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The experience of information literacy in nursing practice

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Information Literacy (IL) plays a key role in nursing, especially in the context of evidence-based practice (EBP), the initiative within health and social care in which clinical practice is informed by research evidence. However there is currently little evidence to show how being information literate is actually experienced by nurses and therefore whether information literacy educational interventions are promoting appropriate knowledge and skills.

A research project has been designed to investigate how nurses experience information literacy using phenomenography, an interview-based methodology which allows experiences to be categorised and put into a descriptive structure for use in the development of educational interventions. Insights from the findings will be used to map out the parameters of information literacy and to put forward a theoretical model of a module to successfully develop it. This paper discusses the context of the research and the findings from a pilot study.

Keywords | *information literacy; nursing; evidence-based practice*

Introduction

Information Literacy (IL), a concept increasingly employed as an ideal in academic and professional contexts in our information saturated age, is exhibited by someone who can *'demonstrate an awareness of how they gather, use, manage, synthesise and create information and data in an ethical manner and will have the information skills to do so effectively.'* (SCONUL, 2011 p.3). The ability to find and use information is vital in the health and social care professions, and is believed to play a key role in nursing, especially in the context of Evidence-Based Practice (EBP), the key initiative in which clinical practice is based on research evidence. (Barnard et al., 2005; Shorten et al., 2001; Bailey et al., 2007; Ross, 2010). Without the ability to identify, locate and interpret research evidence, clinical practice risks becoming out of date, inappropriate or even dangerous.

In 2010 the Nursing and Midwifery Council published their Standards for pre-registration nursing education (NMC, 2010); Competency 9 of Domain 1 states: *'all nurses must appreciate the value of evidence in practice, be able to understand and appraise research.....'* (p.14). Domain 3 states: *'...all practice should be informed by the best available evidence and comply with local and national guidelines.'* (p.17). Modern nurses are made very aware that nursing practice should be evidence-based, but their education rarely includes effective information literacy education.

There are many reports in the literature of work being done by librarians attempting to develop information literacy in nurses, usually based on a behaviourist or constructivist paradigm. (Isetta, 2008; Brettle, 2003; 2007) There is, however, very little quality research evidence of the effectiveness of such initiatives, or their effect, if any, on the ability of nurses to practice in an evidence-based way. These reports often describe how information literacy appears to manifest itself (also often describing attempts to measure the skills and knowledge felt to be associated with it), but say little about how nurses actually experience the phenomenon. The investigation of that experience seldom consists of more than the recording of nurses' reflections on their levels of self-confidence and sense of being competent.

Without an understanding of nurses' experience of information literacy, there is no

way to verify whether the skills developed in IL education are appropriate, or the nurse's expressed increase in self-confidence is justified - or whether the 'objective' skills and knowledge tools used in these studies are measuring anything of significance or value. Such an understanding would allow information literacy education for nurses to be grounded in the framework of relevant, understood and measurable aims which it is currently lacking.

Information literacy

The term 'information literacy' appears to have been coined by Paul Zurkowski in 1974 in a proposal to the US National Commission on Libraries and Information Science. The idea of information literacy evolved from more common and more restricted notions of library skills or information skills. (Rader, 1991; Snavely and Cooper, 1997). A key watershed in the acceptance of the concept was the definition of information literacy by the American Library Association in 1989: *'To be information literate a person must be able to recognise when information is needed and have the ability to locate, evaluate and use effectively the needed information'*.

The following years saw a conflict between those who put forward a constructivist model and saw information literacy as a set of personal attributes (following Doyle (1992) cited by Owusu-Ansah, 2003) and those who held to a behaviourist model, seeing it as a process following Kuhlthau (1993). In the former camp Lenox and Walker (1993) moved the definition on to the information literate person. Such a person has the analytical and critical skills to search for and access a variety of types of information in order to meet a formulated information need. This recognized the real professional and academic contexts which effect how IL is actually experienced and viewed.

The literature identifies both theories and frameworks of information literacy. Of the latter, the SCONUL Seven Pillars of Information Literacy (SCONUL, 1999; revised 2011), which has widespread authority and use in the United Kingdom and abroad and the American equivalent, ALA/ ACRL's Information Literacy Competency Standards (ACRL, 2000) stress a skills and knowledge combination, and a 'path' which the information literate person

follows in the process of successfully applying the skills and knowledge to whatever goal the person has. Both frameworks are therefore behaviourist. However the 2011 revision of the SCONUL seven pillars demonstrates a move towards a more constructivist model: *'Within each "pillar" an individual can develop from "novice" to "expert" as they progress through their learning life'* (p.3). Kuhlthau's six stage model of literature analysis was used at the University of New Mexico by Emmons and Martin (2002). In this model, *'rather than learn to use the online catalog and an index simply for the sake of becoming familiar with those tools, students do so in the service of a real quest for information to increase their understanding'* (p.547). This is an example of a model which makes use of constructivist ideas, in which there is an understanding that information literacy is the ability to apply skills and understanding to a context or situation, and is not simply the ability to perform a task or exhibit abstract knowledge.

Bruce (2002 p.2) identified three models of information literacy, and two sets of standards as the key frameworks used in education.

- Eisenberg and Berkowitz' Big6 information skills (Eisenberg and Berkowitz, 1990)
- Doyles' attributes of an information literate person (Doyle, 1992)
- Bruce's seven faces of information literacy (Bruce, 1997)
- The information literacy standards for student learning (ALA and AECT, 1998)
- The ALA information literacy competency standards for higher education (ALA, 2000).

The first two are very similar to each other and involve knowing which information related tasks to perform and knowing how to perform them. Eisenberg and Berkowitz (1990) Big 6 steps are defined as task definition, creating information seeking strategies, locating and accessing information, using information, synthesizing information and evaluating information. In Doyle's model the information literate person recognises the value of information for effective decision-making and can formulate questions, identify sources, search successfully and access and evaluate the information found. *'Learning to be information literate involves acquiring and demonstrating these attributes.'* (Bruce, 2002, p.3).

As a result of research done using Phenomenography, Bruce (1997) moved beyond both behaviourist and constructivist

models in the development of a new 'relational' model. The relational model emphasises that at any moment the information user's experience of being information literate is subjective but contextualized, and can make use of any or all of as many as seven ways (or 'experiences') of being information literate

1. As a user of IT
2. As knowing what information sources to use
3. Knowing processes to search those sources
4. Information control: having information stored and easily to hand
5. Knowledge construction: building a personal knowledge base
6. Knowledge extension: combining knowledge and personal perspectives to create new insights
7. Wisdom: using information wisely for the benefit of others: exercising judgement, making decisions, doing research; placing the information in a wider context.

The information literate person experiences the phenomenon of information literacy differently in different contexts within the information gathering process. Some individuals are capable of experiencing it in all 7 ways; the less information literate in fewer ways. This understanding of the subjective and contextual nature of IL goes a step beyond a model of the Kuhlthau type in its sensitivity to the many different ways in which information literacy is experienced.

In more recent years, there has been a move towards defining IL as part of a broader pattern of competencies. Koltay (2011) groups IL with 'digital literacy' and 'media literacy' and the close interconnectedness of information awareness and the ability to function in the contemporary digital multi-environments. Mackey and Jacobson (2011) point out the role of contemporary information environments and collaborative technologies in changing the way people find, use and share information and propose 'metaliteracy' as new term to incorporate the many literacies and technology-competencies now required. Brophy (2007) has linked information literacy to other literacies such as those associated with IT and even basic academic literacies such as reading. From an academic perspective IL is simply one of the literacies which allows a student to function effectively. In higher education, information literacy is now often included in the group of competencies together variously

defined as 'graduateness' (Peters, 2011) – i.e. exhibited by a person who has fully developed the skills of a graduate which are often defined as those needed for self-directed and self-motivated learning. However, Hoyer (2011) points out that IL skills as currently taught in the academic environment are inadequate to allow students to deal with the wider information environment they will encounter outside the academy.

IL is increasingly seen not as a separate subject or discipline but as something with little meaning outside its specific contexts – whether as part of a broad pattern of generic but highly integrated competencies or within the professional functionality of a specific discipline (Jacobs et al., 2003).

Information literacy in nursing

As described above, health professionals are expected to base their practice on the research evidence and information literacy is believed to be a key component in this process (Bailey et al., 2007; Ross, 2010; Pravikoff et al., 2005; Bernath and Jenkin, 2006). Bailey (2007, p.78) emphasised that it is essential for students training to enter the health professions to become information literate as *'The drive towards evidence-based practice and care makes it essential that students become information literate and acquire the skills to become lifelong learners.'* For Barnard (2005) the development of IL is the foundation for critical thinking in nursing, and necessary for the successful implementation of evidence-based approaches to clinical practice. In fact, the application of new clinical evidence is vital in developing and retaining competence throughout a nurse's career. *'Development of information literacy not only facilitates engagement with effective decision making, problem solving, and research, it also enables nurses to take responsibility for continued learning in areas of personal or professional interest.'* (p.506). IL should therefore be an essential focus of nursing education.

However nurses and nursing students often lack the skills to locate and evaluate information on which to base clinical decisions (Dee and Stanley, 2005; Jacobs et al., 2003; Pravikoff, 2005, 2006; Verhey, 1999). Majid et al., (2011) found that nurses in Singapore thought EBP a valuable concept, but because of a lack of

time, inability to understand statistical terms, and inadequate understanding of research terminology, were unable to find and use evidence. Layton (1995) pointed out that nurses have historically made less use of libraries than comparable health professionals and that this was usually ascribed to them having little knowledge of, and few skills in information use. Medical schools often had modules for credit in finding research literature and other IL-based topics but this was rare in nursing education.

Does a lack of IL skills inhibit EBP? Ross (2010) and Rosenfeld (2002) discuss this. Ross examined Perianaesthesia nurses' perceptions of literature searching skills. She found that the three main barriers to finding and using research evidence were: lack of understanding of electronic databases – how they worked and how they were constructed; lack of skills to critique and synthesize the research literature, and difficulty in knowing how and where to access research papers. She concludes: *'A barrier to EBP has been identified as a need for improved information literacy and includes recognition of information required and the development of skills for locating, evaluating, and effectively using relevant evidence.'* (p.64) Beke-Harrigan (2008) conducted an investigation of the evidence-based practice readiness of 1,442 nurses and found that though they accepted that research evidence was increasingly important to their practice, many admitted to not using their in-house library (70%) and not knowing how to use specialist databases (preferring Google: 43%). As Beke-Harrigan states, many nurses provide care based on what they learned in nursing school and on their accumulated experiences and neglect other sources of evidence.

Information literacy education in nursing

Reports of individual examples of IL education are numerous, particularly in the context of nursing. They almost without exception pay little attention to methodological issues and as a result, conclusions are ungeneralisable and vague. Three typical examples will be discussed which demonstrate typical issues and concerns, and the approaches used to address them, supplemented by a systematic review conducted by Alison Brettelle of Salford University in 2003. Bailey et al., (2007) analysed the effectiveness of 'remedial

workshops' in using the book catalogue and 'journal portal' given to nursing students at Northumbria University. Students were identified as 'having low information literacy', and therefore suitable for the workshops, by means of a diagnostic essay which also assessed skills levels in academic writing. The study showed that skills levels and confidence were both increased by the workshops. *'Quantitative evidence, in the form of a comparison of assignment grades from the first diagnostic essay and subsequent summative essay revealed that all of the original 23 participants who attended at least one workshop improved their academic grades,'* (p.83). The question remains whether this consists of 'evidence'. The phrase 'information literacy' is mentioned in connection with the knowledge and skills under investigation with the unexamined assumption that the behaviourist IL paradigm is the correct one. Similar ambiguities and assumptions are typical of many other similar papers.

Verhey (1999) used an exploratory descriptive approach to evaluate the information literacy program in an undergraduate nursing curriculum. Individual and group assignments within the nursing modules were designed to develop student abilities in critiquing and evaluating the information using the current literature in nursing practice in conjunction with embedded information literacy educational experiences. This is an example of a more constructivist approach, in which students learn from 'experiences' of similar kinds to those in which they would operate as information literate professionals in the 'real world'. The student is taught how to address the information needs provoked by clinical scenarios similar to those they would experience in practice.

To evaluate effectiveness of the integration of information literacy into the curriculum, a pre- and post- experience design was used. A self-reporting questionnaire was created to measure 'skills and confidence'. It addressed six areas:

1. Information sources used to complete assignments.
2. The use of reference databases.
3. The use of libraries.
4. Ease and confidence in accessing information sources.
5. Problems in accessing information resources.
6. Plans for accessing current information after graduation.

The questionnaire found significant increases in student use of the CINAHL database, in use of a health and biosciences research library located nearby, and their level of comfort in using the journal literature. Despite an attempt at a more constructivist learning approach the assessment tool's measurement of 'skills' follows a behaviourist paradigm.

Turnbull et al. (2011) recognised the limitations of classroom based IL study for student nurses – the lack of student engagement and limited amount of 'hands-on' activity due to lack of time, as well as practical difficulty of arranging such classes in a busy curriculum. Their solution was the development of an on-line 'tutorial' in six modules to provide 'structured guidance' in information skills: (1) locating relevant resources; (2) search strategies; (3) evaluation; (4) referencing conventions and avoiding plagiarism; (5) best practice examples; and (6) a 'test your own skills' module to promote revision and practice (p.125). Assessment was 'focussed on application' so that the practical value of the skills being developed was clear to the student. 83% of students surveyed (from a small sample) agreed that they felt more confident in using the resources. External assessment was looked for in students' grades which were 'better than last year' (p.127). Not a particularly scientific measurement. There was no real discussion of EBP and therefore no assessment of the value of the self-assessed increase in confidence of the students.

In 2003 Brettle attempted a systematic review of reports of information skills training in medical and nursing education in the UK, USA and elsewhere: its effectiveness, what the best methods in conducting it are, and whether it can be proven to effect patient care. The findings were inconclusive with 'limited' evidence produced and with many studies found to be flawed. The courses varied widely: single user, group and large group; 1 to 3 hour sessions; single and multiple sessions. Outcomes were measured mainly by user questionnaires and asked for self-assessment of changes in skill level; objective testing was used only in some of the programmes. Brettle points out the inadequacy of a purely subjective questionnaire as a reliable measure, citing Grant et al's (1996) study which shows that users frequently under-report their skills levels compared to objective measurement. Four studies described skills assessment which was part of the assessment of academic assignments with the broader course of study. In general, study flaws were found to include

inappropriate outcome measures. Typical published papers had little understanding of methodology or interest in education theory.

An investigation into how information literacy in nursing is experienced

In order to address some of the issues above, a research project has been developed at UWL with the following aims:

1. To investigate how being information literate is experienced by nurses.
2. To use the insights obtained to develop a description of the parameters of information literacy in nursing, including those of its role and value in evidence-based practice.
3. To develop the theoretical modelling of the information literacy development process in nurse education with a view to practical application and improvement of outcomes.

The project sets out to answer the following questions:

- i. How is information literacy experienced by nurses?
- ii. What are the parameters of information literacy in nursing, including the parameters of its role and value in evidence-based practice?
- iii. What is the structure of a theoretical model of the information literacy development process in nurse education?

Overview of method: The project consists of the phenomenographic analysis of the information literacy experience and behaviour of nurses, as expressed in interviews. It will also include an analysis of the effect on some of the subjects of the university's information literacy module 'SEARCH for Health'.

The project has two parts:

1. A phenomenographic investigation into the information literacy experience and behaviour of nurses.
2. An investigation of any changes in the experience of information literacy of some of the subjects from part 1 after having

taken the SEARCH for Health module.

Findings will be supplemented by asking this group to take the module assessments before and after the module to analyse which particular skills and knowledge domains are associated with the new presence/ continued absence of the additional ways of experience information literacy.

There will follow an analysis of the educational significance of these findings.

These activities will lead to:

1. A description of the experience of information literacy in nursing, including a description of its parameters.
2. A description of the relevance of these findings for IL education in nursing, leading to the development of a theoretical model of an information literacy course or module.

The phenomenographic investigation:

The phenomenographic method uses open-ended interviews in which subjects describe their experiences of a phenomenon in one or more contexts. The researcher categorises the experiences and relates the categories into logical relationships in the form of a diagrammatic representation or representations of how the phenomenon is experienced.

In this study, participants are asked to describe their information seeking activities, as they set about analysing a clinical problem or issue and determining their information needs. Also, more generally, how they relate their experience of being information literate with their roles as clinical professionals and evidence-based practitioners.

The researcher then attempts to define from the interview transcripts the discrete ways of experiencing the phenomenon in the form of 'categories of description' and then create one or more 'outcome spaces' which show logical relationships between the categories. Categories of description are interpretations in which what is conceived is put in relation with how it is conceived. Outcome spaces are diagrammatic representations of the logical relationships between categories of description, representing a map of the varying ways the phenomenon is experienced by subjects.

The pilot study

Åkerlind (2005a) strongly recommends pilot studies in phenomenographic research, to iron out problems in questionnaire content, interview technique and data analysis issues. A pilot study was undertaken in autumn of 2011.

Subjects: 3 subjects were invited to be interviewed. (Åkerlind 2005a). All three were academics in the field of nursing with many years of clinical experience and experience in teaching the principles of Evidence-Based Practice (EBP) to students. The subjects were chosen as suitable for a pilot study as they had experience in talking about the issues involved and were experienced interviewees.

Method: Subjects were interviewed in a one-to-one format and asked to describe their information seeking activities, as they set about analysing a clinical problem or issue and determining their information needs; also, more generally, their understanding of Evidence-Based Practice in Nursing and the role of information literacy within it. These experiences were then analysed to tentatively develop 'categories of description' and 'structures of awareness' in which various understandings of IL in the categories were either prominent or neglected, as well as criteria which could form the structure of an 'outcome space'. Ashworth and Lucas's (2000) guidelines were used as a general basis of approach.

Results: provisional categories of

description: It became clear that the Åkerlind method of data analysis (Dall'Alba, 1994; Bowden, 1994; Prosser, 1994; Åkerlind, 2005a; 2005b) could allow the successful development of a number of provisional categories of description. This method emphasises the whole transcript as a unit of analysis and warns against the tendency to view small sections of dialog in isolation. The method employed by Marton and others (Marton, 1986; Marton and Booth, 1997) in which the transcript was immediately broken down into small sections of dialogue proved incapable of dealing with the complex and extended ways the categories revealed themselves.

Each category describes how information literacy is experienced in nursing. A picture emerges of a practitioner who is not merely attempting to achieve the goals of EBP but one who uses their information literacy to become confident in their role: able to act

autonomously yet also to work comfortably and effectively within a multidisciplinary team.

The draft categories are as follows.

Representative quotes have been given in each case; however the full significance of the quote requires the full transcript as its context:

1. IL is experienced in the successful collection of sufficient and persuasive evidence to justify change in practice. *"[a properly functioning, evidence-based practitioner] is ...someone who can actually develop practice, so they can find new ways and better ways of treating people by devising interventions for better care...."* Subject C
2. IL is experienced in an ethical context, in the successful accumulation of evidence to establish what is the most ethically appropriate care *"...through necessity I have to follow evidence-based practice. It's an ethical issue. We can't, ethically, treat a patient without knowing why we're treating them"* Subject C
3. IL as experienced in the successful gathering of evidence to support the facilitation of culture change in the clinical environment *"....they draw on current evidence and we teach the student to question practice – why are you doing it this way? It's been very beneficial for the existing staff because they know that the student is up to date so they listen to the student and learn from them – so the culture has been gradually changed"* – Subject A
4. IL as experienced in the successful obtaining of information of clinical value to enable nurses to contribute to a multidisciplinary team *"looking for information – to justify in front of our professional colleagues.... All kinds of information – to justify why it will be clinically effective, to help us raise different arguments and clarify..... from different sources"* Subject B
5. IL is experienced in the building up

professional competence through the location and application of key scientific or psycho-socio-cultural background knowledge *“we always had to find when giving care to patients ‘what is the scientific principle’? And that kept us on the top of our nursing practice”* Subject B *“I might investigate if there’s a cultural angle to it ...is there something that we don’t know about”* Subject A

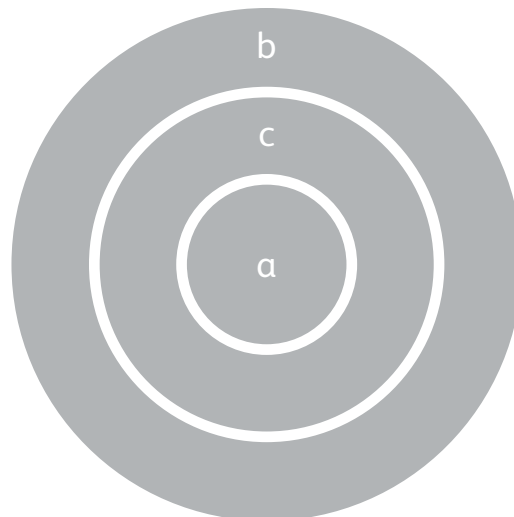
6. IL is experienced in the successful accumulation of sufficient and appropriate evidence to justify are strategies to, and re-assure, patients and family *“...my presentation was nothing but bringing information and justifying why this action was important, to comfort the child and the child’s parents”* Subject B
7. IL is experienced in the successful establishment and support of an autonomous status for the nursing professional by providing evidence for independent and defensible clinical opinions. *“Autonomy is important, certainly, ... as an autonomous practitioner..... I can carry out a procedure in the way that I do because I have evidence to support me”* – Subject C

learning process – progressing from a guided introduction to relevant issues, terms and theories towards effective critical appraisal.

- e) An understanding in which IL is the filling-in of knowledge gaps determined through an ethical self-reflection.

A category of description can be represented graphically in terms of the structures. eg. Category 3 - in which the most prominent understanding is a) followed by the next most prominent c) and the next, b).

By grouping and differentiating categories



The main study will perhaps lead to the merging or splitting of these categories or the development of new ones.

Towards an outcome space: Within each category, ‘structures of IL understanding’ were prominent to a greater or lesser extent. Five of these could be provisionally determined :

- a) An understanding in which IL is seen as a source of autonomy. comprehensiveness and timeliness
- b) An understanding in which IL is seen as successful autonomous information gathering within an enquiry-based learning paradigm.
- c) An understanding in which IL is the successful building on existing knowledge and understanding in a constructivist paradigm.
- d) An understanding in which IL is a

of description based on these structures, an outcome space can be developed, giving an overall picture of the experience of IL in evidence-based nursing.

Two further criteria of prominence by which categories of description could be related in additional outcome spaces could be provisionally determined, each with five variations:

What is the meaning of IL – what does it mean in practice?

- i. Completing a knowledge framework
- ii. Introducing a stimulus for change
- iii. Developing a plan of action
- iv. Developing a means to participate
- v. Developing a means to autonomy

The meaning of information – what is information?

- i. Agent of change
- ii. Knowledge of essential facts
- iii. Proof of competence
- iv. Evidence for re-assurance
- v. License for autonomy

nurses who are genuinely information literate and therefore potential leaders in the on-going project of promoting and developing evidence-based practice. In addition, as the preliminary findings promise, the revised module could contribute to the production of confident, autonomous practitioners who are agents for positive change.

The future

How will the finalized results be used? As described above, a group of interviewees will be re-interviewed after undertaking the SEARCH module to find which categories are now within their experience and which ones still remain outside it. They will also be asked to take the module assessments before and after doing so to analyse which particular skills and knowledge domains are associated with the new presence/ continued absence of the categories of description. More specifically, using the 'relational frame' for IL education developed from Bruce's own phenomenographic investigations (Bruce et al. 2006), each category and its associated skills/ knowledge will form the focus of educational experiences in a new form of the module.

Initial findings have been responded to with interest and broad agreement by senior nursing professionals. The main study, in which 30-40 further nurses will be interviewed, is underway.

An improved SEARCH module based on research evidence will be more likely to produce

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