Review

Supporting the development of information literacy skills and knowledge in undergraduate nursing students: An integrative review

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A B S T R A C T

Background: Undergraduate nursing students have the opportunity to develop information literacy skills while at university so they can work effectively in an increasingly information-intensive clinical environment. This can be achieved through learning how to effectively search for required information, critically evaluate it, apply and reference it. Librarians working in academic libraries can assist with this essential skill development through library instruction, delivery and support.
Objectives: The aim of this integrative review was to undertake an analysis of the peer-reviewed research in the context of library instruction programs delivered in undergraduate nursing courses. A synthesis of the key themes was also undertaken.
Methods: This paper takes the form of an integrative review. Four library databases were systematically searched for research articles investigating 'library instruction' within 'undergraduate nursing' courses. The search strategy was based on synonyms for these two concepts.
Results: A total of 26 articles based on 25 studies were identified for review. Research was undertaken in a number of different countries with the most being in the United States of America (8). Total participants were 2820 nursing students. Sixteen of the studies were a quantitative approach, three were qualitative and six were mixed methods. A range of data collection methods were used that included surveys, interviews, focus groups and an observational study. One study was a randomised controlled trial and one used a mixed methods final year thesis analysis. The year level of participants varied with most being in the first year of their course (12 studies). Six studies were a mix of year levels. The four key inter-related themes identified were: collaboration, course-integration, linking to assessments, and confidence.
Conclusion: There is evidence to suggest a positive relationship between library instruction and information literacy skill development. Sustained training and support across year levels provides the opportunity for positive student outcomes.

1. Background

Twenty years ago, it was predicted that nurses would need generic qualities enabling them to work effectively in a world of information overabundance (Cheek and Doskatsch, 1998). This prediction is now a reality with nurses working in an increasingly information-intensive environment (Gray, 2016). Therefore, educational opportunities to strengthen the required information literacy skills are important for undergraduate nursing students.

Information literacy (IL) as a concept focuses on a person's ability to interact with information and the cognitive and behavioural processes that are involved (Hepworth et al., 2013). For the purpose of this review, information literacy skills and knowledge are the ability to: ask a focused clinical question (or determine keywords from an assignment question), develop a search strategy from this question, search databases and other digital tools, find needed information, critically evaluate and reference what is found, and ultimately implement this in clinical practice (Boruff and Harrison, 2018).

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The importance of developing information literacy skills as an undergraduate nurse has been well documented in the literature (Brettle and Raynor, 2013; Forster, 2015). Many nursing students find the transition from university to the workplace challenging so developing as much of this knowledge prior to registration can help with the transition (Theisen and Sandau, 2013). When nurses complete their annual registration in countries such as Australia, they are expected to be competent in a range of areas. This includes being able to use relevant literature and research findings to improve current practice, to participate in the review of guidelines based on research, and to identify and disseminate any changes in practice (Nursing and Midwifery Board of Australia, 2013). Developing these skills has an impact on nurses' future clinical work and their ability to achieve best practice. Keeping up to date with current trends and latest interventions is vital as new research becomes published.

Librarians employed in subject-specific instruction or liaison roles are highly motivated to work with both nursing faculty and students to support the development of IL skills and knowledge. In the United States of America (USA), academic library directors unanimously express a strong commitment to the IL education of undergraduate students (Long and Schofield, 2014). In addition to this in October 2013 the American Association for College and Research Libraries (ACRL) developed the Information Literacy Competency Standards for Nursing (ACRL, 2013). ACRL encourages the integration of these standards into programs to ensure nurses are given the tools needed to utilise evidence in their professional practice (Phelps et al., 2015).

Existing reviews have been conducted on IL education designed to determine the most effective methods of training (Brettle, 2003; Swanberg et al., 2016) and to establish the value of library instruction on patient care (Bryant and Gray, 2006; Weightman and Williamson, 2005). Other reviews including integrative, umbrella and systematic reviews exist that relate to undergraduate students but are not specifically focused on nursing students (Koufogiannakis and Wiebe, 2006).

For the purpose of this review the authors provide a definition of 'library instruction' being any lecture or tutorial that teaches information literacy skills from a one-time session to a series of classes across a year, either face-to-face, virtual or via a self-directed online tutorial. The term 'nurse academic' will be used subsequently to refer to the following: nursing professor, lecturer, educator, faculty and instructor. The population selected for this review was undergraduate (pre-registration) nurses and has been conducted to highlight the importance of this cohort developing IL skills while at university.

2. Objectives

The aim of this review was to undertake an analysis of worldwide library instruction programs delivered within undergraduate nursing courses that have been designed and evaluated using one or more research methods. A further aim was to synthesise the key themes to create a body of evidence demonstrating the value and benefit of this instruction.

3. Methods

This paper takes the form of an integrative literature review. This approach was adopted to allow for the integration of a broad range of study designs and data collection methods (Whittemore and Knall, 2005). Further, it is intended to expand on the diverse knowledge base, provide new perspectives and focus on key issues related to this expanding topic (Torraco, 2005).

Development of the review was undertaken using the guidance for narrative synthesis that provided direction for determining description of theme patterns across the included studies. These relationships were then explored (Popay et al., 2006). The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flowchart was included as a useful tool to document searches as well as inclusions and exclusions (Moher et al., 2009).

The following health, education and library science databases were searched in September 2019: EBSCO's Medline, Cumulative Index for Nursing and Allied Health Literature (CINAHL), Education Resources Information Center (ERIC), and Library, Information Science and Technology Abstracts (LISTA). Google Scholar was also searched for any additional articles. The reference lists of retrieved articles were scanned using a pearling method to identify gaps in the search results. In total 379 results were identified. After removing 242 duplicate records, the remaining 137 records were assessed for eligibility.

The initial search strategy was developed for Medline and modified for the other databases with the following search strategy: ("library instruction" OR "information literacy" OR "library education" OR MH information literacy) AND (nursing student* OR student nurs* OR undergraduate nurs* OR preregistration nurs* OR MH students, nursing). The date limit was set at 1990 to reflect the establishment of university-based education for nurses in many countries (Shin et al., 2002). At this time hospital-based nursing was being phased out and nurses became more empowered, self-directed learners in an academic environment. This all occurred at a time when the computer era was developing rapidly and the need for contemporary search techniques encompassing IL was evolving (Australian Government Department of Health, 2013). The early nineties also saw evidence-based practice become more prominent around the world, recognising that applying research evidence into practice through the development and use of local, national and international guidelines was key to improving patient outcomes (Mackey and Bassendowski, 2017).

The initial searches were intentionally kept broad to capture all the research undertaken on this topic. Once duplicates were removed, the articles from these initial searches were screened independently by the first two of the three authors using title and abstract to assess inclusion. Articles were then identified as potentially relevant and the full text was retrieved for comprehensive review.

Papers were included in this review if they met the following eligibility criteria:

- Primary research study
- Published between 1990 and 2019
- English language
- Nursing undergraduate (pre-registration) students (also included were studies with nurse academics and/or librarians as participants combined with nursing students)
- Contained a description of the library instruction

Excluded studies were those focusing on the following combined or individual components:

- Digital literacy
- Health literacy
- Non-nursing disciplines
- Information seeking
- Program description
- Informatics
- Web skills
- Enrolled nursing
- Postgraduate education

A PRISMA flowchart (Fig. 1) was used to document each stage of the paper selection process. No formal critical appraisal tool was used for quality assessment as the authors wanted to capture all research being undertaken on this topic. Manual screening of the text within the articles was undertaken to determine which topics were mentioned most often. These were recorded and common themes identified and analysed. A narrative synthesis of the literature was undertaken (Popay et al., 2006). EndNote (Clarivate Analytics, 2016) citation software was used for duplicate removal and screening. Microsoft Excel was used to
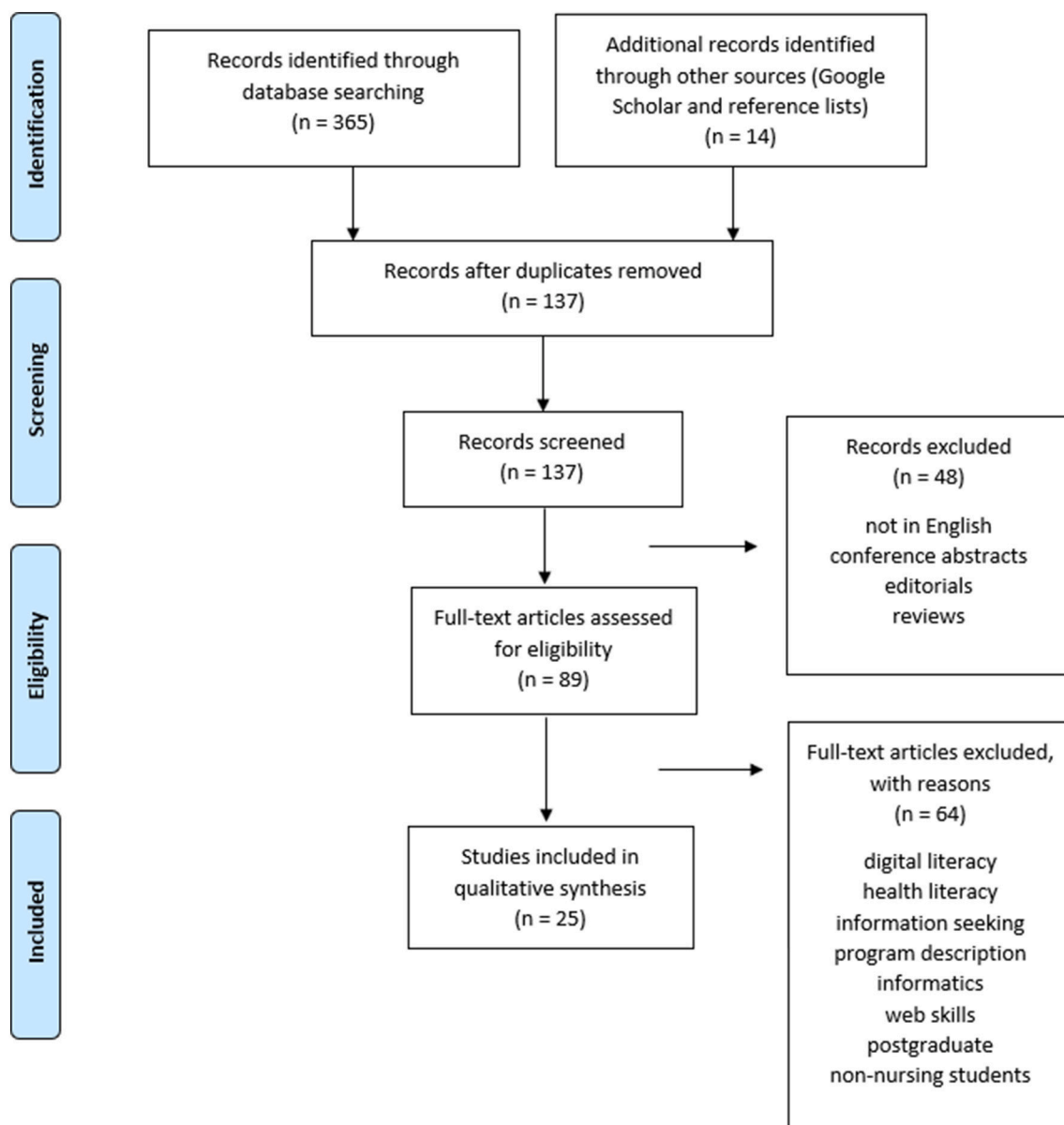
Fig. 1. PRISMA flow diagram (Moher et al., 2009).

chart key data from the papers and to establish the four key themes.

4. Results

A total of 2820 nursing students participated in the 25 included studies. The sample size of the studies ranged from 11 to 422 participants. There has been a significant increase in literature on this topic in recent times. Of the 25 studies, five were published prior to 2005, five from 2006 and 2010, and since 2011 there have been 15 studies published (Table 1). For each included study the year published, country of origin, research methods, number of participants, year level and key themes were identified.

4.1. Setting

The literature covers a wide range of geographical locations. Studies were undertaken in the following countries: USA (*n* = 8), United Kingdom (UK) (*n* = 4), Australia (*n* = 3), Canada (*n* = 3), Norway (*n* = 3), Denmark (*n* = 1), Ireland (*n* = 1), Sweden (*n* = 1) and Turkey (*n* = 1), (Table 1).

4.2. Research methods

Study designs included quantitative, qualitative and mixed methods depending on the focus of the research. Sixteen of the studies were a quantitative approach, three were qualitative and six were mixed methods. A range of data collection methods were used across the 25 studies that included surveys, interviews, focus groups and an observational study. One study was a randomised controlled trial and one used a mixed methods final year thesis analysis.

4.3. Population

Of the 25 included studies, 12 focused on first year, none were specifically from second year and six had a third year focus. Six were mixed years and one did not specify the year level. Four studies included participants in addition to nursing students and were included in this review as they were consistent with identified themes and the eligibility criteria. These studies were: Bønløkke et al., 2012 – 9 nurse academics and 1 librarian; Murray and Preston, 2016 – 3 nurse academics; Sundin et al., 2008 – 1 nurse academic and 1 librarian; Kolstad,

Table 1
Characteristics of studies included in review
(*n* = 25).

Characteristics	n (%)
Country	
USA	8 (32)
UK	4 (16)
Australia	3 (12)
Canada	3 (12)
Norway	3 (12)
Denmark	1 (4)
Ireland	1 (4)
Sweden	1 (4)
Turkey	1 (4)
Year	
Pre-2005	5 (20)
2006–2010	5 (20)
2011 +	15 (60)
Study design	
Quantitative	16 (64)
Qualitative	3 (12)
Mixed methods	6 (24)
Year level of participants	
1st year	12 (48)
2nd year	0
3rd year	6 (24)
Mixed	6 (24)
Not specified	1 (4)

2015 - student supervisors and librarians. Table 2 provides a summary of included studies.

4.4. Themes

A number of different approaches to library instruction occur in practice. However, this review revealed some common themes across the literature. The first theme identified was collaboration. Subsequent themes included course-integration, linking to assessments, and student confidence. All four themes were identified as important components of library instruction delivery. All 25 studies included at least one of the themes and four of the studies included all of the themes (Table 3).

Understanding the themes helps the reader to recognise the importance of this integrative review. Collaboration in the context of IL education is when nurse academics and librarians work together to create coursework intended to develop information literacy skills and knowledge (Guillot et al., 2005). Eighty percent of the reviewed articles (20 out of 25) discussed the importance of collaborative partnerships between librarians and nurse academics.

Course-integration is incorporating library instruction into the curriculum of a university course (Flood et al., 2010). Twenty-three of the 25 reviewed articles discussed library instruction that had been embedded into the curriculum.

In the context of library instruction, linking to assessments occurs usually through a graded assessment task. Such tasks may include writing an annotated bibliography, creating and critiquing a search strategy, locating journal articles on particular subject areas from library databases, demonstrating correct referencing, or comparing and evaluating search tools (Shorten et al., 2001). Ten of the 25 reviewed articles included an aspect of graded assessments or assignments as part of effective library instruction.

Confidence as a concept can be defined as a self-belief in one's ability to achieve a given task, (Perry, 2011) which in this review is the empowerment of nursing students in relation to IL skills and knowledge (Farrell et al., 2013). Of the 25 articles assessed for this review, 12 investigated student confidence as a factor in achieving IL competence.

5. Discussion

One of the aims of this review has been to draw out key themes to create a body of evidence demonstrating the value of library instruction programs in undergraduate nursing education. It is apparent from these results that there is significant heterogeneity of the type of training offered by librarians, the year level, numbers of students studied and the way the research has been conducted to evaluate learning. Consequently, the results from the included studies are difficult to compare. In the following, examples of included studies have been selected to demonstrate how they fit into the themes and how the theme has contributed to the effectiveness of library instruction. These results are backed by supporting literature as referenced below.

5.1. Collaboration

Some studies have revealed that nursing students have low levels of IL skills, which may be carried through into nursing practice if not addressed during the undergraduate years (Duncan and Holtslander, 2012). Close collaboration between nurse academics and librarians may be a way of overcoming this (Fox et al., 1996). As university support staff, it is difficult for librarians to make a real impact unless this collaboration occurs.

Evidence shows many academics do not view librarians as partners who can help them instruct IL skills and search strategies to students (Derakhshan and Singh, 2011). Therefore, many librarians undertake regular self-promotion and marketing of their expertise (Janke et al., 2012) to highlight the skills, knowledge and motivation that can provide meaningful support to nurse academics (Turnbull et al., 2011).

An instance that demonstrates the importance of these partnerships comes from Kolstad (2015) who discusses the inclusion of a librarian in a 'community of practice' where complementary skills training led to increased IL learning. Nordsteien et al. (2017) reported that the collaboration "ensures that library teaching input is directly applicable and accommodates the student's needs at the right time" (p. 27).

The study by Bønløkke et al., 2012 was designed specifically to "gain insight into students', librarian's and lecturers' experiences of and learning from an intervention concerning development of information literacy in a nursing programme" (p. 53). To achieve this aim academics and librarians used a collaborative approach to develop a plan for the intervention. The plan was informed by pedagogic discussions based on literature, research and their combined experience (Bonlokke, 2012). Xiao (2010) found that both collaboration and integrating library-specific resources into the online learning management system was an effective way to improve student learning.

Both the earlier dated and more recent articles in this review emphasised the importance of collaboration (Craig and Corrall, 2007; Guillot et al., 2005; Turnbull et al., 2011; Wallace et al., 2000). The long-term impact of these partnerships has rarely been evaluated (Sproles et al., 2013) but the number of studies over the years that have documented nurse academics and librarians working together highlights the positive nature and impact of working in a collaborative way.

5.2. Course-integration

It has been recognised in the literature that many nursing students struggle with locating and evaluating information and that a single library induction session in first year is inadequate to develop successful IL skills (Duncan and Holtslander, 2012). Course-integration is a step beyond librarians delivering a single literature searching lecture or database training session. The content becomes part of the course and its learning objectives. The librarian works with one or more academics to provide a series of tutorials or discipline-specific online workshops (or both) within one or more units across year levels. Ideally an assessment item related to this is included. Developing high level IL skills is more likely to occur when meaningfully integrated with other

Table 2
Summary of included studies.

Study	Country of origin	Research method	Number of participants (n)	Year level	Purpose	Main findings
Bailey et al., 2007	UK	Survey and focus groups	n = 58	1st year	To assess the impact of workshops on levels of IL skill development.	The study found that students who attended at least one workshop improved their grade in the next assignment. Qualitative data collected from focus groups indicated an improvement in IL skills.
Bønløkke et al., 2012	Denmark	Focus groups	n = 20	Not specified	To evaluate a curriculum-integrated IL program.	The focus groups were with students, an academic and a librarian. The results found IL is meaningful when systematic, continuous and linked to an assessment.
Brettle and Raynor, 2013	UK	Randomised controlled trial	n = 77	1st year	To compare the effectiveness of an online IL tutorial with a face-to-face session.	Comparison was undertaken by scoring the students' database search histories. They found a statistically significant improvement in search skills following delivery of sessions. Tested skills retained after one month - both methods had similar results.
Courey et al., 2006	USA	Survey	n = 58	1st year	To evaluate the effectiveness of an IL program using two groups, one being a control group.	Comparison of a control group and program group found negative student attitudes towards IL but an increase in ability to access nursing research information post-workshop.
Craig and Corrall, 2007	UK	Skills quiz and interviews	n = 29	1st year	To investigate whether library instruction is effective in developing skills and confidence.	Pre and post skills quiz testing plus interviews found an increase in students' skills and confidence.
Duncan and Holtslander, 2012	Canada	Grounded theory	n = 11	3rd year	To examine strategies used by students to locate information for class assignments.	Students expressed frustration in getting the keywords right. Researchers recommended focusing on the importance of keywords and phrases when teaching IL skills.
Farrell et al., 2013	Canada	Survey	n = 422	Mixed	To determine if increased exposure to library instruction improved students' level of confidence and competence.	The study found competence and confidence improved between first and fourth years but not as much as was expected. Improvements in the program were implemented based on the project.
Fox et al., 1996	USA	Survey	n = 116	Mixed	To evaluate nursing students' skills development following library instruction.	Results indicate improvement in student skills however the article also discusses the multidimensional approach to evaluation.
Guillot et al., 2005	USA	Survey	n = 22	3rd year	To evaluate online IL support via virtual group classes and a chat service.	The survey found that the majority (87%) of students were satisfied or very satisfied with this type of IL support.
Ha and Verishagen, 2015	Canada	Observational	Not specified	1st year	To analyse whether applying Kolb's learning theory to library instruction enhances student engagement and improves teaching.	Self-reflection and feedback from the two lessons found that both the instructor and students were more engaged when incorporating Kolb's theory.
Hossain et al., 2012	Australia	Survey	n = 228	1st year	To evaluate the embedding of library instruction into a first-year nursing unit.	It was found there was a significant difference in confidence (improvement) in students who had attended the classes.
Jacobsen and Andenæs, 2011	Norway	Survey	n = 249	Mixed	To assess whether an IL program intervention (with a greater number of IL related assignments throughout the course) increased nursing students' knowledge of finding and evaluating information from research databases and internet sites.	Minimal differences in outcomes between groups at the end of the three years and strategies used in one context not necessarily relevant in another. More research needed into what activities best enhance development of IL skills.
Kolstad, 2015	Norway	Observation and interviews	n = 400	Mixed	To investigate what interactions and conditions shaped the librarian's role in interdisciplinary supervision of student's workplace assignments.	This study investigated IL learning from a social interaction perspective and found that librarians can become partners in the supervision process.
Lyons, 2013	USA	Survey	n = 34	Mixed	To evaluate library instruction that was embedded into the learning management system, using a discussion board, a chat service and online tutorials.	Following the program, the survey found an increase in student satisfaction and reflective thinking.
McMillan and Raines, 2011	USA	Survey	n = 46	1st year	To evaluate strategies used to assist students in a professional paper writing assignment.	The survey responses were positive and academic feedback was that there was an improvement in writing and referencing after the program.
Murray and Preston, 2016	Ireland	Survey and interviews	n = 21	Final year	To evaluate an introduction to the library program that included face-to-face tutorials for International students.	Librarians interviewed students and academics and made changes to the program based on feedback.
Nordsteien et al., 2017	Norway	Thesis analysis	n = 194	3rd year	To evaluate how a collaborative librarian/faculty teaching intervention affected the nursing students' research skills when writing their final theses.	Results found research skills improved over the three years of the study.

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Table 2 (*continued*)

Study	Country of origin	Research method	Number of participants (n)	Year level	Purpose	Main findings
Özbıçakçı et al., 2015	Turkey	Survey	n = 157	Final year	To compare traditional library instruction and problem-based learning (PBL) at two universities.	A survey of personal IL perceptions found that students of both programs rated themselves high in skill level but that PBL had a stronger influence.
Roberts and Ousey, 2011	UK	Survey	n = 110	3rd year	To explore student nurses' experiences of learning to search for and use evidence to support their academic assignments.	These students valued first year library instruction but felt there was not enough support in second and third years.
Shorten et al., 2001 (see Wallace et al., 2000)						
Sundin et al., 2008	Sweden	Interviews	n = 16 (plus one librarian and one academic)	3rd year	To investigate librarians' expertise in relation to teaching IL skills.	The interviews found the program to be important at giving IL meaning and assisted to develop a closer relationship between the nursing faculty and the library.
Turnbull et al., 2011	Australia	Survey	n = 174	1st year	To evaluate whether an IL program that incorporated the development of an online tutorial and a collaborative partnership between the librarians and academics was effective in improving IL skills in first year.	The survey found a greater knowledge of library resources as well as an improvement in confidence and assignment grades post participating in the program. It was an effective way to support large numbers of external students.
Verhey, 1999	USA	Survey	n = 287	Mixed	To evaluate integrated library instruction using two different cohorts of students.	Testing done prior to implementation of the program. Post-testing revealed positive improvements in student use of journals and databases. Self-assessment did not indicate improvement in assessing or evaluating information sources.
Wallace et al., 2000	Australia	Survey	n = 55	1st year	To evaluate an IL program that focused on locating and retrieving literature integrated into a core first year nursing subject (as described in Wallace et al., 1999).	It was found that there was evidence of developing effective IL skills after completing the program.
Xiao, 2005	USA	Survey	n = 80	Not specified	To assess a library instruction program within a transcultural nursing subject.	Survey responses briefly commented on and found mostly favourable responses.
Xiao, 2010	USA	Survey	n = 244 (over four years)	1st year	To evaluate an earlier program (Xiao, 2005) with the development of a course-related library website within the learning management system that included use of discussion boards.	Annual survey responses found the program was helpful, and an improvement in IL skills.

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Table 3
Summary of identified themes.

Study	Theme - collaboration	Theme – course-integration	Theme – linking to assessments	Theme - confidence
Bailey et al., 2007		*		*
Bønløkke et al., 2012	*	*	*	
Brettle and Raynor, 2013	*			*
Courey et al., 2006		*	*	
Craig and Corrall, 2007	*			*
Duncan and Holtslander, 2012		*		*
Farrell et al., 2013	*	*		*
Fox et al., 1996	*	*	*	*
Guillot et al., 2005	*	*		
Ha and Verishagen, 2015	*	*		
Hossain et al., 2012	*	*		*
Jacobsen and Andenæs, 2011	*	*	*	*
Kolstad, 2015	*	*		
Lyons, 2013	*	*		
McMillan and Raines, 2011	*	*	*	
Murray and Preston, 2016	*	*	*	
Nordsteien et al., 2017	*	*	*	
Özbıçakçı et al., 2015	*	*		*
Roberts and Ousey, 2011		*		*
Shorten et al., 2001*				
Sundin et al., 2008	*	*		
Turnbull et al., 2011	*	*	*	*
Verhey, 1999		*		*
Wallace et al., 2000	*	*		
Xiao, 2005	*	*	*	
Xiao, 2010	*	*	*	
Total (25)	20	23	10	12

* Wallace et al. (2000) and Shorten et al. (2001) are the same study – refer to Wallace et al. (2000).

learning (Hossain et al., 2012).

An early adopter of this approach to IL education was the University of Wollongong in Australia (Wallace et al., 2000). Results from their pre and post program survey found integration to have potential value for IL skill development. At this time, a university-wide 'Information Literacy Policy' detailing what was expected of graduates was also implemented.

The structure of a program within a nursing subject is dependent on whether it is being delivered on campus or via external study. If students are on campus, there are a number of teaching strategies possible. These include small group research projects, referencing classes, discussion groups focusing on assessment topics, hands-on workshops with a research focus as well as individual support.

If the course is external (taught online) many libraries now offer assistance via webinar classes, online subject guides and video tutorials. Additional assistance can be given via phone, email or a chat service. Web-based interactive tutorials have been developed, refined and assessed in a number of the reviewed articles (Turnbull et al., 2011; Walters et al., 2015). These online tutorials address a gap in the support provided to large numbers of external nursing students (Walters et al., 2015). More recent articles have discussed the evolution of tutorials that are now embedded within individual unit learning management systems (Xiao, 2010). The module format of online tutorials provides the flexibility for self-directed learning and access to content at the optimal time (Weiner et al., 2012).

A British study compared two common teaching strategies (Brettle and Raynor, 2013). Their hypothesis was that an online tutorial was as good as face to face training for teaching IL skills to first year student nurses. The type of study used was a randomised controlled trial and they allocated 40 students to the tutorial group and 37 to the face to face group (77 total). The IL learning outcomes were embedded in the module *Foundations of Nursing Knowledge* (Brettle and Raynor, 2013). There was a statistically significant improvement in research skills of both groups post-session. Follow-up at one month showed both strategies remained equally effective (Brettle and Raynor, 2013).

Courey et al. (2006) reported on a program where specific tasks were created for the students to undertake during their course. These were based on the program objectives which were to introduce students to skills including how to access, evaluate and utilise professional journals. To help consolidate their learning students were required to present the literature to their peers. A positive effect on students' literacy was revealed in a post study evaluation (Courey et al., 2006). Course-integration provides an opportunity for task-based assessment rather than the traditional teaching methods of direct instruction.

5.3. Linking to assessments

A number of authors agree that linking to assessments is a significant component of effective library instruction (Bønløkke et al., 2012; Farrell et al., 2013; McMillan and Raines, 2011). McMillan and Raines (2011) state that when nursing students practice written communication skills this assists in their ability to communicate effectively with diverse patient populations.

One method that has been used for analysing the effect of library instruction on student performance is evaluating assessments. This method was utilised by one of the reviewed articles (Nordsteien et al., 2017). Their research was used to improve teaching practices and as a consequence improve students' understanding of library concepts. These researchers evaluated a library instruction model by examining nursing students' final year literature review theses. They assessed the references of 194 papers (by looking at the research databases selected and the reasoning behind selection). The results found research and IL skills improved over the three years of the study.

A 2013 study from Canada evaluated a program where library instruction was embedded into the nursing curriculum. Participants were 422 students across year levels. First year focused on CINAHL search strategies. The second year students were shown advanced CINAHL and medication information resources and third year included the Evidence-Based Practice (EBP) framework and PubMed searching using Medical Subject Headings (MESH) and Clinical Queries. An assessment based on each session was given a percentage towards the student's final mark. First and final year students undertook a questionnaire to determine if increased exposure to library instruction improved competence and confidence. This study found that increasing the number of sessions

during a semester improved student retention of IL skills, although less than expected (Farrell et al., 2013).

To assess students' research skills, assessment linking was evaluated in the study by Murray and Preston (2016) where students were required to complete a literature review as part of their EBP module. Similarly, the study conducted by Jacobsen and Andenæs (2011) aims to demonstrate that adapting assessments to include finding and evaluating material from bibliographic databases results in students' acquiring improved skills and understanding of these professional tools.

One would expect that where there is linking to assessments, there is also course integration. Course integration can occur without being dependent on linking to assessments. However, linking to assessments is not possible where there has been no course integration. This is the first step in any discussion around embedding IL instruction into nursing curriculum with a mandatory assessment that contributes towards a student's final grade. Ten studies had course integration combined with linking to assessments. Twelve studies had course integration that were not linked to assessments (Table 2). Two studies did not use course integration or linking to assessments (Brettle and Raynor, 2013; Craig and Corrall, 2007).

5.4. Confidence

Building confidence is important during a nursing student's journey as it means trusting one's ability to find and use required information (Hossain et al., 2012). An Australian survey of 174 first year nursing students undertaking course-integrated IL education (including an assessment) found that confidence was a key factor. A number of these students studied via external mode. They were supported by the development of an online tutorial created collaboratively with input from nurse academics and librarians (Turnbull et al., 2011).

Results from a small-scale UK study indicated that students who attended at least one library instruction workshop improved their confidence and academic grade in their next assignment (Bailey et al., 2007). Students in the study by Fox et al. (1996) also had improved confidence outcomes.

Respondents in the study by Murray and Preston (2016) provided positive feedback with respondents stating, "the programme was beneficial to them and made them feel more prepared to use library services and resources" (p. 242). Feeling prepared is an important component of developing self-confidence.

The study by Craig and Corrall (2007) directly investigated the impact of the IL program with regard to increasing both confidence and skills in students by looking at the relationship between confidence, demographics and skills. Farrell et al., (2013) had a similar aim to address confidence and empowerment and how they relate to IL. To measure confidence students were surveyed in skill areas including: "reading research, selecting resources, searching for evidence and identifying research types" (Farrell et al., 2013).

Confidence is a complex measure to assess, as it incorporates 'how students feel', self-efficacy, self-belief, empowerment and overall belief in ability to implement skills. However, becoming confident may mean that a student is more likely to "have a go" or "seek help" if they have an information need requiring an answer (Hossain et al., 2012).

5.5. Recommendations

It can be a challenge to teach IL skills to undergraduate nurses (Duncan and Holtslander, 2012; Jacobsen and Andenaes, 2011). Concepts may be difficult to grasp so it is important they are taught as a process rather than as an event (Mikkelsen and McMunn-Tetangco, 2016), and time and effort on behalf of both librarians and nurse academics is required to produce effective results. According to Spring (2018), focusing on context and timing may be the key to effective delivery of library instruction. A strong lifelong learning culture can be established in undergraduate students by tailoring library instruction to

learning needs and skill levels in a variety of situations (Mi and Riley-Doucet, 2016).

To date there is a significant body of published literature in this field that is based on program description (excluded from this review). There is a need for more research that investigates which learning activities best enhance the development of IL skills (Jacobsen and Andenaes, 2011) as well as research that measures impact and student outcomes.

Studies that assess learning performance measures based on actual student work such as tests and course assessments will allow greater comparison and be an indication of effectiveness of instruction when compared to measures of attitude such as self-reported surveys, interviews and focus groups (Schilling and Applegate, 2012). In this way, librarian and nurse academic time commitments and resources can be directed towards the most effective library instruction delivery.

5.6. Limitations

Although a comprehensive and systematic search of the literature was conducted for this review, it is possible that not all relevant articles were captured. Predominance of included articles was from western countries that may not reflect the nature of library instruction delivery in all countries. Other relevant programs are likely to be unreported due to the nature of such collaborations by nursing academics and librarians.

It was not a primary aim of this review to identify the training categories and program descriptions, but this may have provided clarity for the future design of training and helped to inform the 'Collaboration' and 'Course-integration' phases of library IL instruction design. Combining this approach with a larger scale andragogy framework such as that proposed by Knowles et al. (2012) would provide additional focus to learning objectives.

Finally, there appears to be a gap in the delivery of library instruction to second year nursing students. This is worth noting as it has been suggested there should be a more systematic approach to these programs as libraries continue to take considerable responsibility for familiarising students with search strategies (Barnard et al., 2005).

6. Conclusion

IL skills that have been well-developed while at university provide a good basis for achieving best practice in nursing. This review supports and adds to the previous literature by synthesising the current state of research on library instruction delivered to undergraduate nursing students. This integrative review provides new knowledge by identifying the four key themes to support effective IL implementation.

There are a number of factors that influence the development of IL skills and knowledge. Librarian involvement providing training and support in undergraduate courses may improve outcomes. Exposure to and awareness of library resources and services appear to be important in the process. In collaboration with academics, librarians possess the skills to assist nursing students in their quest to become information literate.

Declaration of competing interest

The authors declare no conflict of interest in submission of this article.

Funding sources

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