Using an inquiry-based learning approach to support engagement with information and scholarship in health care education

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Health care professionals, be they researchers, clinicians or educators, routinely face the need to find and apply best evidence in the context of complex situations. In order to navigate an increasingly large body of evidence advanced information literacy skills are required. More than simply a set of skills, information literacy is an approach that makes possible all other professional activities and goals in evidence-based practice (EBP). The Association for College and Research Libraries (ACRL) recognized this by shifting focus from information literacy competencies to overarching ideas or frames. While it is unlikely that healthcare organizations and accreditation bodies will rescind specific competencies, it is important for educators to recognise and explore the overarching ideas identified by the ACRL Framework, and perhaps identify and engage with other foundational ideas unique to healthcare. Workshops and lectures that teach linear strategies using easy-to-teach examples do not teach skills that students can easily apply to real and complex scenarios requiring critical thinking and iterative strategies. The use of pedagogical approaches such as inquiry-based learning (IBL) have historically been useful in this regard. We have successfully used IBL at the McGill Ingram School of Nursing to teach EBP competencies and engage with higher-level concepts.

Keywords: Evidence-based practice, information literacy, healthcare education, nursing education, inquiry-based learning, professional competencies

1. Introduction

Healthcare professionals, be they researchers, clinicians or educators, routinely need to find and apply best evidence in the context of complex situations. To navigate an increasingly large body of evidence, frequently updated/advanced information literacy skills are required. However, information literacy is not simply a set of skills, it is an approach, even a philosophy, underpinning and enabling all other professional activities. Fostering curiosity, enquiry, critical thinking and iterative searching is integral to health specialty education (Bodi, 2002).

The evidence-based practice model (EBP) closely mirrors the Information Literacy Competency Standards published in 2000 by the Association for College and Research Libraries (ACRL) (see Table 1). Librarians have in general focussed on teaching skills related to the first three steps; however, we bring more to the table than just expert search skills. For the sake of brevity, I use the term librarian

Table 1
Comparison of evidence-based practice and information literacy

Evidence-Based Practice Steps (Franzen & Bannon, 2016; Wallen et al., 2010)	ACRL Information Literacy Competency Standards (American Library Association, 2017)
1. Ask Answerable question(s)	1. Determine the extent of information needed
2. Acquire: Find the Evidence	2. Access the needed information effectively and efficiently
3. Appraise the evidence	3. Evaluate information and its sources critically
4. Apply: Integrate the evidence into practice	4. Incorporate selected information into one's knowledge base
	5. Use information effectively to accomplish a specific purpose
5. Assess: evaluate effectiveness & practice change	6. Understand the economic, legal, and social issues surrounding the use of information and accesses and use information ethically and legally

to include librarians working in the traditional library environment, also information specialists, and clinical and research embedded information professionals such as informationists, and so forth. We have a deep and broad understanding of the complex issues surrounding the production, seeking, retrieval and use of information. We can therefore not only find answers to clinicians' questions, but also help them to form better questions, and understand the practical and ethical issues surrounding evidence (or the lack thereof). Likely in recognition of this, the Standards were rescinded in 2016 in favour of the ACRL Framework (American Library Association, 2017). The Framework takes a higher and broader view, moving away from a focus on information literacy skills in favour of six overarching ideas or frames (see Table 2). This leaves the question open as to how to address these larger concerns within the learning environment. The Framework arose "out of a belief that information literacy as an educational reform movement will realize its potential only through a richer, more complex set of core ideas." (Association of College and Research Libraries, 2016, p. 2).

What does this profound shift, essentially a call to action, mean for EBP in healthcare? Professional competency guidelines refer to EBP competencies with or without identifying them as such (Canadian Association of Schools of Nursing, 2015; "CanMEDS 2015 Physician Competency Framework," 2015; Leprohon et al., 2009). While it is unlikely that healthcare organizations and accreditation bodies will rescind EBP competencies, educators should recognise and explore the overarching ideas identified by the Framework, and perhaps identify and engage with other foundational ideas unique to healthcare.

It remains to be seen how the shift from the Standards to the Framework will affect library and information graduate studies curricula, but for practising librarians and educators in healthcare, the Framework has formalized what we have been working to address for some time.

Table 2
ACRL Framework presented alphabetically and not in order of process or importance (Association of College and Research Libraries, 2015)

Frame	Explanation
Authority is constructed and contextual	"Information resources reflect their creators' expertise and credibility, and are evaluated based on the information need and the context in which the information will be used. Authority is constructed in that various communities may recognize different types of authority. It is contextual in that the information need may help to determine the level of authority required."
Information creation is a process	"Information in any format is produced to convey a message and is shared via a selected delivery method. The iterative processes of researching, creating, revising, and disseminating information vary, and the resulting product reflects these differences."
Information has value	"Information possesses several dimensions of value, including as a commodity, as a means of education, as a means to influence, and as a means of negotiating and understanding the world. Legal and socioeconomic interests influence information production and dissemination."
Research as inquiry	"Research is iterative and depends upon asking increasingly complex or new questions whose answers in turn develop additional questions or lines of inquiry in any field."
Scholarship as conversation	"Communities of scholars, researchers, or professionals engage in sustained discourse with new insights and discoveries occurring over time as a result of varied perspectives and interpretations."
Searching as strategic exploration	"Searching for information is often nonlinear and iterative, requiring the evaluation of a range of information sources and the mental flexibility to pursue alternate avenues as new understanding develops."

2. Problem

Use of current best evidence correlates with improved patient outcomes (Marshall et al., 2013; McGowan et al., 2008; Perrier et al., 2014; Westbrook et al., 2007). Information services provided by librarians help mitigate barriers to use of evidence, such as lack of time and inadequate search skills, by providing mediated information retrieval (Bartlett & Marshall, 2013; Marshall, 1992; Marshall et al., 2013; McGowan et al., 2008). Librarians can also affect scholarly activities positively by improving research productivity and quality, and reducing waste (Edmunds Otter et al., 2017; Gore & Jones, 2015; Hollister & Schroeder, 2015; Quesenberry et al., 2016). Unfortunately, not all healthcare professionals have access to such services, and unless we reverse the trend in budget cuts and library closures, these will likely become an increasingly rare source of support outside of academia. Librarians engaged in health specialty education must prepare graduates to navigate the information landscape

Table 3
Case-based learning, problem-based learning and inquiry-based learning

Case-based learning	Problem-based learning	Inquiry-based learning[1]
"…engages students in discussion of specific scenarios that resemble or typically are real-world examples" (Queen's University Centre for Teaching and Learning, s.d.-c)	"In PBL, learners encounter a problem and attempt to solve it with information they already possess … They also identify what they need to learn to better understand the problem and how to resolve it" (Queen's University Centre for Teaching and Learning, s.d.-b).	"…education begins with the curiosity of the learner, inquiry in the classroom places the responsibility for learning on the students and encourages them to arrive at an understanding of concepts by themselves." (Queen's University Centre for Teaching and Learning, s.d.-a)
– Tells a story relevant to practice – Students analyse data to reach a conclusion – Students develop analytic, communicative, and collaborative skills – Instructors use cases as content	– Students attempt to solve problem with information they already have – Students engage in self-directed study to search for information needed – Process is iterative – Instructor provides resources and guidance	– Learning is question driven and emphasis is on asking answerable questions – Builds library and critical thinking skills – There is a peer-to-peer learning component – Instructor acts as facilitator and models inquiry

Note. Inquiry-based learning may include both Case-based learning and Problem-based learning.
[1]Enquiry-based learning is the British spelling and should be used along with the American spelling when searching the literature.

without our expert mediation.

The teaching of linear strategies through simple examples does not impart adequate skills that students can easily apply to real and complex scenarios requiring critical thinking and iterative strategies (Badia, 2016; Bodi, 2002), leaving the learner facing a chasm as they attempt to apply their learning to the messy reality. This is particularly problematic in clinical settings, where questions are self-identified, patient cases are rarely as simplistic as generic example scenarios, and patient outcomes are at stake. Individual consults are helpful here but only reach small numbers.

3. Potential solution

Student-centred pedagogical approaches such as case-based learning (CBL), problem-based learning (PBL) and inquiry-based learning (IBL) have been useful in this regard (see Table 3). McMaster University adopted PBL in 1969, and an IBL bachelor of health sciences degree in 2000. We now see both PBL and IBL in use across the healthcare disciplines (Aditomo et al., 2013; Cuneo et al., 2012; Rankin, 1996; Rideout et al., 2002; Rigby et al., 2012; Williams, 2001; Zhang et al., 2012).

The sometimes-subtle differences between these approaches can be difficult to parse, but essentially IBL is an active learning approach that may be used to build upon CBL and PBL (see Table 3). IBL may similarly use complex cases or scenarios to simulate real situations and stimulate self-directed learning, but puts greater emphasis on the inquiry process (the "Ask" step of EBP). This allows students to become partners in their learning and come to understand concepts by themselves (McKinney, 2014; Queen's University Centre for Teaching and Learning, s.d.-a). Formulating clear and answerable questions is the foundation of successful evidence retrieval. Both PBL and IBL put the focus on 'question development', highlighting its iterative nature and better preparing students for the realities of practice. Teaching from real cases is challenging; however, ultimately participants are better able to apply what they have learned to practice, and have an improved understanding of the importance of basing practice on best evidence (Coomarsasamy & Khan, 2004; Featherstone et al., 2013; Green & Ellis, 1997).

3.1. Using IBL to teach nursing students at McGill University

The McGill Ingram School of Nursing (ISON) launched an inquiry-based curriculum (IBL) in 2017. As we developed the curriculum, we added EBP to the school's model of nursing, which is a Strengths-Based Nursing approach (Gottlieb, 2014) guided by the Clinical Reasoning Cycle (Levett-Jones, 2013). This presented the challenge of adopting IBL to support EBP learning needs across all programs, from undergraduate to PhD. Working closely with nursing faculty has made this possible. As a librarian who was working the clinical setting, I had previous teaching experience using complex and current patient cases submitted by clinician participants (Featherstone et al., 2013). In the academic setting, simulations allow the students I teach to form questions from complex scenarios beginning as early as the first year of the undergraduate curricula.

Applying IBL in my course-embedded information literacy instruction has allowed me to address the higher-level Framework concepts. Rather than focusing on specific skills-based learning outcomes (e.g., foreground/background questions, or PICO[1].), I help students identify questions born of these complex simulated scenarios. Responding to student-led concerns, I now ask what makes a question answerable, and how broadening or narrowing a question can influence our ability to find appropriate evidence. Students learn to search for answers, and to value the importance of clarity when asking clinical questions. We still measure defined learning outcomes, however specific hard skills such as database searching are no longer my primary focus.

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[1] The PICO framework facilitates the formulation of epidemiological and statistical research questions, improves the success of searches of empirical studies based on quantitative methods. "PCO identifies the Problem/Patient, Intervention, Comparison and Outcome. This in turn helps identify key concepts, and tease out multiple questions from a single complex scenario." (Frati & Featherstone, 2017)

When I do offer workshops and lectures, a flipped classroom approach allows for critical thinking and discussion. I provide a grounding in competency-based skills using online modules; the sophistication of the students then determines to what level the discussion goes. This approach is profoundly student-centered, exploring the real complexities that students are wrestling with, on their own terms and in the context of whatever challenges they are facing.

"Library clinics" are another approach I have adopted (Frati et al., 2018), either in place of online modules or as the classroom component of the flipped approach. Clinics allow students to bring any problems they are working on to the session and receive my support. They are more efficient than one-to-one consultations, allowing me to reach several students simultaneously.

4. Conclusion

There is no panacea; placing greater importance on the journey rather than the destination, on the process of questioning, and on our role in navigating and contributing to the world of information rather than on finding the one good answer, is at the heart of ACRL's shift from competencies to frames. In health care, we have seen this shift reflected in the evolution of evidence-based *medicine* into evidence-based *practice* (sometimes referred to in nursing as evidence-*informed* practice (McTavish et al., 2014)) and finally into the seven-step evidence-based *nursing* practice (EBNP) (Melnyk et al., 2015) [emphasis mine]. We are currently updating the nursing model at McGill, replacing EBP with the seven steps of EBNP. This introduces the element of curiosity and the importance of creating a culture of evidence into the mix (step 0), as well as evaluating changes to practice and disseminating results (steps 5 and 6), with nurse leaders acting as mentors and champions.

The IBL approach to learning allows instructional content, and more importantly discussion, to be tailored by discipline and setting. In hematology there is very little synthesized pre-appraised evidence, so critical appraisal is usually necessary, while in family medicine the opposite is true. Nursing questions often span multiple disciplines and rarely fit the PICO framework. The ACRL Framework is an opportunity to recognize explicitly and formally the richness and complexity of evidence-based practice rather than focusing on skills-based competencies, while using IBL allows us to recognize the particularities of each discipline while addressing themes of concern to all.

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