'Making Strange': Exploring the Development of Students' Capacity in Epistemic Reflexivity

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Abstract

Objective: Developing compassionate and humanistic practitioners is an enduring imperative in health professions education. Engaging in epistemic reflexivity, or the ability to question the ways in which we practice, and their association with organizational and social structures, creates the ability to interrogate embedded assumptions. This insight allows for disruption of patterns of automaticity, which allows us to re-imagine how disciplinary practices could be otherwise.

Methods: In this interpretivist inquiry, we used qualitative methods to explore experiences with an educational initiative to develop knowledge and skills in epistemic reflexivity among learners enrolled in the final year of a Master's-level entry-to-practice physical therapy training program. We used observations, a focus group and a face-to-face interview to deepen our understanding of the socially-constructed and iterative processes that underpin reflexivity.

Results: Our data illuminated key dimensions of study participants' experiences that suggest a transformation in students' orientation and ability to question taken-for-granted aspects of physiotherapy practice; however, skillful nurturing of the process by facilitators with expertise in epistemic reflexivity was important to allow these efforts to bear new positive possibilities rather than negative impacts.

Conclusions: Developing capacity in epistemic reflexivity must be carefully facilitated and nurtured. Future research could elaborate on the relevance of our findings in other novice groups within the health professions and how our provisional step-wise framework may be adapted for learners other than novices.

Introduction

The development of compassionate and humanistic health professionals with a high degree of expertise has long been a focus of health professions education research. Although the accumulation of biomedical

knowledge has historically dominated this field of education, there is increasing recognition that proficiency in the social sciences and humanities fosters humanism and compassion in healthcare professionals[1] and is essential for the health professions to keep pace with the complex and ever-changing healthcare context.[2,3] Moreover, evidence is accumulating to suggest that expertise development in the health professions ought to be re-conceptualized as an approach to practice wherein the practitioner engages with different forms of knowledge from diverse disciplines, activating and moving between multiple epistemologies at different moments in clinical practice.[3,4,5,6]

The significance of this re-conceptualization of practice is increasingly recognized as critical to meaning-making within disciplinary learning, and for solving complex problems and advancing professional practice.[2,7] For the rehabilitation professions, adopting this approach to practice can enable full engagement as person-centered practitioners, particularly for complex issues concerning professionalism, ethical decision-making, and social justice. Kuper et al[1] investigated the forms of non-biomedical knowledge that are required to develop physicians. They found that a robust understanding of epistemology was foundational to implementing the various roles of a physician. Similarly, in their qualitative study of expert physiotherapists, Edwards et al[8] noted that expert clinicians moved between multiple forms of reasoning in any given clinical encounter, including narrative and hypothetico-deductive reasoning. In doing so, these expert clinicians sought to not only address the cause of clients' physical disability and pain, but also understand the clients' values, beliefs and experiences of disability. This insight helped clinicians interpret examination findings and nurture a collaborative relationship with their clients. This imperative to move between multiple epistemologies requires healthcare practitioners to understand the constructed nature and production of diverse forms of knowledge (eg, beyond solely biomedical knowledge), and from this position to examine the social conditions under which knowledge is generated, gains credence and is reproduced in practice.[2,3,9]

Central to understanding the role of epistemologies in professional practice is a phenomenon called *epistemic cognition*, or the process of acquiring, understanding, employing and adapting one's knowledge in a particular context.[10,11] An emerging body of scholarly work suggests that skillful and deliberate reflection and analysis of one's epistemic cognitive process, known as *epistemic reflexivity*, is critical to transforming professional practice.[10,11,12] Epistemic reflexivity calls us to question, or to 'make strange' the taken-for-granted ways in which we practice, the organizational and social structures of our discipline, and the embedded assumptions therein. From this view, we are better able to re-imagine how our practices could be otherwise. Thus, epistemic reflexivity offers a way to 'make strange' our practices through deliberate interrogation of one's own values, cherished beliefs, perspectives and social traditions that contribute to the construction of specific knowledge claims and the commitments we make to them.[11,13,14]

Pierre Bourdieu's[13, 15] notion of *habitus* provides a lens for appreciating the challenges to changing entrenched ways of thinking and doing. Habitus refers to a set of durable dispositions that incline persons toward particular practices in given contexts. Practices are understood as deeply ingrained ways of acting and thinking formed through repetition and internalization of social norms until they are understood as 'just the way things are.' In the case of physical therapy learners, this might include: (a) the internalization of

professional practice conventions; (b) ways of approaching complex concepts such as disability, quality of life, bioscientific methodologies, evidence based practice, and algorithmic reasoning; and (c) a host of other ways of thinking and doing that intermix to form a physical therapy habitus shared among members of the profession. The habitus is not fully unconscious but nevertheless provides a set of ready-at-hand propositions that guide everyday actions, and that are not usually subject to scrutiny. As such, it is difficult for individuals, and professions more broadly, to change or even notice habitus. As a result, to successfully change the habitual 'doings' of clinical practice requires the acquisition of reflexivity skills, or more precisely, the development of a reflexivity habitus.[16] Practicing reflexivity strengthens recognition of how clinical practices are shaped by habitus and the taken-for-granted norms that organize physical therapy and healthcare.[17,18] Moreover, specific efforts targeted at improving clinicians' reflexive skills have been shown to contribute to promoting sensitive, humanistic, and person-centered care.[16,19,20,21]

Building capacity in epistemic reflexivity has tremendous potential to support health professional learners in broadening their worldviews, improving patient experiences, and ultimately working toward more morally robust social systems.[14] Unfortunately, there is currently a dearth of literature on how best to develop understanding and use of different epistemologies among health professional learners.[22] There is literature describing teaching and learning strategies to facilitate epistemic reflexivity,[10,21,23,24] but little guidance specifying how learners come to develop and apply these skills in educational practice. With a growing desire to develop compassionate and humanistic health professionals, a deeper understanding of the power and promise of cultivating epistemic reflexivity among learners in the rehabilitation professions is needed to continue advancing the field of rehabilitation.

To this end, we conducted a study to explore the experiences of learners with developing capacity to critically analyze practices within physiotherapy and healthcare. In this article, we present our analysis of learners' experiences with an educational initiative aimed at developing epistemic reflexivity skills.

Methods

In this interpretivist inquiry, we use qualitative methods to explore learners' experiences in an educational initiative to develop knowledge and skills in epistemic reflexivity among students enrolled in the final year of a Master's-level entry-to-practice physical therapy training program. An interpretivist view of learners' experiences is relevant to our study because we aimed to understand how learners confront, grapple with, and manage insights related to epistemic reflexivity within the physiotherapy training context.[25] We drew specifically on our critical understandings of reflexivity in relation to habitus, both to develop the educational initiative and inform our analyses.

This study was part of a broader inquiry concerning the development and evaluation of curricula to build expertise in the non-biomedical sciences for the health professions.[1] In this study, three members of the research team (EY, SN, BG) created and implemented a pilot curriculum as an entry point to understanding epistemic reflexivity. This curriculum consisted of four activities: a pre-internship workshop, a reflexivity task completed by students during a 5-week clinical internship, a post-internship debrief session, and an oral presentation in which each student demonstrated their skills in epistemic reflexivity through a critical analysis of an aspect of health, rehabilitation and/or

physical therapy.

First, three members of the research team (EY, SN, BG) co-facilitated a three-hour pre-internship workshop to introduce students to epistemic reflexivity and its application in the physical therapy and healthcare context. We utilized a variety of media (eg, stories, videos) and a combination of teaching methods to illustrate the relevance of epistemic reflexivity in multiple aspects of professional practice.[26,27] Similar to the tenets of Brownlee's[10] reflexivity framework, we introduced a 7-step framework for critical analysis designed to disrupt automaticity; question taken-for-granted assumptions, biases and attitudes; and, make meaning of the challenges, contradictions and ambiguities that are encountered in practice (Table 1).[28] Notably, the latter steps in this framework invite reflection on *how we know,* and make way for transformative learning and subsequent action.[28] Since the reflexive process involves deliberation and expression of deeply-held beliefs and values, we sought to create a safe environment for open dialogue throughout all interactions. This sought to develop mutual trust among workshop participants, and to invite deeper discussions about our own analysis and shared experiences with epistemic reflexivity.

Following the pre-internship workshop, students were asked to apply the 7-step framework for epistemic reflexivity to an aspect of physiotherapy or healthcare practice encountered during their five-week internship. After the internship, the same three workshop facilitators conducted a three-hour post-internship debrief session with students to discuss their experiences in engaging with epistemic reflexivity, and deepen their analysis for the oral presentation. One week following the debrief session, each student delivered a five-minute oral presentation on their critical analyses.

PARTICIPANTS

The opportunity to participate in this study was offered to a class of 90 final-year physical therapy students, with the goal of recruiting 6 to 8 participants. Six physical therapy students volunteered to participate in this educational initiative and to deliver an individual oral presentation as an alternate assignment to an existing graded course assignment. This sample size was established based on the concept of information power, which suggests that the more information the sample holds (as related to the study aims), the fewer the number of participants required to achieve the research aims.[29] In our case, information power was maximized by the narrow aim of our study, the high specificity of learner characteristics in relation to the study aims, and the strength of the dialogue among participants and researchers during data collection. The three workshop facilitators were experienced qualitative researchers and educators who possessed a depth of knowledge about physiotherapy education and skills in building trust during focus groups and interviews. Thus, the high degree of information power in our study necessitated a less extensive sample.

All participants attended the pre-internship workshop and completed the internship task. Five students participated in the post-internship focus group. One student was unable to attend the focus group and so participated in a face-to-face interview. All 6 participants delivered individual oral presentations to their classmates. This study was approved by the University of Toronto research ethics board.

DATA GENERATION AND ANALYSIS

We used observations, a focus group and a face-to-face interview to deepen our understanding of students' experiences. These multiple methods were employed

at different time points during the educational initiative to capture a broad range of student experiences and to explore the socially constructed and iterative processes that underpin reflexivity.[2]

Participant observations of the pre-internship workshop and the post-internship debrief session were conducted by a member of the research team (JS, a physical therapist with extensive training in qualitative research.) He transcribed discussions as close to verbatim as possible and recorded detailed field notes and reflections on students' experiences and reactions to engaging in the reflexive process for both sessions. During transcription, participant names were replaced with pseudonyms to maintain anonymity. Data from the pre-internship workshop were reviewed by three researchers (EY, SN, BG) for accuracy and to inform the post-internship debrief session. Immediately following the post-internship debrief session, two members of the research team (SN and JS) conducted a semi-structured focus group to further explore students' experiences. The focus group was also transcribed as close to verbatim as possible by JS, and this transcription was reviewed by SN for accuracy. The one student who was unable to attend the focus group participated in a face-to-face interview with SN three days after the focus group. To mitigate the power imbalance in our study, the post-internship debrief session was led by a research team member who was not directly involved in the course the students were completing. The transcript from the post-internship debrief session was also de-identified so that course instructors could not attribute data to specific speakers.

Data from the observations, focus group and interview were analyzed using techniques outlined by Braun and Clarke.[30] Two investigators (EY, SN) read all field notes and transcripts for initial impressions. A provisional coding framework was developed and used by EY and SN to code the data independently. Initial codes focused on how students used the 7-step framework and their experiences of engaging in epistemic reflexivity. We then compared and revised the coding framework and subsequently applied it to all data. The entire team met to further explore relationships among concepts, data, and existing theories of epistemic reflexivity, and to identify recurring themes.

REFLEXIVITY

The study team comprised 5 researchers with doctoral-level training, 4 of whom are physiotherapists with diverse clinical and teaching experience within physiotherapy (EY, SN, JS, BG), and one of whom is a physician (AK). Four of the 5 team members also have substantial experience (between 10 to 25 years) with critical social science theories and qualitative methodologies (SN, JS, AK, BG). Throughout the study, all team members took into account how their experiences, backgrounds and assumptions influenced their approach to the design and implementation of the study. For example, while generating and analyzing data, the team committed to regularly making explicit how our respective roles, interactions and reactions may have influenced study participants' narratives.

Results

Six students aged 23 to 30 years volunteered to participate in the study (4 females, 2 males). Over the course of the educational initiative, students expressed feelings of discomfort and evolving insights related to engaging in epistemic reflexivity and its relevance for critically analyzing taken-for-granted aspects of clinical practice. Students' experiences were characterized by two interconnected dimensions, which we describe below: 1) awakening and grappling with epistemic

discomfort, and 2) evidence of transformation.

AWAKENING AND GRAPPLING WITH EPISTEMIC DISCOMFORT

Awakening to epistemic reflexivity

The task of engaging in critical analysis during the clinical internship led to the awakening of epistemic discomfort, or what students referred to as 'spidey senses' in reference to the popular Spiderman character. Epistemic discomfort was described as moments of uneasiness that emerged as they attempted to problematize previously uncontested 'truths' in practice, as noted by Cory:

[It was a feeling of] 'this doesn't feel quite right' that was more like a tingling sensation,….I felt like Spiderman. I think just because I was more aware of it, I could see where things were different. (Cory)

Students collectively labeled these experiences as spidey senses and agreed that these senses were awoken on multiple occasions as they searched for aspects of health and physiotherapy to analyze during their clinical internships. Students described that some spidey senses were awoken with little cognitive effort, while others were activated only through greater depth of analysis. Toni explained how this phenomenon was manifested in her critical analysis of a set of texts at the clinic where she completed her internship:

I read something in the clinic and right off the bat was like, "I don't like that." And then there were different levels of sensing, and one I knew right off the bat, and others I had to sit and think about it. (Toni)

Similarly, Corrine remarked how her spidey senses were triggered by a highly-prescribed referral note from a physician which left her feeling marginalized. Her understanding of the broader implications of this experience required further in-depth analysis, as suggested by an observational reflection during one of the workshops:

My thought here is that although Corrine doesn't quite articulate the power differentials between doctor, physio, and patient that enabled the detailed prescription to be written, she nonetheless is beginning to recognize that things like this extend beyond herself. And although she sees herself as having been marginalized by the note instead of recognizing the broader issues associated with that practice, she nonetheless is beginning to understand that her feelings were an unintended consequence of this doctor's actions. (field notes from workshop #2)

Len also described how deeper levels of analysis were essential to the 'making strange' process triggered through spidey senses:

One key lesson for me is those times when spidey senses are tingling, not to let those times pass. You have to take advantage of those times to think through it. You have to sit back and think and break it down and figure out why you were feeling that way. (Len)

At the same time, Len acknowledged that engaging in deeper levels of reflection was not always possible in the moment:

You get a spidey sense that something is wrong, but then it's only at the end of the day that you kind of get time to put that together and realize what it was. (Len)

Although the spidey senses prompted further reflection, students described engaging in deeper levels of analysis as unpracticed and difficult. Again, Len articulated this well:

I found that for me I always saw the most obvious point first and then took time to dig down. I picked this acupuncture ad and at first I just saw how it might be beneficial for patients, and then

it took time to see, like, was there race involved in the ad, social class, and so first it was the most obvious point that smacked me in the face but the more challenging part was to look beneath that. (Len)

Students' discomfort can be understood in terms of the challenges to the ingrained dispositions that constitute the habitus. As learners who have internalized multiple 'truths' regarding health, disability, and the roles of physical therapists, practicing reflexivity is an exercise in realizing that the world can be understood, experienced and acted upon differentially. Importantly, students' identification that 'something is wrong' highlighted the ethical dimensions of reflexivity in terms of unintended harms and their effects.

Grappling with discomfort

Students grappled with their feelings of discomfort, particularly when identifying the unintended effects associated with the aspect of practice under analysis. For example, Toni shared about how her experience with critical analysis surfaced negativity:

That's exactly what my experience was like. You know, it's not intended to be negative, but when you look at how other people might perceive it [aspect of practice under analysis], that's when you start to see the negative stuff. (Toni)

Throughout the educational initiative, we emphasized that epistemic reflexivity involves exploring both positive and negative *consequences* of the aspect of practice under analysis, rather than *intent*. Yet, students' discussions tended to focus on the intentions of those who produced the object under analysis. This led to further feelings of discomfort. For example, Don expressed his hesitation with assigning responsibility to the clinic owners for perpetuating negative representations of disability in their signage, without having more information regarding their intentions:

I would have liked to speak to the people who were responsible for the space, you know, the logo, things on the wall, understand why they did things the way they did. Just to see if there was actually any conscious decision-making about the result. But I didn't want them to feel I was judging their logo or what they put on the wall, you know? (Don)

In both workshops, facilitators reinforced the importance of acknowledging and processing the feelings of discomfort.

Students struggled to see how the unintended effects were part of a larger social discourse. As a result, they experienced guilt for placing blame on a well-intentioned individual for reproducing the discourse. This was highlighted in Corrine's reflection on the potentially disparaging effects of showcasing a series of photos of para-athletes on the walls of the clinic:

I agree it [critical analysis] was challenging, but it's also because I really liked my internship and thought the clinic was really great. And sometimes I see things and think that they could be bad, but I know the clinic owner and it's not like she's trying to be bad, not trying to get across this belittling image. You know, maybe they think this but maybe not. (Corrine)

This was similarly reflected in a researcher's observations (captured in a field note) of a workshop discussion about the unintended consequences of the photos of athletes that Corrine was analyzing:

My own thought at this point is that the students really struggled to understand that the 'locus of agency' is conceptualized quite differently in the paradigm(s) that underpin the 7-step framework – they are trying to locate a 'bad' person who intended to marginalize particular people (eg, Corrine's clinic owner), whereas the point is to undercut exactly that assumption about Cartesian agency that would lead to the effort to identify a single person as 'responsible.' It takes a lot of work to see your own assumptions about agency. (Field notes from workshop #2)

EVIDENCE OF TRANSFORMATION

While students struggled to see how the unintended negative effects associated with the object under analysis were part of a larger social discourse, our data provide evidence of transformation and the nascent development of an epistemic reflexivity habitus. This included changes in participants' ways of thinking and a deepened commitment to taking a critical approach to taken-for-granted assumptions in practice. For example, Corrine described how our educational initiative led to new insights about habitual biases, hidden assumptions and unintended messages:

I think we usually just take things at face value and totally rely on our own biases. Like in that acupuncture picture [sexually suggestive picture of female patient]*, I would never have looked at [it] and thought of other perspectives, you know? So just being aware of the messages you convey or in a picture, and how that impacts people who maybe had a different upbringing or a different life. (Corrine)*

Similarly, Don described the importance of reflexive practice as an ongoing exercise to inform patients' choices to engage in physiotherapy:

Physio is one of those areas of healthcare that is kind of unique, you know, because people make a decision about whether they want to engage in it. They don't have to. They make an active choice to do so. These objects we've been talking about play a large role in whether people end up making that choice. So yeah, it's pretty apparent why it [reflexive practice] is important. (Don)

Students also noted the importance of examining hidden assumptions in order to account for patients' perceptions of physiotherapy practice:

The thing is just being more reflexive about the messages you convey, you know, understanding how that impacts your practice. The messages patients receive and how that impacts their perception of physiotherapy. It all ties into how you see your role in healthcare and how patients perceive physiotherapy. (Corrine)

Developing the capacity to 'make strange' made way for students to consider more inclusive practices:

Something just as simple as how the room is set up is so important. Just by changing beds or pulling curtains you can less objectify a patient. So in those ways, you know, I can see bringing this type of thinking to clinical practice. And just, maybe it is common sense, but it lets you challenge things and say, 'Hold on a minute, let's challenge this and have a situation that is more inclusive or less negative.' (Len)

Consequently, students expressed a deepened commitment to interrogating assumptions that may eventually be more embedded in their practices:

Right now that [7-step] framework, it's just an assignment. But over time if you practice it, it becomes a different way of thinking…it may shape how you see the next patient in a similar circumstance. (Cathy)

Notably, students recognized that adopting a critical interpretation of any aspect of practice is always perspectival and that moving from interpretation to action requires coming to see perspectives beyond one's own:

You can think as hard as you want, but you still just have to ask other people. And even if they're a similar status or gender or age, even they might have a different way of looking at it. I think asking someone of a different race or demographics could be even more different than asking peers. So you have to take more perspectives than just your own before making decisions. (Cathy)

While there was evidence of transformation, students were nevertheless largely reticent to engage in self-critique as noted in an observation note from the post-

internship workshop:

One of our observations was that the objects students commented on were 'external', and not about the students themselves; …students were reflexive about our profession, but that it seemed to be a higher-level task to be able to be reflexive about themselves. Students didn't seem to frame things as, "These are objects/practices we ALL do", and rather as things that other people/clinics/physios do. (field notes from workshop #2)

The accounts thus suggested that students both embraced and struggled with shifting their habits of thought and experienced these challenges as intellectually and emotionally unsettling, and also invigorating.

Discussion

This study sought to understand students' experiences with an educational initiative to develop capacity in epistemic reflexivity. The study highlights important issues for consideration when teaching novices to examine their epistemic cognition within the context of clinical practice.

The framework used in this study involved a series of seven steps to facilitate the development of epistemic reflexivity among students. We found that this process included an element of awakening to new insights and grappling with discomfort while engaging with the steps outlined in the framework. As advocated by Kinsella and Whiteford,[2] employing a structured reflexive process cultivates the skills needed for epistemic reflexivity and allows the complex process to unfold more clearly and explicitly for learners who may be new to or unfamiliar with reflexivity. Our results illustrate that the use of a structured framework, accompanied by guidance from individuals skilled in reflexivity, allowed for the principles and practice of epistemic reflexivity to become more visible and its complex process more accessible to novices. Explicitly articulating key principles in this way may benefit novices learning to engage with the reflexive process in both the pre-licensure and practice contexts.[29]

In this study, students' use of our 7-step framework[28] uncovered what they collectively labeled as 'spidey senses' or moments of discomfort. However, while some spidey senses were easily interpreted by students, they grappled with deeper levels of analysis. Specifically, students struggled to consider the embedded nature of healthcare practices within the larger social context, suggesting that students may have been grappling with epistemologies that were previously unfamiliar to them. Reflexivity goes beyond superficial reflective thought and requires deeper evaluation about one's own perspectives, embedded in the habitus and the broader social context.[10,32] As such, our study participants may have benefited from further guidance to engage in this type of internal dialogue. Although employing a step-wise framework may help to initiate the process for epistemic reflexivity, future work could elaborate on how best to support novices in educational and practice settings to manage the dialogical process of deliberating, evaluating and negotiating between multiple perspectives.[10,12,33,34] Although it may be useful to specify which aspects of the framework were most useful in the process observed among our participants, our study did not directly address this issue. We suggest that assessing which aspects of the framework are most helpful in the development of epistemic reflexivity could be a fruitful line of future inquiry.

We note the alignment of the aims of the 7-step framework for critical analysis with the broader movement to reduce health inequities through valuing and centering ways of knowing beyond the Western orientation of biomedicine. In particular, we have

learned from anti-colonial scholarship that centers Indigenous knowledge and advances the concept of cultural safety as an approach to improve healthcare at the individual and community levels.[35,36,37] Indigenous rehabilitation colleagues and their settler allies have used the 7-step framework as a tool for building capacity regarding cultural safety among occupational therapists.[38] Going forward, we are interested in exploring how the framework might be modified to include questions that promote analysis of particular systems of inequality, such as settler colonialism in the example above.

Our study results highlight the importance of using discomfort as an entry point for learners to interpret their experiences.[10,39,40,41] In this study, students experienced cognitive conflicts that arose from problematizing taken-for-granted aspects of practice. Study participants expressed feelings of doubt and guilt for being seemingly negative in their analysis. These observations highlight the affective nature of reflexivity which can surface emotional reactions through a difficult-to-pinpoint sense of unease when the habitus is challenged. Similarly, Rand,[37] drawing on the work of Sarah Ahmed,[42] identified 'sticky' or emotionally saturated responses associated with reflexive learning initiatives with social science students.

Affective reactions can be anticipated but also suggest the need for pedagogical strategies to support students. Feelings of doubt and guilt are consistent with Boler's[43] assertion that the 'making strange' process is inherently susceptible to a binary mentality of 'good' and 'bad.' Students developed discomfort as they struggled to move from identifying a single person as the 'bad' person responsible for producing the unintended consequences of dominant physical therapy practices. In this study, our educational initiative offered students guidance to examine and challenge the binary mentality referred to by Boler[43] and to articulate and embrace the contradictions and ambiguities therein. However, future efforts could explore other teaching and learning methods in which students make use of their feelings of discomfort as a greater stimulus for changing and advancing practice. For example, how could learners be further challenged to make visible and examine the values and perspectives that shaped their own patterns of thinking or behaviors in relation to their feelings of discomfort? A possible way forward may be to offer students opportunities to share their emotional responses in the absence of faculty who may expect students to uphold certain professional behaviors, as this appears to influence the extent and with whom students choose to share their emotional experiences.[44] Such efforts will be important for equipping novices to interpret their experiences with epistemic reflexivity and to engage in transformative learning.

This study also highlights the importance of using discomfort to develop higher-order thinking skills and to think beyond their immediate context.[10,40,41] Although our study results provide evidence of attitudinal changes among students, students mostly remained as observers who by and large failed to recognize that the aspects of practice they were analyzing extended beyond their own environment or circumstance. For example, within the timeframe of the study, they struggled to see that the larger social discourses they were discussing were reproduced in local practices and in their own assumptions. Our study results lend support to assertions that reflecting on one's epistemic cognition requires learners to think deeply about their own values and assumptions in relation to a specific social context[10,40] This type of learning helps students manage the theory and practice gap by moving beyond mere comprehension of

concepts toward a deep understanding of the assumptions and values that shape our collective actions within a social context. For example, promoting learners to adopt the role of a 'witness' rather than a 'spectator' may be one strategy to foster higher-order thinking. In the context of 'making strange,' a spectator observes from a distance and abdicates responsibility while the witness necessarily and actively explores and embraces ambiguity and contradictions.[43] In this study, while we asked students to evaluate their frame of reference relative to the broader social context, we did not explicitly require them to assume the stance of a witness. This focus may have assisted students with envisioning new possibilities for action that advance the profession to the benefit of our patients and their communities. Identifying more specifically how to bear witness in the epistemic reflexivity process may promote the higher-order thinking skills required to examine one's epistemic cognition.

Our study findings underscore the importance of framing epistemic reflexivity as an action-oriented process. According to Brownlee,[10] the pedagogy of discomfort underpinning epistemic reflexivity is not only in service to the "positive possibility of gaining new perceptions" but to alternative courses of action.[2,42] Shifts in the shared habitus of a profession will be unavoidably slow, but expedited through the teaching of reflexive habits of thought. It is worth noting that while the 'making strange' process is intended for transformative action, it does so by mobilizing both individuals and communities toward action, changes in attitude, and/or a deepened commitment to taking a critical stance.[43] Our study results demonstrate that while our efforts helped students develop individual analytical skills, we must help to foster a sense of collective accountability in order to create change. This holds true for students learning to transition to clinical practice, but may be even more crucial for those already embedded in the field.[32] Our data underscore the importance of representing epistemic reflexivity as a social process and to take caution not to inadvertently portray it as simply a self-reflection tool used solely for introspection and self-assessment.[32] Rather, by depicting epistemic reflexivity as a transformative tool toward social change, students and clinicians alike will increasingly regard it as a social enterprise that necessitates collective reflexivity.[43] For educators developing tools to evaluate reflexivity in pre-licensure or continuing professional development contexts, future work could focus on exploring ways to strike a balance between monitoring and assessing the quality of reflexivity among individual learners, while simultaneously allowing reflexivity to emerge as a social process.

Conclusion

In this study, we explored the experiences of learners with an educational initiative aimed at promoting epistemic reflexivity. We noted changes in students' orientation and ability to question the taken-for-granted aspects of physiotherapy practice; however, skillful nurturing of the process by facilitators with expertise in epistemic reflexivity was important to allow these efforts to bear new positive possibilities rather than negative ones. While our sampling of physiotherapy students in this study offers insight into the novice experience with epistemic reflexivity, further work could elaborate on the relevance of our findings in other novice groups within the health professions. Moreover, our use of a 7-step framework to introduce learners to epistemic reflexivity highlights the benefits of being systematic and explicit at the outset to foster higher-order thinking and to promote transformative learning.

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TABLE 1: Seven-Step Framework for Critical Analysis (Nixon et al., 2017)

This table is reproduced from Nixon SA, Yeung E, Shaw JA, Kuper A, Gibson BE. "Seven-Step Framework for Critical Analysis and Its Application in the Field of Physical Therapy." *Phys Ther*. 2017;97(2):249-257.

Step	Task	Questions to help with the task
1	Name the specific aspect of practice being analyzed	- Describe the aspect and where/how it is seen or found
2	Identify the intended purposes of this aspect of practice	- On the surface, what is the point of this aspect? - What is it that physical therapists are trying to do with this aspect? - Why are the creators or users of this aspect using it like this?
3	Uncover the assumptions that support these intended purposes	- What assumptions must be shared for everyone to so easily see that these are the intended purposes of this aspect? - What needs to be widely understood in order for these intended purposes to seem obvious?
4	Identify who benefits	- In general, who benefits from the common societal assumptions identified in step 3? - Which groups of people tend to be supported and empowered or made to feel good about themselves because of the assumptions identified in step 3?
5	Identify who is disadvantaged	- In general, who gets left out, marginalized or harmed by the assumptions identified in step 3?

		- Which groups of people may feel worse about themselves or looked down upon by others because of the assumptions identified in step 3? - How might disadvantaging these groups potentially disadvantage society as a whole?
6	Link these specific ideas to society-level patterns	- What societal patterns of privilege and oppression do the findings in step 3 and 5 (respectively) reflect and reinforce? o eg, ableism, racism, sexism, heterosexism o eg, related to religion, language, class, education, immigration status, indigeneity
7	Conceive of alternatives that mitigate actual or potential harms	- What might be other versions of the aspect of practice (identified in step 1) that avoid the harmful effects identified in step 5 and better achieve benefits? - How might one imagine altering this aspect of practice so that it dismantles (as opposed to reinforcing) the unfair power structures identified in step 6?

About the Authors

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