

2022

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Recommended Citation

Mitchell, A. W., & Woods, L. (2022). Changes in Epistemic and Ontological Cognition of Occupational Therapy Students During Fieldwork: A Qualitative Study. *Journal of Occupational Therapy Education*, 6 (3). Retrieved from <https://encompass.eku.edu/jote/vol6/iss3/6>

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Abstract

The purpose of this study was to represent occupational therapy students' perspectives of their beliefs about knowledge and knowing, or epistemic and ontological cognition (EOC), before and after their first level 2 fieldwork experience. Twenty participants from four classes of entry-level Master of Occupational Therapy (MOT) students who had successfully completed 18 months of didactic coursework provided written explanations of self-ratings on the modified Four-Quadrant Scale of Ontology and Epistemology and written responses to four open-ended questions. Four major themes emerged: 1) Concrete knowledge may have a specific right or wrong answer, 2) Knowledge can change depending on the client, the situation, personal experiences, and evolving evidence, 3) Sources of knowledge and ways to justify knowledge include personal experience, clinical reasoning, authority figures, and the client, & 4) Integrating multiple sources of knowledge helps occupational therapists reason and make decisions. Students' ontological cognition varied, depending on the specific knowledge considered. There were similarities between students' epistemic cognition post-didactically and post-fieldwork, with differences in emphasis on specific sources of knowledge, e.g., hands-on experiences, critical reasoning, and research. Post-fieldwork, use of multiple sources of knowledge was more widespread and strongly emphasized, suggesting the fieldwork experience may have promoted beliefs about knowledge that were more consistent with the profession's practice epistemology. Educators who guide students in recognizing, evaluating, and using critical types of knowledge and multiple sources for justification may better prepare students to successfully solve practice problems. This study provides insight into changes in students' beliefs about knowledge and knowing after their first Level II fieldwork experience and may inform educators seeking to prepare effective practitioners.

Keywords

Clinical reasoning, fieldwork education, qualitative research

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Changes in Epistemic and Ontological Cognition of Occupational Therapy Students During Fieldwork: A Qualitative Study

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ABSTRACT

The purpose of this study was to represent occupational therapy students' perspectives of their beliefs about knowledge and knowing, or epistemic and ontological cognition (EOC), before and after their first level 2 fieldwork experience. Twenty participants from four classes of entry-level Master of Occupational Therapy (MOT) students who had successfully completed 18 months of didactic coursework provided written explanations of self-ratings on the modified Four-Quadrant Scale of Ontology and Epistemology and written responses to four open-ended questions. Four major themes emerged: 1) Concrete knowledge may have a specific right or wrong answer, 2) Knowledge can change depending on the client, the situation, personal experiences, and evolving evidence, 3) Sources of knowledge and ways to justify knowledge include personal experience, clinical reasoning, authority figures, and the client, & 4) Integrating multiple sources of knowledge helps occupational therapists reason and make decisions. Students' ontological cognition varied, depending on the specific knowledge considered. There were similarities between students' epistemic cognition post-didactically and post-fieldwork, with differences in emphasis on specific sources of knowledge, e.g., hands-on experiences, critical reasoning, and research. Post-fieldwork, use of multiple sources of knowledge was more widespread and strongly emphasized, suggesting the fieldwork experience may have promoted beliefs about knowledge that were more consistent with the profession's practice epistemology. Educators who guide students in recognizing, evaluating, and using critical types of knowledge and multiple sources for justification may better prepare students to successfully solve practice problems. This study provides insight into changes in students' beliefs about knowledge and knowing after their first Level II fieldwork experience and may inform educators seeking to prepare effective practitioners.

Introduction

Epistemic and ontological cognition (EOC) include beliefs about knowledge and knowing (Greene et al., 2008; Mitchell, 2013). Research reveals connections between EOC and academic performance (Greene et al., 2018). Interventions such as guided inquiry, exposure to multiple contrasting perspectives, and direct teaching of strategies for evaluating knowledge sources promote EOC development and can lead to gains in academic achievement (Cartiff et al., 2021). Since EOC may have an impact on occupational therapy students' academic performance and their integration of learning into practice, it is important for academic and fieldwork educators to understand students' EOC (Billet, 2016; Mitchell, 2014; Ng et al., 2019).

Literature Review

EOC Definitions and Dimensions

Epistemic cognition and ontological cognition are interdependent concepts, as ontological beliefs are based on epistemic beliefs (Greene, 2009). When describing epistemic cognition and ontological cognition, many authors refer to different dimensions of beliefs (Greene, 2009; Hofer & Pintrich, 1997). From this perspective, *ontological cognition* involves a continuum of two beliefs about the nature of knowledge: simplicity and certainty (Greene, 2009). At one end of the continuum, individuals believe that knowledge consists of discrete, unchanging facts, and at the other end, that knowledge is complex and evolving.

The term *epistemic cognition* is used to describe beliefs about where knowledge comes from—the source and justification of knowledge (Greene, 2009; Green & Yu, 2016; Lee, 2021). The culmination of experiences leads to beliefs about what counts as knowledge and whether knowledge is justified based solely on external sources such as authority figures, textbooks, or research evidence (Muis et al., 2006). Greene and colleagues (2008) described two dimensions of epistemic cognition: justification by authority, i.e., reputable external sources such as instructors, and personal justification, i.e., personal experience and/or critical thinking. Bråten and colleagues (2011) and Ferguson and colleagues (2012) described a third dimension, justification by multiple sources, i.e., using multiple textual sources to compare and cross-check each other. While occupational therapists must judge the strength and quality of textual sources when considering conflicting or discrepant research evidence, sources used by practitioners are both textual and non-textual. Nevertheless, the term *justification by multiple sources* may be useful to indicate the type of justification that exemplifies occupational therapy practice epistemology. That is, occupational therapists use critical reasoning to integrate, coordinate, and/or cross-check textual and non-textual sources and develop a rich, holistic, picture of the client and his or her situation. No one single source of knowledge provides the holistic picture needed to generate solutions to practice problems.

Changes in beliefs about the nature of knowledge (ontological cognition) and sources and justification of knowledge (epistemic cognition) may occur in response to academic and life experiences (Greene et al., 2008; Mavri et al., 2021). While there are no published studies of occupational therapy students' EOC on fieldwork, Mitchell (2015) conducted a longitudinal study of occupational therapy students' EOC during the didactic portion of a program. She found no difference in the students' ontological cognition after 18 months in the program, but a change was observed in epistemic cognition. After 18 months of didactic coursework, the students' beliefs in authorities as sources of knowledge were weaker than at the beginning of the program. Although the outcome measure used did not assess personal justification, Greene and colleagues (2008) suggested that a shift away from authority indicated more sophisticated epistemic cognition.

Developmental Perspectives of EOC

Some theorists have described developmental models of EOC and how EOC evolves from more absolutist and dogmatic (black and white) thinking, to more multiplistic (gray) thinking, to the ability to evaluate and reason the best solutions to complex problems (evaluativist thinking, e.g., Greene et al., 2008). Mitchell (2014) examined the development of EOC in occupational therapy students. She compared their EOC at entry into the program and on completion of the didactic portion of the coursework and found that post-didactic students' occupational-therapy-specific EOC was more sophisticated than the entering students' EOC. Only post-didactic students demonstrated evidence of evaluativist EOC.

Mature EOC is essential for the critical thinking required to acquire and construct information in the classroom and to use that knowledge when encountering complex situations in the real world (Green & Yu, 2016; Lee, 2021; Ng et al., 2019). Research has shown that occupational therapy students who began the academic program believing that knowledge comes from an authority such as an expert or textbook tended to have lower scores on the Watson-Glaser Critical Thinking Appraisal (Mitchell et al., 2020). Beliefs in an omniscient authority as the source of knowledge also predicted critical thinking at the end of the didactic portion of the academic program.

Variations of EOC

Research shows that EOC can vary based on factors such as the topic or domain, the type of knowledge, or the context (Greene et al., 2018; Greene & Yu, 2014). For example, knowledge about a topic such as symptoms of a disability may be perceived as more certain. On the other hand, knowledge about a topic such as holistic interventions for an individual with a particular disability may be perceived as more evolving and dependent on individual situations, needs, and preferences. Researchers have also posited that EOC can be domain-general, i.e., applied across domains or topics. For example, students may believe that both historical knowledge and mathematical knowledge consist of discrete facts that can be imparted by instructors. Conversely, EOC may be domain-specific, varying across domains such as aesthetic or moral judgments (Buehl & Alexander, 2006; Muis et al., 2006).

Context is another factor that can influence EOC. Sociocultural context influences both domain-general and domain-specific EOC, since EOC evolves as individuals engage in education and life experiences (Greene et al., 2008; Mavri et al., 2021). Greene and colleagues (2016) also proposed that EOC may shift when individuals move from one physical setting to another. According to Cartiff and colleagues (2021), individuals need to develop flexibility and to adapt EOC according to the norms of a particular situation or context. It is therefore important to consider the influence of academic contexts on EOC (Muis et al., 2006), and for occupational therapy students, these include both the classroom and fieldwork.

Greene and Yu (2014) discussed differences in EOC based on different types of knowledge. These types of knowledge included declarative knowledge (facts that can be memorized), procedural knowledge (knowledge of how to perform skills and techniques), and principled knowledge (knowledge that is specific to a domain and well-integrated in that domain). Greene and Yu suggested that it may be more likely for individuals to believe that declarative knowledge is simple and certain and that it originates from authorities than to hold those beliefs about procedural knowledge or principled knowledge.

While there are a few studies that have described students' EOC during the didactic portion of an occupational therapy curriculum, there are currently no published studies of occupational therapy students' EOC during fieldwork. Due to shifts in the topics and types of knowledge emphasized during fieldwork, as well as the shift from the classroom to the practice setting, it seems possible that occupational therapy students' EOC may differ from their EOC during the didactic portion of the occupational therapy program. Research describing students' EOC after their first Level II fieldwork experience could enhance academic and fieldwork educators' understanding of students' EOC. As educators increase their understanding of EOC, they may be able to better recognize and address aspects of EOC that may be barriers to student learning during fieldwork. Thus, this study sought to provide insight into changes in students' EOC as they moved from the classroom into practice and experienced the epistemic norms of the fieldwork setting. The specific research question was: What are occupational therapy students' perspectives of their EOC before and after their first Level II fieldwork experience?

Methods

This qualitative case study was granted exempt status by the university's institutional review board.

Positionality Statement

Both authors are Caucasian female faculty members at a state university. The first author has studied EOC, published both conceptual and empirical articles on EOC, and has presented on the topic at national conferences. She was the participants' instructor during the didactic portion of the program but was not involved in fieldwork grading or decision-making. None of the students who volunteered experienced adverse academic situations during fieldwork that would have required input from the entire faculty. The

first author recruited the second author, who was not the participants' instructor, and who was new to EOC concepts. By triangulating the two authors' interpretations of the data and incorporating theoretical triangulation, efforts were made to represent participants' perspectives.

Participants and Setting

Participants were from four classes of entry-level Master of Occupational Therapy (MOT) students enrolled in a health science center campus in the Midsouth region of the United States. All students were invited to participate; 20 of the 126 potential participants volunteered. All participants had successfully completed 18 months of didactic coursework in the program. The program included 81 credit hours of basic science and occupational therapy coursework, with three 2-week Level I fieldwork experiences (one during each of three six-month didactic terms) and three 3-month Level II fieldwork experiences following the didactic coursework.

Instruments and Procedures

Data was gathered using two instruments, written explanations of self-ratings on the modified Four-Quadrant Scale of Ontology and Epistemology, with instructions adapted for occupational therapy students (mFQS; Schraw & Olafson, 2008), and responses to four open-ended questions. On the mFQS, respondents rate their beliefs along continua from realist to relativist for both epistemic and ontological cognition. The realist end of each continuum represents beliefs in certain epistemic or ontological cognition, and the relativist end represents beliefs in changing, tentative epistemic or ontological cognition.

The following four written, open-ended questions were adapted from Baxter Magolda (2002), Buehl and Alexander (2006), and Mason (2010) and were used to gather additional information about students' occupational-therapy-specific EOC. Questions 1 and 4 focused on both ontological cognition and epistemic cognition, and questions 2 and 3 focused on epistemic cognition.

1. Think back on important learning experiences you've had during your coursework and/or fieldwork.
 - Which types of learning experiences do you think will be most useful to you in the future?
 - Why were the experiences important?
 - How do you think they will help you in the future?
2. Think about a situation in which there is/was more than one viable option for assessment or treatment with a client.
 - How will you/did you decide which option to follow?
 - What will be/were the most important considerations in your choice?
 - Please give details.
3. What should the role of the instructor (classroom or clinical) be in terms of your learning? Explain your answer.

4. Think about times when two instructors (classroom or clinical) explained the same thing differently.
 - Can one be more correct than the other?
 - Can you ever be sure of which explanation to believe? If so, how?
 - If you can't be sure of which explanation to believe, why not?

Instructions were included to introduce the questions and direct the students to provide thoughtful and complete responses.

These instruments were administered in a classroom setting at the end of the didactic coursework, and via Blackboard Academic Suite™ at the end of the first three-month Level II fieldwork experience. There were no time limits for completion. Students were asked to complete the mFQS first.

Data Analysis

After data de-identification, we analyzed the data individually, reading the data multiple times and using open and axial coding and analysis of themes (DePoy & Gitlin, 2016; Stake, 1995). The first author (AM) approached data analysis by using word processing software to organize segments of data under headings that represented meaningful, recurring categories describing students' descriptions of their EOC. The second author (LW) analyzed the data by sorting and organizing it into common meaningful patterns using color-coding. Some segments were categorized under more than one theme. The mFQS data and responses to the written questions were first analyzed separately, then combined and re-analyzed. We used an iterative process, considering categories based on both dimensional and developmental EOC theories after initial coding. Additional categories that emerged were also considered. Extensiveness and intensity of the themes were noted. Similarities and differences in codes and themes post-didactically and post-fieldwork were also reviewed from dimensional and developmental perspectives. Tables and charts were used to sort, analyze, and compare data. After each step of analysis, we discussed our thoughts and ideas and came to mutual agreement on codes and themes (Saldaña, 2016); differences were minor.

Independent coding and analysis of themes allowed for multiple perspectives on the data. Collecting data from students across several cohorts permitted triangulation of data sources, collection of larger amounts of data, and multiple perspectives on EOC. Themes were defined according to participants' statements and views of EOC, then reviewed for consistency with various aspects of EOC theory. Auditing was used to document the steps of analysis.

Results

Demographics

Of the 20 students who participated, 70% were female. The average age was 25.3 years (range = 23-30). Eighty percent were White, 10% African American, 5% Asian, and 5% Hispanic-Latino.

Themes

Four themes emerged from the combined data (i.e., mFQS explanations and narrative responses to the four open-ended questions), two related to ontological cognition and two to epistemic cognition. The ontological cognition themes included: 1) Concrete knowledge may have a specific right or wrong answer; and 2) Knowledge can change depending on the client, the situation, personal experiences, and evolving evidence. Themes related to epistemic cognition were: 3) Sources of knowledge and ways to justify knowledge include personal experience, clinical reasoning, authority figures, and the client; and 4) Integrating multiple sources of knowledge helps occupational therapists reason and make decisions. These themes were consistent at both points in time, although differences in student narratives indicated subtle changes in EOC. Themes were considered predominant when they were widespread amongst the participants and emphasized strongly in their statements (see Table 1).

When describing ontological cognition, some post-didactic students focused entirely on more “concrete” declarative and procedural knowledge and described it as simple and certain. These statements excluded principled knowledge and any mention of knowledge being complex and evolving. For example, one student remarked, “I agree that OT’s (sic) should have a certain skill set for all practices...” On the other hand, post-fieldwork students seemed to expand their view of occupational therapy knowledge, contrasting simple and certain declarative and procedural knowledge with more complex and changeable principled knowledge. Post-fieldwork, no students mentioned knowledge being exclusively simple and certain, and some procedural knowledge was also recognized as complex and situationally dependent. For example, one student commented, “Yes, a stroke is a stroke, but every person is literally affected by it differently compared to the next guy. Although textbook material can provide a basic understanding and textbook options, to improve functionality, there are still instances when certain treatments work better for some people who have incurred a stroke than others.”

Across all the data, students referred to various external authorities as sources of knowledge. These included experienced therapists, research evidence, textbooks, and instructors/coursework. However, post-fieldwork, students’ responses suggested an evolution from believing that knowledge comes from external authorities such as educators, textbooks, and research, moving toward confidence in using critical reasoning. Further, both post-didactically and post-fieldwork, some students described the therapist as the authority for the client. One student stated, “I believe the *therapist* is the professional and expert when selecting assessments and interventions for the client aimed towards his/her deficits.” Some students described collaboration with the client and sharing authority, e.g., “... I feel including collaboration with clients in the treatment process is important in order to determine interventions that will be most effective for them and their progress.” Still others suggested the client is the authority, e.g., “I strongly believe that the client is the most important member of the treatment team and is an expert about their own life. They know more than anyone what type of interventions will motivate them to participate.”

Along with various authorities, students often discussed personal justification when responding to the different contexts of the written questions and mFQS self-ratings. The types of sources emphasized appeared to shift post-fieldwork, however. Before fieldwork, students stressed personal justification through hands-on experience. After fieldwork, students appeared to value critical reasoning and research evidence.

Table 1

Themes and Comparisons Over Time

Themes	Differences	
	Post-Didactic	Post-Fieldwork
Ontological Cognition		
Concrete knowledge may have a specific right or wrong answer.	<ul style="list-style-type: none"> • Sometimes mentioned exclusively 	<ul style="list-style-type: none"> • Not mentioned exclusively • Contrasted declarative and procedural knowledge with principled and some procedural knowledge
Knowledge can change depending on the client, the situation, personal experiences, and evolving evidence.	<ul style="list-style-type: none"> • Widespread and strongly emphasized • Research findings lead to changes in knowledge and practice 	<ul style="list-style-type: none"> • Predominant
Epistemic Cognition		
Sources of knowledge and ways to justify knowledge include personal experience, clinical reasoning, authority figures, and the client.	<ul style="list-style-type: none"> • Predominant <ul style="list-style-type: none"> ○ “Hands-on” experiences ○ The client • Emerging sources <ul style="list-style-type: none"> ○ The client as the authority • Collaboration/shared authority between therapist and client 	<ul style="list-style-type: none"> • Predominant <ul style="list-style-type: none"> ○ Critical reasoning ○ Research evidence ○ Collaboration/ shared authority between therapist and client • “The client as the authority” more widespread and strongly emphasized
Integrating multiple sources of knowledge helps occupational therapists reason and make decisions.	<ul style="list-style-type: none"> • Widespread and strongly emphasized: Two to three sources used 	<ul style="list-style-type: none"> • Predominant: As many as five sources used

Both post-didactically and post-fieldwork, when students discussed the use of more than one source of knowledge (i.e., epistemic cognition), between two and eight sources were mentioned. As one student explained post-didactically, "...I would consider my patient's needs, the patient's insurance, time requirements, space requirements, and what the (sic) skills that I have as an occupational therapist." Post-didactically, students most often described using four sources, and post-fieldwork, four to six sources. An average of five sources were mentioned both post-didactically and post-fieldwork. At both points in time, the most frequently cited sources were personal justification (both hands-on experiences and critical reasoning) and authority figures (the client, instructors, and research). Hands-on experience was most frequently mentioned post-didactically, with research most frequently cited post-fieldwork. Responses that included critical reasoning also increased slightly, while mentions of instructors, context, and textbooks decreased slightly from post-didactic to post-fieldwork responses. Thus, while students described personal experience and authorities as important sources of knowledge at both points in time, their emphasis on the personal experience of critical reasoning appeared to increase post-fieldwork. Similarly, post-fieldwork, the types of authorities they discussed seemed to shift slightly, away from sources associated with the classroom and toward research.

Students mentioned integrating multiple sources to justify knowledge both post-didactically and post-fieldwork; however, this theme was stronger for the post-fieldwork students. Post-didactically, students described integrating two or three sources of knowledge, but after fieldwork they described cross-checking and integrating as many as five sources. Cross-checking and corroborating sources was exemplified by one student's post-fieldwork explanation of how to determine which of two instructors' explanations to believe:

...Therefore, when a student hears two of them, taking them both into consideration is key until the student him/herself runs across situations where they use that knowledge and can decide for him/herself which is the most accurate. Also, conducting evidence-based journal reviews and discussing these explanations with other professionals would prove useful to the student to decide for him/herself which one is the most believable.

Discussion

Ontological Cognition Themes: 1) *Concrete knowledge may have a specific right or wrong answer.* 2) *Knowledge can change depending on the client, the situation, personal experiences, and evolving evidence.*

As in studies of other disciplines (e.g., Bråten et al., 2009), the occupational therapy students' beliefs about the certainty and simplicity of knowledge varied depending on the specific knowledge considered. They described more concrete declarative and procedural knowledge about diagnoses, symptoms, and post-surgery protocols as simpler and more certain, while also recognizing that all types of knowledge can have aspects that are complex and changing. One student stated,

...the assessments and interventions occupational therapists use need to change as we gather research and experiential evidence to inform our practice, but in some scenarios, such as an ortho clinic, old protocols need to remain in place until new techniques are approved or selected by your doctor... And there is almost always more than one effective approach to intervention...

Statements about principled knowledge focused on client-centered practice and the uncertainty of knowledge. Students recognized that client-centered practice requires tailoring interventions, regardless of the similarity of clients' diagnoses. One participant explained, "Each client will have different needs even if they have the same diagnosis. Also, every client will have different beliefs, roles, and values so to have a client-centered intervention there could not be a fixed intervention in place."

While statements emphasizing simplicity and certainty of knowledge were not particularly common post-didactically, after fieldwork no students described knowledge as exclusively certain and simple. Rather, they described some types of knowledge (particularly declarative and procedural) as certain and simple, and other types (particularly procedural and principled) as complex and changing. Students seemed more able to see the nuances and "exceptions to every rule" and to recognize the uniqueness of each client and situation (Billet, 2016; Ng et al., 2019). This may represent a further shift away from dogmatic ontological cognition, as described by developmental theorists (e.g., Greene et al., 2008). These findings are also consistent with Mitchell's (2014) study of the EOC of pre- and post-didactic occupational therapy students, as the students in her study also expressed beliefs in both certain and uncertain knowledge. Further, the results coincide with Schommer-Aikins' (2002) view that even mature thinkers may retain beliefs that some knowledge is certain.

Greene and colleagues (2016) argued that EOC may be influenced by the physical setting. Consistent with this notion, several students expressed the idea that some clinical settings may encourage views of knowledge that are simpler and more certain (e.g., orthopedic clinics), in contrast with other settings, (e.g., mental health settings). The fact that students recognized this variation in the nature of knowledge based on the norms of the treatment setting also suggests that they may have begun to develop the flexible, adaptive EOC described by Cartiff and colleagues (2021).

Across the data, some students described personal experiences as opportunities to learn protocols they could apply to future clients, while others described them as important opportunities to practice reasoning and problem-solving. These views of personal experiences seemed to change after fieldwork, however. Consistent with Dutton's (2003) finding that first-year occupational therapy students were more likely to view hands-on experiences as opportunities to learn protocols, while second-year students were more likely to focus on critical reasoning aspects, in this study the view of personal experiences as protocols seemed to fade somewhat after fieldwork. This exemplifies the transition from beliefs in certain knowledge (i.e., personal experiences

provide protocols that can be applied across situations, since knowledge is certain) to beliefs in uncertain knowledge (i.e., personal experiences provide practice with critical reasoning that can be used to problem-solve in situations that vary, since knowledge is uncertain).

Students' discussion of research evidence differed depending on whether it was described in relation to ontological cognition (i.e., as a factor that made knowledge less certain) or in relation to epistemic cognition (i.e., as a source of knowledge). Although research evidence was described as a source of knowledge at both points in time, it was only mentioned as a factor that resulted in occupational-therapy-specific knowledge being uncertain post-didactically. Differences in emphasis on evidence-based practice during didactic coursework versus fieldwork may have contributed to the lack of identification of research evidence as a factor resulting in uncertainty of knowledge, as Crabtree and colleagues (2012) found that occupational therapy students' basic evidence-based practice skills and knowledge decreased after fieldwork. Further, twelve weeks may not have been enough time for students to experience research as a facilitator of change in practice.

Epistemic Cognition Themes: 3) Sources of knowledge and ways to justify knowledge include personal experience, clinical reasoning, authority figures, and the client. 4) Integrating multiple sources of knowledge helps occupational therapists reason and make decisions.

At both points in time, students described a variety of sources of knowledge and ways to justify knowledge. Consistent with the literature (Greene et al., 2008), these included both internal, personal sources and external authorities. Statements about personal experience as a source of knowledge, specifically "hands-on" learning, dominated the responses by the post-didactic students, particularly for procedural knowledge. This was in contrast with a previous study (Mitchell, 2014) that did not identify a specific focus on personal justification through "hands-on" practice. In the current study, students focused on the need to learn skills and techniques used by practitioners. For example:

I feel that the hands on (sic) practical learning experiences I have had will be the most helpful for fw [fieldwork]. These will be helpful so I actually know what to do with myself, like how to position my body for transfers and support.

Although this theme was apparent in the post-fieldwork data, it was less predominant, perhaps reflecting students' increased skill and confidence in their procedural knowledge following fieldwork.

Students also discussed critical reasoning as a means of personal justification at both points in time, although post-didactically personal justification through "hands-on" learning of specific skills was the most widespread and strongly emphasized aspect of personal justification. Post-fieldwork, students seemed to recognize that occupational therapy practice required more than "hands-on" procedural knowledge. Students' beliefs in personal justification appeared to have expanded from "hands-on" experience to

incorporate critical thinking as an essential part of the personal justification used in occupational therapy practice. Fieldwork may have facilitated development of the critical thinking required to flexibly apply didactic knowledge when encountering complex situations in the real world (Greene & Yu, 2016; Lee, 2021; Ng et al., 2019).

Post-didactically, students emphasized collaboration with the client, but post-fieldwork, the client as the authority was more widespread and strongly emphasized. Students used the term “client-centered” after didactic coursework, but they emphasized the client as a source of knowledge, describing how the therapist must know about the client’s diagnosis, symptoms, and needs in order to make clinical decisions. Post-fieldwork, students also perceived clients as sources of knowledge, but they were better able to describe the therapist-client relationship and the centrality of the client’s individual needs, goals, and desires to the intervention process. These findings are similar to Mitchell’s (2014) in that beliefs in the therapist as the authority and the client as the authority were both apparent in her study, and statements indicating a belief in the client as the authority increased over time. However, in Mitchell’s study, the therapist as the authority was only discussed by one post-didactic student; whereas in the current study, this belief was expressed both post-didactically and post-fieldwork.

Developmental Perspective

Like the evaluator (Greene et al., 2008), students often discussed both personal justification and various authorities as sources of knowledge when responding to the different contexts of the written questions and mFQS self-ratings. The shift from emphasis on hands-on personal experiences before fieldwork to emphasis on critical reasoning and research evidence after fieldwork suggests that fieldwork experiences may have helped the students appreciate the need to augment hands-on experiences as sources of knowledge. In response to ill-structured problems encountered during fieldwork, students may have been impelled to seek out research they believed might provide more certainty. As one student stated, “The best and most appropriate methods for assessment and treatment [should] be determined through research or expert recommendation.”

Epistemic and ontological cognition development was also evident in the students’ discussions of the use of multiple sources of knowledge to verify and corroborate each other. The need for justification by multiple sources was noted to some degree both post-didactically and post-fieldwork; however, this was more widespread and strongly emphasized in the post-fieldwork data. Consistent with previous literature (Bråten et al., 2014; Greene et al., 2008), the specific sources integrated depended on the contexts of the prompts. For example, when discussing conflicting information from instructors, students often discussed integration of knowledge from instructors, personal experience, and research, with the addition of critical reasoning post-fieldwork. When describing selection of assessments and interventions, students tended to mention integrating research and knowledge obtained from the client post-didactically, whereas post-fieldwork they mentioned critical thinking and knowledge obtained from the client. This may reflect the more mature, flexible approach to justification of knowledge described by Bråten and colleagues (2014).

Implications for Occupational Therapy Education

Kienhues and colleagues (2008) argued that the disequilibrium that occurs when there is a difference between existing beliefs and new experiences is what facilitates change in EOC. Novel experiences encountered during fieldwork may foster development of more adaptive EOC as students strive to restore equilibrium and learn to solve practice problems that do not have a definite right answer (Mitchell, 2013). This adaptive EOC may, in turn, facilitate the critical thinking needed to make connections between evidence and practice and to solve problems more accurately (Billet, 2016; Wilson et al., 2021). Conversely, some students may have difficulty applying knowledge from the classroom to real-world situations when it does not fit exactly what they learned in the classroom (Billet, 2016; Kienhues et al., 2008; Mitchell, 2014; Wilson et al., 2021).

The findings of this study may enhance academic and fieldwork educators' understanding of students' EOC while completing fieldwork. As a result, they may be better prepared to address barriers to student learning (Mitchell, 2013). For example, promoting principled knowledge and justification by multiple sources may enhance the EOC of students who are focused on and primarily value personal justification through hands-on learning of skills. Fieldwork educators who incorporate methods for facilitating EOC development may also promote adoption of the profession's practice epistemology (Mitchell, 2013). Further, this study may inform educators seeking to design curricula that foster the development of students' EOC.

Limitations and Suggestions for Future Research

This study was conducted in one program in the Midsouth region of the United States which may limit the transferability of its findings. The potential limitations of self-report should also be considered; however, this approach was appropriate to address the aims of this qualitative study. Multiple strategies were used to enhance trustworthiness, but focus groups, interviews, and member checking would strengthen trustworthiness of future research. Suggestions for future research include studies describing students' EOC at the end of their final fieldwork experiences, research exploring the relationships between justification by multiple sources and didactic and fieldwork performance, and studies of students' versus experts' EOC and epistemic values.

Conclusion

Cartiff et al. (2021) recommended that educators utilize guided instruction and explicitly teach students to employ the practice epistemology of the discipline. This can begin in the classroom, but it also needs to extend into the real-world context of fieldwork. Classroom instructors and fieldwork educators who guide students in recognizing critical types and multiple sources of knowledge and how to evaluate and use them for justification when solving practice problems may better prepare students to be successful and effective practitioners.

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