Nursing informatics education and opportunities disguised as problems

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In today's information intensive world, cost effective quality health care requires computerised information systems. If these systems are to include the unique services provided by nursing, nurses must acquire the knowledge and skills necessary to design and implement those systems. The goal of nursing informatics education is to provide that preparation. This includes preparing nurses who determine the design of these systems as well as nurses who purchase, implement and use them in the process of delivering health care.

Nursing informatics educators working to achieve this goal face a myriad of problems. These problems are opportunities in disguise. This paper identifies and explores these problems as a first step toward realising the opportunities they offer. The problems interrelate and overlap. As a result an isolated approach to one problem can and usually does exacerbate another problem.

Educational programmes based on a realistic appraisal of the work to be done and the environment in which that job must be done offer the best opportunity of achieving the benefits provided by healthcare informatics.

Problem one: no consensus on prerequisites and programme content

As nurse educators we have not defined the prerequisites, nor the basic and advance nursing Informatics concepts that must be included in our formal and informal educational programmes. As a result, it is possible to find the same basic computer literacy skills listed as a prerequisite in the school bulletin, included in a class for beginning students and in a class for graduate students all in the same school. Why would this happen?

Nursing as a practicing profession uses a variety of related theories and disciplines in building its unique body of knowledge. Nurses with years of education and experience have an extensive background in understanding how information from different theories is used in nursing practice. Nurse educators routinely use this knowledge to establish admission requirements and identify required course work.
Professional organisations use this understanding to establish formal accreditation requirements. Mathematics provides an example of this process. Nurse educators know that basic nursing students must calculate drug dosage, IV rates etc. Advanced students need mathematical concepts in learning how to do research. Faculty in curriculum meetings are quick to offer opinions on what type of mathematical background students require. Most faculty are comfortable discussing this issue even if they have forgotten the details of complex mathematical procedures they once learned. But how many faculty are comfortable discussing the mathematical background necessary for nursing informatics? Yet mathematics is key in setting up a spreadsheet or the more complex task of planning an artificial intelligence program. Many faculty believe that they have identified the necessary prerequisite by requiring some degree of computer literacy. Nursing informatics certainly requires basic computer literacy but, that is only the beginning.

While much work remains to be done in this area the need is recognised. In the United States the National League for Nursing has included computer literacy in their accreditation criteria. The Ministry of Education in New Zealand has published a guide for teaching nursing informatics in that country.1 In your country, in your professional organisations and in your home school how is this issue being addressed? On the other hand, the answer is not as simple as gaining a consensus on a specific set of requirements. A rigid set of curriculum requirements will eliminate needed flexibility in a rapidly changing field.

**Problem two: no relationship between level of education and student knowledge**

Nursing students, professional nurses, and nurse educators vary widely in their knowledge of health care computing. A beginning student from a good school with a computer in the home can be very computer literate. If this student is using the Internet they may have had an excellent introduction to health care informatics. An equally good beginning student in the same class may have little or no computer background. This wide range of computer and health care informatics knowledge exists throughout nursing. There are valuable nursing leaders with little or no background in computing. At the same time nursing is well represented at the international level in the leadership circles of health care computing.

Given the wide variation in what our learners know or need to know, how then do nursing educators identify and teach basic and advanced nursing informatics? In discussing this question remember the goal for nursing is better health care. Nurses learn about health care computing in order to provide for better health care. The reverse is not true. They do not learn nursing theory in order to do health care computing. At the same time we are reaching the point where nurses can not provide for safe care without understanding basic health care computing concepts. Because health care computing is tied to a rapidly changing technology some version of this problem will always be true.

Pharmacology has presented some of the same problems for nursing. All nurses require a basic knowledge of pharmacology. What an individual nurse needs to know varies widely and constantly changes. In major medical centres where patients with multiple problems are on numerous drugs busy nurses will tell you that they can no longer remember every detail they need to know to safely administer those drugs. It is at this point that safe patient care requires the development of information systems to
manage this information overload. But the development of these information systems requires the involvement of the same bedside nurses.

The emphasis here must be on creating opportunities for learning. In this constantly changing environment opportunities to learn even basic concepts, can not be limited to formal educational programmes. Leaders in nursing informatics education must create life long learning opportunities that are integrated into continuing education for all professional nurses. For example, if continuing education is required for recertification or relicensure in your practice, is there any nursing informatics content included in that requirement?

**Problem three: limited access to resources**

Around the world there is great variation in how nursing education programmes are organised and what resources are used to teach students. However, nursing is a practice profession and students in every educational programme participate in related hands-on experiences. For example, a student in a doctoral programme learning how to do nursing research will be enmeshed in real research. Basic students learn clinical nursing concepts by providing care to real people. In both of these examples the management of nursing information is an inherent part of nursing. To learn the management of nursing data in today's automated environment students require access to health care information systems.

While clinical settings are usually prepared to provide nursing students full access to paper medical records they are frequently totally unprepared to provide any access to automated records. The first problem is passwords. Access to automated systems usually requires a password. Rarely is a clinical setting prepared to provide temporary passwords for a parade of short term non-employees. As a result students are forced to go through either their instructor or another nurse to obtain the patient/client information stored in a computer. Furthermore, they receive little or no experience in entering data into a health care information system. As health care has become automated students of nursing are no longer learning current documentation concepts or procedures.

It is not just the basic process of data entry that is lost. Certainly new nurses are oriented to the information systems in their clinical settings. What is presented however, is the procedure for using the system with limited time for exploring related theoretical issues. Concepts like minimum data set or unified nursing language become irrelevant. Furthermore the nurses providing the orientation have themselves been educated with these same limitations.

This limitation is further exacerbated by a lack of realistic computer education software that emulates health care information systems. The long term consequences of limited student access to real and simulated health care information systems is unknown. But how can nursing leaders guide the use of nursing information systems, if they are given such limited access from the beginning of their education?

This situation provides nursing educators an opportunity to work together with other health care disciplines in solving health care education problems. Each of the health care disciplines uses hands-on direct experience as a primary educational tool.
Many of the disciplines have no more access to the actual systems than nursing. None of the disciplines have access to good simulated systems. Developing and maintaining this type of software is expensive. Effective nursing information systems never exist in isolation. Just as nursing professionals integrate into health care systems so must our information systems. Nursing informatics educators will not get access to the expertise needed to manage this problem unless we unite with our colleagues in health care.

**Problem four: grassroots nursing leaders in nursing schools are poorly prepared to provide needed support**

Grassroots leadership refers to individuals who chair divisions, departments or schools. The day to day collective decisions of individuals in leadership positions have a major impact on nursing education. These are academically successful people, who are used to learning new information. However, most nursing leaders developed their initial work habits in a manual world. To personally experience the gains that automation can offer they must relearn basic work habits. Many have tried learning to use computers in their daily work and have been unsuccessful. Their learning experiences before trying computing have taught them to expect a sharp upward slope in their personal learning curve. The initial learning curve with personal computing usually has a gradual slope. Personal computing is a psychomotor skill requiring the integration of strong cognitive verbal skill with good eye hand co-ordination. For example, composing on-line requires that the writer mentally develop the ideas, translate these ideas into finger movements while appraising how well the words appearing on the screen express the ideas in the writer's mind. Initially the computing process is disruptive to the creative thought process. It can be hard to see the advantages of automated systems if you find that they only slow you down.

Even with this limitation, many leaders have accepted the need for computer resources. But these are expensive resources. In most schools there are competing demands. Not only do different departments compete for resources but other educational needs also compete for the human and financial resources of the school. The lack of personal experience with computing while dealing with competing demands is frustrating.

While grassroots leaders are poorly prepared to provide needed support, this problem creates a great opportunity to develop needed educational programmes. Educational programmes should focus on the computer learning needs of the grassroots nursing leadership. How can one decide, for example, whether to put new computers in a centre for nursing research or in a student learning laboratory? Does it make more sense to purchase an authoring system and develop new computer assisted instruction (CAI) as needed, or to buy off-the-shelf CAI. These nursing leaders have a multitude of learning needs that are not met by teaching them basic computer literacy. These examples focused on leaders in nursing education, but our leaders in nursing practice also need educational programmes that support the administrative decision making process.
Problem five: faculty have not been prepared to teach electronic information seeking skills

From the first day that a student enters a programme of nursing education they are introduced to nursing knowledge and theory. From the very beginning of their education they are taught to seek out information, to analyse that information and then use that information to answer questions and solve problems. They learn how to search literature databases and develop lists of references. They learn how to read and study printed materials. Students are taught how to critique research. But they are learning with limited, prepared information. There are a limited number of journals and publishers in health care and a smaller number focused on nursing. Inherent in the publishing process is the review of the materials being published. In addition cost has limited the number of printed resources available to students. As part of the teaching process, faculty guide and direct students to selected readings.

Nurse educators the world over are well aware that nurses need independent learning skills, including the ability to find new information. But students and faculty alike have learned information seeking skills in a world where personal exposure to other people has been limited by geography and printed information had been carefully prepared for publication.

Today through the use of the Internet an article can be distributed across the world with one push of the return key. The result is an enormous amount of information. Certainly more than any one person can read. Furthermore there are no current procedures that control for accuracy or quality. The best and the worst of information exists in the electronic world.

With e-mail, students and faculty alike are exposed to a host of people with different ideas. But their exposure is limited to the words on a screen. There are no intonations or body language to help interpret the meaning of the words. Communication with written words only creates an environment where it is easier to misunderstand, misinterpret or to offend. Electronic communication requires a whole new set of communication skills and rules. Issues related to electronic information access and communication offer another area of exciting opportunities. For example, one could do research on the questions: When is it more effective to read several abstracts and when is it more effective to read one carefully detailed article? What type of nursing skills can be taught to large numbers of learners with distant education and what skills just do not translate well to the format?

Conclusion

This paper has identified and explored five problems facing nursing informatics education. In reviewing these problems one could compare nursing informatics education to a raft trip in constant white water. But always remember, white water is the exciting part of rafting. These problems represent some of the exciting opportunities available in the field of nursing informatics education.
References
