Caledonian program will increase the technology skills for students entering the healthcare profession. Additional benefits for teachers will include less demonstration time in class and therefore increase clinical practice time for students.

**Conclusion**

The literature reviewed for this project indicates that the implementation of online delivery for nursing and related fields holds benefits for students. The aspect of flexible delivery through the Internet produces opportunity for individuals who, because of work scheduling,
might otherwise not be able to access this type of education. Providing there is sound instructional design in the online course design that adheres to adult educational pedagogy and allows for multiple levels of communication, and then the likelihood of success for the student and teacher are increased.

With regard to mobile learning, there is no shortage of literature devoted to the use of mobile devices being utilized to access medical drug guides and dictionaries – an electronic device that contains reference material normally associated with large printed documents. Much of the literature did bring to light the advantages of mobile devices especially for nursing students as this technology is now becoming standard in evidence based practice.
Chapter 3 - The Context

The College of New Caledonia in conjunction with the University of Northern British Columbia currently offers the Northern Collaborative Baccalaureate Nursing Program (NCBNP). The NCBNP is a four-year degree program, which consists of 140 credits (a unit that gives weighting to the value, level or time requirements of an academic course) with 98 required credits in nursing. The research project for the Northern Collaborative Baccalaureate Nursing Program (NCBNP) aimed to combine blended online course delivery with mobile learning devices, thus increasing access to students enrolled in the programme. Not only is there a lack of online material available to students within this programme there has been little use of mobile devices as a teaching and learning tools before. The online delivery of a course of this nature addresses the growing need for this type of training and can provide access to students who require a flexible learning environment due to work constraints attributed to the health care industry. In addition, the use of PDAs as a teaching tool is innovative and could allow the students to access instructional video and related curriculum using a portable and affordable technology during clinical practicum portions of the programme (Fryer, 2003).

Strategic Planning at the College of New Caledonia

The College of New Caledonia is currently undergoing a review and re-writing of its strategic plan. The previous plan dating, from 2002 to 2006, “Fostering a Learning Centered Environment” (College of New Caledonia, 2002) identified five major strategic directions, strategic directions 1 and 2 are the most relevant as they relate directly to the new implementation plan.

Strategic direction 1: “To continue to foster and develop a Learning Centered Environment”, identified issues such as professional development by teachers and greater access by students to the delivery of programs were key results to be measured.

Strategic direction 3: “The College will align and direct its human, physical, financial and technological resources to its strategic directions.” This strategic direction included some key results to create a plan for the use of emerging technologies and to evaluate the use of
educational technology to mirror students learning demands. An annual review process inclusive of reports or surveys measured all of the five strategic directions.

**Areas of Improvement**

There needed to be systems or processes in place to address the issues of training for teachers or staff in the educational technology being used as well as ensuring student web access from on-campus and off-campus (Stockely, 2004). The unique nature of the practice under review in this research project (the use of a PDA as a teaching tool combined with online delivery) underscored the importance of the strategic planning and collaboration required to achieve the goals set in place for the project.

In setting up this process, three issues emerged as areas of concern that required appropriate planning; educational technology trends, staff training and access for students. Dhanarajan (2001) has identified 10 key issues that need to be monitored for distance education to meet the challenges of the coming years. Three of these areas reflect some of the issues pertaining to this research project are access and equity for students, training for staff and technology trends.

**Project Objectives and Expected Outcomes**

The broad objectives for this project involved several strategic phases that included preliminary research into online learning and the use of a personal digital assistant (PDA) in a classroom in the area of nursing education. The major objectives of this research project were as follows:

- Research and project viability
- Request for Proposal (RFP) application
- Design and development of current course content for online delivery
- Design of PDA component for use in mobile learning environment
- Creation of instructional videos and 3d animation
- Project assessment and review of best practice

The project included the migration of the current curriculum to online delivery and also through a personal digital assistant (PDA). The use of a PDA by nurses to access clinical
reference material, drug information and medication dosing is standard practice both in education and industry settings. Students enrolled in the Northern Collaborative Baccalaureate Nursing Program are required to use a PDA as part of a clinical practicum course. In the online environment, course curriculum will be delivered thus creating greater access to course content, group assignments, and instructor lead discussions through the use of an online learning management system (in this case WebCT™). The PDA usage aspect includes the production of video segments depicting medical procedures or diagnostic situations, which would then be delivered via the PDA for students to access at any time. As is the case for many students using a PDA in the health care area, they currently use it as a resource tool to access medical journals or drug information; ‘medical students can use PDAs to get medical information during their practice period, instead of consulting bulky, printed books that might not be accessible at the location (Strandvall, 2003, p.3).

To meet the objectives and desired outcomes for this project, an action plan was incorporated into the process as part of overall strategic planning. An action plan in this context served as a framework to identify goals, the actions needed to attain goals, who has the responsibility and when that goal will be reached. The action plan diagram (see Fig.2) lays out the major stages involved in planning to implement a goal from the initial intended goal, the strategy necessary to achieve that goal, the final objective, identify who will take action and when will the objective be met.

Fig. 2  Action Plan Sequencing
**Professional Development**

Within the College of New Caledonia, the newly formed Institute for Learning (ILT) and Teaching provides the only avenue for teachers or staff to obtain training for educational technology related issues. Previously, there has been no formal training initiative or strategic plan by the college to provide more formalized training to teachers in the area of online delivery or teaching via distance using synchronous or asynchronous tools. This section of the overall strategic plan deals with some solutions to the growing need for adequate support for professional development at the college.

Specific to this project i.e. the use of an online synchronous/asynchronous learning management system (LMS) and PDAs, have created an immediate need for teachers training in the areas of teaching online, e-moderating and using a handheld device as a teaching tool. The aspect of using a handheld device is not limited to teachers as students require specialized training is the use of a PDA learning or collaborative tool. What is the best method of organizing and meeting these various training needs? As Bates (2003) suggests; ‘centralized and decentralized support’ is the best combination of approaches that will serve the needs of the institution at large as well as localized needs of teachers/students requiring specific training. The ILT is adopting the dual approach of centralizing and decentralizing much of its training in response to teachers and staff needs.

Professional development for the instructors involved in the nursing program was of major importance in this project. The current instructors in the nursing program had no experience teaching online and therefore require training in the delivery environment. To assist in the training of instructors, they were involved in curriculum assessment, media planning, and all the relevant aspects of course development for online teaching. Salmon (2004) has created a list of criteria that assist in managing and training of e-moderators. Several suggestions for training include making sure that the trainee be given sufficient time to learning online first before teaching; facilitate trainees in learning the software as they become more familiar with the online environment; and create and environment where trainees with varied prior skills are able to function.
Technology Requirements
The technology requirements for this project covered two areas; the online delivery of the course content and the design and development of course content for PDA delivery. All of the eight courses planned for development for the first year are currently taught in a classroom setting. The technology employed for this project had several aims as described in the functions for technology.

Means (2004) describes the four functions of technology used for learning: From this perspective, educational technologies can be classified into four broad uses: they can tutor, they can explore, they can be applied as tools, and they can communicate.

The technology that was used through the PDA can be thought of as a tutor that is providing a demonstration of a procedure through the use of instructional video segments depicting medical procedures. Students have the opportunity to use practice quiz on a PDA independently in order to prepare for mid-term or final exams, thus giving the student a chance to solve problems and answer questions.

Allowing a student to move through material or explore as a discovery process was implemented both online and through the use of a PDA. The exploration aspect of technology also gave students the ability to learn concepts or procedures by using the technology. The simulation video segments and 3D animation incorporated into the course design is an example of a simulation to be learnt.

A PDA is a tool now common in the health care industry and for the courses in this nursing program, students used a PDA that is a technology applied as a learning tool. These technologies are not necessarily designed for education purposes, but in this case will be adapted into the course delivery.

The use of technology to communicate was used both in the online section of the courses, but also through using a PDA. Both teachers and students had the ability to communicate through WebCT in the form of email and discussion groups. They also had the ability to
communicate using a PDA by beaming messages or assignments to one another or to the instructor. As the frequency and complexity of technology increases in distance education, so do the barriers and obstacles faced by instructors and students.
Chapter 4 - Research Approach and Methodology

Research Methodology

This chapter discusses the key components within the interpretive research methodology relating to this project. In addition, the project aim, and methodology rationale are discussed in this section.

Aim of Research

The aim of this project was to explore and investigate the effectiveness of online course delivery as well as mobile content specifically designed for nursing education. Traditionally, the nursing programme that was selected for this study had been delivered only via a classroom setting, but the introduction of an online and mobile course curriculum can provide more latitude for students to access their courses off-campus. Additionally, teachers can also provide new opportunities for engaging their students that could contribute to increased collaboration and interactivity for students. The research questions for the students relating to this topic were:

- How many times during this week did you access the course content from the online WebCT course?
- How long did you access the course content from the online WebCT course in terms of approximate minutes/hours?
- Did you experience any technical issues when using WebCT? If so, what was the nature of the problem?
- What elements of the online course content were useful to your learning experience?
- What elements of the Pocket PC mobile content were useful to your overall learning experience?
- How many times during this week did you access the Pocket PC module material?

Rationale for methodology

A qualitative approach was utilized so as to generate an in-depth understanding of the issues and circumstances that contributed to effective instruction and learning in both blended online and mobile delivery modes. Given that this study is utilizing qualitative methods for gathering and reviewing all the collected data, it is important to identify various perspectives of this type of methodology from literature. Hoeplf (1997) defines qualitative research as that which arrives at findings that do not rely on statistical
procedures more associated with quantitative research. Qualitative research focuses on different types of knowledge that reveals ‘illumination, understanding and extrapolation to similar situations’ (Hoepfl, 1997). In relation to this study, the research into online and mobile learning is aimed at gaining insight and more in-depth information in an areas where there is existing knowledge to build upon, thus conforming to a qualitative approach. Similar definitions of qualitative research are described by Corbin and Strauss (1990) by identifying that the findings are not arrived at by the use of statistical means and referring to research ‘about persons’ lives, stories, behavior…”(Corbin and Strauss, 1990 p.17). Such research information can be gathered using observation or interviews as well. There are also advantages to the qualitative research approach as identified by Patton (1990) whereby he states that the information gathered from qualitative research can be more detailed information based on smaller numbers of people which lessens the risk of generalizing about the case being studied.

Within the broad interpretive tradition the ethnographic approach fitted best with the objectives of this research inquiry. According to Rossman and Rallis (1998) the ethnographic approach is concerned with the concept of culture: that is, beliefs and values shared by members of a group that guide their actions and their understanding of those actions. This focus on culture is important for this inquiry as the culture of universities and the culture of learning. Ethnographers are interested not only in individual meanings but how interactions shape meaning. Again this is seen as directly relevant to this inquiry as interactions are intrinsic to the concepts of support and collaboration.

In qualitative research, a hypothesis is not needed to begin research unlike quantitative research which requires a hypothesis before research can begin. Another major difference between qualitative and quantitative research is the underlying assumptions about the role of the researcher. In quantitative research, the researcher is ideally an objective observer who neither participates in nor influences what is being studied. In qualitative research, however, it is thought that the researcher can learn the most about a situation by participating and/or being immersed in it. These basic underlying assumptions of both methodologies guide and sequence the types of data collection methods employed.
Although there are clear differences between qualitative and quantitative approaches, some researchers maintain that the choice between using qualitative or quantitative approaches actually has less to do with methodologies than it does with positioning oneself within a particular discipline or research tradition (Hoepfl, 1997). This study relied on qualitative information and some quantitative information gathered from written anecdotal content from the participants that yielded greater insight into the experience of each individual.

A major goal for this research project was to broaden the teaching experience for teachers who have traditionally only been involved in face-to-face teaching environment. With the design and implementation of both the online and mobile (Pocket PC) course content the faculty needed to adjust their methods of delivery to suit the flexible course offerings. Students were also making an adjustment in terms of their learning environments from the traditional classroom to the online and mobile delivery.

The terms and language for this study will focus initially on the relevant technology for online and mobile learning so as to create a more “global” understanding between teachers and students. Familiarization with the new learning environments will have to be facilitated so as not to intimidate those who have little knowledge of the technology and its capabilities.

Henry and McTaggart (1996) categorize Action research into three areas; Participatory Action Research, Critical Action Research and Classroom Action Research. They describe Participatory Research (PAR) as one the deals with attributes that separate it from conventional research such as ‘shared ownership of research projects, community-based analysis of social problems, and in an orientation towards community action (Henry and McTaggart1996, p.6).’ Critical Action research ‘expresses a commitment to bringing together broad social analysis: self-reflective collective self-study of practice (Henry and McTaggart1996, p.6).’ and finally Classroom Action Research as an approach that utilizes qualitative research methods of enquiry whereby ‘key participants in classroom action research are teachers…other participants may be university researchers and occasionally curriculum consultants and students (Henry and McTaggart1996, p.6).’ This classroom approach to action research obviously has underpinned the method of enquiry for this study.
of nursing education as it has lent itself well to the exploration of how to improve practices, self-understanding and judgments for teachers.

**Research Procedure**

This research study includes four stages to achieve the intended results. The research design is intended to span over a six-week period so that students and faculty have the opportunity to reflect on the experience through diary entries and an anonymous questionnaire that they received. A sample of volunteer students was recruited from the 2nd year of the 4-year degree programme. Each student and teacher was provided with a questionnaire that was divided into six parts representing each of the weeks of this study. The participants were asked to answer a set of questions that was repeated for each of the six weeks that would assess access and utilization of the online and mobile course content.

The questions asked of the students were:

- How many times during this week did you access the course content from the online WebCT course?
- How long did you access the course content from the online WebCT course in terms of approximate minutes/hours?
- Did you experience any technical issues when using WebCT? If so, what was the nature of the problem?
- What elements of the online course content were useful to your learning experience?
- What elements of the Pocket PC mobile content were useful to your overall learning experience?
- How many times during this week did you access the Pocket PC module material?

The questions asked of the teachers were:

- How many times during this week did you access the course content from the online WebCT course?
- How long did you access the course content from the online WebCT course in terms of approximate minutes/hours?
• Did you experience any technical issues when using WebCT? If so, what was the nature of the problem?
• What elements of the online course content were useful to your teaching methodologies?
• What elements of the Pocket PC mobile content were useful to your overall teaching experience?
• How many times during this week did you utilize the Pocket PC module material for instruction?

The participants were also asked to keep a weekly diary that would contain reflections on their own unique experiences in this study. The weekly diary did not contain questions and was unstructured in its intent. The diary was intended for the participants to note elements of the online and mobile learning experience that did not arise in the questionnaire that they also filled out.

Usage statistics of online and PDA use were gathered for all students.

**Action Research**

Action Research was used in this research project. The four steps used in the cycle: Observe, Reflect, Plan, Act and are representative of a reflective practice whose aim and goal is continual improvement with respect to the study. This study used three separate cycles of inquiry to gather and assess data. Cycle One was conducted prior to the 6 week course commenced, Cycle Two was conducted during week 3, the mid-point of the study and finally, Cycle Three was conducted at the conclusion of the 6 week study. Detailed notes were kept as a record to track the process as the study moved through the 3 cycles. The team consisted of:

• Educational Technology Coordinator – Project Leader (Anthony Ralston)
• 2 nursing teachers
• Dean – Health Sciences
Ethical Considerations
Human subjects were involved in the research process utilizing Action Research procedures and therefore ethics clearance was necessary. The study was designed to take place at the College of New Caledonia with both nursing students, and nursing teachers involved in the research study. My role as the project leader for this study was to design all of the components that went into the research study and remain impartial throughout the research process. All of the distribution and collection of questionnaires was coordinated through the faculty of Health Sciences and I had no influence or power when it came to the collection of data. As part of the Deakin University Human Ethics Research committee requirements, informed consent was obtained from the individuals in the study (see Appendix 1 for Plain Language Statement and consent form). Ethics forms have been completed and stored with approval from Deakin University.
Chapter 5 - Presentation of Findings

This chapter contains details of the findings of this study undertaken to examine the effective uses of online and mobile learning for nursing education. It begins by describing the research participants then describes the results of the action research process which framed the study. The findings are divided into teacher data and student data. Teacher data includes a report from the surveys that were distributed to all participants are described as well as summaries and excerpts from their diary entries. Student data includes online and PDA usage data as well as survey data and anonymous diary entries that were submitted by some of the participants.

Research Participants

The group had equal representation from all interested parties so as to create balance in the inquiry and consisted of the following:

- Educational Technology Coordinator – Project Leader (Anthony Ralston)
- 2 nursing teachers
- Dean – Health Sciences
- 17 nursing students – representative group enrolled in the second year of the programme

Teachers and students who were participants in the study volunteered to participate in the completing of the anonymous questionnaire as well as a voluntary diary documenting their experiences during the six-week study. The study took place over a 6 week period during which the students were engaged in a Clinical Studies Practicum at the Prince George Regional Hospital. The students provided their own Pocket PC (PDA) mobile devices and were provided with the learning module for those devices by the teachers. The teachers participating in this study were provided with the PDA mobile devices by the college. Both teachers and students were asked to complete an anonymous questionnaire on a weekly basis during the six-week Clinical Studies Practicum. In addition, both students and teachers were requested to keep a weekly diary reflecting their usage of the online course curriculum content and the mobile learning module.
Teacher 1 (T1) was a female full-time instructor in the Health Sciences Division of the college and has been involved in teaching for 5 years. She teaches courses in the first and second years of the nursing programme.

Teacher 2 (T2) was a male full-time instructor in the Health Sciences Division of the college and has been teaching for 7 years. He also teaches courses in the first and second years of the nursing programme.

**Action Research Process**

The results of the Action Research process are described below. The results are grouped under the steps of each cycle as described in chapter 4 and each cycle responds to one of the research questions. The intent of the questions in the study is to establish the effectiveness of the online course curriculum and the PDA mobile content in terms of teaching pedagogy.

**Cycle One:** *What are the effective uses of educational technology in nursing education i.e.; WebCT™ and PDA mobile devices?*

During Cycle One, held before the course began, the members of the research team met to review the intended study. The purpose of this meeting was to examine all the elements of the study inclusive of template questionnaires, online course material in WebCT™, PDA learning module and the proposed diary entries. These were:

1) The template for the questionnaires for both the teachers and the students were reviewed to ensure that the questions were structured in such a way so as to extract the desired information.

2) The online blended course in WebCT™ was shown and the course materials and tools were reviewed to ensure that no further changes were required before the online course was released to the students.

3) The learning module that was intended for the PDA devices was tested and reviewed to ensure both technical and pedagogical integrity.
Observe:
There had been no previous use of online and PDA technology for nursing education.

Reflect:
- There had been no previous need to know more about the effective use of WebCT™ and PDA mobile devices for delivery of course curriculum.
- There was a need to gather more information from teachers and students on the use of mobile and blended online delivery of course curriculum.

Plan:
- To review developed online and PDA delivered course material.
- To develop questionnaires for both students and teachers.
- Students and teachers to fill out diary entries over the course of the 6 week study to document their respective experience.

Act
- Meetings held with project leader, 2 nursing teachers and the Dean of Health Sciences to review developed online course in WebCT™ and PDA course module.
- Review of study template questionnaires for both students and teachers.
- Discussion about proposed diary entries for both students and teachers.

Cycle Two (Week 3 of study): What changes or adjustments can be made at this mid-point of the study to improve delivery and utilization of both online and mobile curriculum content?

Cycle 2 of the study occurred at the mid-point of the course and involved a meeting with the project leader and the 2 nursing teachers. The object of this meeting was to review course progress so far and discuss recommendations for changes that could be made at this time to improve the online or PDA learning materials.
**Observe:**
- Both teachers reported back that there are elements of the online and mobile course content that was not utilized and should be modified.
- Teachers reported back with verbal comments from some students on some positive and negative aspects from the online and mobile content.
- Teacher 2 had little previous experience with using educational technology and made some recommendations for use of WebCT™ and the PDA devices and expressed the need for more professional development for educational technology in general.
- No major technical access issues were reported by either teachers or students though there were some problems with missing WebCT™ passwords for students.

**Reflect:**
- Teachers 1 and 2 noted that there was little or no activity for the Chat tool in WebCT™ or the Key Terms or Key Concepts sections on the mobile module.
- Teachers 1 and 2 noted positive responses to the use of the instructional video in both the online course and PDA modules.
- Informal verbal feedback from some students to the teachers indicated that the instructional video segments were of benefit to the learning experience.
- Teachers 1 and 2 indicated that time restraints during the course made it difficult to keep extensive diary notes.
- Informal verbal feedback from the students indicated that some material on the PDA was not used either because it was a duplicate from the online course or there was insufficient time to review the material.
- Teachers 1 and 2 noted a wide variation of student access to the online content do in part to obligations to other courses or part-time work.
- Teacher 2 noted that the quiz on the mobile devices need editing to increase the text size or removed altogether from the module.

**Plan:**
- To increase communication with the Computer Helpdesk for students having issues with online course access.
- Interim support from the Computer Helpdesk for Teacher 2 to assist with technology.
- Informal conversation with students to get feedback on the online and PDA course content.
- Collect data from teachers about improvements that could be made to the online tools and content in WebCT™ as well as the mobile learning module.
- Teachers 1 and 2 make recommendations for course content changes to project leader.
- Project leader will keep in regular contact with the two teachers for the remainder of the study.

**Act:**
- Project leader will provide temporary technical support for both teachers.
- Detailed notes were taken by the 2 nursing teachers and the project leader on everything discussed during the meeting.
- Teachers 1 and 2 will provide a summary of course changes for both the online and PDA mobile learning module materials.
- Teachers 1 and 2 will meet with students who are having issues using the online course content to see if any assistance can be given to them.
- Final meeting date set to review all the data and summarize recommendations and changes to course content and delivery.

**Cycle Three:** *What was the overall effectiveness of the online and mobile course curriculum used during this study?*
Cycle 3 took place once the 6 week course had concluded and included a meeting with the project leader, 2 nursing teachers and the Dean of Health Sciences. The objective of this final meeting was to review the data collected and make recommendations for changes or revisions for future deployment of the online course and mobile PDA learning module.

**Observe:**
- Both teachers reported that due to time restraints during the study they completed most of the diary entries after the course had finished.
- Both teachers indicated that they had filled in the questionnaires for each week of the course and submitted them for review.
- Students had completed questionnaires and diary entries and submitted them through the faculty of Health Sciences for review.
- Online course content material and tools used in WebCT™ required changes to address student needs.
- PDA mobile content requires changes surrounding legibility of content and removal of some tools in the module.

Reflect:
- Technical and professional development support was identified by the teachers as an area for improvement.
- Teachers 1 and 2 reported that some of the tools in the online course as well as some of the sections in the mobile learning module were not utilized as expected.
- The instructional video clips were identified by both teachers and students as very useful in reviewing medical procedures.

Plan:
- Plan future meetings to review all the collected data from the study.
- Summarize all recommendations by teachers and students with respect to course content modifications.
- Project leader to review all collected data for the study.
- Formal WebCT™ professional development and technical training for teachers planned.

Act:
- Project leader to itemize and review all the collected data.
- Project leader to design and implement more formal professional development seminars and support for teachers with respect to educational technology such as WebCT™ or PDA devices.
- Teacher 1 and 2 to re-write some curriculum for online delivery and consult with project leader regarding changes to WebCT™ tools and PDA learning module content.
-Dean of Health Sciences to report back to senior administration on the study once the data analysis is complete to make recommendations for future offerings for online and PDA delivery for nursing education.

**Teacher Data**

**Online usage by Teachers**

The two nursing teachers from the Faculty of Health Science were involved in the development process for the online and mobile learning module from its inception. They had differing amounts of experience in online learning and the use of mobile devices in teaching. Teacher 1 (T1) was competent with technology and was experienced in teaching online via WebCT™ as well as through the use of a PDA. Teacher 2 (T2) had less overall experience with utilizing educational technology especially in terms of WebCT™ and PDA devices. Although both teachers were eager to make use of the new blended online curriculum content and also to utilize the mobile learning module, there was hesitation on the part of T2 whose experience and level of comfort with educational technology posed some barriers. This teacher experienced basic difficulties in technical operation at the beginning of the study but had achieved competence by the end of the six-week study though he required more in the way of assistance with final course assignments and assessments that were due.

Both T1 and T2 noted in their respective diary entries aspects of use relating to the tools and course material available on WebCT™. They indicated in their entries whether the various tool and course content material (see Table 1) were utilized in the following ways; “No use”, “Moderate Use” or “Significant use”. Both teachers also added recommendations for improvements or changes to both the type of online tools or course content, which are relayed in this section. The use of the rating terms in the diary entries were agreed upon by the two teachers in Cycle One of the planning process, further described at the end of this section.
<table>
<thead>
<tr>
<th>WebCT TM</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion Area</td>
<td>Moderate use</td>
<td>Moderate use</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Significant use</td>
<td>Significant use</td>
</tr>
<tr>
<td>Chat</td>
<td>No use</td>
<td>No use</td>
</tr>
<tr>
<td>Course notes</td>
<td>Moderate use</td>
<td>Significant use</td>
</tr>
<tr>
<td>Video files</td>
<td>Significant use</td>
<td>Significant use</td>
</tr>
<tr>
<td>Email</td>
<td>Significant use</td>
<td>Significant use</td>
</tr>
<tr>
<td>Calendar</td>
<td>Moderate use</td>
<td>Moderate use</td>
</tr>
</tbody>
</table>

Teacher 1 and Teacher 2 included specific comments relating to the various tools and course content provided through WebCT TM and their respective effectiveness, overall use during the research study and recommendations for future consideration. As noted in Table 1, Teacher 1 made either ‘Moderate’ or Significant’ use of all the elements included in the online course with the exception of the Chat tool that showed No Use. The following sections summarize the teachers’ comments about each online aspect and provide excerpts from their entries.

**Discussion Area**

The Discussions tool allows the user to create topics relevant to the course where users enrolled in the course can post and reply to messages. Teachers can ask questions, generate discussion, and encourage students to share feedback and ideas. The Discussion Area for this course through WebCT TM was available for all the students to access and was unstructured in its nature. Students could freely post items, questions or comments relating to the curriculum being covered. As well, teachers could post and contribute to the class wide discussion. As T1 suggested:

‘There was moderate to low participation in this online discussion area and more structure and planning is needed to improve the use of the tool. I would add specific discussion topics and include participation marks next time this tool is used in a course like this one. I did not use this tool as much as I would have liked to and think that
more planning and preparation will have to go into discussions and maybe link the topics closer to what I cover in class. ‘

**Quizzes**

There were three online quizzes for the students to complete during the 6 week clinical studies practicum course valued at 10% each towards the final mark that could be taken at any time as long as they were completed by the last day of class. T1 indicated significant use of this tool, but would structure the release of the quizzes in future course offerings:

‘My teaching colleague and myself liked the online quiz tool and were able to write and create quizzes for WebCT™ that we would normally have to give out in class. Having the quiz content online saved time in marking and also gave me the chance to use the class time that I usually have to spend for giving out quizzes for reviewing the knowledge we had to cover instead. For this course the quizzes were available online at any time for my students to take, which worked well for some students who are organized, but many students tend to leave things to the last minute.’

**Chat**

The Chat tool allows communication in real time with other users in the course. The Chat tool can be used to engage in real-time conversations with all users or selected users. Both teachers noted that they did not use this synchronous feature and would not necessarily recommend it for future use due to the difficulty of organizing a real-time event. T1 stated that ‘the online chat tool required too much planning to get everyone together at a time that was convenient for everyone’ and commented that though students liked instant messaging this was not a tool she was comfortable with particularly for course use. T2 agreed, adding:

‘I have never used any online instant messaging tool and can’t think of a situation in my class where this would be useful. Nursing education requires more face-to-face teaching than sitting at computer and sending messages back and forth. I don’t think myself or my colleague would have a use for this sort of tool and I wouldn’t recommend it for future courses in our department.’
Course notes

Both teachers had the opportunity to post lecture notes for the online course for the students to access. These notes took the form of Microsoft Word files, PDF files and PowerPoint presentations. Of the two teachers, T2 utilized this section of the online course more than T1. T1 had found time constrained her use stating:

‘I have done some courses before where I posted lecture notes and related material online for the students to read or print and found it useful. I probably would have done more of that for this course, but found my time limited during the semester. Mostly, I uploaded PowerPoint files and PDF files that contained course material that I would have covered in class. My students did report that they liked having course material online so that could access it anytime especially since too many of my students also worked part-time while studying nursing.’

T2 was learning to use WebCT and experimented with this feature stating:

‘It proved to be useful for me to be able to upload documents like PDF notes or web links for my students to access and review. … I also found it useful to upload my PowerPoint presentations after each class so that the students could study the material in more detail after class was over.’

Video files

The course included a total of 12 video clips depicting basic medical patient assessments that the students and teachers could access. The video clips were included so as to engage the learners and improve retention of the techniques and processes included in each clip. Both of the teachers noted significant use of the instructional video during the study. The teachers had the ability to not only show the video clips during classroom instruction, but students were able to access the clips for further study and review online in an asynchronous manor. T1 states the following on the value of these files and to future courses:

T1:

‘I liked the fact that I could show each video clip during class which helped to illustrate the procedures with visual representations. Also, the videos were made locally showing the actual equipment that our students would use at our local hospital. My students said they liked having the clips online so that could look at them on the weekend or evenings during the week. They liked the fact that they could access this resource at any time in a flexible way that worked with each person’s schedule.’
Email
WebCT™ has a private email tool, which can be used to send and receive messages within the course by the teacher(s) and enrolled students. Both teachers and students used the email tool extensively as a form of communication and sharing of resources. The teachers also had the ability to email either the entire class or just individual students. T2 expressed these ideas and thoughts about email as follows:
T2:
‘I did use the email tool as a way to extend communication with my class outside of my classroom. The feedback I got from my students was positive since they were able to email questions to me at any time. I noticed my students also used the private email to share information on our course work and to stay communicated during the busy semester.’

Calendar
WebCT™ has a calendar tool, which is useful to help instructors and students keep track of chat sessions, assignment due dates and exams. Calendar allows you to view and create dated reminders about events. Entries can be viewed for a day, week, or month. Both teachers agreed that the Calendar tool had the potential for improving student time management skills, but due to time restraints during the semester the tool was not exploited to its fullest. T2 had these comments on the Calendar as follows:
T2:
‘I would have to say that I only used the Calendar tool moderately, but would probably use it more next time I was teaching a course with an online component. I found it useful to add an entry to remind my students about an upcoming quiz or assignment. Several of my students mentioned how much they liked the tool and would like to see more use of it in other nursing courses.’

Mobile PDA usage by Teachers
The use of a mobile device played a unique part in this study as the devices were intended to be used in a teaching and learning realm. As with the use of WebCT™ one of the teachers was more comfortable with a PDA device while the second teacher had little expertise using a PDA. For both of the teachers, short training sessions and occasional one-on-one assistance was integrated into the project so as to improve their competency with these devices. Both of the teachers used the PDAs frequently in the first week and continued to use them to access materials for a total of 7 hours for T1 and 9 hours for Te2.
T1 and T2 reflected in their diaries on their use of the module content that was available on the PDA devices. Both teachers indicated that using email in this way improved overall communication with the class and increased the amount of time to further assist students with questions outside of the regular class times. Table 2 compares their use of PDAs.

<table>
<thead>
<tr>
<th>PDA Device</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Terms</td>
<td>Moderate use</td>
<td>Moderate use</td>
</tr>
<tr>
<td>Key Concepts</td>
<td>Moderate use</td>
<td>Moderate use</td>
</tr>
<tr>
<td>Video Clips</td>
<td>Significant use</td>
<td>Significant use</td>
</tr>
<tr>
<td>Self-Assessment Quiz</td>
<td>Low use</td>
<td>No use</td>
</tr>
</tbody>
</table>

The teachers’ use of each PDA device is explained below.

**Key Terms Tool**

This section of the PDA module included a selection of 30 common terms with definitions that were identified by both of the teachers as necessary for the students to be familiar with in the course. The terms took the form of an interactive presentation whereby the user could navigate backward or forward through the terms. Both of the teachers indicated moderate use of this segment in the module and found that due to time restraints this section of the module was not utilized to its full potential.

**T1:**

‘The Key Terms section on the PDA was used to some degree by myself and my colleague, but it was a repeat of what students could read in class or the online course. I would like to see it dropped from the mobile module since we didn’t have much of an opportunity to look at this section while we were in the clinic. Most of my students said that they had covered these terms in class and felt that there wasn’t enough time to review them again.’

**T2:**

‘My students passed on feedback to me regarding the Key Terms in the mobile module to the effect that it was redundant information that was already covered in class. I too found that the information did not end up being useful in this format as we had hoped during the first set of planning sessions in the Action Research process.’
**Key Concepts**
This section of the module included common concepts with images that were identified by both of the teachers as a required element for the students in this course. The concepts included were taken from the some of the PowerPoint instructor notes that were included on in the online portion of the course. Similar to the Key Terms, theses concepts could be accessed through the navigation buttons in the module at any time. The user could review the content in an interactive format thus allowing for forward and backward navigation through the material.

T1:
‘I ended up referring to the Key Concepts only a few times during the course since it was material that was covered extensively in my class and was also available on WebCT™ as well. Some of the image content in this area was useful, but the text was small and difficult to read on a PDA. I would probably recommend that this section along with the Key Terms section be deleted or replaced with more video or animation clips that show the procedures that we are teaching.’

**Video Clips**
The same instructional video clips that were in the online WebCT™ course were also used on the PDA devices as to save time and resources. The video clips were integrated into the learning module through a menu system that allowed the user to view and review each video clip as required. As indicated in Table 2, there was significant use by both of the teachers of the clips. The teachers noted in their respective diary entries that the access to the instructional clips on mobile devices was a useful teaching tool during the clinical studies practicum at the local hospital that they regularly used. The teachers were able to refer to the video demonstrations of medical procedures before the students had to perform the procedure and students liked their short 2 minute duration and close-up shots. The two teachers wrote that the students reacted favorably to having this type of resource format available for their use on the PDA devices at any time.

T1:
‘The clips were a great way to illustrate a medical procedure that the students had to learning. The ability to replay the video clip during our clinical sessions was quite effective and allowed my students to review the procedure first before having to perform it on a patient. My students who
accessed these video clips said that liked the short duration of about 2 minutes each as well as the close-up shots that showed detail. Since the video clips were produced in our local hospital the student easily recognized the equipment and surroundings. I would like to see more of these types of instructional video clips included since they helped to contribute to a more collaborative atmosphere for the students.’

T2:

‘I had lots of positive comments from my students who watched the video clips on the PDA devices. I also referred to them often once we were in the clinic setting where the students had to perform medical procedures as part of the course requirements. My teaching colleague and I agreed that the addition of the video contributed to the visual learning for the students and helped them with memorizing certain procedures by being able to reply the video as often as they needed to better learn the process.’

Self-Assessment Quiz

The quiz content was designed in such a way so that students could access this section of the module at anytime to check their knowledge relating to content from the video clips, key terms or concepts contained in the learning module. This quiz was designed as a self-assessment whereby no marks were recorded, but it was a tool that the students could use for checking their knowledge. The respective diary entries by the two teachers indicated moderate and no use of this quiz for several reasons as stated in these excerpts:

T1:

‘The idea that we came up with in the first planning session for a self-test for the students did not get the access as we had thought. However, being that this project was new to us as teachers we wanted to try out things and see what the results might be. This quiz was also available on WebCT™ where it was accessed more by the students. The main complaint from my students about the self-assessment quiz was that it the text was too small to read on a PDA device. Also, my students commented that they felt as though there time would have been better spent on other aspects in the course. My use of this quiz on the PDA was low to moderate and too found the text hard to read in that format.’

T2:

‘I tried to use the quiz on the PDA once and found it too difficult to read each question and didn’t pursue any further use. This quiz material was available on WebCT™ and I know my students preferred to use this format of a self-test than on a small PDA screen. I would not recommend this format of quiz in the future and feel that other material could be put in its place for the students to access.'
Questionnaire Results

The following questions were asked of the teachers each week.

**How many times during this week did you access the course content from the online WebCT course?**

This question was asked each week of the six-week study for each teacher participant. Here are the respective responses to this question. Access time for this study is defined as any single login to the online course that lasted more than 30 minutes.

**Table 3: WebCT™ Access Times Per Week by Teachers**

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<tr>
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<th>Week 1</th>
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<tbody>
<tr>
<td>T1</td>
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</table>

**How long did you access the course content from the online WebCT course in terms of approximate minutes/hours per week?**

**Table 4: Length of Time Accessing WebCT™**

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<th>Week 1</th>
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<tbody>
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<td>T2</td>
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</table>

**Did you experience any technical issues when using WebCT? If so, what was the nature of the problem?**

**Table 5: Technical Issues**

<table>
<thead>
<tr>
<th></th>
<th>Download times for QuickTime video and Flash content</th>
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</thead>
<tbody>
<tr>
<td>T1</td>
<td>Download times for QuickTime video and Flash content, playback of PowerPoint files.</td>
</tr>
</tbody>
</table>
What elements of the online course content were useful to your teaching methodologies?

T1: Teacher 1 reported that the video segments in the course enhanced the ability to illustrate certain concepts and procedures. Also, the email and discussion tools in WebCT™ proved to be a benefit that contributed to a more collaborative learning experience for the students. Teacher 1 also noted that being able to post presentations and course notes was a benefit to the students who could then access materials and print them as needed.

T2: Teacher 2 found the online discussion boards most helpful in not only monitoring student participation, but also creating learning opportunities that occurred outside of the normal classroom hours of instruction. In addition, Teacher 2 indicated that blending the online material with the clinical studies practicum content required some adjustments in terms of pedagogy and approaches. However, this teacher indicated as that after the first week of the practicum, that utilizing the online elements such as discussions and the instructional video segments greatly increased the opportunities for engagement with the students that would not have normally be available.

What elements of the PDA mobile content were useful to your overall teaching experience?

T1: Teacher 1, with more experience with mobile devices noted that inclusion of the PDA devices with the learning module installed greatly improved the teaching and learning experience. She added that utilizing the mobile content with the students present helped to contribute to more instantaneous and constructivist learning environment. The students had an opportunity to access and process information according to their own individual needs and timelines. She did note however that the small screens on the PDA were a hindrance in some cases to read the content.

T2:
Teachers 2, with very limited experience with mobile devices expressed that the basic operation of the unit was a barrier at first although with repeated use this situation improved. In addition, this teacher said that the instructional video segments were very useful during clinical study sessions with students so as to review the medical procedure prior to the students performing the procedure.

How many times during this week did you access the PDA module material for instruction or related teaching events?

Table 6: Access of PDA Module by Teachers

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<th>Week 1</th>
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<tr>
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<td>9</td>
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<td>T2</td>
<td>20</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>8</td>
</tr>
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</table>

Collected Diary Entries

The diary entries by teachers were often notes added to some of the questions in the questionnaire. They also sited that there was limited time during the semester to devote to extensive diary entries and therefore chose to include amendments to the questionnaire itself. Both of the teachers did make entries that included comments on both the online material as well as the PDA mobile devices that were utilized for this study. When it came to the use of WebCT™ as part of the course delivery, both teachers expressed the opinion that the material available online was a benefit to the students who could access the course content at any time, thus increasing flexibility in delivery. One teacher noted that there was a steep learning curve when it came to WebCT™ due to limited exposure to online course delivery in the past. This teacher also noted over the duration of the study that with consistent use of the online material that the barriers or issues lessened to some degree. Both teachers expressed appreciation with regard to the material that was made available to the students via the PDA units. They indicated that the flexibility of accessing this material at any time during the clinical practicum section of the course added value to the educational experience. The teachers also noted that further
development in for utilizing mobile devices in future and to incorporate wireless access to course materials.

**Student Data**

The following section deals with students’ interaction with the online course and the PDA devices as reported through the questionnaire and diary entries. Specifically, the time and frequency of access by the students are reviewed along with feedback regarding the various tools and content available to the students.

**Online usage by Students**

Student participants noted in the questionnaire as to the number of times that they accessed WebCT™ over the six-week study. In the first week of the study, the 17 students accessed the online course on average of 10 times per week, which decreased slightly during weeks 2 through to week 5 as they became more familiar with the material. The final sixth week showed a slightly higher number of access times (average 11 sessions) to the online course as students were also required to complete an online quiz.

Access times for WebCT™ varied amongst the students and a review of the comments in their respective diary entries reveals that there were several themes regarding access that emerged. Two groups of students indentified negative factors that affected their access as either technical ability or time restraints due to part-time jobs outside of school. A third group of students who entered comments in their diaries indicated that they were comfortable with the online environment and accessed the course material often.

First, 5 students noted that they had very little or no experience when it came to being part of an online course. These students all commented that they felt intimidated by the technology and were reluctant to use WebCT™ at the start of the course. The students (3, 4, 12 & 16) wrote in their diaries that they were unfamiliar or apprehensive towards the online learning environment and as the weeks progressed they felt somewhat more inclined to use the online sections. For example, student 12 did increase the number of access times the online course and noted the following in a diary entry:

Student 12:

'I had no experience with computers before taking this course and it took awhile to get used to using WebCT™ and finding all the course material. I needed to get help from my friends to use my
computer and log into the course. After the first week I did manage to get logged in a bit more as each week went by.

Second, some of the students had previous experience accessing online course content and therefore took advantage of the resources being offered and had greater access times.

Third, 6 students (1, 3, 7, 12, 15 and 17) offered comments indicating that due to time restraints resulting in obligations to work outside of school said that they could not devote as much time as they wanted to the online course. One student (12) in this group found that working part-time was difficult and impacted the studies as in this excerpt:

'I have to work at least 15 to 20 hours a week to be able to afford the tuition for the course each year. Sometimes it was difficult for me this term with my shifts at work to find time to check WebCT™ and download the latest material for the next class. I really like the idea of being able to access my course anytime, but working got in the way sometimes.'

Table 7: Number of Access Times for WebCT™ by Students

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<th>Week 1</th>
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<th>Week 3</th>
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<td>Student 6</td>
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<td>Student 9</td>
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<td>Student 13</td>
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<td>Student 14</td>
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<td>Student 17</td>
<td>7</td>
<td>9</td>
<td>12</td>
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</table>
In terms of comparing access times and number of hours logged into the course by the students, there are two trends that emerged. First, some students would access the course for 1 hour each time they logged in. Students 1 and 2 showed similar actions when it came to logging in and spending approximately 1 hour each time they entered the course. These students noted in their respective diary entries that due to scheduling they only had a limited amount of time to access the course and review the materials necessary. Student 2 noted that the only computer access he had was at the college and due to other scheduling was limited in the amount of time to access the course. The second trend that emerged was that some students would log in fewer times, but would stay logged in for a longer period of time. Students 11 and 17 demonstrated this behavior by logging in less than students 1 and 2, but stayed in the course for a longer period of time. Both students 11 and 17 reported that they had computer access at home and had no other commitments and could therefore spend a greater amount of time in the online course.

The students were also required in the questionnaire to indicate the number of hours that they accessed the online course materials (see Table 8). The amount of time measured in hours was greater to start with in week 1 with an average of 8.8 hours of access, then decreased slightly to 6.7 average hours of access by the 17 students. The final sixth week showed an average of 9.8 average hours of access, due in part to the final online quiz that was required to be completed by all students.

As with the number of times per week that the students accessed WebCT™ there were some determining factors that emerged from the questionnaires and the diary entries. The results varied for this measurement of time spent using the online course materials due to student schedules and individual needs which were factors when accessing the course. Student 6 reported a high degree of time spent in the online course whereas student 4 by contrast reported and overall low amount of time spent in logged into the course. The diary entries for student 6 revealed that the student was not working part-time and was familiar with using online course technology and felt comfortable accessing the course materials regularly each of the six weeks. Conversely, student 4 noted in the diary entry that working part-time and obligations to other course work were factors that contributed to a lower
amount of time spent logged into the course as well as a lower number of access times per week.

Several students noted in their entries that in the first week of the course they spent more time reviewing the course and becoming familiar with the online content. Once the second week commenced the amount of time spent logged in decreased and continued at those levels until week 6. In week 6 the amount of access time increased due in part to the fact that some assignments were due and there was an online quiz that the students were required to take. For example, student 14 wrote:

‘For the first week on the course I spent time logging in looking at all the different material we had to learn and also printed off what I needed for my next class. For the rest of the week 2 to 5 I didn’t think that I needed to log in as much as I was getting to know the content. I week 6 I had to log in more so that I could submit my assignments and do the online quiz.’

Table 8: Number of Hours of Access for WebCT™ by Students

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
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<tr>
<td>Student 1</td>
<td>6</td>
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<td>Student 2</td>
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<td>Student 17</td>
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</table>
Mobile usage by Students

All of the 17 student participants in the study were familiar with using PDA devices whether it was a Palm Pilot or PDA, so the basic aspects of operation and comfort levels with the technology were not an issue.

The PDA devices that the students were using had the learning module installed that included 2 Flash presentations, instructional video clips and self-assessment quizzes. The modules were designed to be self-contained programmes that did not require wireless access to function. The instructional video clips depicted basic medical assessments that were required knowledge by the students for this section of the programme. All of the students identified that the video clips were highly useful in terms of being able to preview a medical assessment for study purposes at any time.

The students were also asked to report the frequency of times that they accessed the PDA devices (see Table 9). As with the results from the online course access, the first week showed a high frequency of access as the students used this time to become familiar with the mobile course content. In week 1 the average number of hours of access by students was 7 and in week 2 it dropped slightly to 6 hours. This trend of higher access time in week 1, then a leveling off for weeks 2 through 5 was also seen in accessing of the online course material. The final week 6 showed an average of 6 hours of access time by the students. This result was lower when compared to the final week on access for WebCT™.

| Table 9: Frequency of PDA Access in Hours by Students |
|----------------------------------|---|---|---|---|---|---|
|                                  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 |
| Student 1                        | 7      | 6      | 4      | 6      | 5      | 7      |
| Student 2                        | 9      | 6      | 5      | 5      | 8      | 4      |
| Student 3                        | 6      | 4      | 3      | 3      | 5      | 6      |
| Student 4                        | 4      | 6      | 3      | 5      | 5      | 7      |
| Student 5                        | 7      | 8      | 8      | 5      | 5      | 4      |
| Student 6                        | 9      | 5      | 6      | 5      | 7      | 5      |
| Student 7                        | 5      | 4      | 7      | 7      | 6      | 5      |
| Student 8                        | 6      | 6      | 5      | 4      | 5      | 5      |
Access times by the students for the PDA showed an average of 9.5 times during the first week of the study (see Table 9). The trend of higher access during the first week then dropping slightly as students became more familiar with the content is repeated in these results. A slight drop in number of access times during week 2 to 9 times on average for all 17 students coincides with an average total of 6 hours access time for that second week. Also, during the final week 6 we see an average of 10 access times per student for a total average of 6 hours of access. The level of access for students varied from low to high. For example, student 5 showed low usage in terms of access times and number of hours for the PDA. This student noted that inexperience with the technology was a barrier in this case and was also not confident using the technology.

Information gathered from student diary entries revealed both positive and negative issues came up with regard to the curriculum content contained on the PDA devices. These issues were identified as any of the text was too small and hard to read especially on a small mobile screen; the material contained on the PDA was a duplicated of what had been covered in class or what was available online; there was too much written content and a lack of time to review all of it. The video clips were cited as the most useful elements on the mobile module and students indicated that they accessed these clips often as a form or review for the particular medical procedure they were learning. A typical comment from the students regarding the written information on the PDA is as follows:

Student 7:
'I couldn’t read the text in the Key Terms section very well on my PDA and didn’t really refer to that section very much, I liked the video clips better as a way to memorize our procedures. ‘

Student 11:

‘The only good thing about the PDA course material was the video clips and I could watch them whenever I needed to and not have to read my text book and just look at the pictures.’

Another theme that emerged from the results for the PDA use was a comparison between the students who accessed WebCT™ to a high degree or low degree and those who accessed the PDA in the same respect. For example, in the results for WebCT™ access (Table 9), Student 1 demonstrated low use for both the online content and the PDA content (see Table 10). In contrast, Student 11 accessed the online line material to high degree as well as the material on the PDA devices. Diary entries from these students show several reasons for differing amounts of access for the respective learning materials.

Student 11:

‘I found myself logging into the online part of the course a lot to see if there had been any changes or new material that we needed to know. Some of the material on the PDA was pretty much a copy of what was online, but I used the video tutorials quite a bit to look at the procedure we had to learn. The close-up shots made it easy to identify pieces of equipment.’

Whether a student worked during the course become a determining factor for accessing the course materials. Students commented in their diary entries that working part-time and trying to manage all their courses could sometimes be difficult and result in less access time for either online or PDA course materials. A typical comment regarding this is as follows:

Student 3:

‘At the beginning of the semester I started working part-time to be able to pay tuition fees and I found it hard to juggle both school and work. I liked being able to log into my course online, but found that I didn’t have a lot of time to review the materials as I would have. Even though I carried my PDA around with me I really only had limited time use it. Also, the concept elements of the module on the PDA was hard to read and there wasn’t enough time during the clinical sessions to sit and look at the small screen.’
Table 10: Frequency of PDA Access Times by Students

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Questionnaire Results

For this study, 17 2nd year nursing students participated on a voluntary basis during their six-week clinical study practicum as part of the course programme.

How many times during this week did you access the course content from the online WebCT course?

From the questionnaire results, the students responded various frequency of access for each of the six-weeks during the study. A trend emerged that showed high access frequency during the first week. The subsequent weeks 2 through to 5 showed a leveling off of access as students became more familiar with the material and online environment. The final week 6 showed a higher amount of access to online material (See Table 7).
How long did you access the course content from the online WebCT™ course in terms of approximate hours?

From the questionnaire results, the students indicated a range of access time for each of the six-weeks during the study. On average, the number of access times was greatest in the first week of the study, then lessened slightly for weeks 2 through to 5. The final week 6 saw an increase in the amount of times students accessed the online materials and quiz (See Table 8).

Did you experience any technical issues when using WebCT™? If so, what was the nature of the problem?

Of the 17 students involved in this study, 13 indicated experiencing issues related to password access to their WebCT account. The students disclosed that keeping track of multiple passwords for various computer accounts at the college and elsewhere was a problem, which frequently accounted for student to lose passwords and thus have to request entry back into their WebCT accounts. In addition, the download times of the video segments was identified by 5 of the students involved as an issue since a High-Speed Internet connection was the preferred platform for optimal performance. Browser utilization was identified by 5 of the students in the study as an issue to accessing the course material in the manner it was designed. The course material created in WebCT was designed for Internet Explorer as this browser showed few errors in display and is also a common browser on most computers.

What elements of the online course content were useful to your learning experience?

A high percent of the students, 15 indicated that the instructional video segments, discussion groups and course material online such as PDF or PowerPoint files.

What elements of the PDA mobile content were useful to your overall learning experience?

As with the responses with regards to the content online in WebCT, as large percentage, 15 students indicated that having access to the video segments, Key Terms, Content section
and self-assessment Quizzes were of great benefit while involved in the clinical study practicum.

**How many times during this week did you access the PDA module material?**
From the questionnaire results, the students showed a varied degree when it came to accessing the PDA learning module. On average, the students accessed the learning module on the PDA the greatest during week 1, and then decreased over the subsequent weeks (See Table 10).

**Collected Diary Entries**
Entries by students were few as most students indicated that there was limited time during the semester to take time out to write a diary. They preferred the questionnaire format as it was organized so that they were only required to fill out each section for each week of the study. Of the 17 total student participants, 8 supplied comments from diary entries that they recorded during the study. Generally, the comments from those students who did respond with a diary entry noted that the flexibility of the online material as it presented access to course material and also an opportunity to participate in online discussions. The online discussions were identified as very useful in gaining further insight into the course content, theories and best practice when it came to nursing education. These participants also expressed appreciation to being able to access learning module content through the use of the PDA units. Here again, students noted that the flexibility provided by a mobile device was extremely useful as it allowed them to access instructional video, nursing terms and a self-assessment quiz without restriction.

**Summary of Findings**
This chapter has described the findings from this study. The aspect of flexibility for the learners and also the teachers was found to be of major importance. Both teachers and students expressed in the questionnaires that the availability of course content online was of benefit since students could access materials from WebCT™ at any time, which allowed them to fit some of the course work around their lives outside of the college. Both groups of participants also identified that having access to course content on a PDA was an
advantage especially when it came to doing medical procedures due to the fact that each procedure was available in a video clip that could be reviewed beforehand. Key aspects from the study are:

- Use of instructional video clips was identified as a positive contribution to the learning experience
- More professional development and technical support was required for teachers
- Text size was identified as an issue for reviewing content material on a PDA
- Students who worked part-time during the semester had a more difficult time using and accessing the online and PDA course materials
- Changes to both the online and PDA curriculum are required for further delivery of these courses to address concerns over redundant material

Chapter 6 –Discussion and Conclusion

PDAs in Nursing

This chapter will compare the project objectives with the summary and analysis of the teacher and student findings. Incorporating the use of blended online curriculum and mobile learning modules through the use of a Pocket PC device provided the context for examining their effectiveness in nursing education. The use of educational technology provided a relevant context for the basis of this study in which participants gained collaborative, technical, skills as well as increased access and retention through the use of technology.

Mobile Technology in Education

In this study, the integration of a mobile device for nursing education was found to have a major influence and importance for the participants. The results concurred with a recent study at the University of Glasgow, the nature of the investigation involved looking at the benefits of using a PDA mobile device as a learning or teaching tool. Trinder, Magill & Roy (2005) explained that their study involved the use of PDAs in the schools of electronics and electrical engineering to increase access for students. They further explain their study in terms of enhancing assessment:

'We wanted to enhance access to assessment and learning materials by utilizing
portable devices to increase accessibility and flexibility of learning for students. With many students needing to work part-time their available spare time for study has been reduced. Any learning resource that can be utilized during the rare gaps in contemporary students’ busy schedule is a valuable asset to them. The immediate readiness of PDAs (switch on and use, no boot up time) makes them ideal to grab a few moments of useful working time. A PDA may bring additional benefits to a student. The organizational, diary and note-taking tools that are built into most PDAs may help the student to develop better organizational skills’ (p.73).

Many organizations have recognized the valuable asset that some of the new technologies have provided for their workers saving valuable time and effort. One enlightening comment overhead with the use of PDAs was it “uses your head to save your feet”. There are similarities here to note with a similar study from the University of Glasgow. In my study, it was evident that nursing students benefited from the increased off-campus access to certain curriculum content through the use of a PDA. Although the University of Glasgow study and the nursing study by comparison involved very different faculties, a common element between them is the PDA units contained a quiz application to provide an opportunity for self-assessment. Trinder et al. (2005) identified some of the benefits to students as the quiz material prompted further discussion between students, the tutor assisted with the student’s understand of the subject matter, collaborative learning increased and the nature of the course material allowed for access controlled by the student away from the campus environment. In the Glasgow project, the students were given a PDA, whereas students within this study willingly took initiative to purchase their own PDA unit. Further to this idea of PDA ownership, Trinder et al. (2005) identified ‘that if students were given, rather than loaned, the PDAs then they would use them more whole-heartedly’ (p. 78). Finally, it was noted in my study that the PDA showed to engage the students in the course content and create an atmosphere of greater interest in learning.

A study was with similarities to my project’s results investigated the use of a PDA by Australian nursing students in a clinical setting. Farrell (2006) explains that 76 students were provided with PDA devices that contained a database of pharmacological information. The results showed an increase in knowledge due to the availability of a PDA. Students would access a PDA for each shift and indicated that their individual pharmacological knowledge was enhanced. Although this study in Australia involved the use of a database
of reference material, it has similarities with my study of the nursing students at the College of New Caledonia as both groups of students from these respective studies showed enhanced learning by utilizing a PDA device in a clinical setting.

In contrast, my study focused on the utilization of the Pocket PC as a learning and teaching tool, which contributes to greater access, more collaborative learning and increased involvement in education for the students. Mobile learning from a teaching point of view, is also personal learning, which could be remote and individual, or social and collaborative as described by Kukulska-hulme and Traxler (2005). Hollis (2002) also makes the point that mobile devices are ideal for blended learning strategy in a corporate environment where small amounts of information or learning objects are used by workers that they access at any time until they need to access more in-depth information from their office. This opinion parallels my study in view of the fact that the students were given a short learning module to access on their Pocket PC units while visiting the local hospital during the clinical studies part of the course.

**Online Teaching and Learning**

In my study, there emerged several positive aspects attributed to online learning both from a student and a teacher perspective. From the teachers point of view the introduction of the blended online course material increased access to students who sometimes faced challenges regarding work and education. From a student perspective in this study, students expressed that increased access to materials was a benefit with regards to life schedules and course loads.

The student participants in my study expressed that they felt an increased role in managing their studies due to the fact that material that was normally just available in a face-to-face classroom setting was now available online to accessed at any time. Student participants identified that on-going communication with the teachers using WebCT™ tools such as email and discussion groups helped in the overall learning and contributed to more positive experience. This had long been noted by Salmon (2000), ‘The support and actions of e-moderators, more than the functions of the technology in use, can truly make the difference
between disappointment and highly productive learning.’ (Salmon, 2000, p.104).

The teachers expressed their opinion that the area of professional development was an important factor when it came to successful online teaching. Both teachers noted that they would have benefited from prior professional development within their own institution so as to better equip them to deal effectively with online learning and the associated technology. Bates and Poole (2003) have also supported such importance of institutions making training available to teachers, ‘Many of the problems face by teachers in higher education in using technology result from poor technical and pedagogical support they are given by their institutions’ (Bates and Poole (2003) p.18). Salmon (2004) has created a list of criteria that assist in managing and training of e-moderators. Several suggestions for training include making sure that the trainee be given sufficient time to learning online first before teaching; facilitate trainees in learning the software as they become more familiar with the online environment; and create and environment where trainees with varied prior skills are able to function. It is a recommendation from my study that further studies in the area of nursing education within the College of New Caledonia should address the issue of training for teachers so as to better equip them to be able to adapt to the online environment and thus exploit its full potential.

**Conclusion**

This chapter will discuss the main research question as well as related aspects such as barriers encountered, support mechanisms for online learners and teachers and course curriculum.

Main research question: How can a blended online component be effectively implemented in clinical based course?

- How can teacher’s best integrate the online curriculum to foster collaborative learning for their students?
- What benefits does curriculum delivered by mobile devices have for students in terms of overall access to content?
- What are some of the barriers to integrating both online and mobile curriculum content and how can they be overcome?
What is the influence on learning for students accessing both the online blended courses and utilizing the Pocket PC mobile devices?
What additional support is required to maintain both online and mobile technology for students and teachers?

Up to this point, nurses have primarily been using PDAs to access clinical reference material, drug information, and information on a variety of nursing procedures. With the growing demand for practical nursing training, this ultimate expansion of online and mobile nursing education will provide students both the opportunity to train as well as a new-found flexibility needed for most adult learners.

Throughout this study, it was found that PDAs can be utilized as a supportive tool for online learning. Online instruction is enhanced by the immediate accessibility with PDAs. Because of the nature of online education, nursing educators are able to network, share education ideas and practices, and discuss topics of professional interest with one another in the Chat areas of WebCT™ for example. The online environment allows nursing educators to be more accessible and provide additional teaching tools, such as sited dedicated to answering students’ questions. In terms of the classroom, educators will be able to integrate the instructional online/PDA video segments to test students during clinical practicum sessions. Nursing procedures through WebCT™ and also loaded on PDAs act as a quick visual component for multifaceted learning modalities available to meet many different learning styles and needs.

Anecdotal information indicated that after the project was completed that students found their overall PDA use a positive experience. Many participants continued to use the PDAs after the research study was completed.

**Online Learning and Collaboration**

This study involved integrating online content into a nursing education course that was used by both the students and the teachers. This addition of online course content added a new dimension to the program that normally was taught in a classroom only situation. Students had access to many content elements such as instructor presentations, course notes, video clips and additional Internet resources through the online portion of the course. This adoption of online learning to the course contributed to higher levels of collaboration amongst the students and in addition a constructivist approach. Offering these nursing
courses in a blended online format allowed for greater flexibility of access to the materials outside of the classroom delivery.

Imel (1991) points out that collaboration contributes to new knowledge and a synergy of information that is created by groups or teams for their own gain. The results from this study show that the use of communication tools for exchanging ideas or working on group projects ranged from “moderate” to “significant” (relating to the use of WebCT™ discussion areas and email). Students indicated that there were advantages to having access to tools in WebCT™ that helped them communicate with one another outside of the normal classroom times. Given that many students worked throughout this course they noted that the ability to access the course at any time was an advantage.

Kaye (1992) also points out the advantages of associated with collaboration in terms of it building and developing on the learner’s existing skills. Students in this study indicated that ability to be involved online discussions and work on team projects together contributed towards a greater appreciation of the content.

**Recommendations for PDA Delivery**

Mobile technologies are not yet in a position to be significant in allowing nursing students remote access to learning resources. At the same time, the technology has great potential to meet the needs of these students. They attach importance to remote access to learning resources and are already make high level use of electronic learning resources. A greater understanding needs to be developed around how and when students access learning resources when they are on placement. This knowledge will allow the use of the technology to be developed in the best way to meet their needs.

M-learning undoubtedly will be supported by health library and information services. This area of learning does present an example of where collaborative learning amongst students is demonstrated.
Barriers to Online and Mobile Learning

Barriers that emerged from this study can be identified as internal, external, technical and personal in nature. A combination of barriers can affect the success of online or mobile learning at any given time for various reasons.

1) Internal strategies for distance delivery are essential for any educational organization to ensure that there is long term planning in place to address programme needs. Strategic planning for the development, design, teaching and upgrading of courses or programmes can affect the outcomes of technology based learning initiatives.

2) Distance learning often has to rely on external funding or support so that projects and initiatives can proceed. Aspects such as technology costs, project personal and ongoing maintenance costs can necessitate that educational institutions seek external sources for additional funding.

3) The use of technology plays a major part in the success on online or mobile learning as the correct infrastructure needs to be in place with provisions for support to teachers and students as well as ongoing research into technology developments. In addition, professional development for teachers using the various technologies is crucial so as to ensure success for both teachers and consequently students using the technology.

4) Learning styles are seen as particularly important in distance learning because of the capability of technology to individualize instruction; thus providing instruction via a student’s preferred modality. Students may be auditory, visual, tactile, or kinesthetic learners, or a combination of these. By providing various alternatives of information dissemination, the instructor may provide a richer learning experience for all students.

Influence on Learning for Students

This study followed the use of online and mobile technologies by students who had traditionally experienced face-to-face learning in nursing education. The increased access to course information was identified by the students as a positive experience. The inclusion
of online blended course delivery created another opportunity to build community apart from just the classroom environment. Also, the addition of the PDA devices was well received by the students as these types of units are commonplace now in nursing and provided the students with greater exposure to the operation and potential in PDAs. A key difference between face-to-face and online learning is the independence and ability to participate in the online class at a time convenient to the student. This aspect of convenience of access was indentified also as a positive element in the course. Student interaction mostly occurs through an online threaded discussion that allows students and instructors to interact in asynchronous time. This is a significant shift for students accustomed to in-class discussions. It provided opportunities for richer discourse through written discussion that allowed students to spend time crafting their responses.
References

Ally, M 2007, ‘Mobile Learning’ *International Review of Research in Open and Distance Learning*, Vol. 8, Number 2


College of New Caledonia, International Research Office – ‘Northern Collaborative Baccalaureate Nursing Program (NCBNP)- Student Age and Gender Distribution, 2004’

College of New Caledonia 2002, ‘Strategic Plan – Fostering a Learning Centered Environment’
*<http://www.cnc.bc.ca/pdfs/CNC_Strategic_Plan.pdf>* (accessed 2 September 2005, Intranet access only)

College of New Caledonia 2005, ‘Strategic Plan Development 2005/06 – The Strategic Planning Process, June 8, 2005

Dhanarajan, G. 2001, ‘Distance Education: promise, performance and potential’, *Deakin University Strategic Applications of Flexible, Online and Distance Education Reader*, Deakin University, Australia


Fryer, W. 2003, 'Competing Visions of Handheld Computer Use in the Classroom', *Tools for Teks: Integrating Technology in the Classroom*


Keegan, Desmond, 1986 ‘Foundations of Distance Education’. Routledge, New York


Kukulska-Hulme, A. and Traxler, J. (editors) 2005, Mobile Learning – a handbook for educators and trainers, Routledge, Oxon

Means, B 2004 Using technology evaluation to enhance student learning, New York : Teachers College Press, c2004


Panda, S. 2003, Planning and Management in Distance Education, Kogan Page, London


Sitman, K., Leners, D., 2006 ‘Student Perceptions of CARING in Online Baccalaureate Education’ Nursing Education Perspectives Vol. 27 Issue 5, p254 – 259


Appendix 1

DEAKIN UNIVERSITY
HUMAN RESEARCH ETHICS APPROVAL

PLAIN LANGUAGE STATEMENT FOR PARTICIPANTS

Project Title: The Effectiveness of Online and Mobile Learning for Nursing

My name is Anthony Ralston and I am studying for my Masters of Professional Education and Training with Deakin University, Australia. I am the Educational Technology Coordinator at the College of New Caledonia, where my position involves the design and development of educational technology inclusive of online learning, professional development for faculty and grant writing to external agencies. This position does not necessitate direct contact with students, thus ensuring an impartial perspective for this research study. I am currently undertaking a 2-credit research project, which is a necessary component of this programme. The project is being undertaken under the supervision of Dr. Elizabeth Stacey, Faculty of Education.

I would like you to consider participating in this project, the details of which appear below:

The aim of this project is to study the effective use of online and mobile learning devices for both nursing students and faculty at the College of New Caledonia, Prince George, British Columbia, Canada. This study is interested in the impact that blended online course delivery might have on a program that has traditionally been taught exclusively in a classroom setting. The end result of this study is intended to produce some recommendations for improvements in the delivery of online and mobile curriculum as well as recommendations for future endeavors in other subject areas within the College of New Caledonia.

I am seeking nursing students enrolled in the Northern Baccalaureate Nursing Programme as well as one faculty member to participate in this study. Participants will be asked to keep a diary of their experience using the online and mobile learning modules as well as to fill out an anonymous questionnaire. Sample questions are attached to this document. Participants who are interested in being involved in this study are requested to take a project study package that will be available to you during the class presentations by Anthony Ralston on this study. The project study package includes the Plain Language Statement, Consent Form, anonymous questionnaire and questions for the diary entry section. Participants are asked to keep a diary of their experiences using both the online and mobile learning modules. A minimum of 1 diary entry per week over the six-week duration of the study is requested for each participant. Potential participants will submit their consent forms to the Administrative Secretary at the Institute for Learning and Teaching located at office 2-122. At the end of the six-week study, participants can drop off their completed questionnaire and diary entries also to the Administrative Secretary for the Institute for Learning and Teaching located at office 2-122.
No findings will be published which can identify any individual participant. Anonymity is assured by our procedure in which false identities are used at all times. Access to the data is restricted to my supervisor and myself. Coded data will be stored securely for six years, as prescribed by the University regulations.

Participation in this research is entirely voluntary, and if you agree to participate, you may withdraw your consent at any time by declining to participate in any section of the procedure.

If you have any queries or would like to be informed of the overall research findings please contact me by telephone (250) 562-2131 Ext. 550.

Thank You.

Anthony Ralston
MPET student in the faculty of Education, Deakin University
Student Number – 500119258
Phone – (250) 964-9066
Email: ralstona@cnbc.bc.ca

30th October, 2006

Should you have any questions or concerns about the conduct of this research project, please contact:

Supervisor
Name: Associate Professor Elizabeth Stacey

Address
Deakin University
Faculty of Education
Melbourne Campus
Burwood Vic. 3125
Phone: 61 3 92446443
Fax: 61 3 92446687
Email: estacey@deakin.edu.au

Or

Chairperson
DUHREC Sub-Committee (Education)

Address:
Deakin University
Melbourne Campus
221 Burwood Highway
Burwood Vic. 3125
Phone: 03 92446412
Fax: 92446687
Sample Questions for Anonymous Questionnaire:

Students:
- How would you best describe your experience using WebCT as a blended online learning tool compared to the traditional classroom-learning situation?
- Have you had any previous experience with online learning or mobile learning?
- Did having access to both course content on WebCT and in a mobile device format benefit your learning experiences in the clinical setting?
- What problems did you encounter with respect to the online and mobile learning course content?
- Was the course content provided in WebCT appropriate learning material for your course?
- Would you recommend that similar educational technologies be integrated into future nursing courses at the college?
- How has the integration of online and mobile learning technologies changed your learning compared to a traditional classroom setting?

Faculty:
- From a faculty perspective, what advantages did you find in utilizing the online portion of the course content?
- As a teacher, what barriers did you encounter when using WebCT as the online course management system?
- Was overall collaboration in the course increased by the implementation of online and mobile learning modules?
- What different skills do you think are required for teaching online as compared to a traditional classroom?
- What aspects of the course content could be improved upon in future courses where an online or mobile component is used?
- How would you describe the overall attitude of the students towards these new educational technologies that were studied?

Sample Diary Entry Questions:

Students:
- How often would you say you accessed the WebCT online portion of this course each week of the six-week duration of this study?
- How often did you use the mobile device to access curriculum content?
- Have you experienced technical difficulties while using WebCT and was the difficulty that you encountered attended to by the college?
• Did you benefit from keeping a diary of log of your studies while using WebCT online content or the mobile learning modules?
• Would you describe your experience using online and mobile learning technologies more beneficial than the traditional classroom delivery that is normally used in this programme?
• Did you find that collaboration with fellow students was increased or decreased by the use of the educational technology in this study?

Faculty:
• What sort of changes would you recommend in terms of course content that would be delivered through WebCT or mobile devices?
• Did you find the students participated in online discussion groups as part of the WebCT course design?
• How often would you say you accessed the WebCT online portion of this course each week of the six-week duration of this study?
• What factors are important for success in teaching/learning online?
• How would you describe the support concerning technology or related issues by the college?
• Compared to teaching in a classroom, has the integration of online or mobile content as a blended format increased access for students?
What type of professional development training would be of benefit for faculty for future courses where these types of educational technology are being implemented?

Thank you for your participation.
“This is an anonymous questionnaire. Please ensure that you do not write your name, or any other comments that will make you identifiable, on the attached questionnaire. By completing the questionnaire you are consenting to take part in this research. As such you should first read the enclosed Plain Language Statement carefully as it explains fully the intention of this project.”

I hereby consent to be a subject of a human research study to be undertaken by Anthony Ralston.

I have read the ‘Statement for Participants’ relevant to the research study and I understand that the purpose of the research is to study the effective use of online and mobile learning devices for both nursing students and faculty at the College of New Caledonia, Prince George, British Columbia, Canada. This study is interested in the impact that blended online course delivery might have on a program that has traditionally been taught exclusively in a classroom setting

I acknowledge that:

1. Upon receipt, my questionnaire will be coded and my name and address kept separately from it.
2. Any information that I provide will not be made public in any form that could reveal my identity to an outside party i.e. that I will remain fully anonymous.
3. I understand that findings will be used for research purposes and may be reported in journals.
4. Individual results will not be released to any person except at my request and on my authorization.
5. I am free to withdraw my consent at any time during the study in which event my participation in the research study will immediately cease and any information obtained from me will not be used.

Signature:

Date: /  /20
FACULTY OF EDUCATION
APPLICATION FOR HUMAN RESEARCH ETHICS APPROVAL

COURSEWORK RESEARCH PROJECT
Supervisor & Student

SECTION A PROJECT TITLE AND DECLARATION

Project Title: The Effectiveness of Online and Mobile Learning for Nursing Students

Project Commencement Date: 11th December, 2006

RESEARCH TEAM (Supervisor and Student)

Provide the following information for Supervisor and Student

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<td>Elizabeth Stacey</td>
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<td>Prince George, British Columbia, Canada</td>
<td>Research Unit: EXR790 Research</td>
<td>Semester 2</td>
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<td>Ph (250) 964-9066</td>
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<td>fax: (250) 561-5871</td>
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<td>email <a href="mailto:ralstona@cnc.bc.ca">ralstona@cnc.bc.ca</a></td>
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DECLARATIONS OF SUPERVISOR & STUDENT

We, the undersigned, accept responsibility for the conduct of this research in accordance with the information provided in this application. If the nature of the project changes over time such that the responses given to any section of this application are no longer valid, we shall not continue the project without prior approval from the Deakin University Ethics Committee (DUHREC).

Signatures of:

Research Student: Date:

Supervisor: Date:

By signing this application declaration I, the supervisor, certify that I have read and approved the research methodology and believe it to be appropriate for the project.

ACKNOWLEDGMENT OF AN ASSOCIATE DEAN.

Name:

Signature: Date: