

Teaching Information Literacy and Evidence-Based Practice in an Undergraduate Speech-Language Pathology Program: A Student Reflection

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In order to prepare speech-language pathology students to incorporate evidence-based practice (EBP) into their clinical work, it is imperative that academic programs provide students with training opportunities to learn information literacy (IL) skills that will enable them to effectively locate, retrieve, and critically assess

information. Teaching IL skills is a fundamental component of EBP education (Boruff & Thomas, 2011; Jacobs, Rosenfeld, & Haber, 2003; Klem & Weiss, 2005; Ratcliff, Swartz, & Ivanitskaya, 2013).

EBP is a four-step approach that incorporates a clinician's expertise, client preferences, and scientific evidence. The first step in EBP includes creating

ABSTRACT: Purpose: This study assessed teaching information literacy and evidence-based practice skills using an active-learning library workshop in an undergraduate speech-language pathology capstone course. **Method:** Students' responses regarding teaching information literacy skills and evidence-based practice using a workshop, which was collaboratively designed and taught by a health sciences librarian and a speech-language pathology faculty member, were measured using the one-minute paper (OMP; Angelo & Cross, 1993). Fifty-one OMPs were collected over a 2-year period. Students were asked 2 questions on the OMP: "What information did you learn today that you think will be most useful to you in your speech-language pathology and audiology course work?" and "What question(s) do you still have?" Student reflections were analyzed using qualitative methods. **Results:** Responses to the first question revealed 6

themes that students found helpful; the most common concept was search strategies. Student feedback on the second question generated 10 themes. The most common theme was not having any questions. Students asked about evidence appraisal and why the material was not introduced earlier.

Conclusion: The benefits of a librarian and faculty member collaboratively teaching undergraduate students information literacy skills for finding evidence-based information are highlighted. Results indicate that students learned effective strategies for finding evidence-based information and support integrating information literacy into the speech-language pathology curriculum early and often.

KEY WORDS: information literacy, speech-language pathology, evidence-based practice, qualitative research, assessment, librarians

an answerable clinical question. The second step is finding the best and most current information needed to answer the question. The third step is critically appraising the retrieved information to ensure its quality. The last step is applying the evidence based on one's clinical experience and the values and needs of the individual client and family (American Speech-Language-Hearing Association [ASHA], 2005). EBP is a cyclical process that must be reassessed with each new client, case, and encounter.

Navigating the EBP process requires IL, which is a synthesis of complex research skills that are developed over time and through practice. Historically, IL was defined by the American Library Association as "being able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (American Library Association, 1989, p. 1). More recently, IL was defined by the Association of College & Research Libraries as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (Association of College & Research Libraries, 2015). The basic proficiencies of IL involve being able to ask good questions, find quality information from appropriate resources, and communicate the answers effectively.

IL skills are essential for successful EBP implementation. However, speech-language pathologists (SLPs) across practice settings have reported a lack of effective IL competencies, including how to locate and retrieve evidence-based information in a systematic and timely manner (Hoffman et al., 2013; Nail-Chiwetalu & Ratner, 2007; Venediktov, 2014). Accessing relevant information is one step of IL and EBP that is often neglected in the field of speech-language pathology (Guo, Bain, & Willer, 2008; Hoffman et al., 2013; B. J. Nail-Chiwetalu & Ratner, 2006; Ratcliff et al., 2013). Closing this gap in the EBP process among SLPs is crucial to increasing the integration of research into clinical practice. Improving student training in IL and EBP in undergraduate speech-language pathology programs is key to increasing the effective integration of EBP into SLPs' clinical decision making (Nail-Chiwetalu & Ratner, 2007; Ratcliff et al., 2013).

LITERATURE REVIEW

A review of the speech-language pathology and library science literature revealed a handful of studies examining the IL and EBP skills of SLPs in a variety

of environments from the university setting to the clinical that provide a broad overview of information behaviors (Foster, Worrall, Rose, & O'Halloran, 2013; Guo et al., 2008; Hoffman et al., 2013; Nail-Chiwetalu & Ratner, 2007; Ratcliff et al., 2013; Vallino-Napoli & Reilly, 2004; Zipoli & Kennedy, 2005). Similar to other studies in the health professions that have reviewed IL and EBP (Boruff & Thomas, 2011; Pravikoff, Tanner, & Pierce, 2005; Rader & Gagnon, 2000; Vogel, 2012), there are a variety of known barriers in the profession of speech-language pathology to implementing EBP into one's practice. For example, the multidisciplinary nature of speech-language pathology is considered a barrier because SLPs must examine and gather information from many fields of study, resources, and formats (Guo et al., 2008; Metcalfe et al., 2001; Vallino-Napoli & Reilly, 2004), leading to an overwhelming amount of information (Ratcliff et al., 2013).

A lack of effective research skills is one obstacle to using evidence-based information in the field of speech-language pathology. Guo et al. (2008) found that 87% of surveyed SLPs lacked skills in PubMed, and 94% lacked skills in CINAHL. Ratcliff et al. (2013) found that university students at both the undergraduate and graduate level performed poorly on Boolean search strategies and on differentiating between primary and secondary sources.

A lack of knowledge about appropriate resources is another known hindrance to accessing and using evidence-based information in speech-language pathology. There is a belief that students and clinicians know how to search simply because there is an abundance of resources (Ratcliff et al., 2013); however, the challenge is often in determining which resources are best depending on the information need (e.g., Cochrane vs. PubMed). Several studies found that SLPs used their own clinical expertise and that of colleagues first when answering a clinical question (Guo et al., 2008; Nail-Chiwetalu & Ratner, 2007; Zipoli & Kennedy, 2005). Nail-Chiwetalu and Ratner (2007) found that less than one-third of the SLPs they surveyed used PubMed, and only 1% used CINAHL. Two studies found that the use of traditional sources of information such as reference and text books to find articles was much higher than the use of EBP resources such as peer-reviewed literature (Nail-Chiwetalu & Ratner, 2007; Zipoli & Kennedy, 2005). Moreover, one study found that 32% of SLPs never used a library when seeking information, and 55% used a library only once a month (Guo et al., 2008). Another study found that only 11% of those surveyed used a library that was described as a school, university, hospital, or public library when seeking information (Nail-Chiwetalu & Ratner, 2007).

Another obstacle to accessing evidence-based information is a lack of time (Hoffman et al., 2013; Nail-Chiwetalu & Ratner, 2007; O'Connor & Pettigrew, 2009; Vallino-Napoli & Reilly, 2004; Zipoli & Kennedy, 2005). Both Vallino-Napoli and Reilly (2004) and Nail-Chiwetalu and Ratner (2007) found that 69% of SLPs in their study stated that they did not have enough time to search and read the evidence-based literature. Vallino-Napoli and Reilly found that 92% wanted to have time earmarked for searching and reading the literature. Hoffman et al. (2013) found that 91% of the SLPs they surveyed stated that they did not have enough time built into their schedule to perform EBP searches and read the literature. Of the 9% who did have time, more than half of the respondents had only 1–30 min per week dedicated to searching and reading the literature. Moreover, the majority of those surveyed performed only one to two clinical searches per year (Hoffman et al., 2013).

A final barrier to accessing evidence-based information is EBP education. Guo et al. (2008) found that 47% of their respondents did not have any knowledge of EBP. Nail-Chiwetalu and Ratner (2007) found that only 9% of those surveyed had had an IL workshop on EBP with a librarian. Hoffman et al. (2013) found that 25% of those surveyed did not have any formal training in EBP, whereas 35% did have some exposure during graduate school. Vallino-Napoli and Reilly (2004) found that exposure to EBP in school did not change one's attitude toward research and potential patient care. In direct contrast, Zipoli and Kennedy (2005) found that exposure to EBP in graduate school was a predictor of having a positive attitude regarding research and using EBP. Two recent studies found that junior practitioners, who are assumed to have had EBP training while in school, were no more likely than seasoned clinicians to implement EBP into current practice (Hoffman et al., 2013; O'Connor & Pettigrew, 2009).

Solutions for addressing the state of IL and EBP skills in the speech-language pathology profession have been discussed in the literature. Guo et al. (2008) found that more than 50% of the SLPs they surveyed wanted to have EBP knowledge, and nearly half wanted 8 hr of in-person training. Hoffman et al. (2013) found that 70% of SLPs stated that they needed more training in EBP, and out of that 70%, 84% were willing to receive training, with 76% preferring an in-person group training workshop. In academia, the literature states that integrating EBP into the curriculum is another solution for bridging the EBP gap in the field of speech-language pathology (Anema, 2014; Hoffman et al., 2013; Nail-Chiwetalu & Ratner, 2007; Ratcliff et al., 2013; Vallino-Napoli & Reilly,

2004). Specifically, librarians have been mentioned as key players in the development and delivery of EBP in the field of speech-language pathology (Nail-Chiwetalu & Ratner, 2007; Trail & Hadley, 2010).

Collaboration

To successfully change the IL and EBP landscape, and to break down the barriers that prevent SLPs from incorporating EBP into clinical practice, efficient instructional methods must be incorporated into undergraduate curricula. One effective method for teaching IL and EBP is through collaboration between speech-language faculty and college librarians (Kuo & Chabot, 2014; Nail-Chiwetalu & Ratner, 2007; Trail & Hadley, 2010). Although few practicing SLPs report having been trained in IL by librarians during their clinical preparation (Nail-Chiwetalu & Ratner, 2007), there is a growing body of literature making the connection between librarians and health sciences faculty for successfully integrating EBP into academic curriculum (e.g., Arguelles, 2011; Boruff & Thomas, 2011; Cobus, 2008; Jacobs et al., 2003; Klem & Weiss, 2005; Powell & Case-Smith, 2010; Schulte & Sherwill-Navarro, 2009; Trail & Hadley, 2010; Vogel, 2012). Reports of such collaboration in the health sciences describe evidence-based, library-centric, curriculum-integrated instruction as a way to improve the IL and EBP skills of future health care professionals (e.g., Boruff & Thomas, 2011; Ivanitskaya, Hanisko, Garrison, Janson, & Vibbert, 2012; Kronenfeld et al., 2007; Nail-Chiwetalu & Ratner, 2007; Vogel, 2012).

By combining the expertise of speech-language pathology faculty and health sciences librarians to teach IL and EBP, students learn not only general IL skills but also discipline-specific search processes necessary for EBP. Moreover, the information has been found to be more relevant and meaningful to students when it is taught in the context of a librarian and faculty partnership (Cobus, 2008; Simmons, 2005; Smith, 2003). Although IL and EBP fundamentals must be infused throughout the undergraduate speech-language pathology curriculum, incorporating a library workshop into a speech-language pathology capstone course can be an effective way to prepare students for future graduate work and clinical practice (Gregg & Hanks, 2008; Jacobs et al., 2003; Miller & Neill, 2013).

Purpose

We conducted a collaboration between a clinical faculty member in the department of speech-language pathology and audiology (SLPA) and the health sciences librarian at Ithaca College to teach undergraduate students IL skills for finding evidence-based information.

We designed and implemented a hands-on workshop in clinical methods, which is a capstone course for seniors that covers the clinical process, with a focus on assessment and intervention strategies in speech-language pathology. We obtained approval from Ithaca College's Institutional Review Board to survey the students in order to assess their perceptions of learning EBP through a hands-on IL workshop.

METHOD

The IL Workshop

The workshop was held once per semester for 75 min. The objective of the workshop was for students to learn about and practice search strategies to locate evidence-based information. The IL workshop was designed to provide an overview of EBP, with an active-learning session tailored to a course assignment (see Appendix A for the complete assignment). The SLPA clinical faculty member reviewed the assignment in the clinical methods course before the library workshop, and students came prepared with a topic and population to search during the workshop. The purpose of the assignment was to familiarize the students with the literature search-and-review process. Research shows that if the connection between an EBP classroom assignment and real-life clinical practice is made, then one is more likely to engage in EBP as a future clinician (Hoffman et al., 2013).

Learning activities during the workshop focused on the first two steps of EBP. The students were given guidance on how to develop a clinical question, the first step in EBP, using the well-known population, intervention, comparison, and outcome method referred to as PICO. The PICO method was first discussed in the literature nearly 20 years ago (Richardson, Wilson, Nishikawa, & Hayward, 1995) and has become a standard in health sciences IL sessions often conducted by librarians (Arguelles, 2011; Johnson, 2006; Kloda & Bartlett, 2014; Vogel, 2012; Wildridge & Bell, 2002). Using a clinical question designed in advance by the librarian and faculty member, the librarian discussed the PICO process while demonstrating a PICO search in the PubMed database. Although the students had discussed PICO in the clinical methods class before the library workshop, this was their first experience observing application of the PICO method to find relevant clinical journal articles.

The workshop then focused on the second step of EBP—finding the best and most current information needed to answer the question—which included keyword versus subject searching; truncation; and search

limits such as publication type (randomized controlled trial, meta-analysis, systematic review), clinical queries (therapy, prognosis, etiology, diagnosis), age, gender, language, and publication date. Different literature databases relevant to SLPA were discussed and explored, including PubMed, CINAHL, PsycInfo, and ERIC. Information management tips such as saving searches, obtaining stable URLs through permalinks, and using citation tools were also highlighted. By the end of the workshop, each student was expected to locate and retrieve one intervention or assessment EBP article using the methods outlined during the workshop.

The hands-on library workshop was held once during the semester in a computer lab with 25 computers. The librarian used a computer at the front of the room, which was connected to a projector. The students each used a computer to actively follow along by entering terms, setting limits, creating inter-library loan accounts, and saving searches. Research shows that when IL learning is active, it is more likely to be retained (Hoffman et al., 2013; Powell & Case-Smith, 2010). The students were then given 20 min to practice the IL and EBP skills by searching and locating an article on their chosen topic while following the PICO model. The librarian and the SLPA faculty member walked around the room to observe the students and provide feedback and support on the students' search strategies.


As supplemental support, the librarian created a web-based course guide that was tailored to the needs of the EBP assignment and course readings (see Figure 1). Screen shots of searches and limits from the various databases were included in this guide. Students were encouraged to use this guide during the IL workshop and throughout the semester to support their EBP research. The students were also encouraged to contact the librarian throughout the semester with any further questions.

The Assessment Tool: OMP


To gather feedback from the students regarding the workshop, we used a one-minute paper (OMP), which is a qualitative method of inquiry. The OMP is generally an anonymous assessment tool that requires a short written response from students. The OMP was developed nearly 40 years ago (Weaver & Cotrell, 1985; Wilson, 1986) and has since been popularized by Angelo and Cross (1993). The OMP is a formative assessment tool that has been rigorously tested and has been demonstrated to enhance knowledge (Anderson & Burns, 2013; Chizmar & Ostrosky, 1998; Das, 2010). It is used to encourage feedback from students and is widely used in the academic setting due to its simplicity and usefulness (Ashakiran & Deepthi,

Figure 1. Library course guide.

SLPA 47200: Clinical Methods



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Dashboard

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Best Bets

MEDLINE (EBSCO) / PubMed
This is a great tool for finding primary medical and research articles.

CINAHL
This is a great tool for finding education, health promotion, and psychosocial health articles along with research articles.

PsycINFO
This is a great tool for finding psychology, psychiatry, sociology and medical articles along with research articles.

ERIC (Ebsco Interface)
This is a great tool for finding education articles.

Student Feedback

Quick Survey

Please take a minute to answer two short questions about your prior exposure to library research with a librarian.

One Minute Paper

Please take a minute at the end of class and complete this short survey.

Defining Your Research Question

- Determine and define the clinical problem
 - Frame this in a question format as it will help you determine the key concepts: population, intervention and outcome.
- Generate a list of keywords using PICO
 - Patient or Population (what is the disorder or disease)
 - Intervention
 - Comparison (if any)
 - Outcome (what you are hoping to assess)

Search Strategies

SEARCHING IDEAS

Searching MEDLINE | Choose Databases

Suggest Subject Terms

sis or amyotrophic lateral sclerosis or tou gahr All Abstract

AND + speech or language* or voice or s All Abstract

AND + Select a Field (optional)

Basic Search | Advanced Search | Search History

1. sis or amyotrophic lateral sclerosis or amyotrophic lateral sclerosis or tou gahr's disease
2. speech or language* or voice or swallowing or deglutition

Searching CINAHL | Choose Databases

Suggest Subject Terms

stutter* or stammer* All Abstract

AND + intervention* or treatment* or th All Abstract

AND + Select a Field (optional)

Basic Search | Advanced Search | Search History

1. stutter* or stammer*
2. intervention or therapy or treatment

LIMITS: Both Medline and CINAHL

Published Date

Month Year 2000 -
Month Year 2014

Age Groups

Infant: 0-23 months
Child: Preschool: 2-5 years
Child: 6-12 years
Adolescent: 13-18 years

Publication Type

Published English
Randomized Controlled Trial
Research Support, American Recovery and Reinvestment
Research Support, Non-U.S. Government

Clinical Queries

Therapy - High Sensitivity
Therapy - High Specificity
Therapy - Best Evidence
Diagnosis - High Sensitivity

CINAHL - Limit to "Research Article"

Research Article

2013; Chizmar & Ostrosky, 1998; Harwood, 1996; Kloss, 1993; Stead, 2005). The student perspective helps improve course content and delivery (Anderson & Burns, 2013; Barnes, 2008; Orr, 2005). The OMP provides the instructor with commentary on what and how well information is learned, which could be difficult to assess during the classroom lecture (Chizmar & Ostrosky, 1998; Orr, 2005).

The OMP for this study consisted of two questions. In the first question (Q1), we asked, “What information did you learn today that you think will be most useful to you in your SLPA course work?” In the second question (Q2), we asked, “What question(s) do you still have?” Students were given 5 min to complete the OMP survey at the end of the workshop (see Appendix B to view the survey).

We used a data-driven, open-coding approach by reading the text and identifying key concepts in each response. Open coding was used to minimize bias as one tries to reflect with “an open mind” when identifying categories and subcategories. We used a thematic organization scheme by identifying the main categories, subcategories, and relationships to identify key concepts (Gibbs, 2007). Because the OMP assessment tool is composed of two questions, we adhered to open coding and thematic organization with each response to the two questions. We used Dedoose (2014), a web-based qualitative software, to assist in the coding and data analysis of each of the OMPs. Dedoose provides an array of analytical and interactive applications such as counting the frequency of codes and co-occurrences of codes in order to track patterns between codes. Dedoose also provides counts as relative frequencies in percentages and normalization to adjust for the number of participants.

RESULTS

Participants

In total, we collected 51 OMPs over a 2-year period, which represents a 94% response rate based on total enrollment for each semester starting in spring 2013 and ending in fall 2014 (see Table 1). The 51 students who completed the OMPs were all first- or second-semester seniors, and all were female. Due to the SLPA undergraduate course sequence, prerequisite requirements, and students studying abroad, enrollment in the spring semesters was nearly 3 times that size of the fall semesters.

Q1

Based on the qualitative analysis performed in Dedoose for Q1, “What information did you learn today

Table 1. The number of participants and the number of surveys completed per semester.

<i>Semester</i>	<i>Number enrolled</i>	<i>Surveys completed</i>
Spring 2013	21	20
Fall 2013	7	6
Spring 2014	19	18
Fall 2014	7	7
Total	54	51

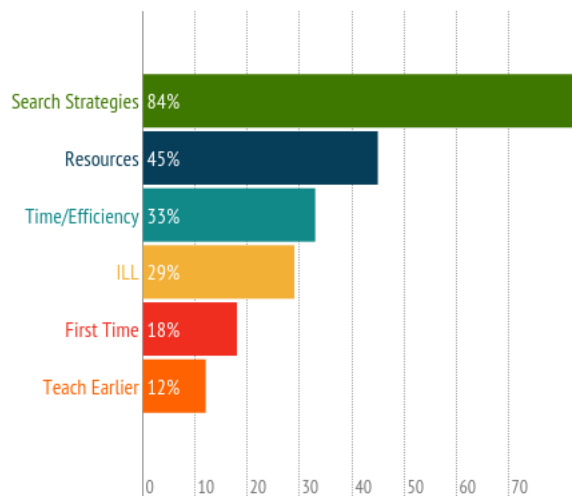
that you think will be most useful to you in your SLPA course work?” six themes and 15 subthemes emerged. The main categories (see Figure 2) include search strategies, resources, time/efficiency, interlibrary loan (ILL), first time, and teach earlier.

- **Search strategies.** Eighty-four percent of the students indicated that learning search strategies was useful. Search strategies were further divided into the following unique subthemes (see Figure 3): narrowing a search, truncation, search terms, EBP, medical subject headings (MeSH), synonyms, PICO, permalink, Boolean, and citation. As illustrated in Figure 3, narrowing a search and truncation were the two most frequently mentioned search strategies, at 39% and 31%, respectively.

Student reflections included:

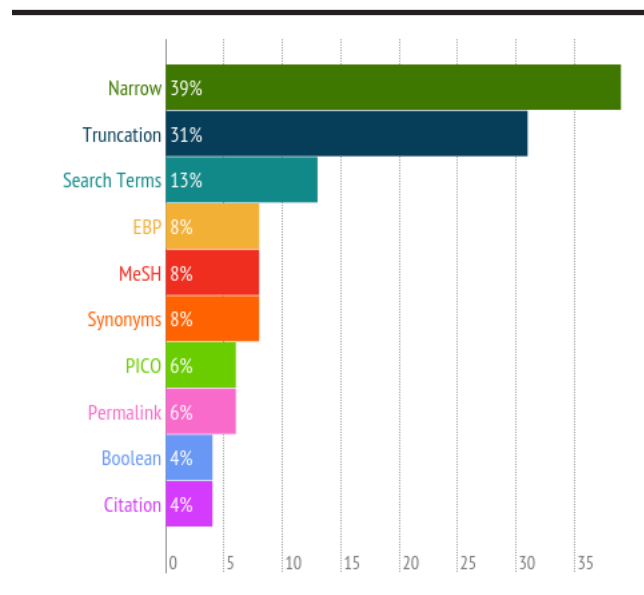
- “I learned how to phrase my search terms. I did not know that you could use an asterisk to truncate words. This will help me a lot as I used to have to do separate searches for each form of the word (stutter, stuttering, stutters).”

Figure 2. Q1 results.



Note. ILL = interlibrary loan.

Figure 3. Types of search strategies in Q1.



Note. EBP = evidence-based practice, MeSH = medical subject headings, PICO = population, intervention, comparison, and outcome.

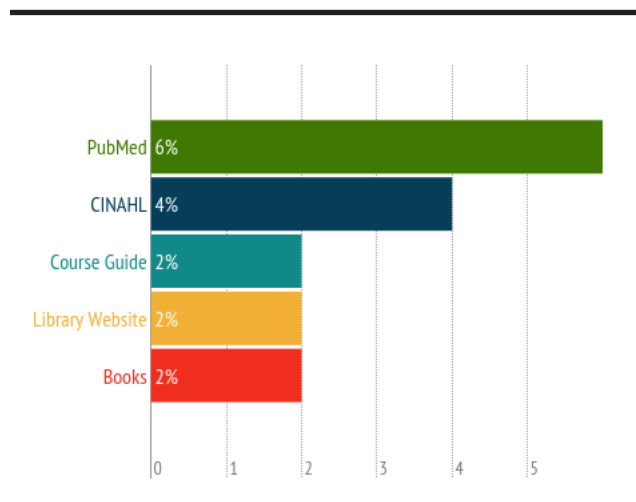
- “I learned how to more effectively find an article that is specific to my topic of research.”
- “I learned better techniques to find relevant information to a specific topic (PICO questions).”
- “Learning about how to effectively use the search bars to limit results was very helpful. I did not know that I could use "or" and the "*" to help bring up better articles.”

- **Resources.** Forty-five percent of the students reported learning about the variety of resources introduced in the library workshop. Resources were further divided into five subcategories (see Figure 4): PubMed, CINAHL, course guide, library website, and books. The students mentioned PubMed and CINAHL most frequently, at 6% and 4%, respectively.

Student comments included:

- “The most useful information was the introduction to new websites to search for articles.”
- “It was really helpful to learn what the different databases specialized in and how we could use them. In the past I have seen the names of databases and not known what I could use them for.”
- “In general, I wasn't aware of most of the resources available to me through the library website - including the different databases.”
- “I've never used CINAHL or PubMed before, so I think it was helpful to learn.”

Figure 4. Types of resources in Q1.



- **Time/Efficiency.** Thirty-three percent of the students noted that the course material will help them to become more efficient researchers and will save time.

Student statements included:

- “I learned...tricks to finding the most relevant articles. This will save me a lot of time in searching for articles in the future.”
- “I learned how to research articles properly. I used to struggle a lot with this. I would have to search through 1,000s of articles before I would find something that I like.”
- “It is always helpful to learn how to search for journal articles. I have almost always needed to find at least one article in every speech-language pathology class I've ever taken, and it can take hours if you don't know how to find one!”
- “It was most helpful to know how easy it can be to search for a particular topic as long as you use the correct database and words in the search bar. If I was a freshman I would definitely keep in mind the ability to search for databases through my class.”

- **ILL.** Twenty-nine percent of the students stated that ILL was helpful for their course work.

Student testimonials included:

- “I also learned about inter-library loan which was helpful because before learning about it I would have just clicked out and not used the article.”
- “It was also very helpful to learn how the inter-library loan works. In the past, I haven't used that intentionally because it seemed overwhelming,

but now that I know how I wish I had learned sooner.”

- “Interlibrary loan was so fast and easy.”
- “I didn’t know how easy the Interlibrary Loan was to use.”
- **First time.** Eighteen percent of the students revealed that it was their first time being introduced to the subject matter.

Student reflections included:

- “All of the shortcuts in the search databases was completely new information.”
- “I have used the Ithaca College Library site but never had someone instruct me which helped a lot.”
- “Pretty much everything we went over today is useful. I had no idea we had these resources available to us.”
- **Teach earlier.** Twelve percent of the students suggested that the content be delivered earlier in the academic curriculum.

Students reported:

- “I would have loved to have had this presentation earlier in my studies.”
- “I wish I had learned this sooner.”
- “This needs to be introduced Freshmen year!”
- “This was really helpful, and I wish I had been taught this information before my last semester senior year.”

Q2

Based on the qualitative analysis performed in Dedoose for Q2, “What question(s) do you still have?” the following 10 themes emerged (see Figure 5):

- **No questions.** Sixty-seven percent of the students did not have any questions at the end of the library workshop.

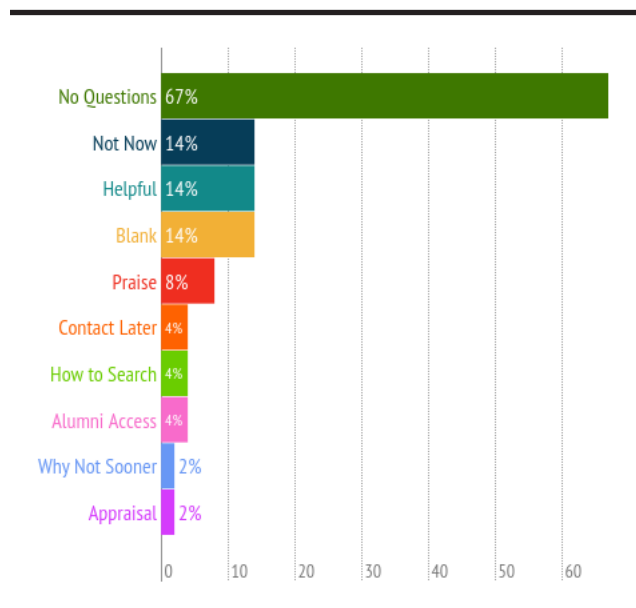
Student feedback included:

- “I have none.”
- “N/A”
- **Not now.** Fourteen percent of the students mentioned not having a question at that moment in time, implying that a question might arise with more practice.

Student statements included:

- “I can’t think of one right now.”
- “None at the moment.”
- **Helpful.** Fourteen percent of the students indicated that the workshop was helpful.

Figure 5. Q2 results.



Student reflections included:

- “I found this to be extremely helpful.”
- “But thank you again, this workshop was really helpful!!!”
- “Very helpful!”
- **No response.** Fourteen percent of the students left Q2 blank.
- **Praise.** Eight percent of the students offered praise for the library workshop.

Student comments included:

- “It was great!”
- “Fantastic presentation!”
- **Contact later.** Four percent of the students mentioned that they may contact the librarian later if questions arise.

Student answers included:

- “Not sure yet but I will email when I think of one!”
- “None for now. But I know how to get in contact with you for the future!”
- **How to search.** Four percent of the students stated that they still had questions about searching for information.

Students reported:

- “I still am never sure what to type in the search box, that is always the worst part.”
- “I’m still wondering what to type into the search bar to find what I’m specifically looking for.”

- **Alumni access.** Four percent of the students wanted to know if access to the resources and material was available for college alumni.

Student questions included:

- “When you graduate from IC, can you still access the library webpages as an alumni?”
- “How do you log in when you’re not attending a college?”

- **Why not sooner.** Two percent of the students asked why the library workshop was not taught earlier in their academic career.

One respondent questioned:

- “Why didn't we learn about this earlier in our academic career?”

- **Appraisal.** Two percent of the students mentioned having a difficult time knowing how to critically appraise search results.

One student asked:

- “How to really decide if an article is valid and worth accepting?”

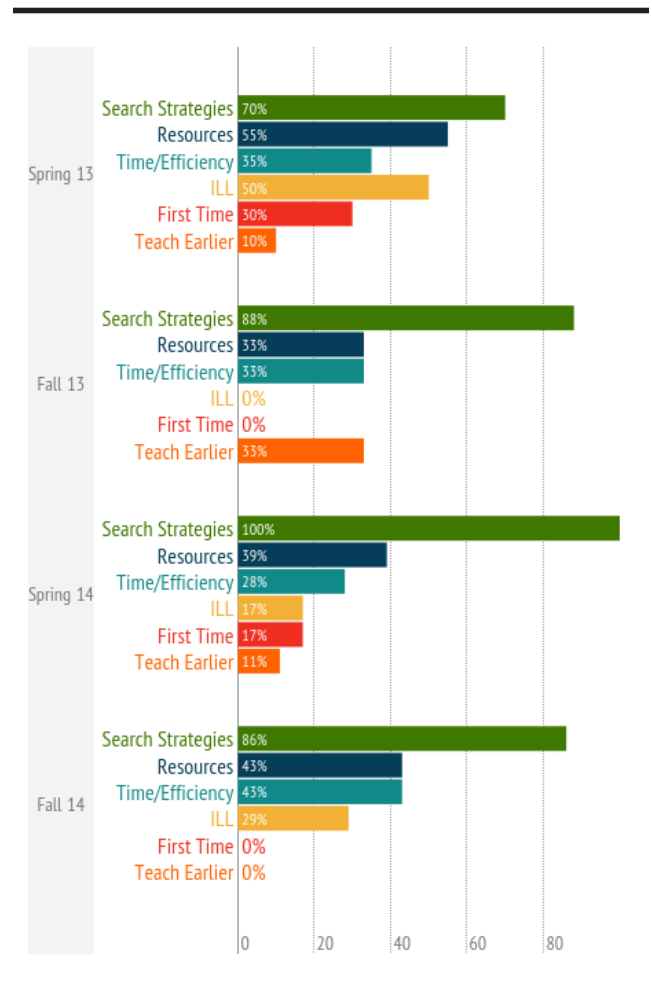
Themes Across the Semesters

The results for both Q1 and Q2 revealed trends and variations across semesters (see Figures 6 and 7, respectively). For example, for Q1, search strategies were the most frequently stated theme across each semester, which matches the total trends. However, participants commenting that the IL workshop should be introduced earlier in the academic curriculum, the fifth most commonly stated theme overall, was the second most frequently stated theme during the fall 2013 semester. For Q2, not having any questions was the most frequently stated response for each semester, which corresponds to the overall trends. Finding the workshop helpful was the second most common response during the fall 2013 semester and the spring and fall 2014 semesters and the third most common response in the spring 2013 semester. Praise was given during the spring 2013 and fall 2013 semesters, but not in the spring 2014 or fall 2014 semesters.

DISCUSSION

We used this study to measure students’ reflections regarding IL and EBP, specifically, their research experience and needs. The OMP data provide evidence that the students found the IL workshop relevant and valuable. Students frequently mentioned “helpful” and “useful” in their responses. Many students indicated that this workshop was their first exposure to

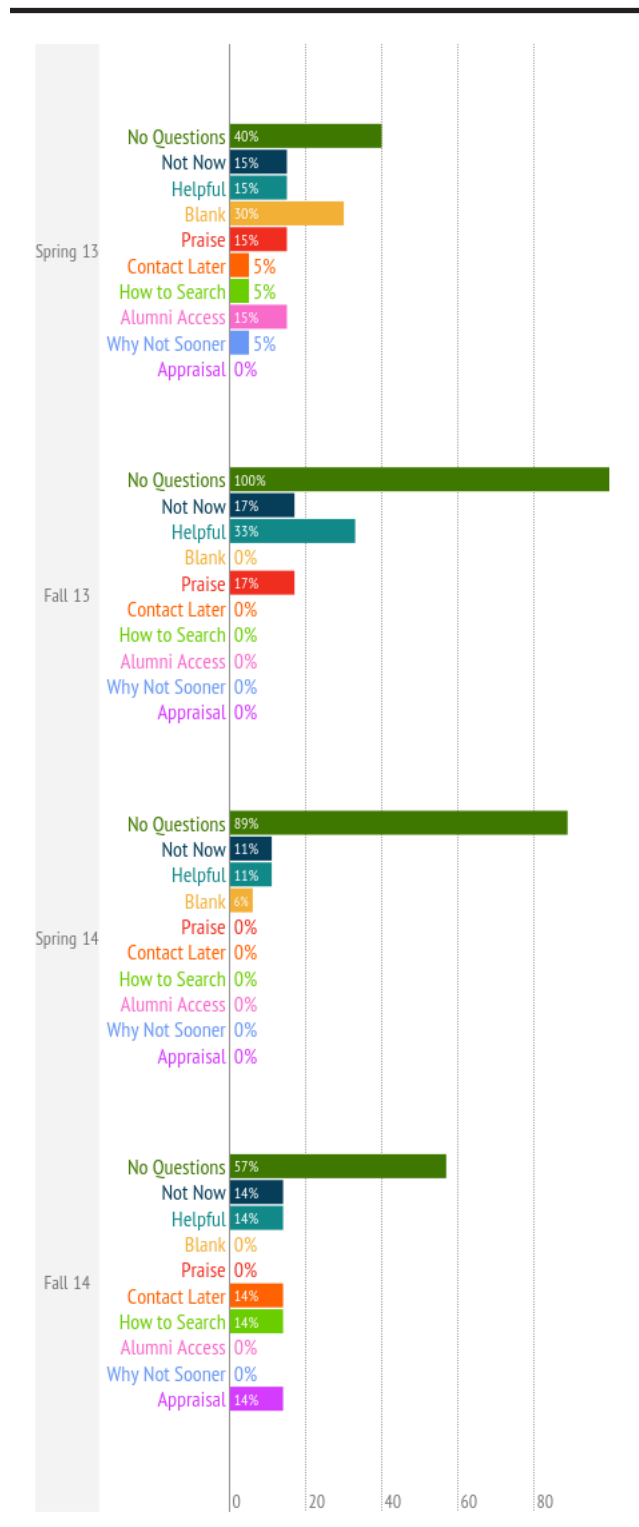
Figure 6. Q1 results across the semester.



various aspects of IL and EBP, including search strategies such as truncation and PICO, specific databases such as PubMed and CINAHL, and the process of accessing information via ILL. In fact, some students questioned why this information had not been taught earlier in their academic career. Their testimonials support the premise that EBP training should be incorporated early and often in the academic curriculum. At present, the curriculum is being evaluated by the SLPA faculty, the college librarian, and the health sciences librarian at Ithaca College in order to formally integrate EBP and IL into the curriculum in a developmental and progressive manner (Kuo & Chabot, 2014).

To strengthen the faculty–librarian partnership, we recommend that librarians provide course-integrated IL instruction in classes where assignments require research and the use of library resources. We also endorse the use of librarian-created course guides to support research-based assignments. Finally, we advocate for librarian participation in faculty department

Figure 7. Q2 results across the semester.



meetings on a regular basis so as to build and sustain the collaborative relationship.

The hands-on library workshop at Ithaca College is effective because it exposes students to research

skills and resources that enable them to find evidence-based assessment and intervention articles and complete their EBP assignment. Collaboration between the librarian and faculty member is crucial to the success of the library workshop. The librarian teaches meaningful IL and EBP skills and corresponding resources for students to complete their course assignment. The faculty member provides context for the speech-language pathology discipline and reinforces the importance of developing research skills as part of the EBP process.

The overall results of this study are unique in that they are based on an IL class for a senior-year capstone course at Ithaca College, but the trends over the various semesters imply that the findings may translate to other similar academic speech-language pathology IL sessions.

Furthermore, the findings suggest that students in the library workshop learned IL skills that are necessary for overcoming EBP barriers to integrating research into clinical practice, as identified in the literature. For example, 84% of the students in our study stated that learning effective search strategies was useful for their course work. Forty-five percent of the students placed value on learning about relevant resources such as the library databases. Presumably, an awareness of these resources may increase students' chance of using them in a thoughtful and strategic manner. The students also reflected on other complexities of the EBP process such as time-saving techniques for locating information and the need for more EBP education. Knowledge and experience with searching for and retrieving needed information through EBP education does not fully address the lack of time barrier; it may, however, minimize the barrier by improving efficiencies and the use of time when performing research. Students also reflected on EBP steps beyond locating the evidence, including critical appraisal.

The students' OMP reflections indicated that they gained knowledge and skills in, and developed a curiosity about, the multidimensional EBP process. This makes the case for the inclusion of IL education in academia that is collaboratively planned and delivered by librarians and teaching faculty to encourage the systematic use of EBP in speech-language pathology. This also makes the case for surveying students as a method of informing curricular change.

Limitations

The generalizability of the findings of this study is limited in various ways. The class size varied for each semester, with the spring 2013 and spring 2014 classes being nearly 3 times larger than the fall 2013

and fall 2014 classes. With such a large range in class size between semesters, it is difficult to know if class size contributed to the differences in students' overall perceptions and reflections of the IL workshop. For example, in the smaller fall 2013 and fall 2014 classes, resources and efficiency were tied as the second most common response, whereas in the larger spring 2013 and spring 2014 classes, efficiency was ranked fourth and third, respectively. In a class with fewer students, the librarian and faculty member may have been able to provide better one-on-one help and address learning-based problems at an individual level. A lower student-teacher ratio may impact student appreciation for the value of efficiency gained from learning and using the various research strategies and resources.

Another limitation of this study is its reliance on the small sample size of OMPs. With a larger sample size, it is possible to have stronger and more reliable results along with uncovering more themes and connections between the themes. Collecting only qualitative data is another limitation to this study. Using a mixed methods approach of analyzing qualitative and quantitative data may better indicate students' needs, knowledge, and skills in searching for, locating, and appraising evidence in the field of speech-language pathology.

An additional limitation is the length of the workshop. Teaching sophisticated and advanced search concepts and several resources in 75 min is challenging. Students' responses to the OMP may have been affected by the newness of the information, especially with Q2: It may be challenging or impossible to have a question when the information is unfamiliar. Students may not yet know what questions they have about IL and EBP.

One final limitation is the lack of follow-up with students to assess if the IL training altered their EBP research skills and improved their knowledge base. Without a reexamination, it is impossible to know the potential extent and impact of the IL workshop, if any.

Future Research

To further evaluate students' IL and EBP skills, we suggest a systematic ongoing collaboration between librarians and the SLPA department faculty. At present, the library and SLPA faculty at Ithaca College are discussing the best ways to integrate IL into the curriculum early and often. Infusing this EBP information throughout the curriculum would provide more opportunities for students to develop and practice the complex IL skills necessary for successful EBP implementation.

We are interested in collecting quantitative data using the Communication Science and Disorders Research Readiness Self-Assessment (CSD-RRSA; Ivanitskaya, O'Boyle, & Casey, 2006; Ivanitskaya et al., 2012; Ratcliff et al., 2013). The CSD-RRSA is a 49-item test that contains multiple-choice and true/false questions that measure students' ability to search for and evaluate health information, with a focus on communication science topics. Upon completion of the CSD-RRSA, a detailed and individualized narrative is provided to the student, describing his or her research strengths and problem areas while reinforcing the academic library and librarians as the best starting place for finding good information. The report also offers links to institution-specific library resources, health-related websites, and other resources to assist in information evaluation and the avoidance of plagiarism. Research has shown that using the health version of the RRSA as a pretest improves the effectiveness of IL library workshops and motivates students to improve their research skills by engaging with a librarian (Ivanitskaya et al., 2012). We recommend implementing the CSD-RRSA as a pretest to collect a baseline needs assessment of student competencies in IL, and at the end of the semester to see if students' IL skills change after exposure to the EBP workshop.

We are also interested in evaluating the best pedagogical approach to teaching IL and EBP to speech-language pathology students. For example, one area that is currently being discussed in the field of speech-language pathology is the value of PICO. Hoffman et al. (2013) stated that PICO is inadequate as the primary focus for teaching EBP because it fails to include critical appraisal and application of the evidence. Moreover, it is being suggested that PICO is altogether insufficient for framing questions in the field of speech-language pathology when compared to alternatives such as PESICO (person/problem, environments/intervention, stakeholders, and outcomes; Kloda & Bartlett, 2014). PESICO was first introduced into the literature more than 10 years ago (Schlosser, 2003; Schlosser, Koul, & Costello, 2007; Schlosser & Neil-Pirozzi, 2006) and is an area that would benefit from further investigation and research.

Conclusion

It is essential that academic programs in speech-language pathology help to close the gap in using evidence-based approaches in clinical practice by teaching students early and often about each step of the evidence-based process. The hands-on library workshop at Ithaca College provides an effective model for teaching the IL skills that are necessary for locating evidence-based information. Student feedback

showed that the collaborative, active-learning approach is positive, informative, and valuable. Based on the OMP results, IL instruction will continue in our clinical methods course on a regular basis and must be incorporated into the undergraduate curricular sequence earlier and more frequently.

Collaboration between SLPA faculty and librarians is key as students develop subject-specific research skills that are more likely to be carried over to graduate work and clinical practice. Furthermore, as accessibility to health sciences information improves and platforms evolve, thereby changing the mechanics of research and varying the format and content of information, it is more important than ever that SLPA faculty and health sciences librarians work together to teach IL and EBP.

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APPENDIX A. ITHACA COLLEGE DEPARTMENT OF SPEECH-LANGUAGE PATHOLOGY AND AUDIOLOGY CLINICAL METHODS

Purposes:

1. To learn about the EBP process.
2. To access evidence-based information.
3. To research an area of speech-language pathology/audiology that intrigues you.
4. To summarize the EBP information in both written and verbal format.

Directions for the written portion of the assignment:

1. Using strategies discussed in class, access evidence-based information about speech-language/audiology interventions and/or assessments with a population of your choice (Early Intervention, pre-K, school-age, adolescence, adults, and geriatrics).
2. Choose one article/study and write a two page summary including the following:
 - A. APA citation at **top** of the first page. (10 points)
 - B. A **brief** summary of the main points/findings. (30 points)
 - C. A **brief** description of **two** experiences you encountered in your EBP information search process for this assignment. (20 points)
 - D. A **brief** description of **two** things you learned from the article. (20 points)
 - E. A **brief** description of **two** ways that this evidence-based information could impact you in your clinical practice and/or future career. (20 points)

APPENDIX B. ONE-MINUTE PAPER SURVEY



We are interested in your reflections about the class presentation on searching for evidence-based clinical research using the Ithaca College library's databases. Your participation in this project may provide you with a better understanding of how this experience prepared you for your future coursework and career.

Participation in this project requires the completion of a One Minute Paper consisting of two questions. It should take about one minute to complete.

Submission of this survey verifies that you are at least 18 years of age and indicates your consent to participate. Submission of this survey also allows for data that is collected to be presented at conferences and may be submitted for publication in journals related to speech-language pathology and audiology and allied health sciences. No names will be associated with the information that is collected. There are no risks associated with participation in the project and you may withdraw from the project at any time.

What information did you learn today that you think will be the most useful to you in your SLPA coursework?

What questions do you still have?

