Scaffolding Information Literacy Learning for Undergraduate Nursing Students: A Mixed-Method Exploration of Student IL Self-Efficacy

Hanneke Croxen, MacEwan University

Jody Nelson, MacEwan University

Lisa McKendrick-Calder, MacEwan University

Wanhua Su, MacEwan University

Information literacy (IL) has been variably defined by the Association of College and Research Libraries (ACRL) as a set of core competencies that include the ability to access, select, evaluate, synthesize, and ethically apply information in context (ACRL, 2013), and as a framework of "interconnected core concepts" necessary for navigating the increasingly complex information environment (ACRL, 2016, Introduction, para. 2). The ACRL IL competency standards for nursing, central to effective evidence-based practice (EBP), are also intended as a framework to, in part, "guide librarians and nursing faculty in creating learning activities that will support the growth of [IL] skills over the course of a program of nursing education" (ACRL, 2013, Introduction, para. 2). Developing IL competencies remains particularly challenging for undergraduate nursing students (Mitchell & Pereira-Edwards, 2022); nursing educators and librarians need to address this IL development gap by exploring effective IL teaching practices that better integrate and scaffold IL concepts in undergraduate nursing education. When IL is addressed solely in connection with an individual research assignment, students tend to focus on information extraction as opposed to engaging with the discursive, iterative processes inherent to effective IL competency development (ACRL, 2016), and the value of IL is minimized (Forster, 2015; Scheidt et al., 2016). When contextual IL knowledge is emphasized and integrated in the classroom, students can begin to move beyond passive IL experiences towards a mindset that values IL as integral to future EBP (Forster, 2015; Mitchell & Pereira-Edwards, 2022).

This article reports on the creation, implementation, and results of an innovative teaching strategy used in a foundational 1st-year undergraduate nursing course. This strategy, called journal club, was built on a social constructivist learning approach in which 1st-year undergraduate students worked interactively in small groups on scaffolded, guided, IL learning activities, with instructor and librarian teaching and support. In this context, we define *scaffold* as the process in which learning activities are designed to increase in complexity and in which each activity is based on the previous one. Our aim for this study was to understand the impact of this strategy on students' IL self-efficacy, which contributes to students' ability to engage in evidence-informed practice. The knowledge, skills, and beliefs developed within this course are building blocks for students' futures, and this strategy can be expanded and scaffolded throughout an entire undergraduate nursing educational program.

Background

The use of current evidence to guide clinical actions and decision-making is an essential element of nursing practice, with two main descriptive terms used in the literature: EBP and evidence-informed practice (EIP). Both terms point to the importance of "theory-derived, research-based information" in making patient care decisions in nursing (Ingersoll, 2000, p. 152), while EIP also allows for the incorporation of other forms of knowledge, such as practice wisdom and tacit knowledge (Epstein, 2009). For this article, EBP is used when citing authors who used EBP as their concept so as not to misrepresent their work. The more inclusive term, EIP, is used when referring to the foundational goal for students to develop.

Despite the centrality of EIP, or EBP, to nursing practice (Ingersoll, 2000; Melnyk et al., 2010), mechanisms to better incorporate EBP in nursing education are under-researched (Horntvedt et al., 2018). IL concepts are recognized as essential components for EBP that need to be further developed, taught, and integrated into nursing education (ACRL, 2013; Brettle & Raynor, 2013; Forster, 2015; Mitchell & Pereira-Edwards, 2022; Purnell et al., 2020). Undergraduate students have been shown to lack the IL critical thinking skills needed for evaluating and understanding research (Bury, 2016; Chaudoir et al., 2016), with nursing student

participants in one study reporting that reading research articles was the most challenging aspect of academic writing assignments (Chaudoir et al., 2016).

These developing IL competencies are not just required for successful academic preparation; they are essential skills required to engage in safe practice as a registered nurse. For example, the College of Registered Nurses of Alberta (CRNA, 2019) identified that "the entry-level RN is prepared as a generalist to practise safely, competently, compassionately, and ethically . . . using evidence-based practice" (p. 4). The Canadian Association of Schools of Nursing (CASN, 2015) identified "uses relevant information and knowledge to support the delivery of evidence-informed patient care" (p. 6) as an entry-to-practice nursing informatics competency, with an indicator of meeting this competency being "performs search and critical appraisal of on-line literature and resources (e.g., scholarly articles, websites, and other appropriate resources) to support clinical judgement, and evidence-based decision making" (p. 7). The IL skills required for this indicator and to provide EIP are higher-level, complex IL skills. Thus, IL needs to be taught and scaffolded throughout undergraduate nursing education, with increasing complexity over time, as highlighted by Groller et al. (2020), until the student has achieved sufficient mastery to meet the entry-to-practice requirements.

Faculty-librarian collaboration is seen as a critical component of effective IL teaching of undergraduate nursing students (Horntvedt et al., 2018; Nayda & Rankin, 2008; Purnell et al., 2020), and such collaborations have been demonstrated as being useful in support of the searching and evaluation competencies central to EBP (Wakibi et al., 2021). Additionally, librarian and course instructor collaboration can be instrumental in cultivating the integrated researching, reading, synthesizing, and writing processes that Scheidt et al. (2016) refer to as IL "research-writing." Historically, library instruction has been relegated to a single class or session with students (Ippoliti, 2018). The constraints of these single, one-time library instruction sessions do not afford the time or space to develop the more transformational, inquiry-focused learning inherent in the development of IL research and writing competencies (Ippoliti, 2018; Purnell et al., 2020). To cultivate deeper, critically engaged IL learning, teaching is ideally embedded in the course or disciplinary context; is scaffolded across classes, sessions, courses, or years (Purnell et al., 2020; Wakibi et al., 2021); and involves collaboration between librarian and course instructor (Ippoliti, 2018; Purnell et al., 2020; Scheidt et al., 2016; Wakibi et al., 2021). Embracing a collaborative approach demonstrates the importance of working in multidisciplinary teams and provides students with both librarian and nursing disciplinary perspectives and expertise. Students' IL has been shown to improve significantly when librarians work closely with students (Brettle & Raynor, 2013).

Scaffolding assignments and activities in nursing education is a strategy that is used frequently. For example, clinical placements provide students the opportunity to apply previously learned skills, theory, and knowledge, in addition to learning new skills and knowledge, increasing in complexity as they move through their program. Similarly, when IL concepts and learning activities are introduced in a scaffolded manner, nursing students have the opportunity to deepen their understanding of IL concepts and further develop important IL competencies for their future nursing careers.

Used in nursing practice settings, journal clubs help nurses maintain currency with nursing research and promote EBP (Häggman-Laitila et al., 2016; Valizadeh et al., 2022; Wilson et al., 2015). Course-integrated journal clubs have been used strategically as an effective guided-teaching method for developing the critical research and reading competencies for EBP in medical

and health sciences education (Friesth & Dzara, 2020; Szucs et al., 2017), as well as in undergraduate nursing education (Murrock, 2020). When IL learning in the classroom setting is scaffolded and organized in a journal club format, nursing students are repeatedly encouraged to apply IL concepts and competencies relating to locating, assessing, and applying research for EIP as students and future graduates (Brettle & Raynor, 2013; Kim et al., 2020; Steenbeek et al., 2009; Thompson, 2006).

Taking a Constructivist Approach

Constructivist theory assumes that knowledge is socially constructed (Young, 2008) and aligns with a learner-centred approach (Kala et al., 2010). A constructivist view suggests that learners build new knowledge or meaning based on previous knowledge (Choe et al., 2014; Young, 2008). It has also been viewed to be a theory promoting learning of essential nursing skills (Duane & Satre, 2014). With a constructivist approach, students "make meaning" (Woo & Reeves, 2007) from engaging in activities in which they are called upon to apply knowledge to specific contexts and in turn build abilities to allow them to apply this knowledge to different contexts. This constructivist approach can be undertaken in a social learning group, referred to as *social constructivism*, in which peers work together to share perspectives and construct meaning and knowledge together, working towards common goals (Williams & Reddy, 2016). Regarding IL competencies, Svensson et al. (2022) indicated that students often look to one another for support and guidance; thus, a social constructivist approach that allows students to participate in meaningful engagement and interaction with one another would be particularly applicable in the development of IL knowledge.

Social constructivism has been used differently within nursing education, such as in problem-based learning (Andersen & Watkins, 2018), peer-assisted learning (Williams & Reddy, 2016), and simulation (Hwang et al., 2022). Social constructivism commonly involves social group norming and perspective sharing, guided participation in social sharing settings, and scaffolded learning activities (Andersen & Watkins, 2018), and students learn from and with one another.

Self-Efficacy

In nursing students and graduates, IL self-efficacy, or the confidence in one's ability to apply IL knowledge in practice, is essential and has been found to be a key factor in future application of EBP as practising nurses (Amit-Aharon et al., 2020; Purnell et al., 2020). When people do not feel capable, they are more likely to demonstrate a lower level of understanding of IL concepts and are less likely to further develop IL competencies (Aharony & Gazit, 2020; Chow & Wong, 2020; Kurbanoglu et al., 2006). This is situated in Bandura's (1977) concept of self-efficacy. Self-efficacy theorizes that the belief an individual has about their abilities informs their motivation and actions towards attaining a goal and reduces anxiety (Bandura, 1977). When a student perceives that they have the required IL knowledge, their anxiety is reduced and they are motivated to apply their IL skills and to try them out in new contexts and challenging ways (Aharony & Gazit, 2020; Purnell et al., 2020).

Methods

To promote EIP learning, an instructor of a 1st-year undergraduate introduction to nursing course collaborated with the nursing subject librarian to develop a scaffolded approach to teaching IL concepts. An innovative strategy to scaffold IL teaching within the context of EBP learning was introduced in a 1st-year nursing theory course in an undergraduate nursing program at a Western

Canadian university with an average intake of approximately 120 new students in the fall term and 120 in the winter term. The teaching-learning strategy was called the journal club, and the intent was to mirror learning activities undertaken in the clinical setting to enhance EIP. Within this academic program, in their 1st year of studies, students have not yet completed research classes. However, they are required to seek, access, read, and interpret nursing research articles for various assignments during the entirety of their program, and IL concepts are embedded across the 4 years with scaffolded expectations of IL competency. For this reason, the journal club, located in the 1st semester of the 1st year in the nursing program, provided an introduction to IL concepts to prepare and equip students with IL competencies needed for their program and nursing practice.

At the beginning of the course, students were asked to choose a specific area of nursing practice in which they were interested. Based on their choices, journal club groups of three to six students were formed. Within their groups, students spent time learning through a variety of teaching modes, including short videos, individual guided reading, and librarian lectures, while also collectively completing guided, scaffolded tasks and learning activities levelled to 1st-year students. Intentional scaffolding of learning allowed students time to build on their previous IL knowledge and competencies, gradually engage more deeply with the nursing articles, and extend the time they focus on IL compared to learning about it for one assignment (Clark & Block, 2022). For example, during the first journal club, students were guided through a basic literature search to find one article on a single aspect of nursing practice. During the second journal club, students worked with the librarian to learn effective searching strategies and were then challenged to enhance their literature searches on increasingly complex topics.

Journal club took place throughout the fall 2022 semester across six classes in a four-credit course lasting 4 months (one semester). The journal club activities lasted either half or the full class time (or 60 to 150 minutes). While there was a small component of individual, task-based learning taking place outside class, most of the instruction and activities were completed during dedicated journal club group class time, with the course instructor, and often the librarian, available to support and facilitate, answer questions, and enhance learning.

The six journal club classes focused on the following:

- Class 1: Explore CINAHL and discover topical results
- Class 2: Apply search strategies and select articles
- Class 3: Carry out preliminary synthesis of articles
- Class 4: Effectively read research articles
- Class 5: Complete quality appraisal and data extraction
- Class 6: Apply evidence in written assignments

Classes 1 and 2 included IL instruction relating to search strategy development, with students collectively working through guided worksheet tasks to locate relevant nursing articles from the nursing database (Cumulated Index to Nursing and Allied Health Literature, CINAHL). Students were invited to find peer-reviewed nursing articles. The articles could vary in subject and the only criteria were that the article was from the nursing discipline and that it had been peer reviewed. While Class 4 saw students work individually through an online, interactive scientific-journal-reading activity, in Classes 3 and 5, journal club groups worked together, again with the help of guided worksheets, on the scaffolded tasks of summarizing, synthesizing, and evaluating

nursing articles. Because students had not yet been exposed to nursing research, and considering students were 1st-year nursing students who likely had little or no exposure to nursing scholarly writing, the journal clubs were designed based on the desired learning outcomes for a 1st-year nursing student. Topics like effectively reading research articles were designed as an introduction to reading nursing research.

The final journal club meeting involved a full class with the librarian, with opportunities for the groups to apply the concepts being taught and build upon prior learning. This last class incorporated threshold concepts relating to source integration, synthesis, and writing, which drew upon the Framework for Information Literacy in Higher Education, including "authority as contextual and constructed" and "scholarship as conversation" (ACRL, 2016, Introduction, para. 2), alongside more fundamental writing skills practice, such as effective paraphrasing. From the third journal club onwards, students worked on guided activities and learning, which focused on the steps of reading, evaluating, selecting, summarizing, and synthesizing—all of which are essential for developing the critical thinking necessary for effective writing. This approach aligned with Miller et al. (2015), who found that with scaffolding written activities and assignments and providing opportunities to practise, students' writing competencies improved.

The activities designed to enhance IL and the student learning experience were strategically chosen, evidence informed, and guided by constructivist learning theory. Specific intentional choices in the design and planning included the ongoing librarian and course instructor collaboration in developing and supporting the activities, the small group size with shared areas of interest to enhance engagement, the scaffolding of knowledge and skills in a structured and supported way, and the consistent challenge for students to use prior knowledge and to continually build upon their IL foundation.

Journal club groups were designed to allow students to explore and construct meaningful collaborative learning. Students were given space to develop ACRL IL competency standards for nursing, such as standard 3.5, "validat[ing] understanding and interpretat[ing . . . information through discourse with other individuals" (ACRL, 2013, Standard 3, Indicator 5), and to grasp IL threshold concepts articulated in the Framework for Information Literacy for Higher Education (ACRL, 2016). For example, by allowing students the space for discovery-based literature searching, they were introduced to the IL concept "searching as strategic exploration" (ACRL, 2016, Introduction, para. 2). In allowing students the space for collaborative IL competency development and discursive knowledge construction, alongside relevant, meaningful exploration of nursing knowledge for practice, we hoped to move them beyond passive or merely goal-specific applications of IL competencies towards experiencing IL as a valued and integral aspect of future evidence-based nursing practice (Forster, 2015).

Our aim for this study was to understand the impact of journal club, this innovative pedagogy, on student self-efficacy in relation to foundational IL concepts. To achieve this, a non-experimental pre-post survey design study was used. Statistical analysis of the survey questions and a content analysis of the open-ended questions were undertaken. Content analysis was selected because of the small sample size and the nature of the data. Institutional research ethics was obtained before recruitment. All students enrolled in the 1st-year nursing course in which this journal club approach was used were invited to participate by completing an online pre-post survey before the first journal club session and following the last journal club session. The course instructor was not present during data collection, and there was no academic advantage to participation. An information letter was provided to all potential participants, and consent was

provided on each survey. Because of the anticipated small sample size and to protect participant anonymity, no identifiers were collected, so the statistical analysis was of the cohort findings.

The survey used is the Information Literacy Self-Efficacy Scale (ILSES) developed by Kurbanoglu et al. (2006). The 28-item IL self-efficacy scale maps to seven main concepts: (a) defining the need for information (1 item), (b) initiating the search strategy (3 items), (c) locating and accessing the resources (8 items), (d) assessing and comprehending information (5 items), (e) interpreting, synthesizing, and using information (2 items), (f) communicating information (7 items), and (g) evaluating the product and process (2 items). This scale was originally validated with 415 primary- and secondary-school teachers (Kurbanoglu et al., 2006), and a portion of this scale (the 17-item scale) has subsequently been used in undergraduate nursing education research (Amit-Aharon et al., 2020). The scale begins with "I feel confident and competent to . . ." and then presents the 28-items with a Likert scale, with 1 being the least confident and 7 being the most (Kurbanoglu et al., 2006). Some items within this scale were not perfect matches for the instructional priorities and learning outcomes (items 16 and 19), and some were outdated for the practices and language used today (item 11), but this was the best validated tool available for our research aims. To enhance the validity of our findings, we elected to leave the scale exactly as developed and tested instead of adjusting or removing these questions.

For the post-survey, two additional open-ended-questions were created, which included "How did your confidence of your information literacy (using a database, finding scholarly articles, assessing their quality, using them in your writing, etc.) change throughout your time in this course?" and "How did journal club contribute to your confidence in your information literacy abilities, if at all?" These questions were asked with a goal of providing additional information and to validate or point out divergence of responses from statistical results. These short-answer responses were analyzed for themes.

Results

Data analysis was completed in two phases. Statistical analysis of the quantitative data collected from the administration of the 28-item ILSES was conducted by the mathematics and statistics student and faculty members of our project team. Thematic analysis of the qualitative data collected through the two open-ended questions added to the student survey was conducted by the librarian and nursing faculty members of our team.

Quantitative Findings

All analysis of the student responses collected via the ILSES was conducted in *R* (version 4.2.3). Of the 40 students enrolled in the class, 37 completed the pre-survey, and 30 completed the post-survey, but 2 students did not provide proper consent on the post-survey, so their responses were deleted from the data analysis, leading to a post-survey sample size of 28. As the responses were anonymous, the pre- and post-survey results could not be matched; therefore, the two-sample *t*-test was used on all items. To run the two-sample *t*-test, the average score over 28 items for each student was calculated. If a student chose more than one option, the average score was taken. Both the numerical summaries and the side-by-side boxplot (Figure 1) show that the post-survey has a larger mean score than the pre-survey, with a *p*-value of 6.039×10^{-13} or $p < .001$.

Figure 1

Boxplot Showing Significant Improvement in ILSES Scores Between Pre-test and Post-test
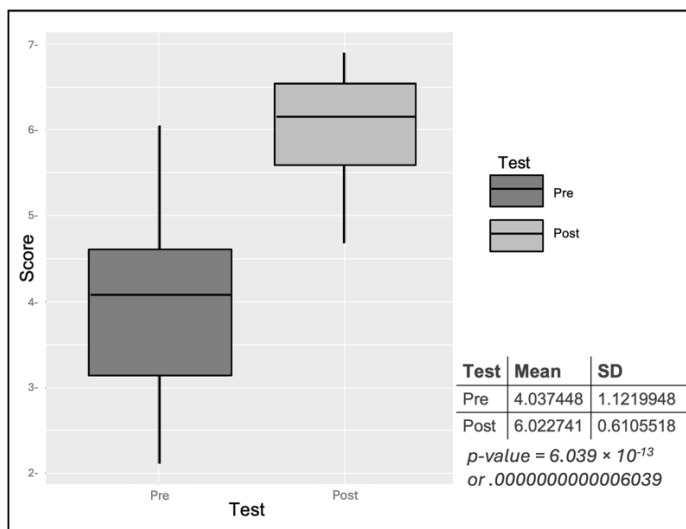
Descriptive statistics, including mean and standard deviations, were computed on all 28 individual items. Missing values were removed when calculating mean and standard deviation.

The significance level was set at α = 0.05. Table 1 compares mean scores for the 28 individual items within 7 categories (A–G) at the start and end of the journal club (n_{pre} = 37; n_{post} = 26). Statistical significance was achieved on 25 of 28 items.

Significant improvement in self-efficacy scores was observed for key items that overlap with the ACRL (2013) IL competency standards for nursing—notably, those that related to identifying the information needed (A1); developing strategies for searching (B4, C5); critically evaluating the authority, reliability, and relevance of sources selected (D14, D15); and synthesizing information (E18). Significance was also found for all items relating to writing and citing in category F, communicating information, and category G, evaluating the product and process, which relates to critical self-reflection and learning from the experience with the IL search process. We did not see significant improvement in the mean scores pre-survey and post-survey for items C11, D16, and E19. This was not surprising, however, as items D16 and E19 assessed knowledge not addressed in journal club activities, while item C11 used terminology (*search engines*, *directories*) not covered in journal club content. When designing the study, we had considered removing these three irrelevant items but elected to keep them in to maintain the integrity of the validated ILSES instrument.

Table 1

Difference in Mean Scores for 28 ILSES Items in Categories A–G, Pre-test and Post-test

		Pre-test	Post-test	Difference in mean	
		Mean (SD)	Mean (SD)	Pre- to post-test	*p*-value
Defining the need for information (A)					
1	Define the information I need	4.351 (1.338)	5.808 (0.939)	1.456	*p* < .001*
Initiating the search strategy (B)					
2	Identify a variety of potential sources of information	4.378 (1.516)	6.192 (0.981)	1.814	*p* < .001*
3	Limit search strategies by subject, language, and date	4.189 (1.777)	6.462 (0.761)	2.272	*p* < .001*
4	Initiate search strategies by using keywords and Boolean logic	3.703 (1.777)	6.5 (0.762)	2.797	*p* < .001*
Locating and accessing the resources (C)					
5	Decide where and how to find the information I need	4.676 (1.51)	6.077 (1.055)	1.401	*p* < .001*
6	Use different kinds of print sources (i.e. books, periodicals, encyclopedias, chronologies, etc.)	3.662 (1.642)	5.731 (1.151)	2.069	*p* < .001*
7	Use electronic information sources	5.432 (1.425)	6.538 (0.761)	1.106	*p* < .001*
8	Locate information sources in the library	3.306 (1.786)	5.923 (1.093)	2.618	*p* < .001*
9	Use library catalogue	2.973 (1.787)	5.731 (1.151)	2.758	*p* < .001*
10	Locate resources in the library using the library catalogue	2.472 (1.647)	5.52 (1.085)	3.048	*p* < .001*
11	Use Internet search tools (such as search engines, directories, etc.)	5.459 (1.556)	6.385 (1.134)	0.925	*p* = .005
12	Use different kinds (types) of libraries	2.757 (1.571)	5.115 (1.143)	2.359	*p* < .001*
Assessing and comprehending information (D)					
13	Use many resources at the same time to make a research [sic]	4.5 (1.915)	6.269 (1.002)	1.769	*p* < .001*
14	Determine the authoritativeness,	3.838 (1.772)	6.462 (0.761)	2.624	*p* < .001*

	currentness, and reliability of the				
	information sources				
15	Select information most appropriate to the information need	4.595 (1.481)	6.231 (0.71)	1.636	$p < .001$*
16	Identify points of agreement and disagreement among sources	5.125 (1.537)	6.038 (0.958)	0.913	$p = .01$
17	Evaluate www sources	3.703 (2.039)	5.615 (1.329)	1.913	$p < .001$*

Interpreting, synthesizing, and using information (E)

18	Synthesize newly gathered information with previous information	4.194 (1.818)	6.04 (0.935)	1.846	$p < .001$*
19	Interpret the visual information (i.e. graphs, tables, diagrams)	4.541 (1.677)	5.462 (1.679)	0.921	$p = .01$

Communicating information (F)

20	Write a research paper	3.757 (1.832)	6.115 (0.864)	2.359	$p < .001$*
21	Determine the content and form the parts (introduction, conclusion) of a presentation (written, oral)	4.459 (1.639)	6.308 (0.838)	1.848	$p < .001$*
22	Prepare a bibliography	2.973 (1.979)	5.692 (1.569)	2.719	$p < .001$*
23	Create bibliographic records and organize the bibliography	2.838 (2.035)	5.692 (1.49)	2.854	$p < .001$*
24	Create bibliographic records for different kinds of materials (i.e., books, articles, web pages)	2.595 (1.817)	5.615 (1.444)	3.021	$p < .001$*
25	Make citations and use quotations within the text	4.392 (1.784)	6.462 (1.029)	2.07	$p < .001$*
26	Choose a format (i.e. written, oral, visual) appropriate to communicate with the audience	4.757 (1.623)	6.154 (0.925)	1.397	$p < .001$*

Evaluating the product and process (G)

27	Learn from my information problem solving experience and improve my information literacy skill	4.73 (1.726)	6.308 (0.788)	1.578	$p < .001$*
28	Criticize the quality of my information seeking process and its products	4.649 (1.798)	6.115 (0.816)	1.467	$p < .001$*

* Indicates statistical significance

Qualitative Findings

Overall, responses to the open-ended, short-answer questions indicated that engaging in journal club increased student confidence with information literacy concepts, with the exception of one respondent. The themes emerging from these responses included recognition of personal growth, IL skill development, opportunity to practise, time, impact for the future, and relational engagement and benefits of the group.

Recognition of Personal Growth

An overwhelming response from students was their acknowledgement of their personal growth and learning IL during journal club. Students indicated they felt more confident in their ability to use and apply IL competencies. One student stated, "At the beginning I did not know what I was doing in research or now to see if it's reliable and now I can do that because of this section of the class." Students felt more comfortable having used diverse types of scholarly work throughout the process, from developing search terms to incorporating research in their own writing: "I learned how to assess the reliability of articles and find them in CINAHL, something I couldn't do before. My citation ability changed dramatically as well, and I don't need to look up every little thing anymore." Another reported, "I am able to incorporate scholarly articles into my writing with ease compared to the beginning of the term." Some students also indicated that although they did develop IL competencies, they still had much to learn: "It became easier, but it is still sometimes challenging to find articles that have the format I want."

IL Competency Development

Various IL concepts were taught throughout the journal club, and participants acknowledged applying concepts in written assignments not linked to the journal club. They highlighted several specific examples of new competencies used, such as "I feel more confident to use various sources and strategies to find reliable nursing articles like using CINAHL and determining whether they're peer reviewed or not." By applying the concepts learned in journal club, completing assignments became easier and faster: "It made writing my responses and research papers much easier to do, and it enabled me to support my claims in a credible, responsible way that avoids plagiarism."

Opportunity to Practise

Journal club was seen as an opportunity to practise IL competencies, with many participants reporting the benefit of this, with one student sharing, "Journal club contributed to my confidence as we were able to practice developing citations, examine and evaluate sources, and properly learn . . . the contents of research articles." Another participant shared that they were more confident to use their IL skills, "however it might take some time getting used to the strategies, it's all about repetition and getting into the habit."

Time

The theme of time arose with participant responses relating to the participants' understanding that these skills took time to develop, and the notion that IL competencies developed through journal clubs would decrease the amount of time they would be spending in the future when applying these skills. One participant reported, "Using the library and database helped boost my confidence and shortened down my research time. As well it also cut down how much I needed to read for my sources."

Impact for the Future

Many reported the skills that they developed during journal club would assist them in the future. Another participant reported, "It contributed to my confidence by introducing and helping me develop these skills of finding data and teaching me how to use it since it is very different from previous education and helps with university level papers. Overall, it makes the research part of writing a paper a lot smoother and I feel like I have enough resources to help me write papers."

Relational Engagement and Benefits of the Group

The final theme that emerged was not focused on IL skills, but rather related to the benefit of small-group work. One participant reported, "It helped with being more comfortable asking questions and developing friendships with some classmates," and another wrote, "It was nice working with a group to see different ideas from a variety of students." A final participant noted, "It gave me a chance to ask questions and explained how to do the research, so I didn't have to feel like I was the only one feeling this way."

Discussion

Students enter undergraduate nursing programs with various experiences related to academic research, reading, and writing practices, making it particularly important to teach IL skills in a 1st-year nursing course. The journal club approach proved to be effective in building IL self-efficacy. By scaffolding the journal club activities and assignments, and working in small groups, students were able to work together while developing knowledge and practising previous skills learned repeatedly throughout the term.

The development of EBP within nursing education is an under-researched area, and further inquiry ought to be conducted within this field (Aglen, 2016). Undergraduate nursing students frequently lack sufficient knowledge and skills to implement EBP as new nurses (Aglen, 2016; Duncan & Holtslander, 2012; Patelarou et al., 2020; Song et al., 2021). Critical thinking skills necessary for applying evidence to practice, such as the ability to understand, evaluate, and apply research, for example, have been found to be lacking in undergraduate students (Bury, 2016; Chaudoir et al., 2016), and there is little evidence to guide teaching practices aimed at this. The results of this study, however, demonstrate that students' self-efficacy increased in these areas, with statistically significant increases in self-efficacy in items 13–17; student written responses also included comments relating to increased ability to appraise and critically read nursing research. Our student participants reported in the short-answer responses that they were feeling more confident in their ability across all IL items critical for successful implementation of EIP, from defining the type of information needed to locating, evaluating, and selecting relevant sources.

In addition to building these skills, many participants provided open-ended written responses that demonstrated awareness of the transferability of these skills into future practice as an academic and a nurse, such as the potential benefit in future academic papers or the reduction of time needed for patient research. Thus, this strategy appears not only to have built these foundational skills but to have assisted students to see the transferability of these skills in a variety of different contexts for their future practices as students and nurses. This study occurred in a foundational 1st-year course, and students have several more academic terms to further develop these skills in a variety of contexts; therefore, this strategy holds great promise for enhancing EIP in newly graduated nurses. Students were encouraged to find any peer-reviewed research articles

based on their area of practice and topic. We were not aiming for the students to be reading, comprehending, and appraising research articles beyond expectations of a 1st-year nursing student; rather, we promoted and facilitated discussion of what they found to be relevant in the identified articles, using probing questions to help them collectively deepen their understanding.

Because IL is an entry-to-practice competency for registered nurses (CRNA, 2019) and is an essential nursing informatic competency (CASN, 2015), the continued use of this teaching strategy may aid in a more intentional and effective integration that aligns with the broader curricular mapping. Future development to scaffold this strategy over an entire undergraduate nursing program with levelled outcomes appropriate to courses and contexts deserves consideration. This could scaffold IL skill development and could help students to continue to incorporate other advancing skills and knowledge gained from other courses, such as their nursing research course. For example, the journal club could be continued in Year 2, where students could complete larger scale literature searches (compared to Year 1), and then compare and contrast articles they found in the writeup of their findings. In Year 3 students complete a research course. At that time, they could focus on critical appraisal and how to select the best evidence based on need or could critique the applicability of clinical trial results for a specific patient (with comorbidities and complexity). Finally, in Year 4, students could form journal clubs in which they appraise and discuss articles in small groups, looking at more complex aspects like the applicability of the article in specific contexts or ways to incorporate knowledge from the paper into their personal nursing practice. Over a 4-year program, an intentional curricular strategy to collaboratively build and enhance IL skills and self-efficacy has the potential to better position students to achieve entry-to-practice competencies and have a higher sense of self-efficacy in their IL abilities.

Considering the importance of IL skills in all health care professions, we believe that the journal club concept could be transferred to other disciplines. Larger-scale longitudinal research to continue to examine nursing students' self-efficacy, IL skill development, and ability to engage in EIP is also warranted. Overall, this journal club strategy was an effective modality for advancing our nursing students' self-efficacy with core IL competencies for evidence-informed nursing practice.

Understanding and incorporating scholarly sources effectively in writing is consistently understood as a challenge for undergraduate students (Miller et al., 2015; Scheidt et al., 2016). Contextualizing IL concepts; scaffolding IL competencies relating to research, reading, and writing; and providing dedicated time during class, have been argued to be a more effective strategy than a single class session with a librarian (Amit-Aharon et al., 2020; Ippoliti, 2018; Scheidt et al., 2016), and our results appear to support this. It was encouraging to see that students' pre- and post-journal club self-efficacy scores increase across all items relating to source synthesis and writing, indicating development of these IL concepts and perceived competence in these areas. Students had time to practise skills and indicated that the time in class to work on this with peer, instructor, and librarian support, and our results support that it enhanced their learning for applications within and beyond the classroom (Scheidt et al., 2016) as evidenced by the open-ended responses. Scheidt et al. (2016) discussed advantages of teaching IL skills not linked to an assignment as students shift their focus onto the IL rather than the assignment. The journal club was found to enhance IL for students in various assignments, and some participants reported it would inform future assignments. This is a welcome finding as in many introductory courses, students are not yet aware of the potential connection to future education and assessment.

Furthermore, the journal club focused student attention on taking a meaningful approach to reading scholarly articles, which is supported by Scheidt et al. (2016). Students reported in the short-answer questions that the journal club enhanced the way they read articles, as they felt more comfortable dissecting articles, understanding the relevance of different sections within articles, and knowing how to use articles in assignments.

We were very encouraged to find significant improvement from pre- to post-survey for items G27 (Learn from my information problem solving experience and improve my information literacy skill), G28 (Criticize the quality of my information seeking process and its products), and the open-ended questions, all of which relate to students' perceived ability for critical self-reflection on their problem-solving and information-seeking processes and experiences to improve their IL skills in the future. Awareness of and reflection on the process are intentionally facilitated in the journal club activities (guided worksheets), individual student reflections, and group problem solving, and so seeing this significant improvement validates the activities as meeting their intended objectives. Cultivating reflection on and for the research and writing process leads to the metacognition necessary for developing IL competencies (Denke et al., 2020). The students' short-answer reports demonstrated that many were nimbler and more efficient and that their IL strategies were more effective. Based upon the responses and identifying the benefit of practical application of knowledge in different contexts, we suspect the constructivist approach, with its scaffolded learning opportunities to repeat and advance skills, contributed to this.

We identified a few items in the ILSES before undertaking data collection that we felt were problematic, and our findings demonstrated this. We speculate that the lack of significance for item C11 (Use Internet search tools) may be due to the use of unfamiliar terminology in the ILSES question; we did not use the terms *search engines* or *directories* in our teaching, so the lack of any significant improvement may relate to a mismatch between the ILSES question and the journal club lesson content. Another possible explanation could be that students at the outset may already have a higher degree of confidence in their Internet searching ability; digital natives often enter post-secondary courses with confidence in their Internet searching skills, despite the fact that there is not a strong correlation between Internet confidence and actual IL ability (Sorgo, et al., 2017; Mahmood, 2016). The additional items (16 and 19), which we had identified as misaligned with the intended learning objectives in the course and project, also lacked statistical significance in the findings, which was not unanticipated or seen as problematic to us and is a representation of how a standardized tool may have drawbacks. However, we still believe it enhanced the study tool to use the tool as it was validated.

The findings highlighted the effectiveness of the journal club in teaching IL, but they also demonstrated areas for enhancement in this strategy in the future. For example, the positive findings provide evidence to support the value of dedicating course time to more challenging IL concepts; in future iterations of journal club in this course, the instructor would give more time to cultivating reading and writing competencies. Other considerations may relate to incorporating new components, such as peer writing feedback, and addressing specific aspects of small groups, such as deliberate selection of group members or assigning member roles to enhance social learning.

Our findings also demonstrate the value of IL being taught in small groups and over time throughout the term. In addition to the impact on students' IL skills, the value of the small-group social constructivist approach within this innovation was particularly highlighted in the short-answer responses, even though we did not ask specifically about this. Anecdotally, the course

instructor and subject matter librarian had observed positive social experiences developing within the journal club groups, and the participants' reporting of benefits from this social learning opportunity reinforced this. Felten and Lambert (2020) described higher education as a relationship-rich environment in which students learn best with high support and high expectations, and they believed that a classroom is central to fostering relationships that can enhance learning. In nursing, and specifically with 1st-year undergraduate students, social support and connection have been found to positively impact their general sense of self-efficacy, academic success, and resiliency (Warshawski, 2022). The importance of social support was reinforced during the shift to remote delivery of learning during the COVID-19 pandemic, when opportunity for formation or engagement with social networks was limited (Cenzig et al., 2022; Montague et al., 2023) and resulted in higher rates of loneliness and social isolation (Pineda et al., 2022). Strategies for social learning and social constructivist approaches, such as journal clubs, are potential mechanisms to introduce social support into the classroom. Further research on social constructivist learning strategies and their impact on diverse learners is warranted.

Limitations

This small-scale study has limitations for generalizability. Because of its non-experimental design, a comparison of this method to traditional methods was not possible, and no correlation can be assumed. While the results showed students increased their self-efficacy with IL skills, other variables may have contributed to this finding, such as papers they were writing or education from other courses, but in our program, this is the one course with educational responsibility for IL skill development. While limitations are noted for generalizability, we can confidently state that over the semester-long course-based student journal clubs, there was a statistically significant improvement in student IL self-efficacy scores relating to the ability to locate, assess, and synthesize research sources, indicating a growth in perceived competence in these areas.

If undertaking this study or a similar one on a larger scale, we would recommend striving for a larger sample size and using participant codes for matching the pre- and post-survey to individuals to allow for inferential statistical analysis. Additionally, in-depth qualitative data collection, such as interviews or focus groups, to elicit more detail from participants to further substantiate and explain the how behind the findings could also be used. We recommend this topic continue to be explored, including longitudinal studies that assess IL retention and self-efficacy over time, including application to future practice.

Conclusion

Our overall findings suggest that the pedagogical strategy of small-group, scaffolded learning provided in a consistent setting, with groups working together throughout an academic term had positive results for the development of IL skill efficacy and social development of 1st-year nursing students. We believe this strategy is replicable in other contexts, potentially with other concepts. We also believe this strategy could be employed over a prolonged time, such as an entire academic program, with IL skills continuing to be scaffolded and developed as appropriate. Overall, the findings of our study provide ample evidence that journal club has positively enhanced students' IL self-efficacy, and this strategy will continue to be used in future offerings of this course.

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