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Article

Health Professions Students' Lifelong Learning Orientation: Associations with Information Skills and Self-Efficacy

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Abstract

Objective – This study aimed to investigate the relationships among health professions students' lifelong learning orientation, self-assessed information skills, and information self-efficacy.

Methods – This was a descriptive study with a cross-sectional research design. Participants included 850 nursing students and 325 medical students. A total of 419 students responded to a survey questionnaire that was comprised of 3 parts: demographic information, the Jefferson Scale of Lifelong Learning (JeffSLL-HPS), and an information self-efficacy scale.

Results – Findings of the study show a significant correlation between students' lifelong learning orientation and information self-efficacy. Average JeffSLL-HPS total scores for undergraduate nursing students (M = 41.84) were significantly lower than the scores for graduate nursing

students (M = 46.20). Average information self-efficacy total scores were significantly lower for undergraduate nursing students (M = 63.34) than the scores for graduate nursing students (M = 65.97). There were no significant differences among cohorts of medical students for JeffSLL-HPS total scores. However, for information self-efficacy, first year medical students (M = 55.62) and second year medical students (M = 58.00) had significantly lower scores than third/fourth year students (M = 64.42).

Conclusion – Findings from the study suggest implications for librarians seeking ways to advance the value and utility of information literacy instruction in educational curricula. As such instruction has the potential to lead to high levels of information self-efficacy associated with lifelong learning; various strategies could be developed and incorporated into the instruction to cultivate students' information self-efficacy.

Introduction

There has been an increasing emphasis on quality improvement in health care, patient satisfaction, and evidence-based practice in patient care to ensure quality patient outcomes. Evidence-based practice is a process of problem-solving, self-directed, and lifelong learning in which caring for one's own patients creates the need for clinically important information about different health care issues. To become lifelong learners and provide high-quality care guided by the best evidence, health professions students need to learn a new set of information skills. How students' lifelong learning attitude or orientation is associated with their information skills has not been explored, in spite of the potential effect of information skills on one's own lifelong learning orientation. Results of any research on the relationships would inform health sciences librarians and health professions educators in developing programs, instructional strategies, or learning activities integrated into curriculums that inculcate health professions students' information skills and self-efficacy for lifelong learning over the span of their future careers.

Literature review

Lifelong Learning

Lifelong learning is considered an indicator of professionalism for healthcare professionals (Arnold, 2002; Duff, 2002; Nelson, 1998; Novak, Palladino, Ange, & Richardson, 2014). It is important for any healthcare providers to engage in lifelong learning because they work with human life--meeting patients' medical or healthcare needs (Muliira, Etyang, Muliira, & Kizza, 2012). Lifelong learning is defined as "an attribute involving a set of self-initiated activities and information-seeking skills with sustained motivation to learn and the ability to recognize one's own learning needs" (Hojat et al., 2003; Hojat, Veloski, Nasca, Erdmann, & Gonnella, 2006). Physicians must be lifelong learners throughout their professional careers, taking time to keep abreast of new developments and advancement in their specialty (Afonso, Ramos, Saraiva, Moreira, & Figueira, 2014). To be successful as physicians, they must commit themselves to a lifetime of self-directed learning or self-education (Duff, 2002).

The Institute of Medicine released a report titled *The Future of Nursing: Leading Change, Advancing*

Health that emphasizes the importance of lifelong learning in developing a more highly-educated workforce (Institute of Medicine, 2010). The report states that "nursing education should serve as a platform for continued lifelong learning and should include opportunities for seamless transition to higher degree programs" (Institute of Medicine, 2010, p. 4). To lead change and advance health, nurses should continuously seek out and actively participate in activities that promote lifelong learning (Rishel, 2013). It is essential for nurses to deliberately plan and execute strategies for lifelong learning by moving beyond simple competency (Woodruff, 2012) which Benner (1984) considers as a low level of professional practice. In Woodruff's view, "competencies may be the stimulus for additional learning, but do not by themselves result in lifelong learning" (2012, p. 12). An inquiry into the relationship between health professions students' information skills and their lifelong learning would contribute to our understanding of and development of strategies and activities to promote lifelong learning.

Lifelong learning is recognized as an obligation for healthcare professionals; however, engaging in the process of lifelong learning is not necessarily something that comes naturally; it takes a personal commitment to pursue learning throughout one's professional career (Rishel, 2013). With an exponential growth of medical knowledge and rapid development of biomedical advances, health care professionals are facing challenges of staying current and applying the growing medical knowledge to caring for individual patients. Hojat and colleagues (2009) maintain that it is important and timely to empirically study physicians' lifelong learning, development, its predictors, and its outcomes. Since lifelong learning is considered as an element of professionalism for healthcare professionals, it is necessary to examine how health professions students develop lifelong learning across the lifespan of their educational career and how lifelong learning interacts with other behavioral manifestations and outcomes. Findings from research on students' lifelong learning may inform curriculum planning and evaluation to improve teaching and learning.

Information literacy

Information literacy lays the foundation for lifelong learning. It initiates, sustains, and extends lifelong learning through a cluster of abilities such as using technologies, finding, using, evaluating, and managing information. Developing lifelong learners is central to the mission of higher education institutions and any profession's education programs (Association of College & Research Libraries, 2000). Information literacy competency extends learning beyond formal classroom settings and provides practice with self-directed investigations as individuals move into professional positions and are entrusted with increasing responsibilities in all walks of life. "Gaining skills in information literacy multiplies the opportunities for students' self-directed learning" (Association of College & Research Libraries, 2000). Because information literacy augments students' competency with finding, using, evaluating, and managing information, it is now considered by accreditation bodies as one key outcome for students (Association of College & Research Libraries, 2000; Liaison Committee on Medical Education, 2013). Information literacy has been, to a certain extent, incorporated into health professions educational programs. Nevertheless, the relationship between students' lifelong learning orientation and their information literacy has received little attention in the literature.

Self-Efficacy

"Efficacy beliefs influence how people think, feel, motivate themselves, and act"(Bandura, 1995b). Bandura (1986) defined self-efficacy as people's belief in their ability to successfully perform a given behavior or task or their capabilities to organize and execute the course of action required to attain a goal. Self-efficacy

for information literacy has been defined as the extent to which college students feel capable of conducting online information searches to identify appropriate sources and retrieve relevant information for academic or research purposes (Ren, 2000). "Self-efficacy beliefs provide the foundation for human motivation, well-being, and personal accomplishment" (Kurbanoglu, 2003, p. 638). People are more likely to engage in activities in which they feel confident or efficacious.

Learning certain skills is far from enough; individuals should also develop confidence in the skills that they are learning (Bandura, 1977). Success is not simply based on the procession of necessary knowledge and skills for performance, it also requires the efficacy belief or confidence to apply the knowledge and skills effectively (Kurbanoglu, 2003). A strong belief in one's capabilities regulates one's learning, motivation, and attitude; thus, building students' efficacy beliefs in their capabilities would likely enhance and sustain their motivation to learn and develop lifelong learning skills. Strong self-efficacy perception for information literacy is a must for accomplishing lifelong learning (Kurbanoglu, 2003).

Efficacy perceptions develop from a gradual attainment of skills and mastery of experiences over time (Bandura, 1986). Previous studies document the effect of information literacy instruction on levels of students' self-efficacy and academic performance (Ren, 2000; Tang & Tseng, 2013). Given the close link between lifelong learning, the attainment of self-efficacy, and information literacy, investigating efficacy beliefs related to information literacy is a worthwhile endeavor to examine the psychological factors underlining the development of information literacy, which would likely affect one's own lifelong learning orientation.

Aims

The study was undertaken to generate empirical evidence demonstrating the relationship between students' lifelong learning orientation, information skills, and information self-efficacy. It addressed the following research questions:

1. What was the relationship between health professions students' lifelong learning orientation and information self-efficacy?
2. What was the relationship between health professions students' demographic variables (student characteristics) and their lifelong learning orientation and information self-efficacy?
3. What was the relationship between students' self-assessed information skills and their lifelong learning orientation and information self-efficacy?

Perceived academic self-efficacy is defined as beliefs in or personal judgments of one's capabilities to organize and execute the course of action required to attain designated types of education performances (Bandura, 1977, 1995b). For this study, information self-efficacy is measured by levels of confidence that students can perform given tasks in information literacy.

Methods

This study employed a cross-sectional research design. Participants included 850 nursing students matriculating at the Oakland University School of Nursing and 325 medical students enrolled at the Oakland University William Beaumont School of Medicine. The study was conducted with approval of the Institutional Review Board (IRB).

Instruments

A survey was administered to nursing and medical students. It was comprised of three parts: demographic information, the Jefferson Scale of Lifelong Learning, and an information self-efficacy scale. The Jefferson Scale of Lifelong

Learning is a validated instrument measuring the lifelong learning orientation of health professions students (JeffSLL-HPS) with 14 items (Novak, Palladino, Ange, & Richardson, 2014). Respondents indicate their agreement or disagreement with each statement on a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). Total score is the sum of all item scores. Higher scores indicate a more positive orientation that the student has toward lifelong learning. Possible range of scores is from 14 to 56.

The information self-efficacy scale developed and used by one of the authors in her instructional sessions (MM) consists of 17 items examining students' perceived level of self-efficacy for information literacy. It measures the degree of certainty that students can perform various information tasks in using library resources, searching for information, and in evidence-based practice. Students were asked to rate their confidence in ability to execute these information skills on a 5-point Likert scale from 1 (extremely unconfident) to 5 (extremely confident). Total score is the sum of all item scores, ranging from 17 to 85. Higher scores suggest a stronger self-efficacy belief in information skills. The scale also included four additional questions: one on frequency of information seeking for their coursework/ project, one on satisfaction with search results, and the other two on searching skills. Participants had approximately 10 minutes to complete the survey. (The scale is available upon request from the authors).

Procedure

Two survey modes (print and online) are recommended to tailor a self-administered survey procedure to specific situations and resource constraints at study locations (Dillman, 2000). The print survey was distributed to first- (M1) and second-year (M2) medical students at the end of one of their course sessions. Third-year (M3) and fourth-year (M4) medical students had clinical rotations in various hospital settings. They received an online version of the same survey by email through SurveyMonkey. The print survey was distributed to nursing students, including undergraduates and graduate students in the master degree program (NP), at the end of one of their class sessions. DNP (Doctor of Nursing Practice) students who took courses online received an email message with a link to the online survey.

Data Analysis

Data collected were checked for completeness and accuracy. They were entered into and analyzed with SPSS. Internal consistency for the two scales was estimated using coefficient alpha to test their reliability. Scale scores were summed up as an average of constituent items. ANOVA, Chi-square test, Pearson correlations, and Spearman rank-order correlations were computed to examine the relationships between students' lifelong learning orientation, information skills, self-efficacy, and demographic characteristics.

Results

Participant demographics

Out of 419 respondents to the survey (an overall response rate of 36%), 87.8% (368/419) completed the print survey while 12.2% (51/419) completed the online one via SurveyMonkey. The majority of the sample was nursing students, 68.5% (287/419) in comparison to medical students, 31.5% (132/419). Detailed demographic information is illustrated in Table 1.

Psychometric Properties of Scales

Prior to running analyses using the JeffSLL-HPS and information self-efficacy scales, it was necessary to assess the reliability of these scales prior to creating total composite (additive) scores. There was a high degree of internal consistency for both the JeffSLL-HPS scale, with

Table 1
Participants' Demographics (N=419)

Variable	**Frequency**	**%**
Medical students (N=132)	128	
M1	51	12.2
M2	50	11.9
M3	13	3.1
M4	14	3.3
Nursing students (N=287)		
Undergraduate students	209	49.9
Graduate students (NP)	72	17.2
Graduate students (DNP)	10	2.4
Age		
18-25	220	52.5
26-36	132	31.5
37-47	47	11.2
>48	19	4.5
Gender		
Male	98	23.4
Female	321	76.6
Race		
American Indian/Alaska Native	1	.2
Asian/Pacific Islander	50	11.9
African American/Black	23	5.5
Hispanic/Latino	8	1.9
Caucasian/White	320	76.4
Other	17	4.1
Enrollment		
Full-time student	355	84.7
Part-time student	63	15.0

Table 2
Correlations between JeffSLL-HPS Total Scores and Information Self-Efficacy Total Scores

	N	***r***	***p***
All Participants	388	.380	<.001*
Nursing Students	265	.441	<.001*
Medical Students	123	.345	<.001*

*Denotes statistical significance.

a Cronbach's Alpha value of .82, and for the information self-efficacy scale, with a Cronbach's Alpha value of .91.

Correlation between Lifelong Learning and Information Self-Efficacy

Overall, there was a significant positive correlation between JeffSLL-HPS total scores and information self-efficacy total scores, r (386) = .380, $p < .001$, as illustrated in Table 2. There was also a significant positive correlation between JeffSLL-HPS total scores and information self-efficacy total scores for both nursing students, r (263) = .441, $p < .001$, and for medical students, r (121) = .345, $p < .001$.

Additionally, average JeffSLL-HPS total scores for nursing students (M = 43.04) were not significantly different from average JeffSLL-HPS total scores for medical students (M = 43.04), t (407) = -0.01, p = .995. However, average information self-efficacy total scores were significantly higher for nursing students (M = 64.01) than for medical students (M = 58.53), t (392) = 5.44, $p < .001$ (Table 3).

Demographic Variables and Lifelong Learning and Self-Efficacy

A chi-square test of independence was conducted to assess the relationships between class status (nursing vs. medical) and gender (male vs. female). The results indicated a dependent relationship between class status and gender, $\chi 2$ (1; $p < .001$) = 33.01. It was of additional interest to assess differences between genders for total scores of JeffSLL-HPS and information self-efficacy within class status. There were no significant gender differences for either nursing students or medical students in JeffSLL-HPS total scores or information self-efficacy total scores.

Average JeffSLL-HPS total scores for undergraduate nursing students (M = 41.84) were significantly lower than average JeffSLL-HPS total scores for graduate nursing students (M = 46.20), t (283) = -6.89, $p < .001$ (Table 4). Average information self-efficacy total scores were significantly lower for undergraduate nursing students (M = 63.34) than those for graduate nursing students (M = 65.97), t (270) = -2.40, p = .031 (Table 4).

It was also of interest to compare JeffSLL-HPS and information self-efficacy total scores across different cohorts of medical students. For this analysis, groups were classified as M1 medical students, M2 medical students, and M3/M4 year medical students. A one-way analysis of variance showed no significant differences among cohorts of medical students for JeffSLL-HPS total scores, F (2, 121) = 2.13, p = .123. However, for information self-efficacy total scores, M1 medical students (M = 55.62) and M2 medical students (M = 58.00) had significantly lower scores than M3/M4 year students (M = 64.42), F (2, 119) = 5.16, p = .007.

Table 3
Comparisons with Means (standard deviations) of JeffSLL-HPS Total Scores and Information Self-Efficacy Total Scores for Nursing versus Medical Students

	Nursing (n = 281)	**Medical (n = 128)**	***p***
JeffSLL-HPS	M = 43.04 (5.14)	M = 43.04 (5.13)	.995
Information self-efficacy	M = 64.01 (8.15)	M = 58.03 (11.41)	<.001*

*Denotes statistical significance.

Table 4
Comparisons with Means (standard deviations) of JeffSLL-HPS Total Scores and Information Self-Efficacy Total Scores for Undergraduate versus Graduate Nursing Students

	Undergraduate	**Graduate**	***p***
JeffSLL-HPS	M = 41.84 (4.56) (n = 206)	M = 46.20 (5.31) (n = 79)	<.001*
Information self-efficacy	M = 63.34 (7.57) (n = 198)	M = 65.97 (9.25) (n = 74)	.031

*Denotes statistical significance.

Information Seeking Frequency and Lifelong Learning and Self-Efficacy

Question 18 of the information skills section of the survey gathered data on frequency of information seeking and contained response options ranging from "never" to "several times a day" that were rank ordered to reflect information seeking frequency (magnitude). For all respondents, there was a significant Spearman rank-order correlation between information seeking frequency and JeffSLL-HPS scores, r_s (391) = .195, p < .001, and between information seeking frequency and information self-efficacy, r_s (379) = .125, p = .015.

For nursing students, there was a significant Spearman rank-order correlation between information seeking frequency and JeffSLL-HPS scores, r_s (266) = .206, p = .001, and between information seeking frequency and information self-efficacy, r_s (256) = .157, p = .012.

However, for medical students, the rank-order correlations for frequency of information seeking were not significant for JeffSLL-HPS, r_s (123) = .161, p = .072, or for information self-efficacy, r_s (121) = .130, p = .152.

Satisfaction with Search Results and Lifelong Learning and Information Self-Efficacy

Question 19 of the information skills section of the survey gathered data on satisfaction with search results. Response options ranged from "very seldom" to "all of the time" and were rank ordered to reflect satisfaction with search results (magnitude). For all respondents, there was a significant Spearman rank-order correlation between satisfaction and JeffSLL-HPS, r_s (401) = .176, p < .001, and between satisfaction and information efficacy, r_s (388) = .444, p < .001.

For nursing students, there was a significant Spearman rank-order correlation between satisfaction and JeffSLL-HPS scores, r_s (273) = .159, p = .008, and between satisfaction and information self-efficacy, r_s (264) = .390, p < .001.

For medical students, there was also a significant Spearman rank-order correlation between satisfaction and JeffSLL-HPS scores, r_s (126) = .208, p = .019, and between satisfaction and information self-efficacy, r_s (122) = .565, p < .001.

Search Skills and Lifelong Learning Orientation and Information Self-Efficacy

Question 20 tested students' skills in using Boolean operators. A chi-square test of independence was conducted to assess the relationship between class status (nursing vs. medical) and accuracy (correct versus incorrect). The results indicated a dependent relationship between class status and accuracy, $\chi 2$ (1; p < .001) = 20.17. Medical students identified the correct answer with 67.4% response accuracy versus nursing students who identified the correct answer with 43.6% accuracy.

Question 21 tested students' skill in recognizing an effective search strategy. The results of the same statistical analysis indicated a dependent relationship between class status and response accuracy, $\chi 2$ (1; $p < .001$) = 62.13. Medical students identified the correct answer with 78.0% accuracy versus nursing students who identified the correct answer with 36.6% accuracy.

Discussion

The findings of the study demonstrate a very good internal consistency reliability coefficient of .82 for the JeffSLL-HPS scale, which was in line with the findings of previous studies showing its sound psychometric properties (Wetzel et al., 2010). There was also a satisfactory internal consistency reliability coefficient of .91 for the information self-efficacy scale, suggesting that it may be appropriate for use to examine self-efficacy beliefs of different groups of health professions students in their information literacy. Among five sources of evidence to test validity of measures is relations to other variables (Downing & Haladyna, 2009). The significant correlation between the JeffSLL-HPS and information self-efficacy scales provides a source of convergent validity evidence for each of the scales.

The finding that students' lifelong learning orientation was significantly correlated with their information self-efficacy indicates that students with a stronger lifelong learning orientation were more likely to have a higher level of self-efficacy beliefs in information skills. From the finding, we could hypothesize that information self-efficacy could affect students' attitude toward lifelong learning or vice versa. This is the first study that has been conducted to establish the significant link between the two constructs. Lifelong learning is considered an element of professionalism (Arnold, 2002) and is critical for safe and competent patient care practice throughout the careers of all health care professionals (Novak et al., 2014). Accreditation bodies for health professions educational programs mandate educational experiences in curriculums that prepare students for lifelong learning as future healthcare providers. To promote lifelong learning, librarians should partner with health professions educators to develop instructional strategies to provide students with information mastery experiences to develop their strong sense of efficacy for information skills that could contribute to a strong lifelong learning orientation.

Most of the studies dealing with self-efficacy had participants comprised of homogeneous samples of students (e.g., undergraduates, library school students). The present study is the first one that recruited heterogeneous groups of students including undergraduate nursing students, graduate nursing students in programs of Master's (NP) and Doctor of Nursing Practice degrees (DNP), medical students, and students taking classes on campus or online. Clearly, it merits research on how students' demographic variables (gender, class status, educational program) could have an impact on their lifelong learning orientation and information self-efficacy. The study examined these demographic variables in relation to the constructs of lifelong learning orientation and information self-efficacy.

There were no differences in lifelong learning orientation between nursing students and medical students, suggesting that both groups of health professions students may perceive lifelong learning with an equal value regardless of their diverse educational backgrounds and learning experiences in different health educational programs. While nursing students' self-efficacy for information skills was significantly higher, their accuracy response rate for two skill assessment questions was significantly lower in comparison to medical students. Medical students may possess higher entry level information skills than undergraduate nursing students. Another possible explanation for such a difference is that nursing students may have an inflated view of their ability relative to their peers or

counterparts. As Pajares (2002) points out, "belief and reality are seldom perfectly matched…it is not unusual for individuals to over- or underestimate their abilities." Kruger and Dunning (1999) posited that people are likely to hold overly favorable views of their abilities in many social and intellectual domains. Their finding that undergraduate students overestimated their test performance and ability led to the conclusion that people overestimated their abilities because they may not be in a position to accurately assess their skills due to a lack of skills in intellectual domains. Maughan (2001) found that graduating seniors had a higher opinion of their ability to access information and to conduct library research than they were able to demonstrate by their test scores. Other researchers confirm the notion that, with regard to assessing their own knowledge and skills, students demonstrated an overconfidence in their abilities (Ehrlinger, Johnson, Banner, Dunning, & Kruger, 2008; Monoi, O'Hanlon, & Diaz, 2005; Ren, 2000). Nursing students in the present study may have expressed overconfidence in their self-appraisal of their information skills, which concurs with the findings of previous studies. The significant difference in the accuracy response rate for the two questions may also be partly explained by possible differences in levels of exposure to formal information literacy instruction in curricula of nursing and medical education programs.

The results of the study show no significant difference in lifelong learning orientation and information self-efficacy between male and female students, which echo the conclusion of previous studies demonstrating no gender-based differences in information self-efficacy beliefs (Bronstein, 2014; Hojat et al., 2009; Multon, Brown, & Lent, 1991; Ren, 2000).

In terms of class status, graduate nursing students had a higher lifelong learning orientation and higher sense of information self-efficacy than undergraduate nursing students. Graduate nursing students work independently in a clinical area while pursuing their graduate study; they must know how to retrieve clinical information for their practice. The authentic, concrete clinical experience propels them to apply their information skills to support evidence-based practice and perform clinical tasks. The clinical context fosters their mastery of information skills. According to Bandura (1995b), mastery experience is the most effective way of creating a strong sense of efficacy. Furthermore, graduate nursing students' course work may be more demanding than undergraduates as the programs are likely to have a narrowly specialized focus and be more research-oriented. For this reason, graduate students may develop a strong sense of professional accomplishment. As a result, graduate nursing students may develop stronger efficacy beliefs in their information skills. The research evidence was in agreement with the findings of previous studies (Hojat et al., 2009; Muliira et al., 2012). Hojat and colleagues (2009) studied physicians' lifelong learning orientation in relation to their academic status (full-time clinicians with exclusive responsibility for patient care and academic clinicians with more involvement in teaching and research). They found a significant link between physicians' lifelong learning scores and indicators of physicians' learning motivation and professional accomplishments. Muliira and his associates (2012) examined nurses' orientation toward lifelong learning, reporting that it increased as they gained a higher level of education.

For medical students, however, lifelong learning orientation did not change across class levels, suggesting that medical students had a consistent view about the importance of lifelong learning over the course of their medical education. On the information self-efficacy scale, the combined group of M3/M4 medical students scored higher than M1 and M2 students respectively. For M1 and M2 students, learning mostly occurs in the classroom setting; while M3 and M4 students' learning takes place in a clinical setting comparable to the clinical

environment for graduate nursing students. The clinical learning experience and clinical patient care tasks promote information seeking to develop information mastery experience. As a result, M3 and M4 medical students may develop a strong sense of self-efficacy in their capabilities to access, retrieve, and use information resources. As Bandura (1995a) pointed out, to remain task-orientated in the face of pressing demands and other trying situations, it is important to have a strong sense of efficacy. The learning environments for both graduate nursing students and medical students in their clinical years may account for their perceived higher self-efficacy in information skills in this study. Further research with large samples of graduate nursing students and upper class medical students across institutions would need to confirm such findings, so information literacy instruction focusing on evidence-based searching skills could be developed and tailored to students' learning needs in patient care settings.

Tella and colleagues (2007) examined how undergraduates' and postgraduates' self-efficacy was associated with their use of electronic information and academic performance. They found that there was a significant correlation among the three variables and that students with high self-efficacy used electronic information more, and performed better on an aptitude test, than those with low self-efficacy. In another study on college students' self-efficacy in electronic information searching before and after library instruction, Ren (2000) discovered that frequent information users continued to hold relatively higher self-efficacy than non-frequent users prior to or following library training. The results of the present study suggest that the overall levels of nursing students' lifelong learning orientation and information self-efficacy were predictive of students' information seeking frequency. The significant correlation between the variables in this study was consistent with previous research findings (Ren, 2000; Tella et al., 2008). However, variation analysis reveals that medical students' information seeking frequency was not strongly correlated with their lifelong learning orientation or information self-efficacy. The finding suggests that medical students' lifelong learning orientation or self-efficacy may play a minimal role in affecting their information seeking frequency. On the contrary, nursing students' lifelong learning orientation and efficacy beliefs may be strong determinants of their information seeking frequency. Further research with an experimental research design would need to confirm the findings and establish a causal relationship between the variables.

One question on the information self-efficacy scale addressed the affective or emotional element of the information seeking process, namely students' satisfaction with their search results. The study discovered that the more satisfied nursing or medical students were with their search results the stronger their lifelong learning orientation and self-efficacy beliefs in their information skills. Further research should investigate how students' affective state or emotion experienced during their search could exert a certain influence on their attitude to their lifelong learning and self-efficacy for information skills.

Research Limitations

It must be noted that there are several limitations inherent in this study. Students volunteered to participate in the study, which could potentially create a risk of bias as volunteers may have been more likely to perceive positively their ability to succeed in library-related tasks. The self-reported nature of the study method may have led to social desirability bias in responses provided by participants who may have tried to appear highly oriented toward lifelong learning (Novak et al., 2014) and show a higher level of perceived efficacy in performing information tasks. This is a single institutional study with a relatively low response rate that utilized a convenience sampling technique for recruiting participants;

any findings of the study should be interpreted with caution and may not be generalizable to all populations of nursing and medical students across health education programs in different institutions.

Implications for Information Literacy Instruction

Interprofessional education is gaining more attention in health professions education. Health sciences librarians and health professions educators need to appreciate the similarities and differences among health care professionals to develop instructional interventions to optimize student success (Horsburgh, Lamdin, & Williamson, 2001; Reid, Bruce, Allstaff, & McLernon, 2006). Information literacy instruction should be designed to tailor to learning needs and skill levels of health professions students in different learning contexts to promote the development of a strong lifelong learning orientation.

"The ultimate goal of the educational system is to shift to the individual the burden of pursuing his own education" (Gardner, 1963, p. 21). To enable students to reach the self-education goal, Zimmerman (1995) stresses that schools must go beyond teaching intellectual skills by developing students' self-beliefs and self-regulatory capabilities to educate themselves throughout a lifetime. In addition to helping students acquire necessary knowledge and information skills to meet their study requirement, it is necessary for librarians to develop strategies or methods to increase and evaluate the level of students' perceived self-efficacy regarding these knowledge and skills, and to investigate how self-efficacy beliefs affect information problem solving and lifelong learning skill building (Kurbanoglu, 2003).

The findings of the present study suggest implications for librarians seeking approaches to advancing the value and utility of information literacy instruction in educational curricula. As such instruction has the potential to lead to high levels of information self-efficacy associated with lifelong learning. Strategies should be developed and incorporated into the instruction to cultivate students' information self-efficacy. Examples of strategies include encouraging students to self-observe and reflect on their use of information resources, search terms, and search process; helping students to become more personally aware of their improved information searching effectiveness and capability; creating checklists for students to self-regulate or monitor their learning and performances of given tasks. The lifelong learning and information self-efficacy scales that have been validated in this study may be used as alternative measures to assess the affective dimension of information mastery, which is an important but often overlooked aspect of information literacy instruction (Monoi et al., 2005).

Conclusions

The present study yields evidence demonstrating that health professions students with a higher level of self-efficacy for information skills tended to have a stronger lifelong learning orientation, and that their information use and satisfaction with their searches were associated with their strength of self belief in performing various information tasks. The study contributes to the body of literature dealing with information literacy education to foster students' information self-efficacy. Such an efficacious outlook would play an important role in the sustainable development of health professions students' lifelong learning.

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