

Preparing entry-level practitioners for evidence-based practice

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Abstract: The authors report on a collaborative instructional method used to prepare entry-level practitioners with strategies for systematically employing an evidence-based practice process as an approach to clinical inquiry, while acknowledging the students' shortage of clinical experience and knowledge of critical appraisal. Challenges to evidence-based practice can be categorized as difficulties in obtaining evidence, analyzing evidence, and transferring evidence into practice decisions. For student occupational therapists, additional challenges are encountered as they seek to fill gaps in their knowledge about client-centred occupational therapy (OT) practice, acquire necessary background information regarding clinical conditions, and formulate a clinical question. Students need to develop literature search skills and learn effective strategies to locate appropriate information to answer the clinical question. This paper will encourage OT faculty to begin a dialogue with librarian colleagues at their institution to develop an evidence-based approach to the teaching of both the clinical inquiry and the literature search process.

Introduction

It is obvious that evidence-based practice is a complex process that relies upon clinical experience and knowledge of critical appraisal. Drawing on the approaches used for evidence-based medicine, Law [1] detailed four steps in evidence-based practice for rehabilitation professionals: (1) questioning, (2) searching, (3) evaluating, and (4) implementing. In dispelling the myth that evidence-based practice is a cookie-cutter approach to rehabilitation, Law noted that evidence-based practice requires extensive clinical expertise. She further described the key features of evidence-based practice as the following: focused awareness of the evidence that bears on clinical practice and the strengths of that evidence, use of the best available evidence in consultation with the client, use of clinical judgment and reasoning skills to determine how to apply the evidence by differentiating how it can be applied to individual clients, and use of insight and creativity to meet the challenges presented by real life problems [2].

From a review of the literature on the application of evidence-based practice in occupational therapy (OT), it is clear that challenges to evidence-based practice exist for experienced clinicians. These challenges can be categorized as difficulties in accessing current research literature, analyzing evidence, and transferring evidence into practice decisions [3,4]. The following have been identified as the reasons for the difficulties encountered by experienced clinicians: (i) lack of time

to search for, read, interpret, and evaluate relevant research findings; (ii) limited knowledge and abilities in appraising research findings; and (iii) individual and systemic resistance to changing current practice in light of research findings [5–7]. In addition, the literature cites the conflict experienced by occupational therapists in their attempts to reconcile holistic, client-centred approaches for evaluation and intervention with the demand for cost-effective interventions based upon scientific evidence supporting clinical decisions [8]. Consequently, experienced occupational therapists have been found to place more emphasis on knowledge from clinical experience, clients, and consultation with colleagues than on scientific literature [9,10]. Despite the wealth of information available to occupational therapists concerning evidence-based practice, ensuring that evidence from scientific research impacts clinical decisions remains problematic for experienced clinicians.

New graduates are also expected to utilize evidence-based practice as the basis for making clinical judgments [11]. For new graduates, the challenges of evidence-based practice are compounded by their lack of clinical experiences and their reliance on rules to help organize their thoughts, observations, and actions [12]. Limited clinical experience restricts the extent to which novice practitioners can use prior experiences with clients as a basis for clinical reasoning and reflective practice, identified by Law as key ingredients in evidence-based rehabilitation [13].

Student occupational therapists are exposed (through course work and fieldwork) to accepted methods of evaluation and intervention for various client problems typically seen in OT practice. Learning experiences are designed to develop technical skills required for performing evaluations and interventions based on client problems [14]. While novice practitioners rely on organizing frameworks that can be applied to each clinical situation, students are still developing their knowl-

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edge base for understanding client problems and service delivery methods suited to OT practice [15].

Given the advanced skills required of evidence-based practitioners, the question of how to prepare entry-level occupational therapists to provide evidence-based services has been raised [16,17]. In a study examining the perceptions of evidence-based practice by experienced clinicians, Dubouloz et al. [18] suggested that entry-level education programs must (1) prepare occupational therapists to view research evidence as crucial to competent practice, and (2) prepare future occupational therapists to view the use of research findings as a necessary part of a client-centred approach. In addition to developing positive perceptions regarding evidence-based practice, it is imperative that educators provide entry-level practitioners with the opportunity to systematically apply the evidence-based practice process as an organizing framework for approaching client problems during their educational program to foster these abilities for future practice.

The purpose of this paper is to describe a collaborative educational initiative between OT faculty and health sciences librarians at the Queen's University School of Rehabilitation Therapy. The objective is to prepare entry-level practitioners to systematically employ an evidence-based practice process as an approach to clinical inquiry with an emphasis on the first two stages of the evidence-based practice process outlined by Law [19] — questioning and searching. Initial findings from a formative evaluation of both the teaching and evaluation methods will be presented along with recommendations for course development. By sharing this teaching approach, we are encouraging OT faculty to begin a dialogue with librarian colleagues at their institution in an effort to develop educational opportunities that prepare entry-level practitioners for evidence-based practice. With limited literature describing teaching methods used to prepare clinicians for evidence-based practice, this paper aims to fill a gap in the dissemination of information pertinent to OT educators.

With the assumption that novices need organizing frameworks that can be applied to clinical situations, this course component made transparent the evidence-based practice process as a framework for analyzing a case study and making clinical decisions for OT evaluation and intervention. To this end, emphasis was placed on developing procedural knowledge for implementing the evidence-based practice process with clients. A second premise used in the development of this educational initiative was that experience is a strong mediator of clinical reasoning [20]. Having completed only one fieldwork placement, students, as individuals, lacked exposure to varied clinical problems. However, as a collective, students possessed a wealth of previous clinical experiences and approaches to clinical problem-solving. To capitalize on this breadth of experience, this course component demanded that students work together in small groups. Learning activities served to foster knowledge-sharing of the students' earlier clinical experiences and encourage reflection on these experiences in light of new problems presented in this class, in an effort to develop skills in clinical reasoning.

Teaching method

Guided inquiry was the teaching method used to introduce students to the evidence-based practice process and to guide

students through each of the four stages: questioning, searching, evaluating, and implementing. A collaborative approach to guided inquiry led students through the stages of evidence-based practice from two perspectives: clinical OT and information literacy. The class of 42 students was divided in half so that one group attended the OT session, while the remainder attended the information literacy session. These groups were switched the following week so that each guided inquiry session was completed on two occasions. This was necessary to encourage active learning and optimize participation using whole and small group learning activities.

Each 2-h guided inquiry session began with a referral for OT. The case study (adapted from Copperman et al. [21]) described a 37-year-old woman with relapsing–remitting multiple sclerosis (MS) and included contextual information regarding her impairments as they related to occupational issues. The case study was presented on overhead transparency. The overall objective of the session was to develop an evaluation plan for this client.

Both the OT and information literacy sessions used the same case study to guide students through the stages of evidence-based practice. Each session placed emphasis on different components of the process. The OT session focused on asking clinical questions pertinent to OT practice and grounded in real-life problems presented by the client. Students were guided through a strategy of anticipating findings as a way to enhance clinical reasoning abilities. Anticipating findings was also thought to facilitate the identification of viable sources of evidence and focus their search for research evidence. The information literacy session placed emphasis on turning clinical questions into searchable questions, developing a knowledge of databases relevant to OT practice, and learning efficient search strategies. Both sessions encouraged reflection by asking students to critically review findings in light of the questions asked.

Occupational therapy session

Questioning

After being presented with the referral for OT service, students were guided through the questioning phase of evidence-based practice by developing a planning guide (adapted from Andersen [22]). Table 1 presents the learning activities completed by the students at the outset of the guided inquiry.

These learning activities assisted the students as they identified areas where they had clinical experience and areas where there were gaps in their knowledge. Facilitating knowledge-sharing in both small and large group format encouraged collaboration and facilitated reflection on recent clinical fieldwork experiences.

These learning activities also laid the groundwork for the importance of obtaining background information as an essential prerequisite to asking a clinical question. It quickly became evident to the class that there were gaps in their knowledge of MS and the possible roles of an occupational therapist with such clients. In advance of this session, librarians compiled a summary of background information on MS and OT from basic texts on OT and physical function. This two-page summary of background information was provided to the students at this stage of the guided inquiry, and they were given time to read and discuss this new information. Emphasis was placed on the use of textbooks to find this

Table 1. Planning guide for gathering background information: examples of information provided by student groups.

Facts/Knowledge	Learning Issues
What do you already know that will help you to evaluate this case?	Where are the gaps in your knowledge?
<i>Examples</i>	<i>Examples</i>
Roles: wife, administration worker, planned motherhood	Learn more about relapsing–remitting MS and role of OT
Diagnosis: MS (×2 years)	What are her coping strategies
Issues: difficulty with vision, frequent falls, fatigue	What financial resources are available
Problems: reluctantly quit job because of fatigue, problems completing ADL tasks owing to impairments associated with MS	What is the fit between her current mobility aids and her level of mobility
	What can the client do
	What are her goals
	What tools are available for evaluation

Note: MS, multiple sclerosis; ADL, activities of daily living; OT, occupational therapy.

background information before proceeding with the development of clinical questions. Providing students with a summary of background information on the client’s condition and the role of OT served as a model for retrieving necessary background information presented in textbooks as a prerequisite to asking sound clinical questions and proceeding with the inquiry.

With background information from basic texts, student groups were then re-directed to the case study and guided to specify client issues that require further OT evaluation. Again these brainstorming sessions were completed in small groups and shared with the larger class to encourage collaboration. With a lengthy list of issues to evaluate, students were asked to prioritize the issues and choose one to pursue with this client. Students defended their choice through discussion, first in their small groups and then with the entire class (see Table 2).

This activity provided students with direct exposure to the process of clinical reasoning based on the available knowledge and evidence presented from the literature. Student groups presented different approaches to prioritizing issues during our discussion. Although a number of these approaches could be pursued in OT practice, for the purpose of the guided inquiry session, students were presented with the instructor’s list of priority issues and the rationale for proceeding with the client’s issue of fatigue. To ensure the learning of how to systematically apply the evidence-based practice process with clients, the issue of fatigue remained at the center of the inquiry for the remainder of this guided inquiry session.

Searching

At this stage of the guided inquiry, the instructor asked students to identify a series of questions regarding this client and her symptoms of fatigue. Following discussion, the instructor provided students with her list of questions (Table 3). Using the instructor’s list of questions, students were led through the process of anticipating findings for each clinical

Table 2. Prioritizing issues for inquiry: an example of the instructor’s list of issues and prioritization.

Issues for inquiry	Prioritizing issues for inquiry
List the issues that should be evaluated by the occupational therapist	Choose one issue that you think is a priority and state your rationale
<ul style="list-style-type: none"> • Fatigue • Mobility • Physical components (balance, tone, strength, ROM) • Dexterity • Sensory systems • Sleep problems • Cognition • Functional capacity and physical demands of work • Occupational performance at work and home 	<p><i>Fatigue:</i> This issue was chosen because it was identified as so severe that it has resulted in the client’s inability to do her normal household tasks, perform her ADL, and work without becoming exhausted. In fact, Katherine has reluctantly resigned from work and stopped adoption proceedings. I wonder to what extent Katherine feels she cannot manage these roles/activities and how they might be altered to support her occupational performance.</p>

Note: ROM, range of motion; ADL, activities of daily living.

question before consulting the scientific literature. Anticipating findings was developed as a learning process that could be used to foster clinical reasoning. The process of anticipating findings also provided students with concrete direction in their search for research evidence to answer their clinical questions. For example, one of the questions asked was, “How is fatigue evaluated?” In anticipating these findings, the class expected that evaluations might assess different aspects of fatigue from diagnostic to client perception to the impact of fatigue on activities of daily living (ADL). This provided further direction for developing a search strategy relevant to OT and suggested that the impact of fatigue on ADL and client perceptions of fatigue would be of importance in a search for OT evaluations of fatigue.

Not surprisingly, the next step in the guided inquiry asked students to identify sources of evidence that could be used for finding answers to each clinical question. In the OT session, emphasis was placed on developing a plan for finding evidence from multiple sources, including expert clinicians, the client (via role playing), peer-reviewed research findings, Web-based materials, and critical review of evaluation tools used in OT practice.

Evaluating

At this point in the guided inquiry session, students were provided with the results of “their” search for evidence in the form of a two-page summary of findings. This summary was completed in advance of the guided inquiry session by the course instructor and further illustrated how evidence is used as a basis for clinical decision-making. Student groups were given time to review the summary of findings regarding factors influencing fatigue, MS fatigue, the impact of fatigue on occupational functioning, and evaluation tools used in OT practice. Students were then asked to develop their own evaluation plan for this client based on the problem of

Table 3. Anticipating findings for priority issue.

Define the priority issue as questions that need to be answered	Anticipate the answers to your clinical questions	For each question, identify your strategy/plan to find the answers
	<i>Examples</i>	<i>Examples</i>
What is fatigue? How does it affect individuals with chronic diseases?	Fatigue is a subjective phenomenon. There are different types of fatigue.	Texts on MS, fatigue, chronic degenerative conditions
Is fatigue in MS different from other kinds of fatigue?	Fatigue affects performance and confidence in the ability to complete tasks, possibly leading to a negative cycle of decreased performance and functioning.	Texts on role of OT in evaluation of fatigue Journal search using database search engines available at Bracken Library
What factors influence fatigue for people with MS?	There is a specific presentation of fatigue in individuals with MS.	Web-based material (e.g., MS Society)
What is the client's experience of fatigue? How does fatigue influence her roles, activities, and tasks?	Evaluations assess different aspects of fatigue (e.g., client perception, diagnostic, impact on ADL)	Texts that review specific evaluation tools for their clinical utility

Note: MS, multiple sclerosis; ADL, activities of daily living; OT, occupational therapy.

Table 4. Developing an evaluation plan.

Occupational performance issue	Evaluation methods/tools	How will the assessment results be used?
	<i>Examples</i>	<i>Examples</i>
Severe fatigue that had increased in the past year and resulted in her inability to do her normal household tasks, perform ADL, and work without becoming exhausted	Fatigue Impact Scale (Fisk et al. [24])	To identify perceived impact of fatigue on ADL and compare the impact of fatigue on the cognitive, physical, and social dimensions of this client's activities
	Self-Efficacy Gauge (Gage et al. [25])	To measure this client's perception of her confidence in the completion of her daily tasks and compare with clinical observation of her performance and interview information obtained throughout the evaluation

Note: ADL, activities of daily living.

fatigue on the client's occupational functioning. Specifically, the client presented with severe fatigue that had increased in the past year and resulted in her inability to do her normal household tasks, perform ADL, and work without becoming exhausted.

Implementing

Following a period of active problem solving, as student groups devised their own evaluation plan on short notice with the evidence provided, the instructor presented her evaluation plan, which outlined the methods and tools that would be pursued and an explanation of how the evaluation results will be used by the occupational therapist (Table 4). The evaluation plan was critiqued by the class to identify both the strengths and limitations of the evaluation plan in evaluating the impact of fatigue on the client's occupational functioning in light of the evidence presented in the summary of findings and present knowledge of the case study.

Review

The 2-h guided inquiry session ended with a brief review of the evidence-based practice process. The client's evaluation results were presented and each stage of the evidence-based practice was reviewed, from the development of a planning guide for asking clinical questions, to producing a summary of findings and developing an action plan. This review was

used as an opportunity to go back through the process the students just participated in and demonstrate how the process could be repeated using a different set of clinical questions to develop an intervention plan for this client. This was necessary to demonstrate how the students would proceed when they completed their own inquiry as an assignment for this course component.

The information literacy session

Questioning

Librarians introduced the concept of evidence-based practice and how researching the literature fits into the complete process. The elements of a good clinical question were examined as part of the complete literature search process. The students were then divided into small groups of six or seven students, each group working with a librarian. As in the OT instructor's session, the groups were given the same case study to read and then the students worked with the librarians to identify the gaps in their knowledge regarding this case. As predicted, most students did not have much information about MS. The librarians then asked the students where they thought they would be able to locate the needed information. Students identified dictionaries and textbooks readily, and usually one or more in each group thought to search the library catalogue for books on MS. Librarians re-

Figure 1. Sample Medline and Cochrane Database of Systematic Reviews searches.

The figure displays two screenshots of Ovid search interfaces. The top screenshot is for MEDLINE, showing a search history table with 4 entries. The bottom screenshot is for EBM Reviews - Cochrane Database of Systematic Reviews, also showing a search history table with 4 entries.

#	Search History	Results	Display
1	multiple sclerosis/rh	208	Display
2	exp fatigue/ or exp muscle fatigue/	4491	Display
3	1 and 2	18	Display
4	limit 3 to english language	16	Display

#	Search History	Results	Display
1	multiple sclerosis.mp. [mp=title, short title, abstract, full text, keywords, caption text]	43	Display
2	fatigue.mp. [mp=title, short title, abstract, full text, keywords, caption text]	244	Display
3	1 and 2	14	Display
4	limit 3 to systematic reviews	10	Display

viewed with their group the key features of the online catalogue. This was done mostly to ensure that skills learned the previous year had not been forgotten during the summer months!

In a real problem-based situation, the students would then be sent off to locate the books found in the library catalogue, read their assigned subtopics, and report back to the whole group at a later stage. Since this was not possible in the assigned class time, librarians prepared a summary to give the students enough information to continue with the evidence-based process.

With some background knowledge in hand, it is then possible to look into the formulation of a clinical question that will be the basis for the specific research in a citation database such as Medline. It was decided during the course planning process to focus on the topic of fatigue in both the library session and the clinical OT session.

Searching

It is important for students to realize that the question itself can be refined and modified, as they gain more information on the topic. Librarians recommend that students look for review articles as a linking step between the earlier background information found in books and the very specific information found in research articles. This will help to focus the search from “any articles on fatigue in MS” to a search that will answer a sound clinical question such as “Do energy conservation methods, such as time management and work simplification, reduce fatigue in patients with MS?”

Database searching is complex in allied health because there is a diverse number of resources to consult. Medline is, of course, a good choice, but students also needed to search

the Cumulative Index to Nursing and Allied Health (CINAHL), Health and Psychosocial Instruments (HaPI), as well as the Cochrane Database of Systematic Reviews. These were the databases available to Queen’s University health sciences students on the Ovid platform at the time of this class in the fall of 2002. Each of these databases has unique features that are important to use appropriately to ensure effective retrieval. In the library’s computer lab, students were encouraged to try the different databases with the same initial topic to learn these searching variations and apply the most appropriate strategies to the database in question (Figure 1).

Evaluating

Evaluating the search can be summarized in one question: “Did I find articles that will help me answer my clinical question?” The databases often offer abstracts of the papers indexed, which are very useful to help determine the need for reading the complete paper. Many journals are now available in electronic format, and the link to full-text can often be made from within Ovid, sometimes directly, sometimes via the link to the university online catalogue. A quick scan is often enough to determine the article’s suitability.

Review

The students were asked to practice writing a clinical question using one of the items from the list of “knowledge gaps” prepared at the beginning of the session. Individually or in pairs, they practiced Ovid searching for this new question, and the librarians helped as needed.

Application: case-based inquiry

Since the students had been guided through the evidence-based practice process from both the OT and information literacy perspectives, student groups received a referral for OT and proceeded with their own case-based inquiry using information provided in the case study to develop an evaluation plan. They repeated the process during the second half of the course to develop an intervention plan for their client. Student groups were then provided with a summary of evaluation findings so that they could repeat the process, adding new knowledge to their inquiry. Students were evaluated on the preparation of a planning guide, their summary of findings, evaluation and intervention plans, and their critical review of their action plans in light of the presented evidence.

Outcomes

Following approval by the Research Ethics Board at Queen’s University, the students were invited to participate in a focus group discussion to provide their feedback regarding the case-based inquiry as a teaching and evaluation method. Ten students participated in the focus group discussion, one from each of the 10 working groups. Students signed an information/consent form and attended a 1.5-h audiotaped focus group discussion at the end of the term (see Table 5 for the interview guide). The focus group discussion was transcribed and reviewed by the authors individually and then together. Feedback from the students was categorized by the stages of evidence-based practice: questioning, searching, evaluating, and implementing. In addition, general comments regarding the use of case-based inquiry as a teaching and evaluation method were grouped together.

Table 5. Focus group interview guide.

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- (1) What was it like when your group reviewed the case study and prepared for your CBI? How confident were you that you knew how to proceed with your own CBI?
 - (2) What strengths did you and your group members bring to the CBI as you worked to develop a priority issue? Were you and your group members able to identify gaps in your knowledge?
 - (3) Tell me about your development of a priority issue. What sorts of things influenced your decisions?
 - (4) Were you able to turn your priority issue into searchable questions (reminder: searchable questions include situation, assessment or intervention, outcome)?
 - (5) Tell me about your process of anticipating findings based on your questions.
 - (6) How much time did you spend searching for evidence in the library? Were there any roadblocks?
 - (7) Where else did you obtain evidence?
 - (8) Tell me about the process of selecting appropriate evidence to use in your CBI. Was this a smooth process? Did you find conflicting evidence? Was evidence lacking? How much time did this take?
 - (9) How confident was your group with analyzing the evidence for its clinical utility?
 - (10) Tell me about the process of transferring your evidence into the development of an evaluation/intervention plan for your case study. Was your group satisfied with your evaluation/intervention plan?
 - (11) Is there anything else you would like to share about the process of participating in the CBI?
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Note: CBI, case-based inquiry.

Questioning

Overall, most students had great difficulty identifying a priority issue for their case study. Respondents reported that they used group brainstorming and discussion of the case study to determine the most appropriate priority issue to pursue. Low levels of student confidence with prioritizing client problems related to their lack of clinical experience. For example, one respondent noted:

We ended up choosing aphasia for our priority issue...we thought that we had to address that because we thought there was no point in going through addressing some of the cognitive and physical issues if we couldn't even communicate with her...it was difficult to choose between physical issues or whether we could stick with aphasia.

Similarly, another respondent reported the following difficulties experienced by their group:

There are so many priority issues when dealing with a stroke patient, and we could not decide which one was the most pressing problem at the moment.

There was consensus from all of the focus group participants that they placed emphasis on sharing their collective clinical experiences in an effort to develop their priority issue. For one group, the similarities between clinical placement experiences and the case study assisted the process:

For our group, the biggest strength was that the three of us had worked on placement with individuals with CVA [cerebrovascular accident]. Another factor was that I had worked with clients following cardiovascular surgery. We were able to throw in what we did over the summer. It helped us to form our priority issue because it was similar to what we had seen in placement.

This confirmed our earlier assumption that the structure of the assignment would force students to pool their individual clinical experiences to assist in the development of clinical reasoning skills.

In addition to lacking confidence and relying on the knowledge of the collective group members to support problem solving, eight out of ten respondents reported that it took a

significant amount of time to identify a priority issue during this stage of the inquiry. Two respondents, however, reported a different experience in their development of a priority issue, noting that they relied heavily on the completion of background reading during this stage of the inquiry to get a better picture of the client and the presenting problems:

Nobody in our group had any practical experience with stroke, so it was a huge challenge to even get a concept of what this person was looking like and what the concerns might be. So that was a big research issue for us.

Analysis of findings from the focus group feedback made it clear that for the most part, student groups neglected the need for background information to focus their clinical inquiry. In essence, they were not yet ready to ask the questions. The two groups that took the time to do some background reading on the condition reported that this stage of the inquiry was completed in a timely manner, and they progressed with greater clarity with sound clinical questions. This was in great contrast to the remaining eight groups who complained that they zigzagged back and forth on determining a priority issue because they would identify an issue and head off to retrieve evidence only to find that they had not considered a significant factor presented in the case study. Neglecting the background reading from basic texts cost these groups a significant amount of wasted time during this stage of the inquiry.

We reformulated our focus of the project a couple of times, so we did all these massive searches only to find out we've gone in the wrong direction and then had to start all over again.

There was consensus from focus group respondents that the instructor could assist with the issue of student confidence by providing early feedback regarding the choice of priority issue. It was also evident from an analysis of the focus group data that emphasis should also be placed on ensuring students attend to the importance of background reading at this stage of the inquiry to provide them with the skills needed to analyze client issues and formulate sound clinical questions.

Searching

Most groups did not take the time to anticipate findings prior to the development of a search strategy and heading out to retrieve evidence. Respondents were uncomfortable with the process of anticipating findings, and others felt that it was a waste of time:

If we put it down in the anticipated findings, then it's not a gap in our knowledge because in a sense we do know the answers. On the other hand, we don't want to put down our anticipated findings if we really don't know; we don't want to guess either.

It was hard to do because it was like doing it backwards...we had already asked the questions and knew that we had to finish the assignment, so we just went to find the answers. We didn't see the point of the anticipated findings.

In contrast, two groups used this phase of the inquiry as an opportunity to focus their inquiry and come to a group consensus. Interestingly, these were the same two groups that effectively used background reading in developing their clinical questions.

We found that by anticipating the findings it gave us more direction in which specific things to look for in the literature.

We used it more as a debate where each group member would anticipate findings...it was collaborative and included everyone's point of view. That helped us to focus for the rest of our assignment. It was at that point that we realized what we needed to keep in and what we needed to take out. It was a useful thing for us.

A few search strategies were examined by the librarian upon completion of the course. Students had difficulty using the features of the database, the controlled vocabulary was sometimes ignored, and there were incorrect combinations of terms. Unfortunately, although students were requested to submit their search strategy, formal evaluation of the search strategies and provision of feedback were not the basis for our marking scheme for the assignment. This limited our ability to provide students with feedback early on in their case inquiry.

Respondents concluded that they spent a lot of time in this stage of the inquiry "chasing a lot of dead ends". Groups estimated that just searching and retrieving information took them an entire week collectively. The students needed help in formulating their search strategies and would have benefited from additional feedback at this stage of the inquiry.

Evaluating

Focus group respondents reported that since the course occurred in parallel with another required course on research methodology, they did not experience difficulties in applying skills of critical appraisal to make sense of the studies they were reading.

Respondents reported that they had greater difficulty evaluating the scientific literature with respect to intervention or treatment approaches compared with assessment. Specifically, they experienced difficulty translating intervention guidelines into specific OT intervention decisions.

We found gaps in treatment. We wondered how exactly do you treat these things as an occupational therapist.

While we found a lot on assessment, there is less on treatment, and there are a lot of judgment calls to make. It is hard to find anything more than general guidelines for treatment.

Especially for OT, we were doing postural control, and there is stuff out there but very little on the specific activities of OT. It is hard for us to say without the evidence. I know I've used it in practice, I know occupational therapist's do it, but I don't have the evidence to back it up.

Interestingly, the case inquiry assignment took place in parallel with course content that reviewed the sensory, perceptual, cognitive, and action systems as well as the theory, guidelines, and general approaches used to understand the cognitive-neurological determinants of occupation. The course was structured around the problems of postural control; mobility; reach, grasp, and manipulation; communication; and feeding. Despite the fact that knowledge of OT evaluation and intervention was provided through classroom learning and course readings, student groups seemed to disconnect the material learned in class from the case inquiry assignment itself and therefore neglected this as a source of evidence.

Implementing

As reported by the focus group respondents, students generally fared better in using research evidence to develop an evaluation plan compared with the development of an intervention plan for their case study. Respondents noted that they were challenged when trying to develop an evidence-based intervention plan in light of controversial information provided in the literature:

We found that there were a lot of different treatment approaches. So we developed three different options for each of our treatment goals.

This lack of confidence in making clinical decisions was clear in the instructor's review of intervention plans for this portion of the case inquiry assignment. Generally, students had difficulty integrating the diverse findings regarding interventions into a realistic intervention plan given the specific case scenario provided. As respondents noted, they were challenged by the translation of treatment guidelines into a specific client-centred intervention plan. Students struggled with the integration of multiple factors presented in the case study with the information obtained through the scientific literature.

We were struggling with integrating all the factors. This was the biggest roadblock. Our priority of muscle weakness is the same, but our client also has a lot of cognitive, safety awareness, perceptual, and sensory problems. So we were trying to take all those factors into account when planning interventions for muscle weakness.

While students generally demonstrated creativity in the design of intervention plans targeting the stated problem, they had difficulty articulating their plans in a concise manner and had difficulty using the literature to identify a specific progression and time frame for their interventions. Again, they were more comfortable when developing evaluation methods for their case study.

General comments

Focus group respondents had some positive things to say about the learning experience of utilizing the evidence-based

practice process within this course component. They reported that the learning activities were practical and that the experience heightened their awareness of the use of evidence in making clinical decisions.

I think it is the most practical assignment that we've done. We thought it would be great to build on this course component by completing our own case inquiry as individuals. It is important and practical...once we get out there practicing on our own, if we don't know how to go find evidence or don't know how to do a literature search, you're probably not going to do it. It took a lot of work and time, but I'd rather do it.

The whole process of getting us to think about things has been really good. I had a supervising therapist at my placement who tended to use a cookie-cutter approach. She seemed to do exactly the same thing with all of her clients. I don't want to practice like that therapist, and I worry about how I can learn from that therapist. I need to be able to go out and think on my own.

Respondents also noted that the process was helpful in maintaining a client-centred approach:

It is helpful for communicating with your client. When they ask you why you are doing certain things, you have the information at hand and can clearly explain exactly why you are proceeding that way. It provides justification for your interventions. You have credibility.

Focus group respondents also had constructive feedback regarding the presentation of the assignment in future years. Specifically, students requested earlier feedback regarding their priority issue, which they felt would make them feel more confident in pursuing the remaining learning activities.

Conclusions and recommendations

Findings of this formative evaluation indicate that this educational initiative was effective in developing positive perceptions regarding evidence-based practice for this group of students, as recommended by Dubouloz et al. [23]. Indeed, students stated that this course component heightened their awareness of the use of research evidence in practice. In addition, students acknowledged the value of using scientific evidence as a necessary part of client-centred practice.

Initial findings of this formative evaluation of the case inquiry as a teaching and learning method also revealed two areas requiring improvement for the development of this course component. First, the need for students to complete background reading at the outset of the case inquiry needed greater emphasis. Students who neglected this component of the process were severely limited in their ability to proceed with both a priority issue and sound clinical questions. The two groups that experienced the greatest success used background reading to develop their basic understanding of the role of OT and were able to use this information to guide their identification of priorities and to anticipate findings for their clinical questions. Second, it is evident that at this early stage in their educational program and with limited clinical experiences, students benefit from feedback at each stage of implementing the evidence-based practice process. This feedback can serve to increase confidence that would come later with greater clinical and information literacy experience.

Evaluation of this course component allowed the authors to identify the following recommendations, which are being used to improve this course component in the fall of 2003.

- (1) Emphasize background reading for three purposes: (i) to identify a priority issue for OT practice, (ii) to develop sound clinical questions, and (iii) to anticipate findings that will further direct their search for evidence in the scientific literature.
- (2) Emphasize the integration of knowledge gained during the course as a source of evidence that should be used in the case inquiry assignment.
- (3) Provide early feedback to student groups on the development of a priority issue and their database search strategies. Timely feedback will mean that students can incorporate the suggestions to increase both their confidence and their success with searching for information.

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References

1. Law M, editor. *Evidence Based Rehabilitation: A Guide to Practice*. Thorofare, N.J.: Slack Incorporated; 2002.
2. Ibid.
3. Dubouloz C-J, Egan M, Vallerand J, von Zweck C. Occupational therapists' perceptions of evidence-based practice. *Am J Occup Ther*. 1999;53:445-53.
4. Law M, Baum C. Evidence-based occupational therapy. *Can J Occup Ther*. 1998;65:131-5.
5. Dubouloz et al., op. cit.
6. Gervais IS, Poirier A, Van Iterson L, Egan M, Tickle-Degnen L. Attempting to use a Cochrane review: experience of three occupational therapists. *Am J Occup Ther*. 2002;56:110-3.
7. Law and Baum, op. cit.
8. Egan M, Dubouloz C-J, von Zweck C, Vallerand J. The client-centred evidence-based practice of occupational therapy. *Can J Occup Ther*. 1998;65:136-43.
9. Dubouloz et al., op. cit.
10. Powell CA, Case-Smith J. Information literacy skills of occupational therapy graduates: a survey of learning outcomes. *J Med Libr Assoc*. 2003;91:468-77.
11. Cope SM. Teaching evidence-based practice using the American Academy of Cerebral Palsy and Developmental Medicine methodology. *Am J Occup Ther*. 2001;55:589-93.
12. Pollock N, Rochon S. Becoming an evidence-based practitioner. In: Law M, editor. *Evidence Based Rehabilitation: A Guide to Practice*. Thorofare, N.J.: Slack Incorporated; 2002. p. 33.
13. Law, op. cit.
14. Cope, op. cit.
15. Pollock and Rochon, op. cit.
16. Cope, op. cit.
17. Dubouloz et al., op. cit.
18. Ibid.
19. Law, op. cit.
20. Pollock and Rochon, op. cit.

21. Copperman LF, Forwell SJ, Hugos L. Neurodegenerative diseases. In: Trombly C, Vining Radomski M, editors. *Occupational Therapy for Physical Dysfunction. 5th Ed.* Baltimore, Md.: Lippincott Williams & Wilkins; 2002.
22. Anderson LT. *Adult Physical Disabilities: Case Studies for Learning.* Thorofare, N.J.: Slack Incorporated; 2002.
23. Dubouloz et al., op. cit.
24. Fisk JD, Pontefract A, Ritvo PG, Archibald CJ, Murray TJ. The impact of fatigue on patients with multiple sclerosis. *Can J Neurol Sci.* 1994;21:9–14.
25. Gage M, Noh S, Polatajko HJ, Kaspar V. Measuring perceived self-efficacy in occupational therapy. *Am J Occup Ther.* 1994;48:783–90.