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ARTICLES

Program-Integrated Information Literacy (PIIL) in a Hospital's Nursing Department: A Practical Model

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This article provides a systematic description of a strategy to integrate information literacy into programs that support professional development in hospitals' nursing departments. Four phases are explained: preparatory, planning, implementation, and evaluation. It suggests that librarians must go beyond the basic one-time instruction workshops to a collaborative model working with nursing management so that nurses and nursing students will use information resources as part of their learning process and obtain the needed skills to be information literate, users of evidence-based information, and life-long learners. The literature reviews the concept of informatics in nursing practice and some of the different programs set up to acquire information literacy competencies.

KEYWORDS *evidence-based practice, hospitals, information literacy, librarians, nursing programs*

INTRODUCTION

The information society of the 21st century requires an information-literate population. In this article, the author reviewed the literature and the new

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trends in the nursing profession with regards to information technology (IT) and information literacy (IL) and concluded that the nursing education community doesn't have a clear understanding of the differences between information technology and information literacy. The literature analyzed does not distinguish differences between the two, and authors jump back and forth between IT and IL without making a clear distinction.

This confusion is problematic because health care has left IL behind for IT trends. An example of this is the push of the federal government for electronic health record (EHR) systems, and the intense use of technology by health care providers to enhance all procedures and processes.

This perspective is difficult to understand considering health care in general is making great efforts to move nurses and other health care providers into evidence-based practice (EBP) to obtain higher standards of quality and better outcomes, as well as to attain outstanding scores or ratings for health care institutions. The question, therefore, is: Do nurses have the necessary skills to locate, use, and analyze information and to use EBP?

Many studies of the last decade cited in Argüelles' literature review have concluded that nurses are not always prepared to use evidence-based information in their practices (1). Information literacy is a complex and difficult situation, and there are many programs to remediate this position, some in the nursing departments, some at the health care system level, and others at a national level (2). IL must transcend disciplinary boundaries by underscoring a shared goal between librarians and health care providers (3). Also necessary are course-integrated IL programs to provide nursing staff with the necessary skills and tools to have a competitive leverage in the workforce. It has been difficult to implement course-integrated IL programs in hospitals because librarians are not using a collaborative model to work and transcend disciplinary boundaries. Continuing education in a hospital is usually sponsored by nursing management and librarians rarely support these programs from an information literacy point of view.

It is important to define roles, understanding that nurses know nursing practice and librarians know IL. Librarians, nursing staff, and students collaborating together can create a model that provides the skills and tools necessary to support information literate nurses. This condition "sine qua non" leads to the next step: using an evidence-based approach in nursing practice and promoting nurses' proficiency for life-long learning.

INFORMATICS IN NURSING EDUCATION

During the last 20 years, the definitions of informatics in nursing have included information technology and evidence-based practice, rather than associating information literacy and information technology.

Authors have not agreed on the general composition of informatics competencies for nurses. Some, like Staggers et al., Lewis and Watson,

and Walker and Walker, emphasize information technology, also sometimes called computer literacy (4–6). Others, like Verhey, concentrate on information literacy also known as information resources. Because there is no agreement, nursing undergraduate and graduate programs are defining their informatics curricula uniquely and independently with both tendencies being reflected in the curriculum (7). This approach has great incidence in nursing practice at a hospital level.

Saba predicted that nursing in the new century would have computer technology as part of the profession (8). Bakken advocates the need for informatics competencies in the new world of evidence-based nursing practice (9). Graves and Corcoran define nursing informatics as a *combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care*. This is one of the first studies that combine the main components: information technology, information literacy, and evidence-based practice. (10).

Wallace et al. consider nursing practice as based on a mixture of research, anecdote, tradition, theory, and hunch (11). Nursing education tends to reinforce the “ritual” by giving a high value to traditional scientific authority and adherence to well-known clinical protocols and routine practices; however, this approach does not equip nurses to practice in the future health care environment. In the new millennium, nurses are expected to be flexible, innovative, and information literate in order to assess outcomes in patient care. Informatics competencies specific to nursing have gradually evolved. Gassert conceptualizes nursing informatics competencies as an integration of knowledge, skill, and attitudes (12).

Schloman explains in her article that computer literacy is not equal to information literacy as many have believed. Having a set of competencies and an understanding of computer basics and being able to use several applications with the idea to manipulate and create documents does not make a person information literate. One must be a knowledgeable user of information, with electronic resources such as databases, e-books, e-journals (13).

Many organizations, such as the American Association of Colleges of Nursing (AACN), the American Nurses Association (ANA), and the Pew Health Professions Commission, have established guidelines for including informatics in nursing programs. The ANA revised the Standards of Nursing Informatics Practice to include computer literacy skills, information literacy skills, and other informatics competencies for beginning nurses, experienced nurses, and the informatics nurse specialist (14).

In 2003, the Institute of Medicine (IOM) determined that health care providers, as part of their health profession education, should have the following five competencies: provide patient-centered care, work in interdisciplinary teams, use evidence-based practice, apply quality improvement, and use informatics (15).

In recent years, two initiatives have emerged to define informatics competencies: the Technology Informatics Guiding Education Reform (TIGER) and the Quality and Safety Education for Nurses (QSEN). The QSEN initiative included the five competencies defined by IOM and defined informatics as the use of information and technology to communicate, manage knowledge, reduce errors, and support the process of decision-making in patient care. The knowledge, skills, and attitudes proposed in these competencies do not include information literacy as part of the process and it demonstrates inconsistency in relation with the definition (16).

The TIGER initiative focused on the use of informatics tools, principles, theories, and practices to make health care safer, effective, efficient, patient-centered, timely, and equitable. TIGER is divided into nine collaborative teams, one of which is the TIGER Informatics Competencies Collaborative (TICC). Consisting of three parts: basic computer competencies, information literacy, and information management, the TICC recommends that the competencies are fundamental to nursing and evidence-based practice (17).

Another project designed to improve information literacy competencies of students and professional nurses is The Learning Information Seeking and Technology for Evidence-based Nursing Practice (LISTEN). LISTEN structured a series of online learning modules, Web-based resources, and interactive opportunities for IL as a threefold acquisition of attitudes, knowledge, and skills in a 5-step information process: needing, seeking, accessing, evaluating, and applying information. It is intended to address the need for nurses to be information literate because according to the *About the Project* section: "50% of nurses haven't been taught information literacy; 50% of nurses don't value research evidence, and information available to nurses and relevant to nursing practice is estimated to double every five years" (18). The project also considers IL to be the path to lifelong learning.

LIBRARIAN-NURSING COLLABORATION FOR INFORMATION LITERACY INSTRUCTION

Collaborative work should be the starting point to creating and co-teaching an IL course in a hospital's nursing department. Librarians and nursing management encounter difficulties because librarians are more process-based whereas nursing management/faculty are more content-based (19).

A successful collaborative model should include the following interactions identified by Ivey: "shared understood goals; mutual respect, tolerance, and trust; competence for the task at hand by each of the partners; and ongoing communication." Collaborative teaching usually requires more time and coordination than teaching a course alone (20). Fox et al. point out that

integrating information literacy concepts into the units of a hospital is only possible if nursing managers and librarians work together. There should be an effort to assess the effectiveness of the programs for decision-making (21).

Weaver, Hodson-Carlton, and Dorner call for collaboration between nursing managers/faculty and librarians (18, 22). To become literate, nurses should be introduced to concepts and tools in a course or Web-based module designed for IL instruction and created by a collaboration between nursing management and librarians.

In an early study by Wallace et al., librarians and nurses used a program-integrated approach to develop a module containing three information literacy activities offered in a single course (11). The structural rationale was based on four key issues: motivation, relevance, integration, and assessment. The organization and structure of the program determined that skills should be taught incrementally, be transferable to academic and professional life, and that nurses should be rewarded for learning and integrating learning activities, assessing tasks, and subject content.

Dorner et al. discuss a collaborative approach between librarians and nursing management/faculty to integrate IL into a department's professional development program. The plan includes communication during the planning and deciding phases on what topics would be taught, how topics would be integrated, and how the work would be divided (23). Librarians participated in the introductory courses where they taught nurses how to search the Internet, evaluate sources, and perform advanced searches in different sources. In the research-level courses they taught advanced CINAHL and MEDLINE skills. As a result, nurses recognize the importance of having IL skills and how the instruction is tied carefully to the content of the course and nursing practice.

Using a single-course approach, Courey et al. taught informatics in the context of EBP. Initial instruction was then followed by weekly type assignments in which the nurses were required to access, evaluate, and use literature relevant to their clinical experience (24).

During the last 5 years there has been a major interest in nursing school programs to include information literacy or some training as part of the curriculum. Authors such as Flood et al. worked on designing programs at the college level to ensure that students are motivated towards learning the skills necessary to become information literate and life-long learners (25).

This path will certainly be a contribution to health care institutions because they can assume that the new nursing workforce will adjust to the increasingly complex and challenging health care environment supporting their decision-making process with evidence-based information.

Research done by Schulte and Sherwill-Navarro on nurse manager's and educator's perceptions towards a collaborate model concluded that nurses see librarians as partners in the educational or research process.

Nurse managers and educators have good or excellent skills for using library resources but are not so familiar with essential features for searching evidence-based information. There appears to be very little support for instructional collaboration related to evidence-based practice and the evaluation of literature. This is why librarians need to increase efforts to train nurse managers and educators in the use of evidence-based resources while implementing creative and far-reaching collaboration strategies with nursing administration (26).

In the article "Merging silos: collaborating for information literacy," Miller et al. emphasize the need for a collaborative relationship between nurses/faculty and librarians to address IL due to the expectations that clinical practice is based on evidence-based information. Their proposal is to create a blended presentation to understand the different roles and skills of the collaboration group. Librarians supply information and expertise, and nurses ask clinical questions guiding the search for the best available clinical evidence to provide patient care (27).

Libraries, in an attempt to promote collaboration between librarians and nurses, have established the figure of departmental liaisons. Liaisons, defined as subject-specialist librarians, make contact with nursing management and develop relationships that will lead to opportunities for information-literacy instruction. The overall goal is to bring nurses and librarians together to improve learning through program-integrated information literacy instruction. This collaboration may result in single, well-timed instruction sessions related to questions about the day-to-day operation of hospital units or the start of teams integrating information literacy into a professional development program in hospital's nursing departments.

INTEGRATING INFORMATION LITERACY INTO NURSING EDUCATION PROGRAMS

Traditionally, information literacy training has focused on a series of skills with little long-term learning that fail to address nurses' information literacy needs. Research suggests that these competencies should be taught continuously with reinforcement and repetition. In general, IL sessions are designed as an ad hoc, stand-alone, or one-time guest instruction course to cover a great amount of information without consideration of the learner's conceptualization of information and its relation to usage. Some programs consider information literacy sessions to be tied to an information need that would fall into context for a specific course or topic related to practice. Because it is not a program-integrated approach closely related to teaching, learning, and assessment of overall program goals or objectives, it neglects several of the following essential elements to ensure the effectiveness of an IL program. These elements are:

- it should be taught incrementally;
- it should be transferrable to other parts of the nurses' academic, personal, and professional lives; and
- it should maintain motivation, develop confidence, and be relevant to nurses' expectations.

Maybee (28) used the phenomenographical methodology developed in Sweden in the 1970s to identify the way professionals think about information use. Unlike a cognitive approach, this methodology determines that experience is a relationship between a person and a phenomenon. The study centered on the experience a professional has with information use and identified three concepts reflecting the experience.

Category One: Sources focus on knowledge of sources and the understanding of their characteristics. Included are print and electronic as well as human sources.

Category Two: Processes are the conception of processes involving stages that begin with identifying the need for information known as the research process.

Category Three: Information use is considered as a knowledge base that can be used for different purposes. Among the uses are problem-solving, decision-making, having their own point of view, or being able to discuss with others their opinions on a subject.

It also notes that information-literacy pedagogy should address the experience nurses have in information use considering it is complex and multitiered.

A relational approach should be used to embed information literacy into professional development programs that focus on nurses' conceptualization of information and is based on the following principles adapted by Bruce: (a) learning is about changes in conceptions; (b) learning always has a content as well as a process; (c) learning is about relations between the learner and the subject matter; and (d) improving learning is about understanding the learner's perspective (29). This provides nurses with the ability to use and understand information in a comprehensive way and will give them an academic advantage in their work environment, making them life-long learners. Nurses should know when information is needed and be able to identify the nature of the information needed, understand that the appropriate information should be retrieved in order to provide the best care, solve clinical problems, and/or promote changes in clinical nursing practice.

Hospitals and health care systems offer favorable circumstances for nurses to learn, advance, and excel in today's dynamic and changing health care environment. Hospitals have programs that support professional development, state-of-the-art simulation laboratories, interactive workshops,

and a robust academic partnership to promote clinical advancement and academic achievement.

Since the new millennium hospitals have developed models that have empowered nurses at all levels to participate in decision-making. Each health care system has a different management structure. Most of the hospitals have a department of nursing and/or a nursing institute and a communication model, also called a shared decision-making model, to provide vertical, horizontal, and diagonal communication. This brings nurses at all levels together to focus on continually improving patient and nursing care outcomes, resulting in the delivery of the highest quality of care. Several models are being utilized to support nursing information literacy needs. Aspects to consider of the following different structures:

Hospital Nursing Departments: The responsibility of the nursing department is to manage and establish a patient-focused service and ensure a permanent improvement of the service through nursing education. The department persuades that each patient receives the best care and each unit of the hospital is run efficiently. The units are run by a nurse manager, who is responsible for managing nursing staff, discussing with patients their care, and requesting supplies. Enforcing and implementing policies and procedures are the basic guidelines for managing nursing staff and their relationships with patients. Because procedures are constantly being updated, nurses at all levels must have adequate information sources and the skills to find, retrieve, and use information.

Nursing Institutes: These institutions, also called nursing centers, offer orientation programs, in-service education, simulation training, continuing education courses, leadership development classes, clinical skills, and electronic documentation training sessions. They also promote nursing grand rounds as a forum to address a broad range of topics on nursing care. Hospitals often have a 6-month critical care or emergency care new graduate program specifically designed to support the new nurse in clinical and professional development.

Shared Governance Councils: The overall purpose of councils is to provide a comprehensive structure for shared decision-making. The configuration of the councils varies in different health systems and/or hospitals. Some of these are the clinical practice council, the research and innovation council, patient relations council, and clinical quality and professional development council.

Magnet Status: Another trend in hospitals is the achievement of awards for excellence and quality of nursing practice. Qualified nurses need a lifelong-learning process to maintain a high degree of access to different information sources. Magnet Status emphasizes the level of recollecting data and the process of decision-making in delivering patient care. The need to focus on nursing research and the use of EBP in the decision-making process provides credible and valid data (1).

Any decision-making process is based on information and this is why it is so important that information literacy be involved. Librarians should be aware of opportunities offered through these diverse structures. Nurses also participate in clinical inquiry projects, research, and evidence-based practice to obtain high-quality and evidence-based nursing care standards. Working with administration and with nurses at all levels of the organization will pave the way to establishing an integrated information literacy program hospital-wide.

A PRACTICAL MODEL

This model is a proposition and can be used to integrate information literacy into nursing programs to support professional development. Similar to a progressive approach in IL, this model has four sequential phases: Preparatory, Planning, Implementation, and Evaluation. The idea is to synthesize the model proposed by Pierce in the article "Integrating evidence-based practice into nursing curricula" and various other theories of change and innovation diffusion (30).

It is a relational approach to embed IL values into courses focusing on nurses' conceptualization of information. Understanding this conceptualization depends on the experience nurses have in using information. Table 1 explains these experiences.

This will allow the creation of a user-centered IL pedagogy designed to strengthen nurses learning in a hospital environment. Being a formative process, it is interactive and flexible. It is also self-regulatory because it provides a feedback dynamic through continued evaluation and change.

This model is a collaborative process between librarians and nursing management/educators; it should be encapsulated in the analysis process that the nursing department performs each year because the model is visualized as a process to be used within the context of an existing program design.

Preparatory Phase

This phase includes identifying the needs, developing a program philosophy, and selecting a plan for an information literacy program. There should be librarian-nursing management partnership to address the improvement of

TABLE 1 Experience of Information Use

Sources—Information use is seen as finding information located in information sources.
Processes—Information use is seen as initiating a process.
Knowledge Base—Information use is seen as building a personal knowledge base for various purposes.

IL competencies and to offer alternatives to maximize resources and skills to achieve better outcomes. There is a need to discuss shared interest and ways to work together to address objectives.

Identifying the needs through an assessment is essential to recognize and outline the knowledge and skills of the nursing staff in relation with IL. A pre- and postassessment should be designed by librarians and nursing management. It is recommended that the assessment include the Likert scale, mainly used in training courses, to evaluate the rate of confidence of the nurses and the staff in the information process and not simply a pretest or posttest correct response.

The standards published by the Association of College and Research Libraries (ACRL) may also be used, and some authors have identified a guidepost with five themes on which questions in the assessment can be based. Mittermeyer and Quirion (Table 2) show the themes and the essential skills for the information research process (31).

Without this evaluation, the IL initiative may be jeopardized, since any existing gaps in understanding the program will hinder nursing management's commitment and buy-in to the objective of producing information-literate nurses. Increasing nurse managers' expertise on IL boosts their commitment to the IL initiative and encourages success, as it can be measured in the evaluation phase.

The philosophy of IL as a guide for decision-making in relation to its integration into a professional practice environment and with specific components of IL and learning experiences is more useful for nurses. The program flow should indicate a novice-to-expert continuum that starts with basic skills and transitions towards an increasing level of proficiency in the use of information and evidence-based to support clinical decision-making. Table 3 designed by Pierce illustrates the information competencies and evidence-based practice by levels and how they apply to nursing practice (32). This table will help librarians and nursing management divide the information literacy model that is a result of the preparatory phase into levels.

TABLE 2 Essential Skills

Themes	Information Research Process
Concept Identification	Questions on significant words
Search Strategy	Questions on the selection of keywords, the Boolean operators "AND" and "OR," search indexes, and controlled vocabulary
Document Types	Questions on document types
Search Tools	Questions on library catalogues, databases, search engines, and meta-search engines
Use of Results	Questions on reading a bibliographic reference/citation, bibliographies, evaluating the information found on the Internet, and the ethical use of information
	Use of information in problem-solving and decision-making

TABLE 3 Framework for Application of Information Literacy and Evidence-Based Practice to Nursing Process

Curriculum	Level 1	Level 2	Level 3	Level 4	Level 5
Information Literacy	Identify information needed	Find needed information	Appraise information	Implement information into practice	Evaluate outcomes of information use
Nursing Process	Assessment	Planning	Intervention	Implementation	Evaluation
Evidence-Based Practice	Develop researchable question	Search for evidence	Appraise evidence	Implement findings into practice	Evaluate outcomes and process

The selection of an IL plan that has a direct correlation with the philosophy adopted should be clear and systematized in order to illustrate the “what, how, where, and why” of learning strategies and activities.

According to Pierce, several elements should be taken into consideration while structuring the plan. These elements are:

- Organization of the plan gives the order and structure that is going to guide its development. The organization should be designed in such a way that concepts and operational definitions can be added as they relate to the philosophy and implementation of the IL program.
- Comprehensiveness of the plan towards the IL program and the provision of guidelines for implementing IL.
- Applicability relates to the convenience of the plan to the hospital's nursing department and their professional development programs.

Planning Phase

In this phase, the relation between knowledge, skills, and competencies and IL are determined. Competencies have their origins in the philosophy of IL and are deduced from the plan adopted in the previous phase. In the document *Nursing Informatics: Scope and Standards of Nursing Informatics Practice* (14), information literacy is recognized as a competency expected at the beginning when nurses are prepared to enter into nursing practice. Evaluation of the IL program and its success are based on the comprehension of the expected nurses' competencies and the data from the initial assessment. The nurses' competencies are established based on the initiative Technology Informatics Guiding Education Reform (TIGER) (2).

The expectations that should be defined in this phase imply the use of computer-based information, knowledge of bibliographic databases and the Internet, and understanding basic search strategies and applying these

strategies within an electronic environment. This would lead to the ability of knowing when information is needed and also to search, locate, use, and evaluate information and evidence-based resources.

It is imperative to start IL skill building at a preclinical level and continue improving skills throughout the nursing practice using an evidence-based approach. The IL plan should be a dynamic document with the purpose of facilitating nurse managers and nursing staff a continuous development from novice to expert in information management entrenched with EBP. This requires a paradigm shift from what has been taking place up to now and a move towards integrating both IL and EBP throughout the learning process.

Implementation Phase

This is a critical phase, and the initial strategies are related to the needs identified in information literacy and research appraisal. This phase is where nursing management and librarians build a level of competence and confidence to solidify the effectiveness of an integrated information literacy program. Next, is to decide whether to begin with clinical nursing staff and implement learning strategies in subsequent workshops or implement learning strategies at all levels at the same time. It is necessary to establish a novice-to-expert continuum that will address IL and research appraisal skills, and guide librarians and nursing management in designing specific learning activities.

Using the plan, the course content outline, and the skills continuum, librarians and nurse managers can design a creative learning experience to build IL skills and promote evidence-based nursing practice. Implementation is a formative process and as a strategy it is integrated into a hospital-wide program.

The team in this phase assembles an information literacy matrix or outline to meet teaching recommendations from TIGER Information Literacy Competencies, also known as the Standards of the Association of College and Research Libraries. An example of the matrix is presented in Table 4. An additional column can be added to include the corresponding nursing course and learning activities.

Evaluation Phase

Every program initiative should be evaluated in an adequate form to identify its outcomes and make the necessary adjustments. The preparatory phase starts with a needs assessment to measure nurses' knowledge and skills. The idea is to have pre- and posttesting as a reliable tool to assess information literacy and research appraisal skills. This valuable data will guide future program development and assure the success of the IL program.

TABLE 4 Information Literacy Matrix (Example): Determine the Nature and Extent of the Information Needed

Results	Instruction Outline	Learning Activities
<ul style="list-style-type: none"> • Construction of a research question exploring general and specific information sources 	<ul style="list-style-type: none"> • Formulating a search question • Reviewing search strategies • Searching databases 	<ul style="list-style-type: none"> • Locating and analyzing public policy and accepted practices • Treatments and/or patient education sources most relevant to a particular condition or disease • Clinical research paper • Completion of a search strategy outline

Being a collaborative initiative, a focus group would offer excellent qualitative data to adjust the program. Feedback from nurse managers and educators is also important because they observe the changes in nurses' behavior towards the use of information and their own progress in IL.

Because nurses are involved in clinical practice, they can also motivate change according to how research is utilized in the clinical environment. It is also important to mention that nurses who use research on a regular basis will master critical thinking and clinical reasoning. This phase is where all the data are used to improve the cycle and obtain better outcomes. The goal is information-literate nurses and life-long learners.

CONCLUSION

"Coming together is a beginning, keeping together is progress, and working together is success" (33). The use of a collaborative model in which librarians work closely with nurse managers will have a positive impact in obtaining information-literate nurses and nursing students. This is an essential part of the success of the model suggested in this article. Another part is to be able to include EBP in the learning process, so that nurses become critical thinkers and their decision-making process is enhanced by the adequate use of information.

According to Rockman, "Information literacy is truly a new instructional pedagogy and a change agent for learning." Only by working with educational stakeholders can librarians, faculty, and administrators/administrators achieve information literacy goals in hospitals (34). This instruction requires a paradigm shift from teaching one-time courses to pedagogy in which IL and EBP are entrenched, requiring nurses to build their skills and knowledge from a novice-to-expert continuum throughout their continuing education.

There should be active participation between librarians and nurse managers in the EBP because the goal is to enable nurses to succeed in their profession using information and building life-long learning skills.

Nurses in hospitals must be information literate, using information effectively to function effectively in professional practice. Regardless of the model used, the integration of IL into nursing depends on the level of partnership librarians and managers have to teach nurses IL skills. When nurses have mastered IL, librarians and hospital managers have accomplished their goal as educators. The challenge is to teach IL skills to nurses to give them strategic advantage in the use of evidence-based information, making them highly productive professionals and building life-long learners who use new knowledge to improve patient outcomes.

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