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Using the Internet to Instruct on Evidence-Based Practice (EBP) in Classrooms across Borders

*** * * On the Internet * * ***

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Abstract

Evidence-based practice (EBP) is a three-dimensional approach to professional services in which high-quality and current research evidence is integrated with practitioner expertise along with client values to inform assessment and treatment decisions. The primary objective of this study is to promote the importance of EBPs for speech-language-pathologies to their students' clinical practices. A cross-institute collaboration on EBP in-class assignment was conducted at the National University in Malaysia and Rockhurst University in the United States. This assignment required students to choose and explore a research article online and write a synopsis of the article and reflections about its findings for clinical application. The findings show that both groups of students learned how to access EBP, and this assignment helped them better understand EBP in the field of speech language pathology. Students from the United States reported that they had more of a base of knowledge about EBP than their peers in Malaysia. Findings from this study could help the local governance and speech-language pathology associations in Malaysia and the United States and university programs in both countries understand the current practice and professional development needs of speech therapists in both countries.

Keywords: *evidence-based practices; speech-language-pathology; clinical; collaboration; cross countries*

Evidence-based practices (EBPs) are a clinical decision-making process whereby clinicians use the current research evidence along with their clinical expertise and patient values to inform their decisions about service delivery (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Indeed, EBP encourages family-centered and culturally sensitive practice, as clinicians are required to utilize their experience and expertise to incorporate the most appropriate evidence into a process of therapy while simultaneously considering family-related factors such as preference, culture and surroundings (American Speech-Language-Hearing Association, 2004; Campbell & Douglas, 2018). There has been a growing body of literature documenting attitudes toward and the use of EBP in Western countries. For example, a US national survey of EBP practices among 2762 school-based speech therapists reported that school-based speech-language pathologists (SLPs) have high interest in additional training and resources to support scientifically based practices (Hoffman, Ireland, Hall-Mills, & Flynn, 2013). However, an equivalent EBP survey has not been performed to explore the opinions of college students. It is important to provide EBP training to SLP college students to adequately prepare them to become clinicians who practice appropriate EBPs when working with clients. This study summarized the perception of EBP among undergraduate SLP students across two borders (National University of Malaysia and Rockhurst University) using a classroom assignment. The United States of America and Malaysia were chosen as comparative countries because speech-language pathology is a relatively young profession in Malaysia and is considered well-developed in the United States, where a research collaboration had been established previously. We intend to expand this assessment of EBP in the current curriculum in the future to neighboring nations to bolster support for SLPs throughout East Asia.

The Internet, begun in 1991, has been an integral factor in the lives of all students since birth, but for most, they have only been consumers, using the Internet for social media, entertainment, and basic surfing for information (Kaya & Bicen, 2016). They have used the Internet to obtain basic facts for school assignments, mostly using general search engines such as Google or Yahoo, but they have not been trained on how to explore primary research in academic search engines, to be discriminatory in evaluating what they find, or to amalgamate information into an applicable product to address a real-life issue (Ng et al., 2018). In developing this assignment, the goal was to provide a group of college students with the initial skills for conducting research on a clinical topic that might challenge them in their future clinical practices. Using the Internet as a tool would ultimately be practical since it is ubiquitously available for no extra cost.

Purpose/Objective

This study was designed to determine (1) college students' perceptions of using the Internet to instruct on EBPs in the classroom. (2) Do these perceptions differ between a group of American and Malaysian students majoring in speech-language pathology? To achieve this, the researchers instructed students in the use of the Internet for accessing primary-source articles and the summarization of their results. Cross-cultural comparisons have been found useful in studies in countless other fields and professions to explore differences and similarities in practices and beliefs, with the assumption that this comparison and contrast will lead to greater knowledge and understanding. Through collaboration between two continents, larger benefits may be developed for the students in both countries. Findings from this study could be used to develop EBP policies for SLPs in Asia in future studies.

Relevant Literature

Evidence-based practice (EBP) is "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients …[by] integrating individual clinical expertise, external scientific evidence, and patient/caregiver values to provide high

quality services" (American Speech-Language-Hearing Association, 2004; Sackett et al., 1996). Owing to the fact that EBP is patient centered, a clinician's role is to interpret the best current evidence from research in relation to patient's preferences, environment, culture, and values regarding their health and well-being. The EBP helps to improve clinical services, bridge the gap between research and practice, and reduce variation in service provision (Schoonees et al., 2007). According to Chu et al. (2014), over the past decades, the importance of integrating EBP into clinical service has been the focus of many guidelines, articles, and professional development activities across the clinical service fields, including the speech therapist field. The American-Language-Hearing Association (ASHA) mandates that SLPs engage in evidence-based practices. To do so, they "must demonstrate knowledge of process used in research and the integration of research principles into evidence-based clinical practice… know how to assess sources of research information and have experience relating research to clinical practice" (ASHA, 2005, p.6). However, this explicitly written EBP policy is lacking in professional bodies that advise speech therapists (STs) in Asia. (Note: internationally, in the United States and in Canada, the term used for a practitioner is a speech-language pathologist (SLP), whereas in Asia, the term used is an ST.) To improve the quality of life for patients with communication disorders, such amendments and guidelines are critical for encouraging students to implement EBP into their early clinical practice.

Previous studies have been conducted to describe the use of EBPs by SLPs in different regions. It has been found that research evidence has not been the primary influence in clinical decision making among SLPs (Brener et al., 2003; McCurtin & Clifford, 2015; Nail-Chiwetalu & Bernstein-Ratner, 2007; Zipoli & Kennedy, 2005). A study of SLPs showed that 5.5% and 17.7% of them based their practices on research and literature in the US and Irish regions, respectively (Zipoli and Kennedy, 2005). At present, it is unclear how much EBP is being practiced by SLPs in clinical settings (Chu et al., 2021; Whites et al., 2007). Only half of the SLPs involved in the management of tracheostomy cases reported the use of research evidence (McCurtin & Roddam, 2012). Instead of evidence, clinicians' decision guidance is more inclined to their own clinical experiences as well as the practices or treatment methods learned from their university studies, regardless of whether these methods are based on evidence (Mackenzie et al., 2010; McCurtin & Roddam, 2012). Over the past decades, the importance of integrating EBP into clinical service has been the focus of many guidelines, articles, and professional development activities across the clinical service fields, including the field of speech and language pathology. However, it appears that relatively little research has been conducted to explore evidence-based clinical practice among SLPs in Asia (Chu et al., 2014), and none has been conducted among undergraduate students.

There are several barriers that affect the implementation of EBP in the field of SLP, such as difficulty transferring research findings into clinical practice and having limited, conflicting or even irrelevant evidence (McCurtin & Roddam, 2012; Pollock et al., 2000). Time constraint is reported as a major barrier to EBP implementation (McCurtin & Roddam, 2012; Metcalfe et al. 2001, O'Connor & Pettigrew 2009, Pollock et al. 2000), in addition to restrictions at the workplace and limited access to resources (McCurtin & Roddam, 2012). After the process of forming clinical questions, sufficient time is required for reading to obtain relevant and quality evidence. Appraisal of evidence is also an important skill required for EBP to select the most relevant evidence for implementation (McCurtin & Roddam, 2012). Hence, early and consistent exposure to EBP could cultivate the use of EBP approaches in clinical practice (Campbell & Douglas, 2018; McEvoy et al., 2010).

The key skills to EBP implementation that students need to acquire to effectively incorporate evidence into their practices in the future are based on the five key steps of EBP: Formulating clinical questions, searching for relevant evidence, appraising evidence, applying the evidence,

and evaluating the outcome of the process of EBP (Bloom, 2010; Sackett et al., 1996). To carry out the EBP process, students need to have an understanding of research methods, be able to search valid resources, access and utilize databases, and appraise the obtained evidence (McCurtin & Roddam, 2012; Schoonees et al., 2017). Commonly used databases that contain evidence for speech and language practice include speechBITE, PubMed, ASHAWire, and the Cochrane review. Other than evidence from research, reliable clinical guidelines are also useful sources of recommended evidence that can be incorporated into clinical practice (Erickson, 2012). At present, SLPs also gather information and knowledge from online platforms and textbooks (McCurtin & Roddam, 2012; O'Connor & Pettigrew, 2009) during clinical practice. There is also a tradition of "trial and error" in the field, which can hinder the implementation of science-based evidence (O'Connor & Pettigrew, 2009). Often, the SLP would make a clinical decision just "because it worked" (Kahmi, 1999). Despite the lack of implementation of EBP among SLPs, knowledge from formal training sessions, such as the Hanen program, dysphagia training, training for PECS implementation, etc., would actually affect a clinician's choice of therapy methods specific to the clinical training (e.g., Hanen, dysphagia training, PECS) influences, resulting in 60% of Irish SLPs changing their practices (Irish Association of Speech & Language Therapists, 2009). This could be because specific skill sets that are directly useful in clinical practice are taught and demonstrated during such trainings (McCurtin & Roddam, 2012).

In addition to establishing the competencies in students to carry out the important 5-step EBP process, teachers' or mentors' teaching methods also play a role in helping students learn the implementation of EBP. Inductive teaching methods are found to be more effective than solely listening to lecture and answering exam questions, as students can be more motivated, adopt a more in-depth approach to learning (Chu & McConnell, 2018; Coles, 1985; Norman & Schmidt, 1992; Ramsden, 2003), and experience the simulation of a real clinical situation that they might encounter in the future (Ludenberg et al., 1999). In an article by Bloom (2010), case-based learning was described as an inductive teaching method where a clinical problem is given to students along with the resources needed for students to solve the problems given to them. Such a teaching method helped students to explore and understand the relationship between research and clinical work, as well as to understand and apply the strategies needed for EBP implementation and utilize all resources available in the process (Bloom, 2010).

Method

Participants

A total of 69 undergraduate students pursuing degrees in speech-language pathology participated in this survey (see Table 1 for demographics). In Malaysia, 33 students (16 during year 1 and 15 during year 2) were enrolled in cognitive neuropsychology. In the United States, 36 students were enrolled in transcription phonetics (19 in year 1 and 17 in year 2). Similar in-class assignments were conducted in both countries. All students were notified by instructors that their feedback on the survey would not affect their grade in the class, and verbal consent to participate in the survey was obtained. These courses were chosen to implement EBP practice because both courses include a group assignment task that fits the objectives of this study and the curriculum teaching goal of both universities. All participants were anonymous in the survey.

Table 1. Demographics

	Malaysia N=33	*US N=36*
Gender		
Male (%)	2 (6.1)	NA
Female (%)	31 (93.9)	36 (100%)
Age		
Mean (SD)	21.55 (1.06)	22.4 (5.24)
Range	5.0	29.0
Ethnicity		
Malay (%)	18 (54.5)	NA
Chinese (%)	10 (30.3)	NA
Indian (%)	4 (12.1)	NA
Other (%)	1 (3.0)	NA
African American (%)	NA	1 (2.8)
Asian American (%)	NA	33 (91.6)
European American (%)	NA	2 (5.6)

Procedure

The purpose of this task is to stimulate EBP practice through an in-class assignment, facilitated by the instructors through internet usage. Instructors presented a lesson on how to search for primary source research online as well as how to read research articles. Students were then placed in groups of two so that they could discuss and support themselves. Students chose a topic within their class's emphasis of study, which they found to be of special interest. For example, in the transcription phonetics class, one pair of students who were bilingual chose the topic of best practices for assessing the articulation skills of children who were both speech impaired and bilingual. For the cognitive neuropsychology class, for instance, students asked to choose a topic on bilingualism and the evidence of its effects on brain plasticity. Research articles related to their topic were identified online. Each group will then select one article to summarize within a three-week period to complete this assignment. Instructors (first and second authors) acted as facilitators in this assignment, initially by assisting students in their searches by finding appropriate sites from which to pick articles from, choosing efficient search terms, using Boolean operators, etc., to help find the most relevant article. Instructors then facilitated by guiding students' use of Bloom's 5 key steps of EBP: Formulating clinical questions, searching for relevant evidence, appraising evidence, applying the evidence, and evaluating the outcome of the EBP process.

Article information and thoughts about its findings in terms of clinical application were organized and written on poster papers using a similar format as if designing a poster for conference presentations. Groups took turns presenting the research findings on their "posters" and explaining their findings to their peers. Then, students completed a survey on their perceptions about evidence-based practices and what they had learned from this assignment.

Survey

The self-developed survey consisted of eleven questions on a Likert scale of 1-strongly disagree, 2-disagree, 3-neutral, 4-agree, and 5-strongly agree (see Appendix A). Survey questions probed student perceptions on such topics as their perception about the applications of evidence-based practices are necessary (Q1-2), the importance of research findings or clinical experience in clinical practice (Q3-4), how well teachers had exposed them to and taught them about EBP during their training (Q5-6), how well the activity had provided them with useful skills (Q7-9), and their perception regarding this activity (Q10-11). An open-ended question was given at the end of the survey to ask students (3 Americans and 3 Malaysians) their view on this assignment. The survey results were compared. Two questions, number three and number six, were written to reflect a response for which a lower score reflected a positive

or desired outcome and a higher score reflected a negative or undesired outcome, unlike the other nine questions. For analysis, these two questions were recoded to reflect all data going in the same direction of positive to negative responses.

Data analysis

To compare the perceptions of the students in the two countries, independent t tests for each question were conducted to compare the perceptions for students in Malaysia and the United States. A bivariate correlation matrix (two-tailed Pearson correlations) was also performed to explore possible relationships among students' responses to questions. For the open-ended question, the six respondents only expressed their impression of this assignment in 1-2 sentences. Hence, in-depth qualitative themes were not obtained. However, our team was able to compile the data and summarize the data in Table 4.

Findings

Table 2 shows the means, standard deviations, and probabilities, as well as Cohen's *d* effect size for all questions in the survey, with effect sizes ranging from medium (Q10), medium to large (Q1 & Q2), to large (Q3, Q5, Q6, Q7, & Q8). Pearson product-moment coefficients were computed to assess the relationships among the responses of the students' perceptions about EBP in communication science disorders (CSD) and this assignment (Table 3).

Table 2. Mean (standard deviation) and independent sample t test for Malaysia and the U.S.

	Malaysia	U.S.	*t* (df)	Significance (p)	Effect Size * (Cohen's *d*)
Q1	4.576 (0.614)	4.889 (0.319)	*t(*67)= -2.691	0.009	0.640
Q2	4.364 (0.653)	4.750 (0.604)	*t*(67)= -2.555	0.013	0.614
Q3	3.273 (0.944)	4.278 (1.137)	*t*(67)= -3.974	0.000	0.962
Q4	3.363 (0.822)	3.500 (0.910)	*t*(67)= -0.651	0.517	N.A.
Q5	3.424 (1.032)	4.194 (0.951)	*t*(67)= -3.227	0.002	0.780
Q6	3.242 (1.226)	4.167 (1.056)	*t*(67)= -3.364	0.001	0.81
Q7	3.758 (0.830)	4.444 (0.773)	*t*(67)= -3.560	0.001	0.855
Q8	3.879 (0.740)	4.528 (0.774)	*t*(67)= -3.553	0.001	0.857
Q9	3.970 (0.770)	4.222 (1.045)	*t*(64.129)= -1.149	0.255	N.A.
Q10	4.000 (0.750)	4.472 (0.971)	*t*(67)= -2.246	0.028	0.544
Q11	3.939 (0.659)	4.028 (1.134)	*t*(57.059)= -0.400	0.691	N.A.
Total	41.788 (5.011)	47.472 (5.262)	*t*(67)= -4.586	0.000	

Only Q4, Q9 and Q11 are not significant.
* Cohen's *d* effect size: 0.20 small, 0.50 medium; 0.80 large

Table 3. Correlations between Questions, *(r/p)*

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q1		0.812 0.001					0.474 0.001	0.459 0.001			
Q2	0.812 0.001			0.287 0.017	0.315 0.008		0.454 0.001	0.427 0.001		0.286 0.017	
Q3						0.261 0.030					
Q4		0.287 0.017							0.238 0.049		
Q5		0.315 0.008				0.452 0.001	0.568 0.001	0.536 0.001	0.394 0.001	0.433 0.001	0.311 0.009
Q6			0.261 0.030		0.452 0.001		0.377 0.001				
Q7	0.474 0.001	0.454 0.001			0.568 0.001	0.377 0.001		0.730 0.001	0.425 0.001	0.530 0.001	0.367 0.002
Q8	0.459 0.001	0.427 0.001			0.536 0.001		0.730 0.001		0.552 0.001	0.605 0.001	0.505 0.001
Q9				0.238 0.049	0.394 0.001		0.425 0.001	0.552 0.001		0.730 0.001	0.638 0.001
Q10		0.286 0.017			0.433 0.001		0.530 0.001	0.605 0.001	0.730 0.001		0.708 0.001
Q11					0.311 0.009		0.367 0.002	0.505 0.001	0.638 0.001	0.708 0.001	

The majority of students in the United States reported that they thought that the application of EBP was necessary in their practice in this field and that EBP contributed to better client outcomes. The American students more strongly felt that research findings published in journals are very relevant to clinical practice, that their teachers had taught them about the use of EBP in clinical practice and that they had been exposed to EBP in their CSD education. They also felt that they had learned how to access EBP after the literature review and presentation activity in class and that this activity helped them to better understand EBP in the field of speech language pathology and that they could continue to use the skills learned from this lesson later in their clinical practice. However, the means and ranges for the responses for both groups suggest a need for instructors in both countries to integrate more consistent teaching about EBP. The neutral and varied responses from both Malaysian and American students about whether they should base their clinical practices on what other clinicians and specialists have previously used as treatment protocols over the years suggests that they are similarly unsure and perplexed as to how much credence to give to the clinical examples they see. This finding is consistent with previous findings in the SLP field that the culture of emphasizing the opinions of academic researchers and more experienced clinicians in the profession is also an influencing factor for clinical decision making (Oswald & Bateman, 2000; Zipoli & Kennedy, 2005). For instance, a study by Zipoli and Kennedy (2005) found that 99.6% of SLPs treat colleagues' clinical experience as a useful and primary source of clinical information. Traditionally used treatment methods are rarely questioned and are preferred over research-based approaches (McCurtin & Roddam, 2012; O'Connor and Pettigrew, 2009). As a result, the clinical decision of newer clinicians with lesser qualifications may base their decision on the knowledge of the more experienced colleagues (McCurtin & Clifford, 2015). The findings indicate that instructors in both places should provide more guidance on how to critically evaluate traditional treatment protocols and search for outcome-based evidence for intervention efficacy.

Table 4. Qualitative feedback from open-ended questions

Student Feedback
Through this presentation, it feels more closer and can be understand easily what presenter trying to explain. (Respondent A2)
I like this type of presentation in a more revolving mock. It helps me to understand and learn more from my friends. (Respondent A1)
Can learn a lot from each group, can freely ask questions because each member able to present their case history in more relaxed way. (Respondent M1)
I think I like this kind of activity in class. (Respondent M3)
I love this educational booth instead of traditional presentation. This will increase understanding and lower negative buffs, e.g., phone opening. (Respondent M2)
I like this one better because I personally can present multiple times, hence increase my understanding for the topic and increase my presentations skills. (Respondent M1)

Note: M stands for Malaysian, A stands for American

Table 4 shows the impression of the students' comments on this EBP implementation. Overall, both groups were satisfied with the use of EBP in clinical practice, and they were feeling interested and motivated as they were able to learn useful skills from their peers during the presentation.

Discussion

Individual studies that examine the implementation of EBP in different professions (occupational therapy, speech therapy, physical therapy, etc.), this study intended to grasp a brief understanding of EBP by each profession, and a comparison of data between different studies should be made and interpreted with caution due to methodology and regional differences. There are no conclusive studies that enable direct comparison and understanding of the use of EBP across different professions in different regions. To our knowledge, this study serves as the first to implement EBP across two institutes in higher education clinical training programs. Given that cultures, work settings, years of working experience and age are the factors that play a role in professionals' decision and ability to implement EBP in their day-to-day practice (McEvoy et al., 2010; McCurtin & Roddam, 2012), early training of EBP at the college level could provide students with the necessary skills to implement EBP in their working settings.

The mutually positive responses from Malaysian and American students indicated that both groups felt that they were able to learn useful skills from their peers during this activity and that both groups enjoyed the activity. These were supported by positive feedback comments from the students' write-ups, such as "I like this kind of activity in class", "I think this activity is more useful as I can learn many things and feel free to ask any questions", and "this activity is enjoyable and good". Overall, these results suggest that this classroom-based learning experience was a benefit to the students, potentially laying the foundation for learning to collaborate and consult with their peers during their professional careers. In such a varied field as speech-language pathology, no one SLP can know it all. Reaching out for collaboration and consultation with others, including SLPs or other professionals, such as physical therapists, occupational therapists, nurses, doctors, and teachers, is a necessary competency. Classroom exercises such as this can help foster capabilities and confidence in reaching out and communicating with peers about unknown, puzzling, and complex cases. Additionally, by using the Internet, students learn that these peers can be anywhere, even on other continents.

The higher positive responses with less variance for the American students indicated that they had learned from their peers during the activity, possibly reflecting that they had more previous experience with interactive learning methods. These methods are becoming more applied in the U.S. in recent years. These findings may be useful for instruction in other countries for practical and clinical applications. However, even though U.S. students did display higher positive responses, possibly due to U.S. instructors having a longer history of exposing students to EBP, since scores are not consistently at the top, this indicates that U.S. professors could be doing more to provide consistent, explicit instruction to their students. Malaysian students are somewhat behind in their positive responses, but considering the shorter history of the profession in the country, definite promise is indicated. While the SLP field was established in 1925 in the United States, it was not until the mid-1980s that Malaysia had SLP to serve citizens (Ahmad et al., 2013). At present, approximately 300 registered SLPs are practising in Malaysia. This means that the ratio of the SLPs to the population in Malaysia is a staggering approximation of 1 SLP to 100,000 people compared to the ratio of ASHA-certified SLPs to residents of 49.6 SLPs to 100,000 residents (ASHA, 2017). The results of this study show that Malaysia's SLP field is still developing and has the potential to improve and produce highly competent students with such collaboration to teach undergraduate clinical students.

Furthermore, a bivariate correlational matrix was constructed to explore the relationships among questions. A relationship was found between students' responses on whether the application of EBPs was necessary in clinical practice and whether this class assignment helped them learn to access EBPs and to understand EBPs in the field. A relationship was also found between students' responses on whether EBPs contribute to their clients' quality of care and whether they have been taught how to access, use, and understand EBPs, plus planning on using EBPs in their clinical practices. A complex relationship was found among having been taught how to use EBPs in clinical practice and the students' learning how to use, access, and understand EBPs in their communication science disorders (CSD) education and with learning useful skills from their peers, as well as plans on applying their learned skills in clinical practice. Correlations were noted as well for perceiving published research to be relevant to clinical practice with the perception of having been exposed to EBPs during the CSD program and having been exposed to EBPs during the CSD program and learning how to access EBPs after this literature review and presentation activity.

The perceptions of EBP among Malaysian and US students are significantly different. Such differences could be due to the educational entry level for SLPs between these two regions. For the US, the entry level to be a certified SLP requires a master's degree in speech-language pathology. However, this is not the case in Malaysia. The entry level to become a certified SLP requires a bachelor's degree in speech sciences. For consistency in this research, both researchers targeted students currently studying at the undergraduate level. In designing the assignment, the researchers wondered whether professors in the U.S. would wait longer until master's level training to highlight learning about EBPs and whether professors in Malaysia would have more pressure to highlight learning about EBPs since the training period is shorter. These data suggest that instruction in EBPs may start early and more consistently in the U.S., benefitting students. Early and consistent training in Malaysia may also better benefit students.

Conclusion

Speech-language pathologists are always committed to the advantages of utilizing evidence-based practices so that the highest quality assessments and therapies can be provided for their clients. They are dedicated to instructing their students in how and where to access these gold-standard practices. So that these EBPs will be practical in their future real-life clinical practices, the students need to be able to utilize common, affordable resources. This cross-border assignment sought to develop a universal assignment for instructing these future clinicians in how to use their affordable, everyday technology, the Internet, guiding them in the most effective and efficacious methods to find and evaluate information about their specific topic of concern.

This research also sought to explore how well speech-language pathologists are teaching their students about how to access and apply evidence-based practices clinically. This study probed students in Malaysia, where the field of communication sciences and disorders is a relatively young field, and the United States, where the profession is more established. The findings of this study show that the classroom activity to teach students how to search peer-reviewed journals, read articles, summarize findings, and share these results with peers was effective in raising students' understanding about EBPs. Students also felt that they had learned from their peers, laying the groundwork for future collaborations, and that they planned on using their learned skills for accessing and applying EBPs in their future clinical practices. The replies of the students from the United States indicated that they had more of a base of knowledge about EBPs at this time than their peers in Malaysia, but the variations in the results for both groups suggest that programs in both countries could benefit from increasing their instruction about EBPs in their undergraduate curricula.

Furthermore, the findings from the correlations among the questions suggest that students will derive more value from an activity with an EBP focus if it is embedded in an overall curriculum that routinely highlights the knowledge base and clinical application of EBP throughout their undergraduate education. This is important for laying a foundation for the students' later clinical practice and graduate studies. Future research could explore the teaching of evidence-based practice in more countries as well. Additionally, longitudinal studies could explore the connection between university instruction in accessing EBP and its application later in clinical practice.

One other positive by-product of this assignment, since students worked in pairs, may be in the practice of collaborating with peers. In the future, this assignment could also be extended to include the finding and evaluation of speech-language pathology groups on other resource sites and social media, providing more practice in extending collaboration skills online. In other cross-cultural research by these authors, students in a classroom in Malaysia and one in the US completed the same project and then compared the results using online communication, not only posting their own results and insights but also posting their reactions to the results of their fellow students on another continent as well as locally (Chu, et al., 2019). The Internet can be a powerful, cost-effective resource for bringing people and cultures together for learning.

There are several limitations in this study. First, the questionnaire design begins with "I feel like…" and may affect students' ratings on the certainty scales. Furthermore, the questionnaire revealed the usefulness of the internet for EBP practice in a general way but not specifically toward the effectiveness of using technology in learning EBP. Hence, future studies are warranted to further investigate the usefulness of platforms or applications that contribute to the best learning of EBP in allied health professionals.

About the Authors

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References

Ahmad, K., Ibrahim, H., Othman, B. F., Vong, E. (2013). Addressing education of speech-language pathologists in the World Report on Disability: Development of a speech-language pathology program in Malaysia. *International Journal of Speech-Language Pathology*, *15*(1), 37–41.

ASHA. American Speech-Language-Hearing Association. (2005). Background information and standards and implementation for the certificate of clinical competence in speech-language pathology. Retrieved from http://www.asha.org/members/deskrefjournals/deskref/default

ASHA. (2017). American Speech-Language-Hearing Association. Retrieved from http://www.asha.org/Research/ASHA-Certified-Personnel-to-Population-Ratios/

American Speech-Language-Hearing Association (2004). Introduction to Evidence-Based Practice. Retrieved from http://www.asha.org/Research/EBP/Introduction-to-Evidence-Based-Practice/

Bloom, R. L. (2010). A case-based approach to teaching evidence-based practice and motor speech disorders. *Contemporary Issues in Communication Science and Disorders*, *37*, 123-130.

Brener, L., Vallino-Napoli, L. D., Reid, J. A., & Reilly, S. (2003). Accessing the evidence to treat the dysphagic patient: Can we get it? Is there time? *Asia Pacific Journal of Speech, Language and Hearing*, *8*(1), 36-43.

Campbell, W. N., & Douglas, N. F. (2018). Supporting evidence-based practice in speech-language pathology: a review of implementation strategies for promoting health professional behavior change. *Evidenced-Based Communication Assessment and Intervention, 11*, 72-81.

Chu, S. Y., Hara, Y., Wong, C. H., Higashikawa, M., McConnell, G.& Lim, A. (2021) Exploring attitudes about evidence-based practice among speech-language pathologists: A survey of Japan and Malaysia, International Journal of Speech-Language Pathology, 23:6, 662-671.

Chu, S. Y., & McConnell, G. (2018). Translating evidence-based practices to clinical practice: starting in the classroom. *International Archives of Communication Disorder, 1(1),* Doi: 10.23937/iacod-2017/1710007

Chu, S. Y., McConnell, G. & Yuen, M-C. (2019). Wherever you are, there you learn. *K-NOVASI P&P UKM, January 23-24, Bangi.*

Chu, S. Y., Sakai, N., & Mori, K. (2014). An overview of managing stuttering in Japan. *American Journal of Speech-Language Pathology*. 23, 742-752.

Coles, C. R. (1985). Differences between conventional and problem-based curricula in their students' approaches to studying. *Medical education*, *19*(4), 308-309.

Erickson, S. (2012). Letter to the Editor. *International Journal of Language & Communication Disorders, 47(3),* 348–350.

Hoffman, L. M., Ireland, M., Hall-Mills, S., & Flynn, P. (2013). Evidence-Based Speech-Language Pathology Practices in Schools: Findings from a National Survey. *Language, Speech, and Hearing Services in Schools*, *44*, 266-280.

Irish Association of Speech & Language Therapists 2009. CPD: An Exploration (available at: http://www.iaslt., i.e.,/docs) (accessed on 18 April 2018).

Kahmi, A. G. (1999) To use or not to use: factors that influence the selection of treatment approaches. *Language, Speech and Hearing Services in Schools, 30,* 92–98.

Kaya, T., & Bicen, H. (2016). The effects of social media on students' behaviors: Facebook as a case study. *Computers in Human Behavior,* 59, 374-379.

Ludenberg, M., Levin, B., & Harrington, H. (1999). Who learns from what cases and how? The research base for teaching and learning with cases. Mahwah, NJ: Erlbaum.

McEvoy, M. P., Williams, M. T., & Olds, T. S. (2010). Evidence-based practice profiles: Differences among allied health professions. *BMC Medical Education, 10,* 69-76.

Mackenzie, C., Muir, M., & Allen, C. (2010). Non-speech oro-motor exercise use in acquired dysarthria management: Regimes and rationales. *International Journal of Language & Communication Disorders*, *45*(6), 617-629.

McCurtin, A., & Clifford, A. M. (2015). What are the primary influences on treatment decisions? How does this reflect on evidence-based practice? Indications from the discipline of speech and language therapy. *Journal of Evaluation in Clinical Practice, 21(6),* 1178-89.

McCurtin, A., & Roddam, H. (2012). Evidence-based practice: SLTs under siege or opportunity for growth? The use and nature of research evidence in the profession. *International Journal of Language & Communication Disorders*, *47*(1), 11-26.

Metcalfe, C., Lewin, R., Wisher, S., Perry, S., Bannigan, K., & Moffett, J. K. (2001). Barriers to implementing the evidence base in four NHS therapies: dietitians, occupational therapists, physiotherapists, speech and language therapists. *Physiotherapy*, *87*(8), 433-441.

Nail-Chiwetalu, B., & Ratner, N. B. (2007). An assessment of the information-seeking abilities and needs of practicing speech-language pathologists. *Journal of the Medical Library Association*, *95*(2), 182.

Ng, L. S., Thang, S.M., & Noorizah, M. N. (2018). The Usage of Social Networking Sites for Informal Learning: A Comparative Study Between Malaysia Students of Different Gender and Age Group. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, 8(4), 76-88.

Norman, G. T., & Schmidt, H. G. (1992). The psychological basis of problem-based learning: a review of the evidence. *Academic Medicine*, *67*(9), 557-565.

O'Connor, S., & Pettigrew, C. (2009) The barriers perceived to prevent the successful implementation of evidence-based practice by speech & language therapists. *International Journal of Language and Communication Disorders, 44(6),* 1018– 1035.

Oswald, N., & Bateman, H. (2000). Treating individuals according to evidence: why do primary care practitioners do what they do? *Journal of Evaluation in Clinical Practice*, *6*(2), 139-148.

Pollock, A. S., Legg, L., Langhorne, P., & Sellars, C. (2000). Barriers to achieving evidence-based stroke rehabilitation. *Clinical Rehabilitation*, *14*(6), 611-617.

Ramsden, P. (2003). *Learning to teach in higher education*. Routledge.

Sackett, D. L., Rosenberg, W.M.C., Muir Gray, J.A., Haynes, R.B., & Richardson, W.S. (1996). Evidence-based medicine: What is it and what it isn't. *British Medical Journal, 312,* 71-72.

Schoonees, A., Rohwer, A., & Young, T. (2017). Evaluating evidence-based health care teaching and learning in the undergraduate human nutrition; occupational therapy; physiotherapy; and speech, language and hearing therapy programs at a sub-Saharan African academic institution. *PLoS ONE 12*(2), e0172199.

Whites, M. M., Gumiela, S., Pitman, A., Janke, N., & Yaeger, K. (2007). A Preliminary Study of Evidence-Based Practice in Speech-Language Pathology. Paper presented at the American Speech-Language-Hearing Association National Convention, Boston, MA.

Zipoli, R. P. Jr., & Kennedy, M. (2005). Evidence-based practice among speech-language pathologists: attitudes, utilization, and barriers. *American Journal of Speech-Language Pathology, 14,* 208-220.

Appendix

Appendix A. Survey for the Perception of EBP

	Strongly Disagree	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
1. Application of Evidence-Based Practice (EBP) is necessary in the practice of speech-language pathology	1	2	3	4	5
2. EBP improves the quality of client care	1	2	3	4	5
3. The research findings published in journals are not very relevant to my clinical practice	1	2	3	4	5
4. Clinical practice should be based on what other clinicians and specialists have used as treatment protocols over the years	1	2	3	4	5
5. During my SLT training, my teacher taught me how to use EBP in clinical practice	1	2	3	4	5
6. I have never been exposed to EBP during my SLT training	1	2	3	4	5
7. I feel like I have learned how to access to EBP after this literature review and presentation activity	1	2	3	4	5
8. I feel like this activity help me to understand what is EBP in speech-language pathology field	1	2	3	4	5
9. I feel like I have learned other useful skills from my peers after this activity (e.g., information sharing, organization of thoughts, presentation skills)	1	2	3	4	5
10. I feel like I can continue to use what I have learned from this activity toward my clinical practice	1	2	3	4	5
11. I enjoy this activity	1	2	3	4	5