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Abstract

This pilot study explored an embedded librarian (EL) intervention to enhance occupational therapy student information literacy skills development. The EL provided computer laboratory and in-class instruction, online presence in the classroom website, and extensive office hours to assist students in the identification of information needed, determination of how and where to find scholarly information needed, and assessment and utilization of information retrieved to meet assignment requirements. Participants were 46 third-year (junior) occupational therapy students. Three tools were used to assess skills pre and post intervention: the Student Assessment of Information Literacy Skills, the Student Perception of Literacy Skills-Q (SPIL-Q), and database tracking of frequency, kind (in-person versus email), and topic (citation formatting, database search term development, etc.) of student visits. These were analyzed via percentage of change and compared with course grade via Pearson r correlation tests. Results: Students showed limited improvement on the quantitative SAILS test (2%), but 31% ($n=14$) perceived increase in overall information literacy skills on the SPIL-Q, particularly in finding information needed for assignments. Correlation analyses revealed a moderate, positive correlation ($r = .600, p < .05$) between those who made *in-person* inquiries to the EL related to defining the need for information and overall course grade. Responses to the question of why students accessed/did not access the librarian outside of class were grouped into general themes. Results suggest occupational therapy educators and students might benefit from explicit instruction and in-person modeling of identification of information needed and database search techniques to locate best evidence for practice decisions and to emphasize this as a lifelong requirement of client-centered care.

Keywords

Embedded librarian, information literacy, evidence-based practice

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An Embedded Librarian Pilot Program to Enhance Occupational Therapy Student Information Literacy Skills

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ABSTRACT

This pilot study explored an embedded librarian (EL) intervention to enhance occupational therapy student information literacy skills development. The EL provided computer laboratory and in-class instruction, online presence in the classroom website, and extensive office hours to assist students in the identification of information needed, determination of how and where to find scholarly information needed, and assessment and utilization of information retrieved to meet assignment requirements. Participants were 46 third-year (junior) occupational therapy students. Three tools were used to assess skills pre and post intervention: the Student Assessment of Information Literacy Skills, the Student Perception of Literacy Skills-Q (SPIL-Q), and database tracking of frequency, kind (in-person versus email), and topic (citation formatting, database search term development, etc.) of student visits. These were analyzed via percentage of change and compared with course grade via Pearson *r* correlation tests. Results: Students showed limited improvement on the quantitative SAILS test (2%), but 31% (*n*=14) perceived increase in overall information literacy skills on the SPIL-Q, particularly in finding information needed for assignments. Correlation analyses revealed a

moderate, positive correlation ($r = .600, p < .05$) between those who made *in-person* inquiries to the EL related to defining the need for information and overall course grade. Responses to the question of why students accessed/did not access the librarian outside of class were grouped into general themes. Results suggest occupational therapy educators and students might benefit from explicit instruction and in-person modeling of identification of information needed and database search techniques to locate best evidence for practice decisions and to emphasize this as a lifelong requirement of client-centered care.

INTRODUCTION

Occupational therapy programs are required to teach skills established in the Accreditation Council for Occupational Therapy Education (ACOTE®) standards (ACOTE, 2016). These standards include the development of skills to find and use the best available evidence for informed decisions about client care (see ACOTE® standards B.8.1, B.8.2, B.8.3, and B.8.5). This corresponds to the current healthcare industry standard of evidence-based practice (EBP; as originally defined by Sackett, Rosenbery, Gray, Haynes, & Richardson, 1996), and resonates with the American Occupational Therapy Association (AOTA) Code of Ethics (AOTA, 2015) that specifies a commitment to the provision of services based on accurate and current information. As a foundational component of EBP, information literacy skills are central to the EBP process (Adams, 2014). Information literacy skills include identifying a need for specific information, knowing how to effectively and efficiently locate the required information, use the information to meet specific goals, and understand the contextual meaning of the literature (American Library Association [ALA], 2015). While the majority of occupational therapy (OT) programs teach information literacy skills as they relate to EBP, most OT students and practitioners admit that they do not routinely search for current evidence in school or later in practice (Kipnis & Frisby, 2016). This indicates a potential need to explore a program for enhancing information literacy skills development and usage.

One potential way to address information literacy skills development is through the use of an embedded librarian (EL) program. An EL is one that moves beyond the library building and becomes involved at either a macro (university or program wide) or micro (course specific) manner (Edwards, Kumar, & Ochoa, 2010). Evidence shows that EL models can improve information literacy skills in a variety of students' groups (Lemley, 2016; Talwar, 2014). The purpose of this pilot study was to explore the use of an EL model, which included in-class and computer laboratory instruction, a continuous online librarian presence, and extensive librarian office hours and availability to students for consult, to enhance the information literacy skills of graduate OT students.

LITERATURE REVIEW

Information Literacy Skills and Standards

With the advent of internet accessibility of copious online information, and expectations of routine internet use to complete assignments on college campuses, there has been increasing interest in understanding how students access and use information. The

ALA has taken a lead in the standardization of information processing for learning in higher education with its “Framework for Information Literacy for Higher Education” as the “ecosystem” of information has grown exponentially (ALA, 2015). ALA standards originally developed for information literacy competency in higher education (and on which this study was based) are no longer available (as the ALA is developing more discipline specific guidelines for information literacy skills). The original standards (ALA, 2000, pp. 8-13) are as follows:

- Standard 1: “The information literate student defines and articulates the need for information.”
- Standard 2: “The information literate student accesses needed information effectively and efficiently.”
- Standard 3: “The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.”
- Standard 4: “The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.”
- Standard 5: “The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.”

The concept of information literacy has been refined by other professional organizations such as the Medical Library Association, which defined *health* information literacy as “the set of abilities needed to: recognize a health information need; identify likely information sources and use them to retrieve relevant information; assess the quality of the information and its applicability to a specific situation; and analyze, understand, and use the information to make good health decisions” (as cited in Schardt, 2011, p. 1). In OT education, information literacy is the ability to understand when information is necessary to support and validate occupationally-based clinical reasoning, and to have the ability to find, evaluate, and utilize this information to make informed clinical decisions (Boruff & Thomas, 2011). Information literacy skills require utilizing books, journals and periodicals, in-person librarian assistance, and online databases to supplement classroom material (Ivanitskaya, Hanisko, Garrison, Janson, & Vibbert, 2012). Similarly, in the OT education process, students are routinely expected to locate information in high quality journals to analyze EBP strategies in OT practice (Galvin, 2011; Powell & Case-Smith, 2003). These standards are further reflected in the ACOTE® Standards, which state that students should “be prepared to articulate and apply OT theory and evidence-based evaluations and interventions to achieve expected outcomes as related to occupation” (ACOTE®, 2016, p. 1). Clearly accessing pertinent and accurate scholarly information is the current expectation, thus it follows that information literacy skill development can be thought of as foundational to OT and graduate education.

In spite of the clear importance accrediting agencies place on it, information literacy skill development presents a challenge to students in higher education. In fact, students across all majors demonstrate below-proficient performance in information literacy skills (Gross & Latham, 2012). Students often overestimate their information literacy skill

abilities in comparison to actual performance capabilities, showing limited awareness of incompetency (Gross & Latham, 2012; Robertson & Felicilda-Reynaldo, 2015). Kipnis and Frisby (2016) found that OT students tended to favor advice from peers about information literacy and researching. Even higher-level graduate students tend to utilize simple Google searches before seeking professional library assistance, and do not seem to recognize the differences in the quality of results generated by this kind of general search engine versus an academic search engine (Williamson, Bernath, Wright, & Sullivan, 2008). This behavior seems to translate directly to habits in practice as licensed therapists refer to colleagues and peers for clinical questions, rather than the literature (Kipnis & Frisby, 2016). Moreover, health care professionals report feeling they did not have adequate skills to find and utilize evidence based research in practice (Nail-Chiwetalu & Ratner, 2006). Students neglect librarian expertise in their search for scholarly information when librarians often represent the best opportunity for students to efficiently find information (Kipnis & Frisby, 2016) and this may translate into substandard use of current evidence in clinical practice. These studies show a need for OT educators to explore and expand information literacy development strategies to strengthen OT as an evidence-based profession.

Information Literacy and Evidence Based Practice

Information literacy contributes to EBP. Evidence based practice is the utilization of research, theory, and clinical experience to provide the best services possible during the therapeutic process (Sirkka, Zigmark, & Larsson-Lund, 2014). In the EBP process clinicians ask critical questions about a client's (individual, community, or population) unique needs to acquire the best available evidence regarding these needs, and critically appraise evidence found for validity and applicability to client concerns (Kielhofner, 2009). These steps reflect the information literacy standards and demonstrate the interdependence of information literacy and EBP. As noted prior, ACOTE® (2016) *requires* that students be educated to use EBP in evaluations and interventions, and to base this on current relevant literature. While it is unrealistic to expect students to display expert levels of information literacy and EBP, academic programs help them to develop skills necessary for life-long learning and application (Thomas, Saroyan, & Snider, 2012).

In OT education, EBP is now standard. DeAngelis, DiMarco, and Toth-Cohen's (2013) survey of entry-level OT programs revealed that EBP is a component of all courses in twelve programs. However, there is evidence that information literacy and EBP training do not generalize into practice (Crabtree, Justiss, & Swinehart, 2012; Morrison & Robertson, 2016). Current research has not included the assessment of students' knowledge prior to instruction in EBP and has not explored which components of knowledge contribute to EBP understanding (Hitch & Nicola-Richmond, 2016). This suggests that the efficacy of traditional means of information literacy / EBP education has not been vetted. Research does indicate that education efforts have failed to fully translate to clinical practice, supporting the need for alternative educational approaches, such as an EL model.

Embedded Librarians

Universities have varied library services that students can access and many have some level of EL. The difference between an EL and a traditional librarian is the embedding in the classroom setting outside of the library, earning the title embedded or liaison librarian (Blake et al., 2016; Freiburger & Kramer, 2009). Embedded librarians are involved at varied levels from macro/university to micro/course specific. Wu and Mi (2013) proposed five levels of embedded librarianship including: purchasing and collection development (Level 1); Guest lecturer and purchaser (Level 2); Team member that collaborates and co-instructs, serves as library liaison and Librarian on call (Level 3); Educator/course developer with faculty status within the library context (Level 4) and; Educator utilizing space as traditional faculty member that engages in research and curriculum development. Wilson's 2015 model of embedded librarianship defines the micro level consisting of three models: 1) face-to-face in the classroom on a daily basis, 2) attending class once a semester (often for a guest lecture), and 3) simple online membership in the course. Embedded librarian components appear to improve the course through professor-librarian collaboration and interaction with students rather than accessing the librarian as an "available" resource only (Blake et al., 2016; Freiburger & Kramer, 2009; Talwar, 2014; Wu et al., 2013). Further, the integration of an EL in a course can enhance student information literacy skills (i.e. assisting students in identifying specific information needs and developing database search terms to locate this information), research (evaluating research articles and level of evidence and developing appropriate research questions of their own), and writing skills, particularly American Psychological Association (APA) formatting (Lemley, 2016; Talwar, 2014; Wu, Trotter Betts, Jacob, Nollan, & Norris, 2013).

Examples of embedded librarianship usage in universities are reported in the literature in primarily descriptive or qualitative formats. For example, the University of Tennessee Health Science Center implemented an EL pilot project for 77 students in an online graduate nursing course, designed to instruct students to locate, retrieve, and evaluate information, and to formulate research questions (Wu et al., 2013), similar to Wilson's third model of EL. The majority of students in this study felt they had above average or excellent skills in searching databases after the intervention, and while 53% ($n=24$) of the students in a pre-survey characterized their scholarly skill in using APA for writing as poor, by the post survey, 95% ($n=43$) of respondents characterized these skills as average or above average. Freiburger and Kramer (2009) described a program of "liaison librarians" that physically situated librarians in offices in close proximity to faculty and students. They utilized a variety of methods, including workshops, individual consultation, classroom teaching and collaboration on grants (micro and macro approaches). At the end of one year, there was a reported 40% increase in the librarian's classroom involvement and more than double the amount of literature search requests from students, but no quantifiable data on improvements an EL librarian had on information literacy skill development in OT students were found. There is a clear need for further studies on the effectiveness of information literacy and EBP education in OT programs that utilize both quantitative and qualitative outcomes.

Purpose of the Study

This pilot study explored the use of an EL model in the Conceptual Foundations of OT course for students in their junior year of a five year undergraduate/graduate OT program, where students are taught and then expected to successfully apply information literacy skills in classroom assignments, including an information literacy /EBP project, a research paper, and in-vivo database searches based on case scenarios. Research questions focused on ALA information literacy standards one to four and included:

Research Question 1: Is there a relationship between the use of an EL model and graduate OT student's information literacy skills as measured by a short version of the Standardized Assessment of Information Literacy Skills (SAILS)?

Research Question 2: Is there a relationship between the EL model and graduate OT student's information literacy skills as measured by overall course grade?

Research Question 3: What information seeking behaviors used by students in an OT classroom with an EL are related to enhanced outcomes on a standardized information literacy testing?

Research Question 4: Is there a relationship between perceived information literacy skills development and the use of an EL model based on the Student Perception of Information Literacy-Q (SPIL-Q)?

Research Question 5: What reasons do students give for accessing available EL services beyond classroom instruction?

METHODS

Participants

Participants were 46 third-year (junior) students, aged 19-21 enrolled in the Conceptual Foundations of OT course. The university's Institutional Review Board committee approved the study prior to initiating the protocol and student consent was obtained. All data were coded and linked to participant unique identifier codes to maintain confidentiality.

Interventions

The course was delivered in a traditional format with 3-hour, face-to-face meetings during the week, and use of an online learning platform, Blackboard®, as a supplement to classroom instruction. Online, the EL was active as a co-instructor in the BlackBoard® course, and thus consistent two-way communication was always available between the EL and students enrolled in the course. In addition, the EL was an active participant in the discussion forum, sharing relevant posts and current research articles for students to access. Early in the semester, the EL presented three hours of interactive lecture in the computer laboratory where students were given step-by-step instructions on how to recognize the need for specific information, to identify effective

search strategies (MESH terms, BOOLEAN operators, date ranges/time limitation strategies, and truncation), and to distinguish between higher and lower quality studies in terms of levels of evidence as they related to one construct within an OT frame of reference. The EL maintained office hours in close proximity to OT classroom and lounge areas. She served as an available resource for questions related to research, evidence based practice, information literacy, and APA formatting. The EL also held weekly library-based office hours (including weekend and evenings) for scheduled appointments. Students were encouraged to access the EL for these specific services throughout the course, to assist in forming effective search questions for assignments and determining an article's level of evidence and usefulness for answering their research questions. The instructor (ED) used the EL's Power Point® handouts from her information literacy skills training 3-hour lesson to model its use as new information was introduced throughout the course.

The majority of assignments in the class required the use of information literacy skills. An example assignment with high demand of information literacy skills was a six-page research paper that asked students to choose a postulate from an OT Frame of Reference, find two articles that offered evidence to support, and two articles that offered evidence against the postulate's claims, and discuss how the evidence would be best presented to a potential client. Students were scored on their ability to locate four scholarly articles, the level of rigor of the studies found including descriptions of databases searched, terms used to search, how the determination of the level of evidence is made, why this was considered best available evidence, and the rationale for presenting the evidence in the way that they choose to a potential client. Only the instructor graded assignments; the EL did not have access to student grades at any time during or after the class.

Tools and Data Tracking

To quantitatively assess students' information literacy abilities, the Standardized Assessment of Information Literacy Skills (SAILS) was utilized. The purpose of the SAILS is to assess students' abilities through a web-based multiple choice knowledge test (Project SAILS, 2016a). The information tested in the SAILS reflects the standards published by the Association of College and Research Libraries (ACRL) in Information Competency for Higher Education (Project SAILS, 2016b). This assessment has high item reliability as it was developed using Rasch software, Winsteps (Project SAILS, 2016b, para. 1). Therefore, reliability estimates are greater than 0.80 (Project SAILS, 2016b, para. 1). The reliability and validity of individually scored tests are over 0.80 using Cronbach's alpha values (Project SAILS, 2016b, para. 1). The modified "Build Your Own Test" SAILS option was used to create an 18-question test to assess students' information literacy abilities. The modified SAILS test used in this study does not have established reliability and validity, however it allows researchers to select specific items from the validated item bank to assess student skills in focused areas, such as the skills pertaining to information literacy standards one through four for this study. The modified SAILS was created and administered by the EL.

The EL maintained a database regarding the frequency, type (online or in person) and topic (i.e. whether inquiries were about APA formatting or search phrase formation, etc.) of each inquiry made by students throughout the semester. The data were coded and linked to participant unique identifier codes. The data was then compared to SAILS scores and overall course grade to determine if there was a relationship between EL utilization and student information literacy abilities, and overall class performance. It was hypothesized that a positive relationship would exist between the use of the EL and successful application of information literacy skills, which could be seen via frequency counts of the EL compared to the SAILS scores and course grade.

To assess student perception of their information literacy skills and changes over time, the researchers used pre and post administrations of The Student Perception of Information Literacy-Q (SPIL-Q), a questionnaire of perceived information literacy competence including topic selection for paper writing, locating relevant research through library resources, selecting keywords and Boolean phrases, evaluating reference resources for topic relevancy, paper writing skills, and paraphrasing (versus quoting) skills. The questionnaire uses a 5-point Likert scale (strongly disagree to strongly agree). The SPIL-Q was developed at Pennsylvania State University (Michalak & Rysavy, 2016).

Lastly students were asked the open-ended question as to why they did or did not access the EL.

RESULTS

SAILS test averages showed a minimal increase of 2.07% from the pre-test to the post-test (77.52-79.59). Initial ranges in pre-intervention scores were 50-94%, whereas post-intervention ranges were 61-100%. Students showed the most improvement (8%) in the areas of Standard 2, efficiently locating needed information.

Frequency data from the EL's data tracking revealed that 48% ($n=22$) of students did not access EL services *beyond* in-class didactic sessions. Twenty-seven percent of students ($n=12$) utilized multiple methods of interacting with the EL, including in-person scheduled office hour appointments, email, and drop-in meetings in the health sciences building, whereas almost 23% ($n=10$) used email contact only. Course grade means were calculated for each group represented by the data above. Students who acknowledged EL postings in the course, but had no further interaction with her had the lowest course grade average at 84.7% (with a range of 78.9 to 88.5%). Those who emailed the EL regarding information literacy questions (but did not meet with her face-to-face) had an average course grade of 87.13% (with a range of 84.7 to 89%). Those students who emailed and had appointments with the EL had a course grade average of 92.9% (with a range of 88.5-94.7%).

Pearson r correlations were used to explore relationships between all variables. These revealed no relationships between interactions with the EL and information literacy skills as measured on the SAILS test. Analyses showed a moderate, positive correlation ($r = .600$, $p < .05$) between those who made *in-person* inquiries to the EL related to the

ALA's information literacy Standard 1 of defining and articulating the need for information and overall course grade. The more frequently students inquired about what information they required for effective database searches the higher their course grade was likely to be. No other correlations were found and regression analysis was not used due to this limited correlation; corrective tests were not done due to the exploratory nature of this pilot study (Streiner & Norman, 2011).

The students perceived a gain of 31% in overall information literacy skills on the SPIL-Q. Results for the individual standard based questions are presented in the graph below. The strongest perceived growth was in the question that pertains to information literacy Standard 2 related to feelings of effectiveness in finding information on topics using a variety of resources. Results for individual questionnaire items are represented in Figures 1 and 2 below.

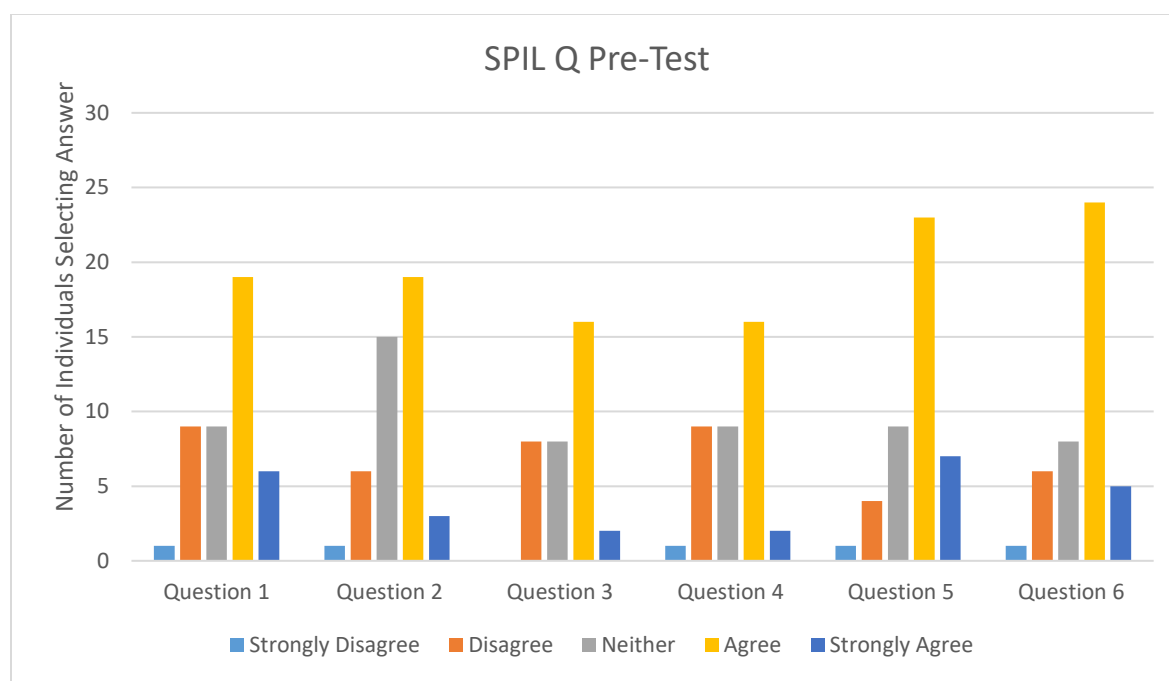


Figure 1: SPIL-Q pre-test results.

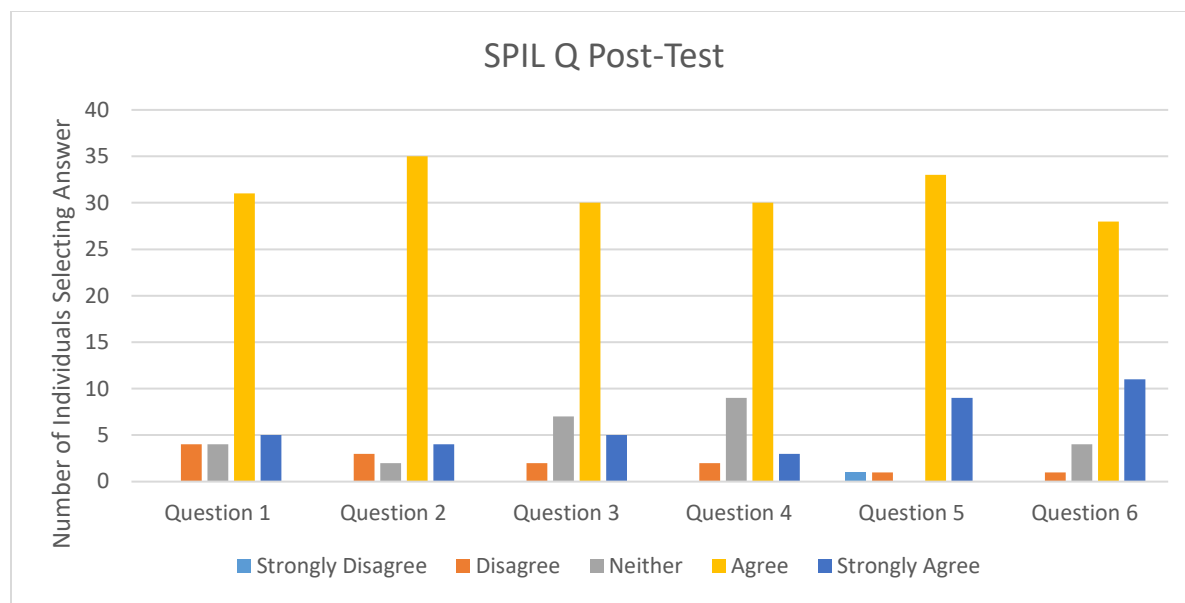


Figure 2: SPIL-Q post-test results.

Twenty-four students responded to the open-ended question about why they did or did not elect to access the EL outside of her direct didactic class times. The primary investigator and EL read through all comments multiple times, then the primary investigator created a basic coding framework of reasons for accessing or not accessing the EL outside of classroom sessions to systematically reduce the data and develop a response to research question #5, consistent with the Qualitative Content Analysis approach (Schreier, 2012). Due to the limited number of comments received ($n=45$), the initial categories were established as “reasons for accessing the EL” and “reasons for not accessing the EL.” From there, inductive coding was completed and brief codes developed, as appear in Figure 3 below. All statements were considered relevant and included in a code, as described by Schreier (2012). All responses were placed within the framework to derive meaningful themes about the decision making process. Sixty-three percent of students (15/24) reported that they accessed EL assistance outside of the didactic sessions. Two themes emerged from these responses: “Editorial help towards improved grade” and “pursuit of the EL’s knowledge for self-edification”. Several students identified the EL’s depth of knowledge displayed in didactic sessions led them to believe they would benefit from her help. Statements such as, “I always need someone to look over my APA formatting, so why *wouldn’t* I ask her for help?” and “She knows everything about using the right phrases to get what you need,” reflect these sentiments. Nine students reported they had *not* accessed the EL outside of didactic group sessions. Primary themes derived for not accessing her services were: “Perceptions of time constriction” and “good enough performance.” Comments reflecting these themes include, “She had such limited office hour availability when I really needed her, like after 8 pm,” and, “I knew I was going to get a B either way so it wasn’t worth going to see her when I had so many other things to do.” Some students who did not access the EL reported sentiments of both time constriction and performing well enough without EL assistance. Figure 3 shows an example of the coding process used to derive the theme of accessing the EL for “Editorial help toward improved class grade”.

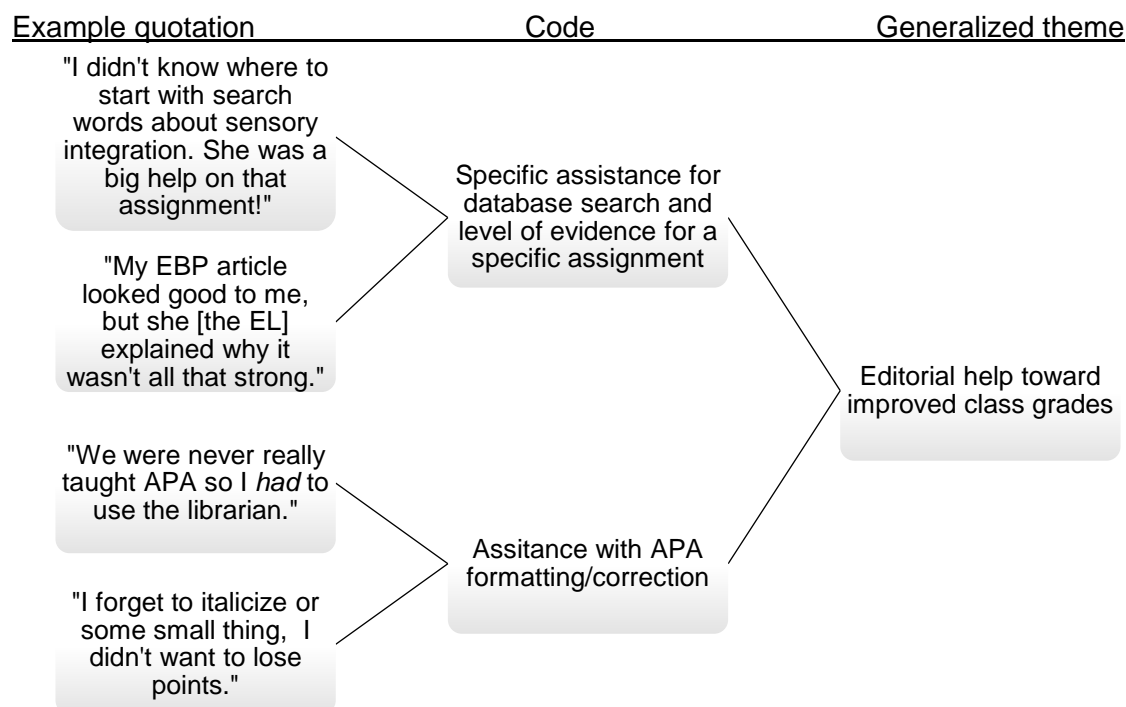


Figure 3. Example of thematic coding process.

DISCUSSION

This study explored the impact of an EL protocol on OT students' information literacy skills (Standards 1-4) and overall course grade via frequency data, correlation tests, performance on a pre and post-intervention assessment of information literacy skills, and one open-ended question about why students chose to access/not access EL services. To the authors' knowledge it is the first study to include quantitative information on OT student information literacy skills following EL intervention.

For research question one, "Is there a relationship between the use of an EL model and student information literacy skills as measured by the SAILS?" students showed a small overall percentage increase in information literacy skills, but no relationship between the interaction with the EL and SAILS scores was found on Pearson r correlation tests. A moderate positive correlation was found between information literacy Standard 1 and *in-person* visits to the EL for identifying information needed for assignments.

Frequency statistics revealed that students who accessed the EL outside of didactic sessions had higher course grades, which suggests that the EL model used in this study had an impact on overall course performance in response to research question number two, "Is there a relationship between the use of an EL model and student information literacy skills as measured by overall course grade?" Furthermore, as asked in research question number three, "What information seeking behaviors used by students in an OT classroom with an EL are related to enhanced outcomes on a standardized information literacy testing?" those who had *face-to-face* contact with the EL had the highest course grades, showing that this particular information seeking behavior might be more effective in enhancing overall course performance/grade.

Although no quantitative studies exploring an EL model in an OT classroom could be found, the results of this study were similar to others such as Wu et al. (2013) that showed quantitative gains on research papers of nursing students as they progressed through a semester using an EL. Edwards, Kumar and Ochoa (2010) found small, quantitative gains in participants ($n=7$) being able to expand search terms to locate pertinent literature following their EL intervention. Likewise, Shannon and Shannon (2015) worked with groups of 37 and 29 students over two years and found repeated visits to the librarian for information literacy skills inquiries affected the number of sources used (mean increased from 5.432 pre to 7.241 post intervention) and the overall quality of student papers (30% of papers being scored in the “average” to “good” range scores prior, and 79.3% being in the “average” to “good” range scores) after the EL intervention. Further, Hobbs, Guo, Mickelsen, and Wertz (2015) found that participant ($n=17$) skills and knowledge in health related EL increased with the provision of library instruction, particularly as related to information literacy Standards 1 (database selection skills increased by 47.1%) and 2 (database search strategies increased by 64.7%). Based on these data, and the results of this study, it appears that students show enhanced information literacy skills when exposed to EL services in classes.

In response to research question number four, “Do students perceived that their information literacy skills improve with the use of an EL in the course?” students perceived their skills had improved most notably in formulating search terms to find pertinent literature (Standard 2). Hobbs et al. (2015) similarly found that students who experienced an EL model had increased confidence in database searching, (2.18 to 3.76 mean score increase), and in creating accurate citations (1.82 to 3.71) on a 5-point Likert scale the authors created to measure confidence and comfort with information literacy skills for their study.

Student reasons for accessing/not accessing the EL outside of class time in this study, research question number five, “What reasons do students give for accessing EL services beyond classroom instruction?” were consistent with others’ findings. For example, Blake et al.’s (2016) findings suggest a need for increased awareness of the EL and the services they can provide. Students in this study reported a perceived lack of EL availability during the semester in spite of her consistent physical presence near the OT classrooms and prompts to access her throughout the semester. Students in this study also perceived that they could receive an acceptable grade without consulting the EL, as indicated in the post-study question, similar to Kipnis and Frisby (2006) who found that students preferred to ask peers for help when they had information literacy questions. Students in Edwards, Kumar and Ochoa’s (2010) study reported the extra time and steps involved in utilizing the EL to be a detractor, a theme that was reflected in the few responses to the question asked in this study.

Collectively these findings suggest the need to further determine what motivates students to seek EL assistance and to ensure students understand the potential benefits of accessing the EL both in schoolwork and for future EBP-related professional skills. Motivations for accessing the EL (or not) were not thoroughly explored in this study and are likely highly individual, as might be expected in any learning environment.

Talwar (2010) suggests information literacy education must be more individualized to learner needs and styles, which resonates with OT's Philosophy of Education statement that describes students as occupational beings with unique learning needs (AOTA, 2014). The exploration of individual learning styles for information literacy was beyond the scope of this small pilot study and represents a different demand on instructors attempting to cover other objectives and content in a course.

IMPLICATIONS FOR OCCUPATIONAL THERAPY EDUCATION

- Professors, instructors and clinical preceptors can help make students aware of the benefits of accessing the health sciences librarian earlier in the education process, particularly in combined undergraduate/graduate programs where students are first developing higher-level/collegiate academic skills. Helping students understand the profession's demand for current, best evidence is critical for health sciences education and practice. Gradually building the amount of data students must find and the use of computer laboratory exercises under the guidance of the librarian and educator can foster more confidence and success with the process.
- Students are occupational beings with unique learning styles and needs. Although this study evidenced potential benefits of using an EL (i.e. higher course grade, enhanced information literacy skills) some students clearly find personal EL inquiries less desirable than using informal methods of finding literature. This suggests that educators need to explore other methods or timing of information literacy skills education. Educators could model the process of identification of information needed, followed by database search techniques for a specific topic in-vivo in a variety of classes to reinforce its importance and model the practice of finding and retrieving the best evidence as part of lifelong professional habits.
- Further quantitative studies are needed in this area of educational research. As more programs move towards granting doctoral degrees there will be increased pressure for therapists to effectively and efficiently access, interpret, and use best available evidence. Information literacy skills are critical to this process.

Limitations

While this study evidenced some limited enhancements in student performance, it was not possible to determine and unlikely that all improvements were the result of EL intervention alone. It could be that those students with higher course grades would have actively accessed librarian services or earned higher grades, regardless of the EL intervention. The sample size ($n = 46$), while larger than others, is still relatively small, making statistical analysis less meaningful. The participants were a homogenous group of primarily white, middle-class students in a combined bachelor's/master's degree program where OT courses are gradually added in the curriculum. The results may have been different in a more diverse or graduate student population.

Conclusion

This pilot study showed preliminary evidence on the impact of an EL model to increase the information literacy in a graduate level OT program, an area not addressed in the OT or library science literature prior. Students' information literacy skills improved slightly in this model, with the most significant gains seen in ALA Standard 2, efficiently

locating needed information. A moderate positive correlation was found between Standard 1 and *in-person* visits to the EL related to identifying information needed for assignments. Students who had face-to-face contact with the EL had higher course grades overall. Educators can use this information to develop their own models of embedded librarianship and consider the unique value it can have for their students as they seek to instill life-long habits of searching for the best available evidence for client-centered care.

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