ABSTRACT: **Purpose**: This article describes the implementation of 4 sustainable learning opportunities that were added to a communication disorders program at State University of New York at New Paltz as examples of integrative learning at undergraduate and graduate levels of evidence-based practice (EBP) principles.

**Method**: Examples include an undergraduate research methods course, an EBP project in a graduate research methods course, grand rounds meetings, and an aphasia support group practicum.

**Results**: EBP presentations by final-semester graduate students demonstrated increased independency to answer clinical questions using 5 EBP steps. Feedback about the presentations by supervisors indicated that the students demonstrated increased professionalism and fluency with EBP.

**Conclusion**: The preliminary outcomes are promising for this communication disorders programs and others, especially in light of the few adaptations that were necessary to provide integrative learning opportunities.

**KEY WORDS**: EBP, integrative learning, CMD programs
An examination of reports investigating how EBP principles and skills are taught (e.g., Togher et al., 2011) reveals the many differences in the perspectives of academic staff and clinical educators. For example, although many academic courses teach the principles of EBP, EBP has not been similarly embedded in clinical education. In contrast, clinical educators perceived students to have limited knowledge of research methods to guide the clinical decision-making process. The authors advised that collaboration between academic staff and clinical educators is of high priority with regard to EBP (Togher et al., 2011).

To evaluate how well students in the CMD program at State University of New York at New Paltz (SUNY New Paltz) are prepared with respect to EBP, a small-scale study was completed in which two graduate students, two clinical fellows (CFs), and two practicing speech-language pathologists (SLPs; all from the SUNY New Paltz program) participated (Sanchez & Anema, 2011). In this study, the participants each selected one client and committed to answering a clinical question by using the five steps of EBP as outlined by Tickle-Degnen (2000); (a) develop a well-built clinical question, (b) gather evidence that may answer the question, (c) evaluate the evidence to determine the “best” evidence, (d) communicate with clients (and/or colleagues) about evaluation and intervention choices, and (e) evaluate the chosen evidence-based evaluation and intervention procedures after the implementations were used. The participants provided electronic feedback on their progress with their cases as well as feedback about their experiences. The feedback about their experiences was grouped into positive and negative comments.

In general, there were more negative comments than positive comments about the five-step process (Sanchez & Anema, 2011). Of the three participant groups, the graduate students offered the highest number of positive comments. The CFs and SLPs reported approximately the same number of negative comments. Some general positive comments included that some steps of the process were not time consuming (e.g., to write a clinical question) and that the process allowed a greater variety of therapy possibilities to be presented to a client. A recurring negative comment was that it was difficult to locate high-quality research.

The SLPs reported negative experiences at all five steps of the EBP process. Both SLPs did not feel confident writing a relevant clinical question. One SLP commented that she had chosen the clinical question based on how much research information she could locate. When gathering evidence, the SLPs reported that they did not have time to perform an in-depth search and that they felt that their training had not sufficiently prepared them to read and interpret article and clinical guidelines. Another difficulty that the SLPs noted was the limited access to privately owned databases. The high number of negative comments of this group may be the result of graduating before comprehensive EBP training was implemented in the SUNY New Paltz CMD program.

The CFs had less difficulty with the execution of the EBP steps; however, both CFs commented about the limited exposure to EBP during their clinical fellowship year. The CFs reported not having enough time to engage in the EBP process. One of the CFs stated that she had little contact with colleagues and wished that she could have collaborated with a colleague on the project. One CF noted, like both SLPs, the difficulty of accessing private databases that are made available by universities but not employers.

The third group of participants, graduate students, had the fewest negative comments. They reported that the five steps were clear; however, neither student selected an appropriate client for the project. One of the students was not allowed by her supervisor to involve her pediatric client with this project and was forced to abandon the project after the third step. The second student had selected a (pediatric) client for which goals had been determined for a period of 1 year.

The feedback of the small-scale study (Sanchez & Anema, 2011) demonstrated that negative reactions to and misconceptions about EBP are present in both the educational and professional context. However, the same feedback also suggests that many improvements can be made at the academic program level to offer students better preparation to participate successfully in EBP. First, students need a chance to become more fluent in the EBP process, which will make the task less time consuming. This could partially be accomplished with more hands-on practice, perhaps starting at the undergraduate level. With more practice, the EBP process may become second nature to students while they are still in their graduate program. To accomplish this level of automaticity, students may need to complete more than one EBP project. Another strategy to gain more experience with EBP, but more associated with clinical expertise and client needs, is to incorporate discussions about, and interactions with, EBP. This would facilitate collaboration between academic staff and clinical educators as well. An assessment of the students’ EBP performance before they graduate from the CMD program may also be useful. A pregraduation assessment would allow EBP teaching methods to be monitored and adjusted more quickly and accurately, ensuring that subsequent cohorts benefit from information learned from previous feedback.

These small, separate improvements are important, but what students need most is to acquire
knowledge about EBP as a comprehensive process. Future speech-language pathology clinicians need to be able to recognize, use, and engage in EBP as a process. Once the process and its steps become an extension of students’ clinical and academic interests, they can hone those skills during the remainder of the graduate program.

The purpose of this article is to introduce a technique known as integrative learning to teach EBP to CMD students as a process. The rationale for focusing on integrative learning is based on the number of research projects that have indicated that CMD students are at risk of acquiring minimal EBP skills too late into their programs so that they subsequently fail to adopt them as an essential part of everyday clinical practice (Bloom, 2010; Connoly et al., 2001; Klee, Stringer, & Howard, 2009; Togher et al., 2011).

**Integrative Learning**

A number of integrative learning opportunities have been created at SUNY New Paltz in an attempt to adopt a more process-oriented approach to EBP. Integrative learning is not a new pedagogical concept, especially not in CMD programs, where integration of theory in the classroom and practice in the clinic are a priority. Indeed, the most successful students in CMD programs are often those who are able to naturally integrate new classroom knowledge in clinical contexts and vice versa. These students recognize that, for example, the rationales they need for their goals in the clinic can be found in the research studies discussed in different courses in the classroom. However, not all students naturally integrate information from different sources, and those who do not do so need to be offered opportunities to further develop these skills (Greenwald, 2006).

Integrative learning can be defined as the ability to make, recognize, and evaluate connections among diverse concepts and contexts (Huber, Hutchings, Gale, Miller, & Breen, 2007). An increasing number of colleges and universities include cross-disciplinary learning communities, internships, and study-abroad programs in their curricula, all of which are considered opportunities for integrative learning. Why the interest in integrative learning among educators? Traditional (higher) education has had limited success preparing students for an increasingly complex workplace in which they have to keep pace with the rapidly changing demands of work roles and environments (Jackson, 2009). To meet these demands, students must develop skills to integrate what they have learned in different situations and across time (Huber & Hutchings, 2004). Opportunities such as cross-disciplinary learning communities, internships, and study-abroad programs enable students to acquire a process orientation to knowledge and learning (Peet et al., 2011). On a smaller scale, such as at the departmental level, integrative learning can be used to help students develop long-lasting skills related to, in this case, the EBP process.

Students are able to retain information acquired through integrative learning situations longer and more deeply than that obtained through traditional learning situations (Huber et al., 2007). Integrative learning stimulates students to learn in terms of a series of qualitatively different levels (Ramsden, 2003). At one of these levels, the abstract level, students are stimulated to improve general qualities such as thinking critically and imaginatively. At this same level, students will develop, or further develop, the ability to communicate effectively. A specific example of the abstract learning level as it relates to EBP is the ability to discuss what makes a strong and a weak clinical question (Tickle-Degnen, 2000; step a) and determine how to rewrite a weak question to be a strong one.

Another distinct learning level activated in integrative learning is the disciplinary level (Ramsden, 2003). At the disciplinary level, students are motivated to consider information as it is linked to a particular discipline or profession. This is comparable to learning to think as a sociologist or as an SLP when faced with a typical problem in a subject. An example of stimulation at the disciplinary level is when students learn to determine in what ways their client differs from the participants in a study.

A third distinct learning level within integrative learning is the categorical level (Ramsden, 2003). At the categorical level, students are made aware of basic concepts and fundamental vocabulary related to a topic (e.g., the steps involved in the EBP process). Students who are stimulated at all three learning levels and are able to connect knowledge across each level will have accrued in-depth knowledge, and in this case, will be well prepared to engage in EBP.

**Integrative Learning Opportunities**

The four integrative learning opportunities adapted at SUNY New Paltz and discussed in this article include (a) an undergraduate research course, (b) an EBP project in a graduate research methods course, (c) grand rounds meetings, and (d) an aphasia support group practicum.

**Undergraduate research course.** Limiting EBP-related research education to the latter part of a graduate program puts students at risk of not developing sufficient fluency with the EBP process and, later on, of losing those EBP skills (Bloom, 2010; Connoly et
fluent, an undergraduate research methods course was introduced. The course was designed so that undergraduate students would closely associate their first exposure to research with speech-language pathology services and the EBP process, thereby enabling the students to start building on their EBP skills before entering a graduate program.

Traditionally, undergraduate research methods courses are offered by psychology departments. An undergraduate research methods class offered through a CMD department that discusses research methods and articles directly related to the field of speech-language disorders can be beneficial for students. The semester-long undergraduate research methods course that was developed at SUNY New Paltz meets twice a week for a total of 26 sessions. The course is based on the development of the field of speech-language pathology and the concurrent development of research in the field. The course is chronologically organized and concludes with the most current information (e.g., imaging of brain activity).

Publications and research articles from different time periods and covering different disorders are used for all discussions, activities, and assignments. Information about different disorders, diagnoses, and clinical issues is provided via PowerPoint slides and is posted on the course’s Blackboard site. Several sessions take place in the library, where students collaborate with a librarian to gain experience in both manually and electronically locating texts and articles. These basic knowledge literacy skills will enable students to become faster and more efficient with the second step of the EBP process (i.e., gathering evidence) that occurs at a later stage of their university career. Also, the librarian is aware of the difficulty for graduates to access the private databases available through the college library and pays specific attention to public databases and other public sources.

The undergraduate research methods course at SUNY New Paltz includes an introduction to EBP by way of an in-depth discussion of a hypothetical situation:

Rose, a recent graduate, is four months into her clinical fellowship year (CFY) when she finds her first client with Parkinson’s disease (PD) on her caseload. She learns that the client is male, 56 years old, and a successful business owner. Because of his busy work schedule, the client will not be able to come to therapy sessions regularly. Rose meets with her supervisor and they discuss the case and potential clinical management solutions. Rose’s supervisor has not worked with many clients with PD and doesn’t feel up to date on the clinical management of this type of client. Rose wants to find out about remote therapy that involves the client’s work environment. Rose and the supervisor decide to use the EBP process in an attempt to answer these questions.

To enable students to participate in the discussion, information about PD is provided. In addition, the CFY system is explained and further discussed. The students are also introduced to the five steps of the EBP process described by Tickle-Degnen (2000).

At least three sessions are reserved for examining and discussing EBP principles. Several research articles are handed out to simulate the gathering of evidence (Tickle-Degnen, 2000; see Appendix A). To promote learning at the abstract and disciplinary levels, the discussions are steered toward five issues that are considered essential to the EBP process (Kaldjian, Weir, & Duffy, 2005). These issues include doubt and inquisitiveness about clinical issues, awareness of one’s own biases, a respect for other positions, a willingness to let strong evidence alter what is already known, and a mindfulness of ethical responsibilities to clients.

Activities in the course that are specifically intended for students to start associating EBP with research and speech-language pathology center on (a) critically rating research articles using EBP levels of evidence and (b) connecting research articles with clinical rationales. For students with little or no research experience to critically rate research articles is a daunting task. By working in small groups and using a checklist, students learn about the differences in the quality of research in the speech-language pathology field (see Appendix B). All articles presented in the course, from historic articles to the most recent research, are evaluated using the same checklist. This enables the students to appreciate the changes in research over time and the more recent drive for well-designed, clinically relevant research. The critical rating of research is an opportunity for students to further develop their critical thinking skills and communication skills (learning at an abstract level) as they relate to EBP.

A second opportunity for students to integrate aspects of EBP within the undergraduate research methods course consists of extracting clinical rationales from research articles. Because most undergraduate speech-language pathology programs offer relatively few clinical opportunities, more effort to engage undergraduate students in the clinical aspects of the EBP process is warranted. Similar to the critical rating of research articles, students learn to associate high-quality, well-designed research studies with clinical rationales. After information about and examples of rationales are provided, students participate in analyses of research articles in order to investigate whether the results can justify a specific
clinical goal. Initially, students are provided with clinical rationales. At a later stage, students write hypothetical rationales based on research articles, learning to relate, for example, the age of participants in the research article to the rationales.

In this specific component of the undergraduate research methods course, the integrated learning opportunity stems from the interaction of existing parts of the curriculum and additional activities that offer students the opportunity to make connections between theory and practice. In the task described above, students are stimulated to integrate aspects of the EBP process on all three learning levels. However, the linking of research outcomes with clinical goals and rationales specifically provides stimulation at the disciplinary level, which is the level that corresponds most closely with thinking as a clinician.

Unrelated to the introduction of EBP, but important to this article, is the fact that the latter of the two EBP-related activities in the research course was selected on program assessment task to evaluate CMD efficacy. This task was selected to measure the recognition of research as fundamental to speech-language pathology and to understand the research foundations of the field. The task requires students to complete assignments related to clinical rationales and research articles halfway during and at the end of the semester. The assessment clearly shows that integrative learning at the disciplinary and categorical levels takes place in the written answers of the students. In addition, by the end of the course, students have gained experience in discussing and writing about the triad of EBP aspects: scientific evidence, expert opinion, and client values.

**EBP project in a graduate research methods course.** The second integrative learning opportunity that was created in the SUNY New Paltz CMD program consists of a hands-on EBP project. As stated before, the principles of EBP are commonly introduced at the undergraduate level and are explored further at the graduate level. What is not commonly offered is the actual practice of the EBP process (Bloom, 2010). Research has indicated that exposure to EBP declined once students graduated and moved into the CFY (Zipoli & Kennedy, 2005). By offering students practice with the EBP process during graduate courses, future clinicians are more likely to use EBP effectively to make informed clinical decisions and to use it as a cost-effective option. Nevertheless, graduates who have completed such EBP projects during their graduate programs still remark about the time-consuming nature of EBP. To increase automaticity, students repeat the project with increasing independence in two following graduate courses at SUNY New Paltz.

An important component of the EBP process is research proficiency. Traditionally, a graduate research methods course offers students the potential to acquire research proficiency through course content and a research (proposal) project. In the SUNY New Paltz CMD program, the content of the graduate research methods course has remained the same; however, the traditional research project has been replaced by an EBP project. Course instruction and the EBP project are supported by using a textbook that is current on EBP concepts and issues (Haynes & Johnson, 2009).

At the beginning of the SUNY New Paltz graduate research methods course, students are presented with a review of EBP principles and are reintroduced to the EBP process. Generally, the EBP process is presented as a series of steps, as suggested by several sources (Sackett et al., 2000; Tickle-Degnen, 2000): (a) develop a well-built clinical question, (b) gather evidence that may answer the question, (c) evaluate the evidence to determine the best evidence, (d) communicate with clients (and/or colleagues) about evaluation and intervention choices, and (e) evaluate the chosen evidence-based evaluation and intervention procedures after implementation are used.

As part of the course, students are provided with resources that clarify how to progress through the stages of the EBP process (Dollaghan, 2004; Schlosser & O’Neil-Pirozzi, 2006). In addition to these resources, students receive hands-on training from a librarian in accessing databases, saving articles, and organizing gathered information. This hands-on training also makes students more efficient in gathering evidence, which may result in experiencing the EBP process as less time consuming. Because the feedback of the local study (Sanchez & Anema, 2011) indicated that CFs and SLPs had difficulty accessing databases, the focus of this graduate course is largely on public databases, especially privately owned ones, during the library session and completion of the EBP project.

For the project, teams of two to three students select one of their clients who is receiving speech-language pathology services. The rationale for having students select a real client, as opposed to being provided with a case study, is based on the fact that clinically based research training allows students to see the relationship between research and practice as reciprocal (Greenwald, 2006). Also, as Seeley-Brown and Adler (2008) pointed out, integrative experiences often occur as learners address real-world problems. Over time and with enough opportunity, integrative learning causes internal changes in the learner (Seeley-Brown & Adler, 2008). These internal changes will enable students to adapt their intellectual skills to a large variety of clients and situations.
Once the semester-long project has been introduced, students are familiarized with topics that are typically part of a graduate research methods course, such as the scientific method, research design, participants, procedures, and statistics. Many students have little background in these topics, and the fusion of research methods and EBP is an effective way to acquire skills in both. Throughout the semester, the different steps of the EBP process are discussed and are applied to the students’ specific clients. In addition to discussions in class, the instructor meets with the teams at set intervals to discuss their progress. Halfway through the semester, once the students have learned the necessary vocabulary and knowledge, the third EBP step of evaluating the evidence and determining the best evidence is initiated (Tickle-Degnen, 2000). At the end of the semester, students write a formal paper and provide a shortened write-up for their colleagues that is distributed during a 30-min presentation.

How is the EBP project related to integrative learning; that is, how are long-lasting skills for EBP created? Throughout completion of the project, the students are stimulated at the abstract, disciplinary, and categorical learning levels. Examples of learning at the abstract level involve the discussions with team- and classmates about the content at each of the five process levels and the presentation. Students are stimulated to learn about EBP at the disciplinary level through the project’s focus on a current or previous client. Finally, the course lectures provide the students with the basic vocabulary of research methodology that constitutes categorical-level stimulation related to EBP concepts, specifically in creating research fluency.

After students complete the graduate research methods course and the EBP project, they are involved in two more EBP projects in an adult language disorders course and a motor speech disorders course. For those projects, students work in teams and are assigned case studies in the event that services are not, or were not, provided to a client by the previous client. To complete these projects, students are familiarized with topics that are new to them but are applied to the students’ specific clients. In addition to discussions in class, the instructor meets with the teams at set intervals to discuss their progress. Halfway through the semester, once the students have learned the necessary vocabulary and knowledge, the third EBP step of evaluating the evidence and determining the best evidence is initiated (Tickle-Degnen, 2000). At the end of the semester, students write a formal paper and provide a shortened write-up for their colleagues that is distributed during a 30-min presentation.

Grand rounds meetings. A third example of EBP integration implemented at SUNY New Paltz is the organization of grand rounds meetings. A study by Togher et al. (2011) demonstrated that students are perceived by their instructors as being more able to include the EBP process in academic assignments than in clinical decisions. Similarly, the benefits of graduate students, CFs, and SLPs in the small-scale study (Sanchez & Anema, 2011) seemed to focus on the external research of the EBP process consisting of collecting research articles and ranking them. In contrast, applying newly gathered evidence to the assessment or treatment of a specific client and using clinical expertise for clinical decision making appears to be secondary for many students and clinicians. As opposed to the two previous examples, the undergraduate research course and the EBP projects in the graduate courses, the grand rounds meetings offer an opportunity for the students to focus on clinical expertise and client needs.

Grand rounds are formal meetings at which physicians or experts discuss the clinical assessment or treatment of one or more patients. Traditionally, grand rounds in teaching hospitals were organized to promote learning clinical medicine, the exchange of ideas, and collegiality (Ramchandani, 2009). The most common format of grand rounds is the case presentation (Mueller, Segouis, Litin, Habermann, & Parinno, 2006). A systematic review of grand rounds serving physicians at 122 hospitals (Parrino & White, 1990) showed that didactic lectures did not improve physician performance or patient outcomes. However, activities that used interactive techniques, such as case discussions or hands-on practice sessions, did improve physician performance and patient outcomes. One of the reasons that grand rounds is more effective than lectures in fields that involve a large amount of problem solving may be the opportunity to integrate acquired knowledge into real-life situations (Mueller et al., 2006).

Thus, when the SUNY New Paltz CMD department was searching for a way for students to apply their academic knowledge to real-world problems and to promote interaction between faculty and both undergraduate and graduate students, the grand rounds format was selected. The first grand rounds meeting was organized following the case presentation format. Each grand rounds meeting focuses on a specific topic, for example, language disorders, data collection,
bilingualism, or multiple disorders. When the topic is language disorders, graduate students select one of their clients who is receiving language services in the department’s clinic or at an off-campus location and include requests for advice or guidance with issues related to language disorders. Students hand in their case studies prior to the grand rounds meeting, thereby enabling the faculty panel to organize the material of the case studies. A panel of faculty and experts then discusses the cases and answers questions.

How are undergraduate and graduate students motivated at integrative learning levels during the grand rounds meetings? At the abstract level, students are stimulated to improve general qualities such as thinking critically and communicating effectively. Undergraduate students will possess sufficient background information about EBP to follow the discussion and possibly participate in the case studies. Graduate students have provided the original case studies and have formulated the clinical questions accompanying the case studies. During the grand rounds, students will be able to hone their critical thinking skills (do they agree with the professionals?) as well as their communication skills (can they verbalize their opinions?). At the disciplinary level, students are motivated to consider information that is more specifically linked to a particular discipline or profession (e.g., speech-language pathology). Undergraduate students will be able to observe how professionals use both research and clinical evidence to guide clinical decision making in each case discussion. Graduate students have the opportunity to discuss the clients they are providing services for in the concurrent or previous semester, which forges connections between all three components of EBP. And lastly, at a categorical level, the students are made aware of basic concepts and fundamental vocabulary related to a topic. For undergraduate students, the discussion may contain many new concepts and vocabulary; however, the grand rounds are organized by topic, which makes the task somewhat less daunting. For graduate students, many of the topics provide a useful review of knowledge from previous undergraduate or graduate courses.

In addition to live feedback after each grand rounds meeting, a student-designed questionnaire is completed by students in attendance and is used to qualitatively measure a variety of outcomes (e.g., attendance rate by undergraduate and graduate students, did students complete a class on the current topic, and what topics/clients students would like to see discussed). Subsequent grand rounds are adjusted according to outcomes of the questionnaire. For example, one adjustment that was made concerned the number of cases discussed per meeting. Students indicated in the questionnaires that they preferred more in-depth discussion of fewer cases.

**Aphasia support group practicum.** The fourth and last example of adopting a more process-oriented approach to EBP is the aphasia support group. The aphasia support group is one of several specialty clinics in the SUNY New Paltz CMD program. Similar to grand rounds, the aphasia support group specifically enables students to gain experience in EBP concepts related to clinical expertise and client needs.

Support groups are common vehicles in CMD programs that are used to expose students to social aspects of communications disorders. Support groups offer natural communication settings (Elman, 1999), a variety of communication partners (Kearns & Elman, 2001), and interaction between communication partners (Davis, 1986). For participants, a support group often serves as the only environment in which they feel understood, validated, and free from societal limitations. In a support group, student clinicians have the opportunity to develop their communication and counseling skills. Also, student clinicians can expect to acquire group therapy skills, experience communication in a natural setting, and collaborate with participants on personally meaningful goals (e.g., requalifying for driver’s license, making telephone calls). These types of goals are known as *life participation* goals (Chapey et al., 2001).

The aphasia support group at SUNY New Paltz meets once a week for 1.5 hr and is attended by approximately five to seven participants with varying levels of neurogenic communication disorders. The meetings are divided into individual reflection time (e.g., “Tell us what has happened during the week”) and a group therapy activity that is planned by the students.

Because the shift from interacting with one client in a previous semester to many clients in the aphasia support group can be overwhelming for student clinicians, the practicum is divided into two equal parts. Before the midpoint of the semester, student clinicians are taught preliminary skills such as how to facilitate group interactions and how to design a group task for participants at different communicative levels. After the midpoint of the semester, the student clinicians use the acquired skills to moderate the 1.5-hr sessions.

Opportunities for integrative learning in the group practicum are present at the abstract, disciplinary, and categorical levels. Whereas in the undergraduate and graduate research methods courses, the research aspects of the EBP process were prominent, in the group practicum, the association between the clinical evidence and the participants’ perspective is highlighted. This means that at the abstract level, the
student clinicians communicate with clients about their evaluation and intervention choices and practice their critical thinking and communication skills in a naturalistic setting. At the disciplinary level, the graduate students are required to think as a clinician, but from a group therapy perspective. This means that the most current evidence that students are required to locate is related to group therapy, as is the explanation of best current therapy approaches when discussing this with a client.

The aphasia support group does not use a formal measure to evaluate the specific EBP skills acquired during the semester. However, once the group practicum is completed, the students are asked to evaluate their experiences. This anecdotal feedback has demonstrated that participation in the group practicum is often a profound experience for the students. Even more significant is the fact that the students recognize the difference between a practicum where EBP plays a minor role versus a major role, such as in the aphasia support group.

**DISCUSSION**

Since the introduction of EBP in the field of speech-language pathology, many CMD programs have attempted to prepare students for successful EBP participation. However, preparation without instruction is difficult, and instructors look for guidance in publications that report on perceived successes and difficulties with EBP in academic and work settings. These sources have indicated, for example, that some CMD programs start preparing students at the undergraduate level (Klee et al., 2009) and others at the graduate level (Bloom, 2010). Another source (Togher, 2011) indicated that students were perceived as being more competent at including the EBP process in academic assignments than in clinical experiences, whereas the goal for instructors is to prepare students to make real clinical decisions following the so-called E³BP model (Dollaghan, 2004). The E³BP model focuses on three types of evidence (E⁵): research or external evidence, clinical or internal evidence, and evidence concerning the preferences of a fully informed client.

Research projects, including the aforementioned small-scale project by Sanchez and Anema (2011), that report on SLPs’ perception of EBP have demonstrated that SLPs often find EBP too time consuming; they do not feel that they possess sufficient skills to locate and analyze research; and as beginning clinicians, they encounter barriers to using research evidence in the work setting (Dubouloz et al., 1999; Meline, 2010; O’Connor & Pettigrew, 2009; Schlosser & Raghavendra, 2004; Zipoli & Kennedy, 2005). These drawbacks result in withdrawal from EBP by clinicians and loss of skills because of underuse.

Instead of viewing EBP as a set of additional skills that CMD students should have, the staff at SUNY New Paltz adapted its curricular and extra-curricular components to create a process-oriented approach to EBP using a technique known as integrative learning. The rationale for the switch in approach is that integrative learning is associated with in-depth knowledge and durable skills. Four examples of integrative learning were described in the article. Each of the examples illustrated how EBP skills are acquired over time at the abstract, disciplinary, and categorical levels, enabling students to make deep connections among ideas and experiences related to EBP.

It is hoped that the involvement in and repetition of EBP activities will create recognition and automaticity, which will then translate into deeply rooted skills. Once the graduate begins his or her CFY, the acquired speed and efficiency for completing the EBP process may reduce the risk of losing basic EBP skills.

The learning opportunities presented in this article are based on comments from graduate students, CFs, and SLPs who participated in an informal, small-scale study (Sanchez & Anema, 2011). To assess whether the change in approach to teaching EBP is measurable in students’ performance, the third EBP project from the SUNY New Paltz CMD graduate program, the one in the motor speech disorders course, is used as a cumulative assessment. This project is different from the EBP project in the graduate research methods course and the project in the adult language disorders course in that it is completed in approximately 2 weeks, students work largely independently, and the presentations are attended by clinical supervisors who engage the students in a short discussion about their case studies. The EBP presentation provides instructors/supervisors with both quantitative and qualitative results. Quantitative measures include the independent completion of the EBP steps, the 2-week completion deadline, and the use of public data sources. Qualitative measures include evidence of integrative learning at the abstract, disciplinary, and categorical levels.

The aforementioned quantitative measures demonstrated that all of the students were able to answer a clinical question fast and efficiently. They also grew significantly more independent in answering a clinical question using the five steps of the EBP process compared to the first EBP project. And lastly, some students were able to answer their clinical question by using public databases exclusively. The clinical
supervisors who attended the presentations provided reports that functioned as the qualitative measures of the assessment, focusing mainly on the students’ ability to discuss their cases and answer clinically related questions. Because this was the first time any students had participated in these presentations, there was no chance of comparison to a previous cohort. Nevertheless, the clinical supervisors observed that the students were able to present and discuss their cases in a professional way (abstract level). The students were able to discuss specific clinical issues about their cases and answer questions about the disorders common to the cases, namely motor speech disorders (disciplinary level). The clinical supervisors also noted that the students exhibited significant fluency in EBP vocabulary as demonstrated by the level of presentations and handouts (categorical level). Finally, the supervisors observed that a number of students were able to integrate all three types of evidence as described by the E³BP model (Dollaghan, 2004). This may indicate that students who acquire process-based EBP skills are able to recognize the importance of different types of evidence instead of research evidence only.

These preliminary outcomes are promising for both the SUNY New Paltz CMD program as well as other CMD programs, especially in light of the few adaptations that were required to implement integrative learning opportunities. CMD programs interested in adopting a process-based approach toward EBP teaching can start with a few program changes or adaptations and add more changes in the future. To stimulate integrative learning in the SUNY New Paltz CMD program, staff will be adding more EBP-related learning opportunities, such as EBP project collaborations of clients, students, and clinical supervisors. These collaborations will be further supported by faculty who can guide database searches and help interpret research articles. Once more adaptations are in place, the original pilot study will be duplicated from the graduates who at that time will be implementing EBP as CFYs and SLPs.

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Contact author: Inge Anema, SUNY New Paltz, Communication Disorders, 1 Hawk Drive, New Paltz, NY 12561. E-mail: anemai@newpaltz.edu.

APPENDIX A. EXAMPLE REFERENCES FOR EBP CASE STUDY


APPENDIX B. ASSESSMENT/THERAPY ARTICLE APPRAISAL CHECKLIST

The following questions will help you identify strengths and weaknesses in research articles. Strengths are identified by yes answers; weaknesses are indicated by no answers.

Guidelines for Appraisal

13 strengths  Qualitatively strong article
10–12 strengths  Relatively strong article depending on weakness(es)
1–9 strengths  Weaker article

Questions to Ask Yourself

Introduction/background section
1. Is the problem clearly identified at the beginning?  Yes  No  N/A
2. Is the review of literature current and critical?  Yes  No  N/A
3. Do the purpose, research questions, and hypothesis flow logically from the introduction?  Yes  No  N/A

Method section
4. Are the participants described in detail?  Yes  No  N/A
5. Is the sample size adequate/justified?  Yes  No  N/A
6. Are materials described in detail?  Yes  No  N/A
7. Were participants randomly assigned to groups or matched on critical variables?  Yes  No  N/A
8. Is the experimental setting described in detail?  Yes  No  N/A

Results section
9. Are the results clearly stated?  Yes  No  N/A
10. Do the results relate directly to the research questions?  Yes  No  N/A

Conclusion section
11. Were the research questions answered?  Yes  No  N/A
12. Were the conclusions consistent with the results?  Yes  No  N/A
13. Were the limitations of the study discussed?  Yes  No  N/A

Note. This checklist was adapted from www.ebm.med.ualberta.ca/.