ABSTRACT: Purpose: There is evidence that exposure to evidence-based practice (EBP) during the American Speech-Language-Hearing Association (ASHA) clinical fellowship is a predictor of the use of EBP resources in professional practice (Zipoli & Kennedy, 2005). Efforts to train graduate students and clinical fellows in EBP and clinical research would benefit from increased collaboration between academic faculty members and clinical supervisors in the community. Method: The triad model of research–clinical training is described, focusing on the collaborative roles of academic faculty members, clinical supervisors, and students/clinical fellows in this enterprise. Results: The article includes guidelines for how to best integrate the three prongs of the triad in order to facilitate the implementation of EBP from the early stages of academic training to external clinical practicum, clinical fellowship, and beyond. Examples from a research methods course and ways to streamline the transitioning of EBP from academic courses to clinical practice are outlined. Conclusion: Combining the efforts of academic faculty members and clinical supervisors in training students and clinical fellows in EBP using the triad model can result in a seamless and effective use of EBP.

KEY WORDS: administration or supervision, education, scholarship of teaching and learning, speech-language-pathology

Speech-language pathologists (SLPs) and audiologists who are certified by the American Speech-Language-Hearing Association (ASHA) are expected to implement evidence-based practice (EBP) in their clinical work (ASHA, 2005). As defined by Sackett, Straus, Richardson, Rosenberg, and Haynes (2000), EBP is “the integration of clinical expertise, best current evidence, and patient values to provide high quality services reflecting the interests, values, needs, and choices of the individuals we serve” (p. 1).

EBP provides a framework for the ongoing critical evaluation of evidence in assessments, treatment planning, and implementation, which can guide the selection of best possible, individualized interventions and outcomes. According to ASHA’s Joint Coordinating Committee on EBP, “the futures and interests of individuals with communication disorders,
practitioners and researchers are all served through EBP” (Robey et al., 2004, p. 18). Therefore, not only is promoting EBP critical to the professional scope of practice, but it is also necessary to improve “the sense-of-wellness and functional health among the clinical populations receiving our professional services” (Robey et al., 2004, p. 2).

Over the last few years, ASHA has increasingly provided support for clinicians to learn methods of EBP and to access EBP resources through the ASHA website and sponsored programs. However, the use of EBP resources by clinicians is not consistent and is often met with resistance due to many factors such as a lack of time, lack of required skills to evaluate resources, difficulty accessing reports, and so forth (e.g., Schlosser & Raghavendra, 2004; Zipoli & Kennedy, 2005). A small-scale study by Sanchez and Anema (2011) indicated that “negative reactions and misconceptions of EBP” (p. 2) existed among speech-language pathologists (SLPs), clinical fellows (CFs), and graduate students. Whereas the CFs and graduate students reported difficulty in the clinical application of EBP, the SLPs consistently had negative experiences with the process.

Similar challenges exist in the academic training and implementation of EBP and how it is addressed in clinical education. Students often perceive a gap between what they are learning about EBP in the classroom and its clinical application (e.g., Alverson & Greenwald, 2009). Togher et al. (2011) validated this finding by reporting a disconnect between how EBP is addressed in academic courses and in clinical education. They found that whereas EBP is intentionally taught in academic courses, there is no such emphasis in clinical education. Inadequate training of EBP skills in students poses difficulties for implementing EBP after graduation. For example, students who had gained EBP skills toward the end of their academic career were at high risk for losing those skills soon after graduation (Connoly, Lupinacci, & Bush, 2001). Thus, even though academic training of EBP through course work appears to be simple and straightforward, its practical application for the clinical decision-making process can be problematic.

In the recent past, there have been numerous efforts to address these challenges by strategically infusing EBP into the academic curriculum. Some pedagogical examples include integrative learning opportunities (Anema, 2014), problem-based learning (Visconti, 2010), and the use of infusion and hybrid models (Christie, Woodall, & O’Rourke, 2008; Hall-Mills & Apel, 2007). Although these training methods show promising results from a teaching perspective, the implementation of EBP can still be problematic from the student and clinician perspectives. Practicing clinicians may be aware of EBP; however, their clinical decisions are not always guided by the external evidence of the EBP process (Bothe, 2010), and they may give more weight to clinical expertise than to other aspects of EBP (Hart & Klienhans, 2014). In fact, some practicing clinicians were found to equate EBP to attending lectures and workshops led by experts in the field (Mullen, 2005). Students have been found to have biases and misconceptions about EBP, such as assuming that the clinical methods taught to them are evidence based and/or that evidence for such materials is readily available on the Internet (Dowden, 2006).

Therefore, bridging the gaps between the stakeholders of EBP—academic faculty members/researchers, practicing clinicians, and students/CFs—is vital to the successful implementation of EBP. Top-down efforts by ASHA to facilitate the training and use of EBP are part of the solution, but focused local initiatives could speed consistent use of EBP nationwide. In this article, we provide guidelines for training graduate students and CFs in EBP using a triad model of collaboration. This is a structure for developing skills in EBP by building practical partnerships and explicitly training collaborative skills.

**THE TRIAD MODEL**

The triad structure that we propose for EBP training includes three participants: the academic faculty member, the clinical supervisor, and the student. In this three-pronged approach, all three participants are co-learners; the education of the student is not the only learning goal. The main goals of the triad model are (a) to increase the use of EBP among the three members and (b) to explicitly train academic–clinical collaboration.

Improved and ongoing communication among the three members may also lead to increased use of EBP to promote quality of service to the public and potentially facilitate clinical research. We explicitly included three people in the triad because all three stakeholders are necessary for the student to learn about collaboration and effective ways of implementing EBP as a team.

In the triad model, the academic faculty member is the person who is charged with the responsibility of imparting EBP knowledge to students in an academic environment. The clinical member of the triad is a clinical supervisor who is either internal or external to an academic department (in the rest of the article, the term clinical supervisor will be used to refer to both internal and external supervisors, unless otherwise specifically mentioned). Internal clinical supervisors may not participate with academic faculty...
members in EBP training; it is even less likely that supervisors at external clinical placement sites are included in department initiatives related to research methods course work or EBP training. However, both internal and external clinical supervisors are well positioned to demonstrate the practical value of EBP for students. This is particularly true in the case of students who are exposed to EBP at external clinical placements during graduate training (Zipoli & Kennedy, 2005). Both the clinical fellowship and the external clinical placement would allow students to observe the application of EBP principles in the “real world” outside of the university. Finally, the student member of the triad is a graduate student or CF, and more than one student could interact with the same pair of academic and clinical members.

Active and ongoing relationships between university training programs and external clinical supervisors closely resemble the collaborative models idealized in the National Institutes of Health translational research structure (Handley et al., 2010). The clinical network attached to each university graduate training program in speech-language pathology or audiology is often a rich structure that has been built over many years; this can serve as the foundation for strengthening EBP partnerships. This may require that academic and clinical members go outside their “comfort zone” to develop increased co-teaching, co-learning, and communication. However, the initial effort expended in setting up this structure and strategies for communication is likely to lead to a range of professional benefits for all triad members.

Benefits for the academic faculty member of the triad include enrichment of teaching methods to more clearly demonstrate for students how EBP principles can be applied efficiently in clinically relevant ways, development of professional relationships with clinicians for clinical research support and ideas, and increased access to clients who may volunteer to participate in research studies. Benefits for the clinical supervisor include co-teaching opportunities in which the clinical supervisor can contribute to the clinical perspective on using EBP, closer ties to academic faculty members for clinical research support and development of clinically relevant research ideas, and a possible increase in access to external research databases, enabling the clinical supervisor to make more informed choices of intervention methods in clinical practice, particularly for external clinical supervisors. Finally, the student member benefits from the co-teaching efforts of the other two as they integrate classroom and clinical goals for EBP and the student directly observes day-to-day details of collaboration that will influence his or her own ability to develop collaborative approaches to EBP in future work. The student also functions as a co-learner, contributing knowledge and skills such as computer and library search abilities. For all three members, working as a team could address the time constraints cited earlier as a barrier to EBP.

Before discussing the triad model further, it is important to address the academic faculty, clinical supervisor, and student perspectives in the collaborative implementation of the EBP process. Of the three relationships among the triad members, it is the relationship between the academic faculty member and the clinical supervisor that has received the least attention to date and which may contribute the most to this collaborative learning model.

THE ACADEMIC FACULTY PERSPECTIVE

Academic faculty members are responsible for educating students about the nature and importance of EBP and for facilitating the systematic use of EBP in clinical practice. This process includes an academic, didactic component and a subsequent clinical application phase, but particular attention needs to be paid to the transitional process between classroom and clinical practice. That is, to maximize a smooth transition between academic knowledge and clinical application, it is necessary to involve both academic faculty and clinical supervisors in order to foster good communication and collaboration between both parties. Although the professional literature contains some advice regarding the academic teaching of the topic, little practical information is available on transferring this knowledge to clinical skills. This section will review the responsibilities of the academic faculty in teaching EBP to graduate students from both an academic and a clinical perspective. The practical description of the process illustrates our collective experience with the process.

Providing students with a sound academic and clinical background in EBP can be divided into three distinct objectives: (a) emphasizing the importance of EBP principles (b) imparting EBP knowledge, and (c) transitioning from academic knowledge of EBP to on-campus clinical applications. Ultimately, the goal is to help students to generalize EBP use from on- to off-campus clinical activities.

Emphasizing the Importance of EBP Principles

The importance of EBP must be demonstrated throughout the graduate program, rather than only in the classroom or only in the clinic. In academic course work, the responsibility of the instructor is to emphasize all of the advantages provided by applying EBP.
For example, it should be underscored that EBP (a) helps practicing clinicians provide superior, ethical clinical services to their clients; (b) guarantees that the clients receive the best possible service; and (c) maximizes the cost-to-benefit ratio for third-party payers. Naturally, the same emphasis on the value of EBP must be carried over to the students’ clinical experiences. The clinical supervisor’s responsibility is to model and help the students realize that EBP is the most effective way to provide the best possible professional service. All three prongs of EBP (i.e., best external evidence, clinical expertise, and client/family input and circumstances) must be equally stressed in both academic and clinical contexts.

**Imparting EBP Knowledge**

In addition to the realization that EBP principles are crucial for superior clinical work, the students must acquire a theoretical understanding of EBP and learn to apply the various EBP constructs in structured guided exercises. The responsibility of the instructor is to develop a strong personal knowledge of EBP principles in the students, as well as a commitment to use effective instructional methods.

Several authors have described a framework for teaching EBP to students in speech-language pathology (e.g., Klee, Stringer, & Howard, 2009; Laing Gillam & Gillam, 2008; Wolter, Corbin-Lewis, Self, & Elsweiler, 2011). Virtually all of these authors emphasize the importance of the first prong of EBP: external evidence. They suggest including such concepts as population, intervention, comparison, and outcome (PICO) questions; strategies for successful searches; and overall evaluation of evidence. However, only a small minority of authors include the other two prongs: that is, clinical expertise and client/family preferences and circumstances (Laing Gillam & Gillam, 2008; Wolter et al., 2011). The models described in the literature, however, tend to interpret “clinical expertise” as familiarity with the target rehabilitation approach instead of the more recent interpretation of “practice-based evidence” (Lof, 2011) in which the scientific method is applied to clinical interactions and data gathering. In addition, even the well-articulated models lack details on how to go about “evaluating the evidence.” For example, only one model mentions the importance of discussing validity (Wolter et al., 2011, p. 120). The students will only be able to evaluate the evidence presented in a research article if they possess all of the necessary tools, such as a basic understanding of statistics, research design, and internal and external validity threats.

In sum, as far as course content is concerned, the published models offer good overall suggestions but fall short in scope and/or level of detail. Based on this literature and on our own personal experience, we created a list of topics that should be part of a research methods course (see Table 1), and we describe how we have implemented these course elements.

A good research methods course starts with discussions on the nature of science (as opposed to pseudoscience), the scientific process, and scientific thinking. Of particular importance is the awareness that clinicians are involved in the same processes as researchers (e.g., formulating hypotheses, measuring behaviors, drawing appropriate conclusions). Scientific thinking is discussed as a healthy skepticism vis-à-vis others’ statements and opinions, as well as the realization that our brains fall easy prey to finding imaginary patterns and to drawing cause–effect conclusions based on unrelated but co-occurring events.

The next important topic is the construct of EBP. Prong 1 (i.e., external evidence) includes a discussion of the external PICO question (i.e., a PICO question answered by the literature search), a review of the strategies for finding the best available evidence online (e.g., Academy of Neurologic Communication Disorders and Sciences website, ASHA compendium), and a discussion of the principles of evidence evaluation. Prong 2 (i.e., clinical expertise) is presented as “practice-based evidence” following the logic of Lof (2011). The revised label emphasizes the importance of applying scientific thinking to clinical interactions, including the use of internal PICO questions (i.e., PICO questions answered by the results of treatment measurements). This process addresses effectiveness

**Table 1. Example of the topics that should be covered in a research methods course.**

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction: What is science?</td>
</tr>
<tr>
<td>What is research?</td>
</tr>
<tr>
<td>Why worry about research?</td>
</tr>
<tr>
<td>The research process.</td>
</tr>
<tr>
<td>EBP: prong 1, 2, and 3</td>
</tr>
<tr>
<td>Contents of the professional article</td>
</tr>
<tr>
<td>Types of research</td>
</tr>
<tr>
<td>Qualitative vs. quantitative research</td>
</tr>
<tr>
<td>Quantitative research: the variables</td>
</tr>
<tr>
<td>Types of quantitative research</td>
</tr>
<tr>
<td>Qualitative research</td>
</tr>
<tr>
<td>The case study</td>
</tr>
<tr>
<td>Quantitative research design</td>
</tr>
<tr>
<td>Internal and external validity</td>
</tr>
<tr>
<td>Treatment designs</td>
</tr>
<tr>
<td>Statistical concepts</td>
</tr>
</tbody>
</table>

**Note.** EBP = evidence-based practice.
rather than efficacy. Finally, prong 3 (i.e., client/family preferences and circumstances) is also presented and practiced. For each of these EBP prongs, the forms developed by Dollaghan (2007) are introduced and practiced, but other sample forms are also examined (e.g., Limoncello & Fanning, 2011).

The remainder of the course is designed to give students the tools needed to evaluate evidence and to become competent scientist–clinicians. The students discuss the traditional sections of a research article, the different types of research, the types of variables (e.g., dependent, independent, extraneous, control), various research designs, internal and external validity, and treatment designs (i.e., how to control variables more effectively in clinical settings), and finally review important statistical concepts. It is only when they have all of these tools at their disposal that students can competently evaluate available evidence. Naturally, practical exercises punctuate this progressive learning.

In addition to content, teaching strategies must also be carefully considered. Many authors agree that course work on EBP must be enhanced by multiple practical exercises and ideally use case-based learning (Greenwald, 2006; Scherer & Smith, 2002; Wolter et al., 2011). In our experience, the class assignments should be designed as a combination of practical exercises and practical application of concepts. At first, the students practice writing PICO questions are required to find, present, and discuss appropriate illustrative research articles, as the concepts are covered in class. In addition, using the guidelines/forms for evaluating external evidence (e.g., Dollaghan, 2007; Limoncello & Fanning, 2011), students develop and refine their own personal version of an EBP evaluation form and practice filling it out to evaluate research articles (i.e., prong 1) throughout the semester. Toward the end, the students submit a self-evaluation of a recent clinical assignment centering on the following question: “Based on my accumulated knowledge of EBP, would I modify any aspect of my approach with this particular client?” This practical application is thus made pertinent to the students’ concomitant clinical experiences. Finally, as a capstone practical application, the students are randomly assigned a specific treatment approach that they have to evaluate. They are required to perform an analysis of the evidence in the literature using the personal EBP form that they developed.

In our experience, the course contents described here are effective in preparing students to become effective users of EBP in an academic environment. However, transitioning from academic knowledge of EBP to on-campus clinical responsibilities is the next crucial step in EBP process training.

### Transitioning From Academic Knowledge of EBP to On-Campus Clinical Applications

In a survey of Australian SLPs, Togher et al. (2011) reported some encouraging trends regarding SLPs’ awareness of and attitudes toward EBP. The results strongly suggested that professionals (both academic and clinical) enthusiastically embraced EBP but showed some significant shortcomings in bridging the gap between EBP knowledge and clinical application. For example, Togher et al. reported that the clients’ needs (i.e., prong 3) were not always considered, even though external evidence was reviewed. Although the SLPs had a good understanding of EBP, only a small minority referred to EBP to support their clinical rationales. Incorporating all aspects of EBP in clinical training thus remains a singular challenge. Particularly revealing was the reportedly weak collaboration between academic faculty members and clinical supervisors and their discrepant levels of student expectation. In sum, this survey by Togher et al. highlights the fact that the transition between knowledge and skills is difficult to realize but partially hinges on good communication between academic faculty and clinical supervisors. The responsibility of the academic faculty member in this phase is to create a transition between classroom practice and real-life clinic application by articulating common expectations.

In order to facilitate this process, the clinical supervisors need to be aware of the course contents and of the knowledge and skills level expected of the students. The easiest solution is for the academic instructor to organize an in-service during which he or she explains these elements to the clinical supervisor, including the purpose and details of the clinical applications exercises. This meeting may be repeated in case the course contents change significantly or when personnel changes require it.

Another well-recognized crucial element in transitioning from classroom to clinic is to maintain a common set of forms between the academic and the clinical trainings. For example, Wolter et al. (2011) offered a sample form they use in both academic and clinical settings. We address this step by allowing the students to use the personal EBP form that they developed in the research methods course during their clinical experiences. By empowering the students to generate their own form rather than imposing an existing checklist, academic faculty members make sure that its use becomes easier because the students take ownership of the protocol and feel more comfortable filling it out. All clinical supervisors, as a consequence, may have to become familiar with the students’ idiosyncratic forms rather than the other
way around. However, the academic faculty member needs to ascertain that all EBP forms generated as part of the course include all of the important variables needed to effectively judge the quality of the evidence presented in a research study.

A final element in our EBP implementation process is the use of a common treatment plan form for each client who is treated in the on-campus clinic (see the Appendix). This form includes all three EBP prongs, and every clinical supervisor requires each student clinician to fill out this paperwork for each client. This process reinforces the importance of EBP in all cases and trains the students to apply EBP principles in a systematic fashion. Additionally, practice using the EBP forms in a clinical rather than an academic context enables the students to make appropriate intervention decisions in regard to their assigned clients.

In conclusion, it cannot be overstated how important this transitional phase is in the overall process. In our view, the important elements to maximize the use of EBP in the clinic are (a) implementing class-based practical EBP applications that ideally include students’ current clinical assignments, (b) allowing the students to create EBP forms they are comfortable using, (c) developing a common set of student expectations regarding EBP by facilitating communication exchanges between academic and clinical faculty members, and (d) maintaining the same set of EBP forms in the academic and clinical settings and across clinical supervisors.

Thus, the academic faculty members and clinical supervisors have a major responsibility in guiding the students through EBP training, in both the academic and clinical realms. The main challenges reside in the transition from classroom to clinic as well as between on- and off-campus clinical experiences. To accomplish those objectives successfully, the responsibilities of the academic faculty members must dovetail with those of the clinical supervisors.

THE CLINICAL SUPERVISOR PERSPECTIVE

Carryover of the use of EBP from the classroom into clinical settings, both on and off campus, is another process that requires time and effort by the academic faculty member, clinical supervisor, and student. It is evident that students’ off-campus clinical experiences have a major impact on their long-term use of EBP (Zipoli & Kennedy, 2005). Once students leave the university clinic and begins working with clients in real-world settings, the external clinical supervisor plays a pivotal role in the continued use of EBP. Often, this experience is overwhelming to students, and the application of EBP in this new setting must be encouraged and mentored.

A survey presented by Sykes (1997) listed the top-ranked descriptors of “best supervisor” with the following: (a) good listener; (b) supportive/approachable/available; (c) experienced, willing to teach; (d) positive; (e) good role model; (f) enthusiastic; (g) good organizer; (h) gives clear expectations of performance; and (i) allows independence but with guidance for success. These descriptors can apply to a clinical supervisor who is mentoring a student through an on- or off-campus clinical experience, but these descriptors further apply specifically when the learning experience involves EBP.

Clinical supervisors, who have a good understanding of EBP, can intertwine this understanding with a practical, functional experience for students. There are three goals that must be considered in the process of supervising a student in the use of EBP. First, the clients’ needs and their progress toward their goals should be the guiding principle of any decisions that are made. Second, the clinical supervisor will be working with the student to apply the principles of EBP to decisions regarding the evaluation and treatment of clients. In order to ensure this, the clinical supervisor should be informed about the expectations of the EBP course. Third, the supervisory process must involve the student so he or she can gain clinical knowledge and independence that will allow him or her to practice with less and less need for supervision.

In order to empower the student to become an independent and successful clinician, the clinical supervisor must be dedicated to advancing the agenda of both the therapeutic process and the supervisory process. The clinical supervisor must have knowledge of the caseload and of each client’s needs. In addition, communication regarding the clients must be ongoing between the student and the clinical supervisor. Such communication is best facilitated by the supervisory process as detailed by Anderson (1988). This process involves several stages where the student moves from a more passive/dependent role to an active/independent role in the supervisory process; the clinical supervisor moves out of a direct-active teaching method to a more collaborative style so as to allow the student to become more independent in the use of the EBP process and clinical skills. As a practical example, a clinical supervisor and a student could fill out the student’s EBP form together at first, with progressive fade-out from the clinical supervisor.

A lack of interest and knowledge concerning current practices in the profession on the part of clinical supervisors can create a setback for continued implementation of the EBP process. For example,
a survey of 36 SLPs with an average work experience of 22 years, most gave only partially complete definitions of EBP, although 67% reported knowing ASHA’s position on the use of EBP (Whites, Gumiela, Pitman, Janke, & Yaeger, 2007). An area of concern that emerged from the results was that although 81% of the SLPs reported “comfort” in using EBP, only approximately 50% of them reported using journal articles or books in clinical decision making. Given that and the fact that most of the respondents were not able to define EBP completely, there seems to be disparity between SLPs who report being familiar with EBP and those who actually apply the EBP principles in clinical practice (i.e., using books/articles).

Another frequently cited barrier to EBP implementation is a lack of time. However, Robey (2011) underscored that the search for EBP evidence cannot be implemented with all treatment approaches at once. He recommended that clinicians select one technique at a time. Remembering this recommendation will help the clinical supervisor as well as the student manage the time commitment inherent to the application of EBP both on and off campus. We have identified four major challenges that might impede the use of EBP in supervisory/student situations. Table 2 presents these challenges and provides alleviating strategies that help in generalizing EBP use from on- to off-campus clinical activities.

In summary, a clinical supervisor who is successful in the use of EBP with a student will have a good understanding of EBP and a commitment to the student in both on- and off-campus settings. He or she will also use resources provided by both the

Table 2. Challenges that might impede the use of EBP in supervisory/student situations and alleviating strategies.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Possible alleviating strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor takes on additional time and effort to work with students/clinical fellows.</td>
<td>a. Ensure that supervisors understand EBP and the nature of the commitment to the student/clinical fellow.</td>
</tr>
<tr>
<td></td>
<td>b. Discuss the supervisor’s motivation for taking on an externship student; the learning goes both ways in these situations when the supervisor is open to new experiences and ideas.</td>
</tr>
<tr>
<td>Supervisor may not have up-to-date knowledge or not be using EBP effectively in his/her practice, currently.</td>
<td>a. Construct an online site for the use of both students and supervisors where open discussion can facilitate learning on all parts.</td>
</tr>
<tr>
<td></td>
<td>b. Incorporate the real-life experiences of the recent graduates in their clinical fellowship into the research methods course. Based on the description of a current “real-life” case, the graduate students in the course can be asked to provide the literature search results and to develop suggestions for prongs 2 and 3; this process benefits the practicing clinician and the students who are learning to apply EBP, as well as the clinicians in their clinical fellowship who are provided with the information and continue to apply EBP to their caseload.</td>
</tr>
<tr>
<td>General time commitment that is required in instructing a student at this higher level can be demanding.</td>
<td>c. Send an externship packet to each supervisor with information on examples of EBP studies developed by students in their program and successfully implemented with clients.</td>
</tr>
<tr>
<td></td>
<td>d. Sponsor a forum or in-service training for supervisors.</td>
</tr>
<tr>
<td>Off-campus supervisor’s perception that he/she has limited access to journals, articles, and books that would be necessary to keep current on the research in the field.</td>
<td>a. Use time-saving strategies to locate relevant literature, including PubMed, searches in ASHA journals, and signing up for alerts on certain topics.</td>
</tr>
<tr>
<td></td>
<td>b. Delegate the “work” involved in locating references to both the student and the supervisor.</td>
</tr>
<tr>
<td></td>
<td>a. Create a system that allows the supervisor access to journals, articles, and books that he/she might not otherwise have.</td>
</tr>
<tr>
<td></td>
<td>b. Ensure that the student takes responsibility for securing articles using the university library or facilities.</td>
</tr>
</tbody>
</table>
student and the academic faculty member. If the student, the clinical supervisor, and the faculty member work together to ensure that challenges to the use of EBP are met, it is likely that all will see the experience as positive. Lastly, applying EBP should be extended to the clinical fellowship experience. It has been recognized that being exposed to EBP during the clinical fellowship is the single most important predictor of long-term EBP use (Zipoli & Kennedy, 2005). Unfortunately, there are no ready suggestions available in the literature on how to promote EBP use during that phase of clinicians’ training. However, some of the ideas described earlier could be extended to that learning phase, such as developing a relationship between the newly minted professionals and current graduate students to provide EBP assistance.

THE STUDENT PERSPECTIVE

Undoubtedly, academic faculty members and clinical supervisors play a crucial role in training students regarding the theoretical constructs and application of EBP. However, as co-learners and collaborators in the triad model, students have an equally important obligation to understand their roles and responsibilities, participate actively in the learning process, and develop and implement the knowledge and skills necessary for EBP from very early on in their clinical training. The earlier that students begin to consistently use these principles in their academic and clinical training, the sooner they will be acclimatized to implementing EBP habitually in their clinical fellowship and beyond. Serving as collaborators in the triad, students in clinical training can positively impact the practice of EBP.

It is imperative that students who aim toward becoming certified SLPs meet the various knowledge and skills standards required for clinical certification (ASHA, 2005). In order to achieve the certification standards, students and CFs have to be motivated and engaged in active learning and discussions not only in classrooms, but also in clinical practice (practica and beyond). It is the responsibility of both students and CFs to actively pursue all three prongs of EBP, integrate scientific knowledge and concepts of EBP, and critically evaluate their scope of practice, under the guidance of both academic faculty members and clinical supervisors. In fact, the integration of theory and practice using EBP principles can occur as early as in the preclinical observation period of 25 hr (ASHA standard Vc) and continue through graduate training, clinical fellowship, and beyond. Students and CFs should demonstrate curiosity about their clients’ problems, learn to ask relevant questions, be motivated to pursue appropriate literature reviews pertaining to their clients’ problems of the client, and write reports that reflect the integration of all three prongs of EBP.

However, there often seems to be a gap in the ability of students and CFs to integrate the knowledge of theoretical foundations and principles of research into clinical practice. One of the possible factors contributing to this gap is the attitudes of students and CFs toward evidence-based clinical practice. For example, students and CFs may have differing views on the outcomes of academic training and clinical practice, or they may perceive the two sections of the training program as distinct and separate entities, which can result in problems bridging the gap between scientific knowledge and evidence-based clinical practice.

Mitchell and Audet (2005) asked graduate students who were completing a course on “transition to clinical practice” to develop clinical philosophy statements using a set of structured guided reflection questions. Based on the clinical philosophy statements, the authors found that the students were predominantly functioning from a “humanistic” viewpoint rather than a “scientific” one and had “not begun to integrate the two” (p. 139). They also found that most of the students reported on client and caregiver priorities and building relationships with clients as the most important factors (Prong 3 of EBP) when asked about their perception of “best practice.” Although most students recognized the importance of critical thinking as essential for best practice, none of them was noted to report on “concepts such as data-driven assessment of progress, theory-driven practice, or a distinction between methods and materials” (Mitchell & Audet, 2005, p. 137) as skills that are essential for best practice (i.e., external evidence factors—Prong 1 of EBP). Further, no student reflected on the application of scientific knowledge to promote clients’ success as crucial for best practice, reflecting the lack of integration of the three prongs of EBP (Mitchell & Audet, 2005). This finding clearly underscores the gap between theory and clinical practice.

It is essential that students and CFs understand the importance of their roles not only in building relationships with clients and their families and helping clients make functional gains through meaningful goals, but also in being accountable for the services they deliver and the resulting outcomes. Students and CFs can benefit from role models who use EBP in their everyday practice. Clinical supervisors could demonstrate principles of all three prongs of EBP using a structured process such as the one described earlier (see the Appendix).

A second challenge that can affect successful collaborations and interactions with academic faculty
members and clinical supervisors is the individual learning style of students and CFs. The need for clear and unambiguous descriptions of roles and responsibilities, and hands-on experiences with structured guidance, reflect the learning styles of the present-day generation of students. For example, the Millennial generation (i.e., students born during 1982–2002) requires structure and guidance through teacher/supervisor-facilitated group processes and is interested in practical knowledge (Jackson, 2009). These students require (a) detailed instructions and guidelines to complete assignments, (b) clearly defined expectations, (c) explicit syllabi, and (d) structured assignments (Marteney, 2010). In contrast, Generation-X individuals (born during 1961–1981) are described as preferring one-on-one, individualized teaching by the teacher. They are reportedly interested in the “mystical knowledge,” require no clear-cut structure, and are willing to “just doing it” for the sake of individual experience (Jackson, 2009). This generational clash in learning styles, value systems, and expectations between students and academic faculty members/clinical supervisors can very likely cause gaps in supervisor–student collaboration. For example, on the one hand, the Generation-X academic faculty members/clinical supervisors may expect students to master knowledge and skills with general guidance, by taking self-initiatives to bridge gaps in learning and performing above and beyond the average expectations. The Millennials, on the other hand, might be easily frustrated with a lack of structure, absence of clear-cut and specific directions, and ambiguous expectations and may potentially fail.

In addition to students’ learning style, a third challenge that could arise is when students experience difficulty learning the knowledge and skills needed for best clinical practice due to their individual personality traits. Emphasizing the importance of understanding the personality traits of students in the supervisory process, Baggs (2012) reported that clinical success can be largely dependent on the interpersonal skills of the students and their ability to function as effective team members. Baggs reviewed a number of studies on the personality traits of graduate students and SLPs and observed a shift in the predominant personality type of current-day students as compared to students from a decade ago. Citing the results of studies from the 1980s, he reported that the personality traits of both practicing SLPs and students were similar. On the Jungian classification, they were grouped as the NF type, which means that their traits were more of “intuiting” (N) and “feeling” (F). Such individuals are described as “global thinkers, learning through theories, ideas and deductive reasoning, filling in the details as they learn” (Baggs, 2012, p. 7). However, reviewing the studies carried out in the last few years (2005 to 2010), Baggs observed that the students were more of the SJ temperament, indicating that they are more of the “sensing” (S) and “judging” (J) types. People with SJ temperament are described as “inductive thinkers who have a traditional work ethic and prefer detail, structure, routine and experiential learning” (Baggs, 2012, p. 7). This is once again consistent with the learning styles of the Millennial generation reported earlier.

Given the individual differences in learning styles and personality traits, it is important that students and CFs are helped to understand their own learning styles and personality traits so that they can advocate for themselves in a productive manner and facilitate their learning through better collaboration with academic faculty members and clinical supervisors. The use of structured reflections as described in the sample research design course described earlier can help bridge better collaboration between students/CFs and clinical supervisors.

A fourth problem that can affect successful collaborations is the misconception of students entering the profession, who may be under the notion that everything that is taught in a course (especially assessment and intervention methods) is proven to be effective, with information readily available at their fingertips (Dowden, 2006). They may also understand “evidence” as a top-down approach and follow only what is taught in their academic course work (Dowden, 2006) without evaluating the evidence. It is important that these false realities are nipped in the bud, ideally even before students enter the graduate program. Once again, using structured guided reflections (as described earlier), an integrative learning process (Anema, 2014), or evidence hierarchies (e.g., Reilly, Douglas, & Oates, 2004; Schlosser, 2000) can help students in their pre-clinical and preservice stages to learn the EBP process.

Further, it is also not rare for students and CFs to find themselves in clinical situations where the clinical supervisors may not adhere to EBP, mainly due to a perceived lack of time (Zipoli & Kennedy, 2005). Students and new clinicians also may not have support to apply EBP in the clinical setting, and at times, clinical skills may be “passed” as EBP skills (Connoly et al., 2001). Although a number of strategies to promote EBP by other triad members of the model have already been addressed in detail in the previous sections, it is critical that students and CFs step up to the challenge by understanding their essential roles and responsibilities in the collaborative learning process of EBP. Graduate students and CFs who have received training to function as effective collaborators of EBP can help to make a positive change for all stakeholders by sharing their
knowledge and skills. They must take the initiative to implement the EBP process, specifically, the “practice-based evidence” (Lof, 2011), by completing all of the required steps with every client and by integrating the knowledge and principles of research with the EBP process. When students and CFs use forms from their academic training to complete the EBP process and share such exercises with their clinical supervisors and other SLPs, it can prove to be beneficial to all parties.

In fact, Maxwell (2009) underscored seven important skills that are considered vital for the development of clinical excellence in their graduate training program, including “critical thinking, collaboration, innovation/creativity, risk taking, advanced social perspective taking, active learning, and self-knowledge and reflection” (p. 15). Additionally, their clinical training uses the core critical thinking skills of analysis, evaluation, inference, explanation, and self-regulation, encompassing self-examination and self-correction (Facione, 1998). Thus, an essential part of Maxwell’s training program requires active participation of students, and their roles and responsibilities are identified as follows: Students are expected to (a) be active seekers of knowledge by asking questions and reviewing literature; (b) be critical thinkers by analyzing, synthesizing, integrating, and applying information from academic coursework to clinical practice; (c) work in teams; (d) be creative with new ideas for intervention; (e) “risk making mistakes” (Facione, 1998, p. 30); (f) self-reflect upon their development and performance; and (g) be empathetic. Such explicit roles and responsibilities can aid in developing the qualities of a “scientist–clinician” (Lum, 2002, p. 136) and in integrating all three prongs of EBP in the clinical learning experience and practice.

Thus, it is imperative that students and CFs take an active role in the EBP training process and assume the responsibility of integrating all three prongs of EBP. The ability to synthesize external evidence from client/family preferences, clinical expertise (or rather practice-based evidence), and research is of paramount importance in reaching optimal clinical outcomes. It is critical that students and CFs gain this ability during both their preclinical and clinical training and work collaboratively with academic faculty members and clinical supervisors in the triad model.

### Establish Common Goals

The success or failure of educational collaborations between academic faculty members, clinical supervisors, and students may largely depend on how collaborative goals are defined. As described by Handley et al. (2010), in order to increase the engagement of practicing clinicians, it is important that the collaboration be focused on mutual goals that are clinically relevant and practical. The experience and insights of community clinicians about what is feasible helps to frame EBP questions that are of the greatest clinical importance. Similarly, educational goals for training students in EBP are likely to be most clinically relevant and practical if the academic faculty member and the clinical supervisor agree on specific incremental steps that the student can follow in using EBP resources within a particular clinical setting.

With increased time efficiency as a primary goal, the triad of co-learners can use “problem-based learning” to move forward continually in addressing clinical problems with EBP. Problem-based learning emphasizes student attempts to solve complex real-world problems (Boud & Feletti, 1997; Rankin, 1999), and there is a close link between clinical care and the development of EBP questions and research design in teaching research methods (e.g., Greenwald, 2006). Using this approach, the triad of co-learners may approach a clinical diagnostic or treatment scenario through a series of questions or steps in problem-based learning as outlined by Baptiste (2003): (a) What do we know? (b) What don’t we know? (c) What resources exist to find that information? (d) Who will consult those resources? (e) What do we report back to the group? and (f) What do we need to find out next? If the triad communicates effectively, this basic structure of inquiry and learning will minimize duplication of efforts among team members and support the efficient use of EBP.

### Communicate Effectively

If setting common goals is important, communicating them clearly and effectively will make all the difference in the efficiency of the collaborative effort. Common goals and collaborative steps in EBP can be stated using a common form. For example, each team member can take responsibility for one aspect of an
external search for evidence to supplement diagnostic information about a client, and can enter this new information into the same form in electronic format. A hypothetical division of labor among team members applying EBP to a client with anomia follows:

- The student will locate and enter information about additional diagnostic tests administered to similar clients described in the literature.
- The clinical supervisor will enter information about a treatment approach described in the literature for similar clients.
- The academic faculty member will enter information from the literature about theoretical interpretations of the types of errors the client produces in naming before and/or after treatment.

A common form containing all of this information can be readily accessible to all three collaborators for entering information and reviewing continual updates.

Student training requirements and time requirements also can be elaborated in the common form at all levels of the EBP learning process. The initial group investment in formulating this plan to complete EBP steps and to share information will save time and maintain direction in later stages of the collaboration.

Evaluate and Update the Learning and Collaboration

During graduate training, student learning often is evaluated separately by academic faculty members and by clinical supervisors. However, using a common form to evaluate student learning would support the close link between the academic and clinical use of EBP in the triad model. The academic faculty members and clinical supervisors would rate the student on specifics such as “asking relevant questions” or “locating relevant resources.” Using a common evaluation form, the student would also be asked to evaluate his or her own performance in meeting the group goals for EBP.

Because the collaborative process is expected to result in learning by all three members, the academic faculty member and clinical supervisor would rate their own learning and EBP performance using the common form, so that each member is accountable to him- or herself and to the other members. All three members also would evaluate the collaborative process and suggest possible modifications. This explicit evaluation procedure would support more rapid refinement of the collaborative process than a more casual approach wherein opposing perspectives may not be identified early and discussed as they arise.

For this reason, these ratings may be most useful if they are done at the end of each semester of collaboration, whether the semester corresponds to a course, a clinical rotation, or an externship.

Conclusion

The separate efforts of academic faculty members and clinical supervisors in training students and CFs in EBP can be more effective when they are combined into academic–clinical learning plans using the triad model. All three co-learners—the academic faculty member, the clinical supervisor, and the student—can benefit from participation in this EBP collaboration, with the ultimate goal of providing better outcomes for the clinical populations we serve. To operate within real-world time constraints, the members will need to (a) set mutual goals that are clinically relevant and practical, (b) communicate effectively, and (c) continually evaluate the strengths and weaknesses of the collaborative procedures.

As this model for EBP training is implemented, identifying specific facilitators and barriers to effective collaboration will be possible across different clinical settings. Some collaborative goals such as increasing time efficiency may translate easily across clinical environments, whereas the best strategies for shared responsibilities or setting specific learning objectives may differ significantly from one setting to another. It will also be important to track potential changes in factors such as professional growth and connections, clinical or research access, and clinical outcomes related to EBP. Following explicit steps for university–community collaboration in training students will allow us to examine indicators of progress using the same set of criteria. The existing network of university training programs, each with surrounding links to community clinical placements, offers a strong foundation for local development of EBP collaborations throughout the country.

REFERENCES


Rangamani et al.: Methods for Training EBP 149


York State Speech, Language, and Hearing Association, Saratoga Springs, NY.


Contact author: Margaret Greenwald, 207 Rackham Building, 60 Farnsworth Street, Detroit, MI 48202. E-mail: mgreenwald@wayne.edu
APPENDIX. SAMPLE TREATMENT PLAN EMPHASIZING THE IMPORTANCE OF EBP (WITH EXPLANATORY NOTES)

Treatment Plan

Section II: Evidence-Based Practice

Best Available External Evidence (prong 1)

Background on Disorder (What do you know about the disorder?)

Resources identified with a brief synopsis:

This is designed for the student to get familiar with the disorder, the symptomatology, as well as with the various therapy approaches/techniques from which to choose.

Background on Therapeutic Interventions

External PICO questions:
(These are the PICO questions that help you focus your literature search for the best available evidence)

Objective/therapy approach 1:

e.g., In adult clients with Broca aphasia (P), does SFA (I) improve naming skills (O) more effectively than no therapy (C)

Highest level of evidence source:
Level of Evidence (with justification):
Brief Synopsis:

Highest level of evidence source:
Level of Evidence (with justification):
Brief Synopsis:
(Repeat tables as necessary.)

For ONE of the articles above, submit a filled-out EBP evaluation form

Objective/therapy approach 2: (External PICO question)

Highest level of evidence source:
Level of Evidence (with justification):
Brief Synopsis:

Highest level of evidence source:
Level of Evidence (with justification):
Brief Synopsis:
(Repeat tables as necessary.)

For ONE of the articles above, submit a filled-out EBP evaluation form

Objective/therapy approach 3: (External PICO question) (repeat as needed)

Practice-Based Evidence (prong 2)

Internal PICO questions:
(These are the PICO questions that your own Tx approach will answer)

Objective/therapy approach 1:

e.g., For this particular adult client with Broca’s aphasia and anomia in the subacute stage (P), does the SFA approach (I) improve naming performance (O) more compared to no therapy (C)?
Explain how you plan on setting up your data gathering process to answer your internal PICO question:
e.g., I plan on using a multiple baseline design across variables. Word naming will be targeted first, followed by verb naming, finally, prepositions. Treatment effects will be demonstrated by the staggering of the beginning of the therapy phase for each variable. Spontaneous recovery can be controlled and the internal PICO question effectively answered.

Objective/therapy approach 2:
e.g., For this particular adult client with Broca’s aphasia and agrammatism in the subacute stage (P), does VNEST (I) increase the number of complete and grammatical SVO sentences in conversation (O) compared to no therapy (C)?

Explain how you plan on setting up your data gathering process to answer your internal PICO question:
e.g., baseline will include the measurement of SVO sentences and questions. The syntactic structure of questions will not be targeted in therapy at this point but probes will be gathered at regular intervals. These data will control for spontaneous recovery.

Client/Family Input and Circumstances (prong 3)
List input from family and client about personal functional goals.
List the circumstances that may influence choice of therapy: e.g., no resources for expensive AAC system, no help at home for homework programs, etc.

Discussion of above & Conclusions regarding Therapeutic Intervention:
Explain your choice (and prioritization) of objectives in the light of your assessment as well as prong 3:
Describe why you chose your objectives for this semester and how prong 3 has been integrated in therapy plan, or not (sometimes clients have goals that are too optimistic that don’t match the clinician’s prognosis). Counseling may need to happen to merge clinician’s and client’s goals.