

## Nursing Students' Information Literacy Skills Prior to and After Information Literacy Instruction

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## **ABSTRACT**

Information literacy has been identified by the University of Southern Queensland as an essential graduate quality. It has also been identified in the nursing literature as a requirement for nursing profession. Data were collected from Toowoomba and Fraser Coast campuses using a questionnaire to assess first-year nursing students' information literacy skills prior to and after information literacy instruction. The findings indicate that embedding such instruction into nursing courses is beneficial.

Key words: Information literacy instruction, embedding, problem solving, confidence, information access skills.

## **INTRODUCTION**

According to Jacobs, et al. (2003), an information literate person possesses "...an understanding of the architecture of information and the scholarly process; the ability to navigate among a variety of print and electronic tools to effectively access, search, and critically evaluate appropriate resources" as well as the capacity to organise "...accumulated information into an existing body of knowledge; communicate research results clearly and effectively; and appreciate the social issues and ethical concerns related to the provision, dissemination, and sharing of information.". Through a collaborative approach involving the University Library, and the Learning and Teaching Support Unit, the USQ Department of Nursing and Midwifery has embedded information literacy instruction into the first year of the nursing curriculum in order to introduce students to these essential professional skills. The aim of this study was to (i) determine the information literacy skills and confidence of students entering the USQ to Bachelor of Nursing Program; (ii) to establish if information literacy skills and confidence improve as a result of embedding information literacy instruction into a first semester, first year nursing course; and iii) ascertain whether there were any differences in information literacy skills and confidence based on the students demographic profiles.

## **LITERATURE REVIEW**

The acceptance of information literacy skills as an essential quality of undergraduates is widespread (Hartmann, 2001; Jacobs et al., 2003; Shorten et al., 2001). Being able to locate, retrieve, assess and adequately use information has always been an important part of learning particularly in an academic setting. However, education facilities need to provide students with the necessary skills to navigate their way through the various information pathways, both online and otherwise. Moreover, in a nationwide review of nursing education (National Review of Nursing Education, 2002) it was put forward that for future nursing professionals to be effective in "the current climate of technological

change "...it is crucial that they are able to maintain their competence" and "...develop it through lifelong learning". To achieve this nursing students need the ability to assess and utilise the information found in a meaningful and applied manner.

In the literature on information literacy and the nursing profession (Shorten, et al. 2001) found that integrating information literacy instruction into nursing curricula increases students' confidence. This was validated by the work of a New Zealand research team (Honey, et al. 2006) who found that embedding information literacy programs into the curriculum, rather than running classes as extra- or inter-curricula, was most beneficial for nursing students. Low confidence levels in students is known to adversely affect their learning abilities and information seeking behaviour (Barnard, et al. 2005). Croke (2004) explained that when nursing students were feeling confident in their abilities, they were increasingly able to engage in self-directed learning. This would appear to bolster the presumption that if confident, students will apply their information literacy skills to clinical practice. The literature is clear that information literacy is an essential skill required by nursing professionals (Shorten et al., 2001) in order to provide evidence-based health care.

Research supports the practice of embedding information literacy programs into curricula (Honey, et al. 2006; Shorten, et al. 2001). While there has been some research into the most effective modes on delivering information literacy instruction in universities, there is scant research available as to continuing efficacy, or whether or not such learning is applied in the professional arena. This preliminary study attempts to bridge this gap in the knowledge by evaluating nursing students' information literacy skills prior to and after information literacy instruction.

## **METHODOLOGY**

After gaining ethics approval to conduct the study data were sourced from both the Toowoomba and Fraser Coast campus nursing students. The students were all enrolled in a compulsory first-year, first semester nursing course (xxxx) that is a pre-requisite to a follow-on second semester clinical based nursing course(xxxx). Prior to information literacy instruction involving a lecture and tutorials conducted by university librarians a questionnaire were used to assess the first-year nursing students' information literacy skills. A plain language statement explaining the purpose of the study, consent form, and the questionnaire were distributed to all first year nursing students who were in attendance at a lecture in first semester 2007. The same cohort of students were approached post information literacy instruction in a similar lecture situation in semester two. The overall response rate in both campuses was 45 and 56 percent respectively.

The questionnaire used was based on the work of Neely (2000) and Tweedale (2006) and was endorsed by the USQ Learning and Teaching Enhancement Committee

(LTEC). Both closed and open-ended questions were included to determine the technical skills, confidence in, and awareness of information access of the students. The students indicated their responses to each of the statements on a five-point Likert-type scale (5= strongly agree, 4=agree, 3= undecided, 2= disagree, and 1= strongly disagree). Data were analysed using the SPSS 14.0 for Windows. Frequency counts and percentages as well as means and standard deviations were calculated for the descriptive data. Appropriate tests were used to determine whether there were significant differences between the groups of students with regards to their information literacy skills based on age, sex, country of origin, highest level of education completed prior to enrolment in the nursing program, prior training on finding and using information and online computer access at home.

The resulting differences in information literacy skills were tested for significance at 0.05 level of probability with an accompany 95% confidence level. For comparing the preference of sources of nursing information of the students, preference indices have been shown in the contingency Table 2. Preference index of information sources was computed by using the following formula:

$$\text{Preference index} = P_{1\text{st}} \times 1 + P_{2\text{nd}} \times 2 + P_{3\text{rd}} \times 3 + P_{4\text{th}} \times 4 + P_{5\text{th}} \times 5$$

Where,

$P_{1\text{st}}$  = Percentage of students indicating the nursing information source as their first preference

$P_{2\text{nd}}$  = Percentage of students indicating the nursing information source as their second preference

$P_{3\text{rd}}$  = Percentage of students indicating the nursing information source as their third preference

$P_{4\text{th}}$  = Percentage of students indicating the nursing information source as their fourth preference

$P_{5\text{th}}$  = Percentage of students indicating the nursing information source as their fifth preference

The possible range of preference indices could be from 100 to 500, where 100 indicated highly preferred sources of information and 500 indicated the least preferred sources of information.

## **RESULTS**

### **Demographic profile of the students**

The majority of the students (79%) were from the Toowoomba campus as compared to 21% from the Fraser Coast campus. The highest proportion of students (28%) was between 16 and 18 years of age compared to 26% aged 31 years and above. The majority of respondents were female (88%) and Australian (83%). International students comprised 17% of the respondents. The highest proportion of respondents (72%) stated secondary school as their entry level of education. Almost half (49%) of students had not participated in classes on finding and using information. Over three

quarters (77%) of the students had online computer access at home to use whenever needed.

### Information literacy of first year nursing students

The students agreed that accessing information was part of their problem solving skills and their confidence and awareness of information literacy increased between semesters one and two (Table 1).

Area of Information access	Semester one		Semester two	
	Mean	SD	Mean	SD
<i>Problem solving skill</i>	<b>4.14</b>	.54	<b>4.02</b>	.71
I usually try to find information as the first step in solving an everyday problem	4.04	.65	3.95	.85
I usually try to find information as the first step in solving a nursing problem	4.26	.63	4.11	.81
<i>Confidence in ability</i>	<b>3.71</b>	.60	<b>4.06</b>	.63
I am able to find nursing information in the USQ library	3.76	.87	4.13	.85
I am able to find nursing information in another library (hospital, other university)	3.48	.84	3.62	.93
I am able to find nursing information by using the Library database	3.76	.84	4.27	.77
I am able to find nursing books using the Library catalogue	3.75	.89	4.04	.92
I am able to find nursing journals using the Library catalogue	3.78	.70	4.16	.83
I am able to locate nursing information using computer search engines	3.77	.87	4.24	.72
<i>Awareness</i>	<b>4.38</b>	.55	<b>4.46</b>	.53
I am aware that any first search results may not give me the information I require	4.30	.66	4.40	.60
I am aware that the responsibility for self learning rests with myself	4.46	.61	4.52	.58

Table 1 Mean and standard deviation of information literacy of the nursing students

### Information literacy based on the students' demographic profile

There were no significant differences in information literacy skills according to highest level of education prior to enrolling in the nursing program. The students who had attended classes on finding and using information prior to their enrolment in the program reported higher problem solving skills, confidence and awareness of information literacy and responsibility for self-learning. Those students who had online computer access at home had higher information literacy skills than those who had no home access.

Female students were slightly more robust in problem solving skills and confidence in their ability to access information. They also demonstrated significantly higher mean ratings in awareness of information than their male counterparts. Similarly, overseas-born students exhibited marginally greater problem solving skills and higher confidence in information literacy ability compared to students from Australia. However, Australian students were more aware of information literacy. As age increased, so did students' problem-solving skills and confidence using Library resources and Internet search engines.

### Preference of nursing students' information sources

In semester one the most preferred information source was the search engine "Google" followed by "Nursing Journals"; whereas in second semester "Nursing Textbooks" surpassed "Google" for first preference (Table 2).

Nursing information source	Level of preference								
	N	1st	2nd	3rd	4th	5th	Total percent	Index	Rank
<i>Semester 1</i>									
Google	87	64	7	3	13	13	100	204	1
Nursing Journals	63	21	55	14	6	4	100	217	2
Nursing Textbooks	92	30	27	36	7	0	100	220	3
Library Databases	90	18	8	34	38	2	100	298	4
Librarian	65	2	2	5	24	67	100	452	5
<i>Semester 2</i>									
Google	114	22	5	10	25	38	100	352	3
Nursing Journals	114	21	44	20	8	7	100	236	2
Nursing Textbooks	114	30	29	23	15	3	100	232	1
Library Databases	114	26	16	37	15	6	100	259	4

Librarian	114	0	6	9	39	46	100	425	5
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*Table 2 Percentage distributions of students according to their level of preference in nursing information source and rank*

Further, in both semesters the students preferred “The bibliography” as a source for finding additional information from a relevant journal article. However, in semester two, students’ second preference was “keywords”, compared to “the index” in semester one (Table3).

Source of publications to the article	Level of preference								
	N	1st	2nd	3rd	4th	5th	Total percent	Index	Rank
<i>Semester 1</i>									
The bibliography	79	60	20	6	5	9	100	183	1
The index	62	35	23	26	11	5	100	228	2
The keywords	65	31	25	17	21	6	100	246	3
The table of contents	58	24	22	24	16	14	100	274	4
The abstract	58	22	12	12	19	35	100	337	5
<i>Semester 2</i>									
The bibliography	107	38	13	13	11	25	100	272	1
The index	106	16	21	17	26	20	100	313	4
The keywords	107	21	28	20	17	14	100	275	2
The table of contents	106	4	14	29	27	26	100	357	5
The abstract	109	24	24	20	16	16	100	276	3

*Table 3 Percentage of preference in seeking further relevant publications to a given article*

### **Citation recognition**

With regard to recognising a journal article citation, the highest proportion (53%) of the students indicated the correct answer in semester one. This increased to 68% in semester two.

## **DISCUSSION**

### **Problem solving skills**

The comparison of information literacy skills showed minor decreases in problem solving skills between semesters one and two. This might not be a true reduction of actual skills because of the knowledge gained in semester two. Students may have become more aware of the set of skills necessary to use information literacy in their problem solving, resulting in a clarification of their perceptions. This was akin to Hartmann’s (2001) finding regarding students’ confusion of information literacy with

computer literacy, which Hartmann attributed to their misconceptions about the nature of information literacy.

Based on analysis of the data, it was evident that using information as a first step in problem solving was a skill that increased with age. This is congruent with the notion that age impacts positively on problem solving skills (Ip et al., 2007). Students who were from countries other than Australia displayed more strength in their problem solving skills. This could be related to several factors such as higher levels of education and attendance at information classes prior to enrolling in nursing. Students who had readily available online computer access at home had better problem-solving skills related to information literacy than those who did not.

### **Confidence in ability**

Increases in students' confidence positively effects information seeking behaviours (Barnard et al., 2005). The confidence of the first year nursing students increased from semester one to semester two. This is to be expected given the students' increased exposure to learning experiences (Booth, 2006; Croke, 2004; Hartmann, 2001) as well as embedded information literacy instruction in the curriculum. These increases were significant in all areas measuring information literacy confidence with the exception being confidence in the ability to find information in another library. This could be due to the students having little or no exposure to libraries other than their university library.

No significant differences were found in most areas of information literacy according to whether or not students had attended classes on finding and using information prior to enrolling in the nursing program. Differences that were found related to students' confidence in their ability to use the library catalogue. In this case, those students who were unsure about whether or not they had attended classes prior to enrolling at university were less confident in their ability compared to those students who had attended such classes. This might be a factor which inhibited their ability to access information. This thought is reinforced by Croke (2004), who states that as students' confidence increases, so does their propensity to engage in self-directed learning.

The confidence levels of students with readily available online computer access at home were small but persistently higher than those students without online access at home. This could be due to more exposure to online sources of information.

A cross-analysis of data revealed that students' confidence in their information access abilities increased, then plateaued at the 22-30 year age group and receded after this. The 31 years and above age group was least confident in finding information using library databases and computer search engines even though they had the highest level of at home online access in proportion than the other age groups. Likewise Ip, et al. (2007) stated that the acceptance of computer literacy is generally positive in the late teens to early 20's age cohorts.



## **Awareness of information literacy**

Those students who were unsure about whether or not they had attended pre university information literacy classes were less aware than those students who had attended classes. Students were aware of the fact that first search results may not have provided the information they required. Contrast analysis yielded significant results showing higher levels of awareness of information literacy in the group of students with readily available online computer access at home when compared to the students who had no such access. In part this may be because those students with convenient online access at their homes have more exposure to searching for information using Internet search engines.

Based on the analysis of data it was evident that male students were significantly less aware than female students regarding information access overall, and particularly less aware that the onus for self learning rests with the individual themselves. As stated, the highest level of education attained prior to enrolling in the Nursing program had no significant impact on information literacy.

## **Preferred sources of information**

In semester one, the preferred location for sourcing nursing information was the “Google” search engine. This preference changed to “Nursing Textbooks” in semester two. Such a change is to be expected, given that the initial questionnaire was administered relatively early in semester one, and students would have become considerably more familiar with their texts by the time the second questionnaire was handed out in semester two.

The order of preference for the listed options to seek further information from a “relevant journal article” also changed from semester one to semester two. “The bibliography” was the first choice in both semesters although “the abstract” went from being last choice in first semester to third choice in semester two. This increase in the use of “the abstract” as a preference was significant, particularly for those students who attended classes on finding and using information. Cross-tabulation found that this group compared more positively with those who did not attend classes. This may reflect increased student knowledge and familiarity with academic literature acquired through attending information literacy classes.

There was a significant increase in the percentage of students choosing the correct journal article citation. This increase was most prominent, as discovered in cross-tabulations, with the students who had convenient online computer access at home. Attendance at classes for finding and using information did not have a positive impact on students’ choices of the correct citation. There was a slight decrease in choosing the correct citation, from semester one to semester two, for those students who attended classes. This would infer that while classes have increased students’ confidence in their

information literacy skills, they did not necessarily gain adequate knowledge to enable them to correctly recognise journal citations. "Prior education" was the next factor, where students that had completed secondary school chose the correct citation by an increase of 15 per cent between semesters one and two.

## CONCLUSIONS

Embedding information literacy instruction into the first year nursing program is beneficial. As information literacy instruction is embedded into the first year nursing courses, students' confidence and awareness is positively affected by their increased exposure to information literacy in the nursing context. Attendance at information literacy classes improved students' confidence in their abilities to find relevant information and to engage in self-directed learning. Additionally, exposure to the various sources of information increased students' awareness of the scope of information.

Given this evidence, the collaborative approach towards embedding information literacy instruction between the Department of Nursing and Midwifery, the Library and the Learning and Teaching Support Unit ought to be continued throughout the subsequent years of the nursing program. This will improve students' problem solving skills, confidence in their abilities and awareness of information literacy.

## REFERENCES

- Barnard, A., Nash, R., & O'Brien, M. (2005). Information literacy: developing lifelong skills through nursing education. *Journal of Nursing Education Vol. 44*(11), 505-510.
- Booth, R. G. (2006). Educating the future health professional nurse. *International Journal of Nursing Education Scholarship, Vol. 3*(1), 1-12.
- Croke, E. (2004). The use of structured reflective journal questions to promote fundamental development of clinical decision-making abilities of the first-semester nursing student. *Contemporary Nurse, 17*(1-2), 125-136.
- Hartmann, E. (2001). Understandings of Information Literacy: The Perceptions of First-Year Undergraduate Students at the University of Ballarat. *Australian Academic & Research Libraries, 32*(2), 110-122.
- Honey, M., North, N., & Gunn, C. (2006). Improving library services for graduate nurse students in New Zealand. *Health information & libraries journal, Vol. 23*(2), 102-109.
- Ip, B., Jones, S., & Jacobs, G. (2007). Retention and application of information technology skills among nursing and midwifery students. *Innovations in education & teaching international Vol. 44*(2), 199-210.
- Jacobs, S. K., Rosenfeld, P., & Haber, J. (2003). Information literacy as the foundation for evidence-based practice in graduate nursing education: a curriculum-integrated approach. *Journal of Professional Nursing, Vol. 19*(5), 320-328.
- National Review of Nursing Education. (2002). *National review of nursing education 2002: Our duty of care*. Retrieved September 6, 2007, from [http://www.dest.gov.au/archive/highered/nursing/pubs/duty\\_of\\_care/default.html](http://www.dest.gov.au/archive/highered/nursing/pubs/duty_of_care/default.html).

Neely, T. Y. (2000). *Sociological and psychological aspects of information literacy in higher education* Unpublished Doctoral Dissertation, University of Pittsburgh.

Shorten, A., Wallace, C., & Crookes, P. A. (2001). Developing information literacy: a key to evidence-based nursing. *International Nursing Review*, 48(2), 86-92.

Tweedale, R. (2006). University of Southern Queensland Information Literacy Strategy: Endorsed by the University Of Southern Queensland Learning and Teaching Enhancement Committee. 6 April 2006 [Electronic Version]. Retrieved May 2006 from <http://www.usq.edu.au/resources/ilstrategyapril2006/pdf>.