

Identity Transformation on Becoming a Teacher: Threshold Concepts and Professional Praxes

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Abstract

Identity transformation is essential for young adults transitioning into a professional community of practice such as the teaching profession. In this study, the ten participants were in a teacher-education programme and completing their practicums, transitioning from identifying as a student to becoming a teacher. The research explored evidence of transformative learning and identity shifts as manifested in the participants' written and spoken discourse. Data sets were reflective writings and semi-structured interviews, coded thematically. Seven of the ten resultant themes demonstrated characteristics of threshold concepts, critical concepts that transform understanding of a given domain; the other 3 themes represented professional praxes, important to dispositional readiness for teaching, but not characterisable as transformative, threshold knowledge. The findings contribute to: a nuanced approach to evaluating identity transformation and transformative learning in young adults; a keen understanding of identity transitions as integral to dispositional readiness for a professional domain; and further definition of the theoretical characteristics of threshold concepts, particularly as differentiated from praxes and dispositions.

Key Words: Dispositions, identity transformation, teacher education, threshold concepts, transformative learning

Introduction

As students transition towards joining a professional or disciplinary community, they undergo significant changes in identity formation, both in how they see their place within that community and in the larger world. For students learning to become teachers themselves, the identity shifts are profound and involve wrestling to integrate critical ideas, dispositions, and practices into their ways of being. Their experiences may even fluctuate within the same day, as they attend a campus lecture in the morning and teach lessons to a full classroom that afternoon during their practicums. Such dramatic periods of identity transitions are transformative and irreversible, and they can be productively examined through the lens of threshold concepts theory (Meyer & Land, 2003). This study pioneers using threshold concepts to examine readiness transition markers in students as they prepare to join the professional community of teachers. In addition, the research fills a gap in how dispositional readiness itself is assessed.

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Transformative learning is possible when a learner examines their experiences and perspectives in ways that make their mindset “more inclusive, discriminating, open, reflective” (Mezirow, 2003, p. 58), with their identity similarly more open to transformation (Illeris, 2014). With new understandings possible, the learner adjusts their worldview, creating conditions for critical reflection and discourse. Transformative learning is inherently personal; the focus is on the learner’s sense of self and their worldview that has been transformed by the learning experience. Researchers have long recognised the potential for transformative shifts in learners, building on the work of social theorists such as Habermas (1984), who wrote of the “systematic changes in worldviews...that can be traced to an internally reconstructible growth of knowledge” (p. 66). Threshold concepts studies have shown that the ability to reconstruct and internalise new knowledge is essential to integrating that knowledge into the learner’s identity (Cousin, 2010).

Theoretical framework

Threshold concepts theory examines the transformative processes associated with learning critical knowledge, and threshold concepts represent essential knowledge within a domain (Hodge, 2019). Threshold concepts originated in a study of critical concepts in economics (Meyer & Land, 2003) and, in the intervening years, they have been explored in a range of disciplines. The threshold concepts theoretical framework is used to study the transformative learning that “opens up new territory once it has been traversed” (Tucker et al., 2016, p. 152). To fully grasp a threshold concept “involves learning to see some aspect of the world in a new, transformative, and often counter-intuitive manner. Following such transformed understanding, continued and profound learning associated with the concept becomes possible” (p. 150).

Threshold concepts and identity

A disciplinary or professional domain has multiple critical concepts; however, not all are *threshold concepts* that transform a learner’s understanding of that domain and also their identity (Shinners-Kennedy, 2016). A threshold concept is:

- Transformative: initiating shifts in perception and identity. “New understandings are assimilated into our biography, becoming part of who we are” (Cousin, 2010, p. 2).
- Troublesome: counter-intuitive, provocative, or uncomfortable, “which unsettles prior understanding, rendering it fluid and provoking a state of liminality” (Land et al., 2010, p. xi).
- Irreversible: highly unlikely to be unlearned. Meyer and Land (2003) emphasise that the “change of perspective occasioned by acquisition of a threshold concept is unlikely to be forgotten” (p. 5).
- Integrative: involving learning to accommodate new information and

grasping “the hidden interrelatedness of phenomenon” (Cousin, 2006, p. 4).

- Bounded: having borders with other thresholds that represent new conceptual areas (Meyer & Land, 2003, p. 6; Barradell & Fortune, 2020).
- Discursive: A threshold concept affects a learner’s discourse about the knowledge acquired and its domain, with “new thinking brought into being, expressed, reflected upon and communicated” (Meyer & Land, 2005, p. 374).
- Reconstitutive: Integrating threshold knowledge requires “a reconfiguring of the learner’s prior conceptual schema and a letting go or discarding of any earlier conceptual stance.” (Land et al, 2010, p. xi).
- Involving liminality: “understanding threshold concepts may leave the learner in a state of ‘liminality,’ a suspended state of partial understanding, or ‘stuck place’” (Land et al., 2010, p. xi).

Identity shift and liminality are closely coupled with the transformative and re-constitutive characteristics of threshold learning experiences (Tucker, 2016). “Two indispensable characteristics of a threshold concept—that it is integrative of the domain and that it is transformative for the student—suggest two distinct units or components of analysis: conceptual and experiential” (Park & Light, 2010, p. 260).

Professional dispositions

Learners in professional degree programmes need to acquire not only the concepts and skills required in their field, but also the dispositions—often called “soft skills”—that successful members of the profession possess (Neve, Lloyd, & Collett, 2017). Within teacher education, dispositions are defined as the “habits of professional action and moral commitments that underlie an educator’s performance” (CAEP, 2013). Students preparing to be teachers may meet all the academic objectives in their programme, but may not be well-suited by disposition to work with young people or to be flexible about the implementation of lesson plans. For this reason, teacher education organisations have standards specific to dispositions, in addition to standards about skills and knowledge. For example, in 2000, the U.S. National Council for the Accreditation of Teacher Education (NCATE) approved the “Professional Standards for the Accreditation of Teachers,” which, for the first time, included assessing dispositions as an explicit obligation of teacher educators (NCATE, 2002). When the NCATE Standards were replaced by Council for the Accreditation of Educator Preparation (CAEP) Standards, the dispositional readiness segments were retained (CAEP, 2013, section 4.2).

Since the NCATE Standards were published, much has been written on assessing dispositions among teacher candidates (Borko et al., 2007; Schussler & Bercaw, 2021), and dispositional assessment tools have been developed (Johnston et al., 2018). Current tools focus primarily on personal skills, such as demonstrating professional-

ism, taking initiative, and exhibiting emotional stability. However, these dispositional assessments, while useful, do not illuminate how students transition into teachers vis-à-vis their professional identity formation. This study sought to fill this gap by analysing students' own reflective discourse about transformative experiences, with threshold concepts as the theoretical lens.

Methodology and research design

The study's research question was: What threshold concepts are evidenced in professional identity formation in student-teachers? The primary aim was contributing to more meaningful evaluation of students' readiness to teach. We sought a nuanced understanding of dispositions that support a student in transitioning the liminal space in identity from student to teacher, and the learning experiences necessary to that transition.

To focus the research design and datasets on the research question, we examined the experiences of students in a teacher preparation programme through interviews and students' own reflective writings. We thematically coded and analysed the interview transcripts and writings to see patterns within each student's discourse. We were especially interested in exploring if and how threshold concepts and transformative learning manifested during the identity transition from student to teacher and to discover transition markers in the student's readiness to become a teacher.

Study participants and context

The 10 participants were undergraduate students at a liberal arts college with approximately 1,000 undergraduates, located in a rural town in the Midwest United States. The demographics of the college are 35% American minorities and international students, approximately 30% first-generation students, and almost all students are 18 to 22 years old.

At the time of the study, the participants were enrolled in their final semester in the programme, completing their practicum in local area schools, and taking a Student Teaching Seminar course one evening per week. The ten participants included eight who identified as female and two as male; nine of the students identified as Caucasian, and one as Latino. These demographics are representative of students in the teacher preparation programme at the college and nationally (NCES, 2017). All participants were between 21 and 23 years old. Eight were earning Elementary Education licensure (grades 1-6), and two were earning K-12 licensure in music.

Data sources

We collected 8 to 10 written artefacts from each participant and conducted semi-structured interviews with both researchers present. The artefacts were the reflection papers written for the Student Teaching Seminar, designed to help the students con-

nect their coursework throughout their four years in the programme to their practicum experiences. The first part of each reflection summarised the salient ideas, theories, or take-aways from the course, and the second part made connections to their practicum. The goal for these weekly papers, each typically 250-500 words, was for students to see how their coursework informed their practice. For example, one week the students reflected on their Theories of Learning class taken in their second year, observing illustrations of Vygotsky's theory of social learning (1978) in their classrooms. Such writings have been shown to be effective in externalising participants' reflections relevant to teacher identity (Coddington & Swanson, 2019).

The semi-structured interviews were 30 minutes long on average, and transcribed. After explaining the purpose of the interview and reaffirming the signed consent that the interview would be recorded, we asked prepared questions about memorable learning experiences and perceptions of identity shifts throughout the programme. Additionally, we asked questions guided by extracts from the interviewee's written reflections. Based on participant responses, we continued with follow-up questions.

Each student had written approximately nine reflections, but some writings focused on peculiarities of the class or semester, such as a conflict with a professor or personal problems that affected the student's absorption of the material. Therefore, we co-selected three reflections per student with the richest data for the study's objectives, totalling 30 written reflections to code and analyse.

Coding and data analysis

We used thematic coding and analysis, strongly informed by grounded theory techniques, to analyse both datasets (Tucker et al., 2016; Tucker & Simmons, 2021); a total of 17,033 words were coded. We developed an initial set of codes, then refined these codes as we re-examined the data iteratively. "Data analysis and collection inform and shape each other in an iterative process" (Charmaz, 2014, p. 343). Each of us independently coded the 10 interview transcripts. Finding a high level of alignment, we single-coded the short reflective writings. Using GoogleSheets to collaborate online, we tracked the codes by six attributes, shown in the Figure 1 column headings: Identifier to facilitate sorting; Theme Code, the resultant theme; Quotation, participant's words in vivo; Filename, the dataset source file; Notes, any researcher memos on the entry; Coder, the researcher-coder's initials.

Identifier	Theme Code	Quotation	Filename	Notes	Coder
7	Broadening of approaches	So I think starting taking education courses, there were always like brand-new terms I learned assessments, differentiation, all these like words that we talked about. But I still had no clue what it meant until I was put in that situation and I saw it firsthand. Like as silly as this sounds, we were assessing what kind of like assessments do we take -- what kind of assessments do we make for math? And as silly as it sounds, I didn't understand what that meant. I just thought what tests are you going to make? I didn't realize it was -- there is formal assessments. There is formative assessments. I had no idea what that meant.	20171114_Becky-transcript.docx		R1
18	Broadening of approaches	schooling is the process of going through the logistics of the school day, whereas education is your entire life experience of learning. Schooling is like training a dog and education is the process of becoming your own thinker... I thought back and realized we are there to school children and teach them how to become educated. This schooling process teaches kids how to fit into society and gives the opportunity to students to become educated if they so choose	Anna-Phil		R1
45	Broadening of approaches	and I don't think my cooperating teacher slows down enough; he just spits out information; I just look at him and like okay that's a lot of information, [inaudible] comprehending any of it.	20171114_Tracy-transcript	Tracy is critical of her cooperating teacher and seems to think that she knows more than he does. She is not open to new approaches.	R2
46	Broadening of approaches	We really did not talk at all about English language learners, like as I was writing that paper I was texting my [inaudible] teachers and like do you have any program, I'm like I don't think you do, like in the back of my head I'm like I don't think they have anything, because they don't have any official ELL students in their district right now. And I reached out to a special ed teacher at an immediate school and the principal and I'm like do you have any formal programs and they told me they do not. >> Okay. >> In the handbook they say, like, they're going to get those English- ELL students to [inaudible] as well as someone that's not.	20171114_Tracy-transcript	Tracy is critical of her cooperating teacher and her school and seems to think that she knows more than the school administrators and teachers do. She is not open to new approaches.	R2

Figure 1. Thematic coding and memoing extract.

During the iterative refinement of codes and the grouping of codes into categories, we merged similar categories and split up some code groups that needed more nuance. As the analysis proceeded, the themes were in flux; we ultimately arrived at ten themes that comprehensively represented the meanings in the data. The themes were reinforced in the final analysis stages as we found no new codes were required, and theoretical saturation was reached (Morse, 2008; Charmaz, 2014).

Results and findings

The ten resultant themes are summarised in Table 1. Each theme is then described, using participant words (in vivo) to illustrate its most prominent characteristics relevant to the research question. Participant pseudonyms are used throughout.

Table 1.
Themes with their attributes

Theme	Student-teacher is developing...
1 Teacher as questioner	sense of self as one who asks questions (teacher), not one who answers questions (student)
2 Teacher as impactful	recognition that their actions have an impact on student learning
3 Student-centered instruction	understanding of students' developmental readiness and adapting instruction for different students; students do not all learn the same way
4 Presence	'teacherly voice'; teacher presence
5 Broadening approaches	understanding that one way is not the only way; humility about one's own background
6 Perspective-taking	knowledge of how little one knows; like learning a foreign language and recognizing how much you do not know
7 Connections	ability to connect theory with practice
8 Understanding it v. teaching it	understanding that knowing a concept is different from being able to teach it
9 Responsibility	understanding of the weight of being responsible for student learning; understanding the work and time involved in teaching
10 Students' cultural context	recognition that students bring their cultural assets to the classroom; that culture and background affect learning and performance in school

Theme 1: Teacher as questioner

Participants spoke of a transition in understanding that a teacher is not one who answers questions for learners, but is instead one who poses questions with thoughtful intention to move a learner forward. Several noted that this was a shift for them, as they had thought a teacher would serve as a "the answerer of all questions," but discovered, on the contrary, that

Our job is to prompt students in their learning, but we ask questions that we already know the answer to. ("Megan," interview).

Megan wrote about the importance of teaching students the skills of "inquiry and student guided learning through questioning" (Methods reflection). Theme 1 prominently demonstrated irreversibility.

Theme 2: Teacher as impactful

In reflecting on the transition from student to teacher, participants spoke of their growing recognition that their actions had an impact on student learning. Some of these expressions tended toward clichés about feeling gratified when students understand a concept. For example, in her interview, “Tracy” remarked,

When you see that lightbulb go on, that’s why I want to be a teacher. I can make a big difference to these kids. (Tracy, interview).

Other participants showed considerable nuance when describing their perceived impact. For example, “Erin” used the analogy that education is like a moving train. She said,

The metaphor of the train is like the student is running to get onto learning because they’re already behind. And the reason they are behind could be that they are struggling readers. It could be students who have a rough home life. If they do catch up, how are they going to get on? It’s the teacher’s responsibility to be that assistance—and they have to put in the work to run alongside the train. (Erin, interview).

These two excerpts illustrate stages in the identity shift that happen when students successfully transform from the mindset of student to the mindset of teacher. As seen in Tracy’s extract, her focus is on herself: how she feels when the student learns the concept, and how this experience has helped her to discern her career path. In contrast, Erin’s reflection is focused on the student’s struggle with learning, and her role in assisting the student to understand.

Theme 3: Student-centred instruction

Participants raised the importance of adapting instruction for the needs of different students and also of being willing to modify lessons spontaneously to meet students’ needs. This theme of student-centred instruction was evident in their descriptions of understanding both the developmental readiness of the students in their classrooms and also in their own awareness of adapting materials to a range of learner needs in the moment. They wrote about the effect it had on them to understand that students learn differently, for example:

The biggest thing that I can take away and apply to my teaching is the importance of presenting math concepts in multiple ways. There are many different types of learners, and what works for one student may not work for another. (Megan, Methods reflection)

In order for data to be coded to this theme, the effect of this new understanding had to include impact on their own teaching activities. In other words, along with ex-

pressing their awareness of learner differences, the participants needed also to describe adapting lesson materials and modifying their interactions so that they centred on the learner.

Theme 4: ‘Teacherly’ voice and presence

To varying degrees, the participants expressed the realisation that they were now needing to enact their new role as adults with authority. Particularly for participants preparing to become high school teachers, they reported struggling to learn how to interact professionally with students who were only a few years younger. “Lyle” explained this change in perspective and role compellingly when he compared the high school students he was teaching to first-year students in college who were currently his classmates:

I have friends that are this age, essentially right now at [college]. You have to really keep in mind that this is a different setting, and it can be that can be tricky at times just to keep that mental barrier going and not let something slip. ... that identity as a teacher comes out through those relationships. (Lyle, interview)

Lyle was grappling with shifting his identity from student to teacher (and in this case, from adolescent to adult), especially in relation to his interactions with students who were only a few years his junior. Adopting a ‘teacherly’ voice and presence can be difficult, and for Lyle, he was traveling back and forth, not just across town, but through a liminal and transformative learning space, sometimes within the span of one day.

Theme 5: Broadening approaches

Often students who aspire to become teachers select the career due to their own positive experiences with teachers. While this personal connection can provide positive motivation to become a teacher, it can occasionally cause students to become closed-minded to any pedagogical approach that differs from their favourite teacher’s approach. Essential to the development of students preparing to become teachers is an openness to a broad range of approaches. The pull is strong to teach as one has been taught (Smagorinsky, 2010), and students who resist ongoing learning may become stunted in their own professional development. Additionally, this attitude tends to result in a contentious relationship with mentors, because the student may be resistant to feedback.

Perhaps more than any of the other participants, Tracy exhibited a tendency to valorise her previous teachers and disparage her practicum cooperating teachers. For example, Tracy stated in her interview:

I don't think my cooperating teacher slows down enough; he just spits out information. (Tracy, interview)

Students who are less capable in their teaching skills may lack awareness of the gaps in their abilities, consistent with the Dunning-Kruger Effect, when “poor performers in many social and intellectual domains seem largely unaware of just how deficient their expertise is” (Dunning, 2011, p. 247). In addition to a lack of self-awareness and openness to feedback, Tracy did not demonstrate the capacity for “tolerating uncertainty” (McConn & Geetter, 2020, p. 246), necessary for transformative learning experiences and vividly described by Timmermans and Meyer (2017) as “epistemic and ontological unmooring” (p. 3).

Theme 6: Taking new perspectives

The participants became animated when responding to our questions about experiences that felt like “a-ha” moments, when they felt they had learned what it was truly like to be a teacher. In these instances, many of the participants expressed humility on realising their prior conceptions had been naïve. For example, “Becky” described learning that teaching involved much more than creating lesson plans and teaching those plans.

I think my a-ha moment happened last year. I thought: I plan a lesson, I teach the lesson, and then I'm done. Then I had one lesson where nothing went according to plan. I realised I had to be adaptable. (Becky, interview)

For these novice teachers, lessons that went poorly proved to be significant learning experiences. Like Becky, Megan recounted a lesson that went badly as a growth experience:

We had a limited set of these rocks and minerals, so I decided to split the class into two groups. One group would work with me on their observations, and the other group I gave a reading and worksheet. In my head, this was a perfect plan. Then as soon as I started it was chaos... that was Day 1. Day 2 I re-planned everything, and it went a lot smoother. But I had to experience that chaos and figure that out through experience—an awful experience—and then I could apply what I learned. (Megan, interview)

In both of these examples, the participant expressed humility about her knowledge of teaching and her ability to manage a class. Megan illustrated her humility again later in the interview, when she stated,

I am still a student-teacher, and the main part in there is “student.” I'm still learning so much. Every year I will have a different set of kids who work differently with each other, who learn differently, have different needs, and I can learn something different from each of those students that's going

to shape my idea of teaching, my idea of what learning is for that specific student or that specific group. (Megan, interview)

This humility and willingness to learn was evident in students' discourse that also revealed maturing perspectives. The experience was likened to learning a foreign language and continually recognising how much the learner had not previously understood (Cousin, 2010).

Theme 7: Making connections

Several participants had reflective writings from their coursework on learning theories, and used words such as "I had to start thinking more," when asked to contemplate how their classroom teaching had affected their understanding of the role of theory. Most prominent in the data was the experience of connection-making, of being able to understand how theory and practice are interrelated.

I really remember [the] Theories of Learning course. I was very by-the-book and realised I had to start thinking more. For example, Vygotsky or Piaget, and I want you to tell me how you're going to use that in your classroom, how this affects children. ("Karen," interview)

In Karen's remarks above, she captured the importance of taking her "by-the-book" learnings and integrating them to improve her teaching practices, using illustrations of learning theories that she could now understand as relevant to becoming a teacher.

Theme 8: Understanding it vs. teaching it

The participants who were more developed in their identity as teachers expressed the realisation that understanding a topic was different from being able to teach the topic. Megan, for example, stated this explicitly,

I've always been OK at math. For me [understanding math] is not a big deal, but there's a huge difference in understanding, like how to subtract or add, and teaching someone how to subtract or add. (Megan, interview)

Other participants expressed a similar experience, emphasising how frustrating it can be not being able to explain a concept in a way that all students are able to understand. "Barb" stated,

[Concepts] I thought were so simple, they still weren't understanding. I'm so used to the way that I think of things. (Barb, interview)

Shulman (1987) was the first to make the distinction between content knowledge and pedagogical knowledge, which has since been studied extensively (Ergönerç et

al., 2014). The ability to know does not translate into the ability to teach without substantial effort and reflection; grasping this difference was an a-ha moment.

Theme 9: Responsibility

One theme that arose repeatedly was the participants' realisation of the enormity of a teacher's job, coupled with the weight of responsibility. In the semesters before the participants began their practicum, they regularly spent time teaching lessons; however, the classroom teacher handled all the responsibilities before and after those lessons. Teaching the full day with the many responsibilities not directly tied to lessons proved to be overwhelming at times. Megan explained:

I realised how much there is to do in a day. Little things like I have to make sure they put all their stuff away, get their Chromebooks, make the lunch count, and do the attendance, all within 15 minutes. Up until then I hadn't done any of that. [Now] it was all my responsibility... That was a memorable moment when I realised that teaching is not just teaching four lessons in the day (Megan, interview)

Becky and Lyle expressed similar sentiments about how teaching can be overwhelming. Becky shared,

My mom was a teacher, and she always told me a teacher makes 1,000 decisions a day. I never understood that until I had a lesson last year that didn't go according to plan. (Becky, interview)

Lyle stated:

My secondary cooperating teacher warned me. She was like, it's a different kind of tired. Last week when I did the Puff the Magic Dragon [song]—by Friday, if I have to sing it one more time, I'm gonna cry. (Lyle, interview)

In addition to the participants feeling overwhelmed with the amount of work each day, they also expressed anxiety about the weight of responsibility for the learning outcomes. Erin stated,

During my practicum I had more leeway because I could teach whatever I wanted, and it wasn't my responsibility for how the students performed in the end. Now I always keep in the back of my head "you have to make sure that they're understanding this." It's great to be creative but you have to make sure that they're getting something out of it. (Erin, interview)

Participants who expressed a clear understanding of the weight of their responsibility also acknowledged the difficulty of the job, and both aspects were important to

this theme and to developing their identities as teachers.

Theme 10: Students' cultural context

The participants expressed growing knowledge that the students in their classrooms bring a wide range of cultural and linguistic assets, and as teachers, they need to validate their students' backgrounds, and also not assume common knowledge and experiences among them. Additionally, the participants showed knowledge that their students' cultural and linguistic backgrounds affect learning. Barb reflected,

We can't just assume English Language Learners know what we are talking about. I have learned to be extremely descriptive and to not assume that my students have the same background knowledge as I do. (Barb, reflective writing).

Similarly, "Anna" commented on the differing levels of background knowledge in the class she was teaching. She recalled,

I was teaching telling time, and that's where my understanding of the range of background knowledge really clicked for me. Some kids completely understood how to tell time by the hour and half hour. And some students had no mental idea of what time is. (Anna, interview)

To be coded to this theme, a participant's growing awareness of their students' diverse backgrounds needed to extend into affecting how they taught lessons and engaged with the students. Anna's reflection above about how she modified the lesson on how to tell time illustrated this impact as she adjusted her explanations, based on the students' previous knowledge.

Discussion

Themes analysed: are they thresholds?

After distilling the data into 10 themes, we analysed each theme to determine whether it had characteristics of threshold concepts. We demonstrate this analysis process for two themes, Student-centred instruction (Theme 3) and Responsibility (Theme 9), chosen because the first exhibited several threshold characteristics and the latter because it did not. The outcome of this analysis for Themes 3 and 9 is detailed in Table 2, and the findings for all 10 themes are summarised in Table 3.

Table 2.

Two themes analysed for threshold concept characteristics (✓=present ✗=absent)

Threshold Concept	Student-centered instruction (theme 3)	Responsibility (theme 9)
Transformative	✓	✗
Irreversible	✓	✓
Integrative	✓	✗
Troublesome	✓	✓
Bounded	✗	✓
Affects discourse about the new knowledge	✓	✗
Affects ways of reconstituting knowledge	✓	✗
Affects sense of identity	✓	✓

Analysis of student-centred instruction (Theme 3)

Student-centred instruction, Theme 3, possessed all but the bounded characteristic of threshold concepts. The participants recounted a specific a-ha moment when they realised that creating lessons was not the same as teaching. They recounted experiences when a beautifully constructed lesson failed for a variety of reasons when taught to a classroom of real students who have emotions, needs, and quirks. While this phenomenon is discussed in teacher education courses, it is only when the participants experienced it for themselves—often in the midst of a lesson that is not going as planned—that they fully grasped this concept. This theme fit the characteristics of threshold concepts well:

- Transformative: Participants who fully grasped this concept began to think of themselves as a “real” teacher in a way they had not before. The experience marked a transformative identity shift.
- Irreversible: Once learned, the participants had a new perception of teaching and could not go back to their previous understanding.
- Integrative: Once students understood that teaching is much more complex than writing beautiful lessons, it affected all parts of their teaching. They planned and taught lessons differently, and they interacted with students differently.
- Troublesome: The participants’ discourse about this theme was perhaps

the most animated of all of the data, since the students were often recounting the lessons that went most poorly in their teaching. They grasped that they needed to be nimble, both in their planning and delivery, ready to adjust to students' responses in real time. They also understood that this agility continues to develop.

- **Affects discourse and ways of reconstituting knowledge:** Once students grasped this concept, they spoke and wrote about teaching in different terms. Their language showed a complex understanding of the nature of teaching and their place in the teaching community. Likewise, this understanding altered how they related to and reconstituted their knowledge of lesson planning, teaching, and assessment. Similar to the characteristic of integrative, it affected all parts of their teaching experience.
- **Liminality:** Many of our participants described their understanding of the necessity of student-centred instruction as a result of a particular lesson that did not go well, but their understanding of how to adapt their instruction for a particular group of students as a much longer process. In this way, this theme held characteristics of liminality, in which our participants existed in an in-between place, even a stuck place, as they worked through how to become student-centred in their teaching.

Analysis of Responsibility (Theme 9)

In contrast to Theme 3 discussed above, Responsibility (Theme 9) was lacking in several key threshold characteristics, such as transformative and integrative. This was an important finding, particularly as we explored the Responsibility theme's relationship to the contours of professional identity transitions through the awareness gaps described by some participants. Specifically, participants had widely varying degrees of awareness of Responsibility. Iterative analysis of this theme showed it was not transformative or integrative, and it did not significantly affect learner discourse or ways of reconstituting knowledge. Learning this concept did show evidence of being troublesome and irreversible, as well as having boundaries alongside Theme 10, *Students' cultural context*.

Threshold concepts vs praxes—and complementarity

All ten themes were analysed as illustrated above, with the findings summarised in Table 3. As shown, seven themes could be characterised as threshold concepts, whereas three themes could not. The three themes with only a few threshold characteristics were categorised as vital professional praxes, such as Responsibility (Theme 9), discussed above. To confirm these findings, we reanalysed the coded entries, going back through the writings and transcripts to ensure that the meanings of their words were fully and accurately analysed.

Table 3.*Themes analysed: threshold concepts or professional praxes*

Theme	Student-teacher is developing...	Threshold concept or professional praxis? Key characteristics in determination
1 Teacher as questioner	sense of self as one who asks questions (teacher), not one who answers questions (student)	<i>Threshold concept:</i> transformative, integrative, and deeply affecting identity
2 Teacher as impactful	recognition that their actions have an impact on student learning	<i>Threshold concept:</i> interconnected with Theme 9, Responsibility
3 Student-centered instruction	understanding of students' developmental readiness and adapting instruction for different students; students do not all learn the same way	<i>Threshold concept:</i> transformative, irreversible, integrative, affecting discourse, identity, and ways of reconstituting knowledge
4 Presence	'teacherly voice'; teacher presence	<i>Praxis:</i> ways to be present in classroom, through voice and physical expressions
5 Broadening approaches	understanding that one way is not the only way; humility about one's own background	<i>Praxis:</i> focus on instructional approaches, ways to reach different students with different learning needs. Support for Theme 3.
6 Perspective-taking	knowledge of how little one knows; like learning a foreign language and recognizing how much you do not know	<i>Threshold concept:</i> interconnected with Theme 10, Students' cultural context
7 Connections	ability to connect theory with practice	<i>Threshold concept:</i> integrative in connecting theory and practice, transformative thinking about professional domain of teaching, dramatic changes in their discourse
8 Understanding it v. teaching it	understanding that knowing a concept is different from being able to teach it	<i>Threshold concept:</i> transformative to move from own understanding to teaching about the concept to others; discourse shift; identity shift
9 Responsibility	understanding of the weight of being responsible for student learning; understanding the work and time involved in teaching	<i>Praxis:</i> irreversible; also troublesome in grasping the weight of responsibility; other characteristics not present or limited
10 Students' cultural context	recognition that students bring their cultural assets to the classroom; that culture and background affect learning and performance in school	<i>Threshold concept:</i> interconnected with Theme 6, Perspective-taking

We observed complementarity between some themes. The praxis of *Broadening approaches* (Theme 5), for example, represented how participants were gaining awareness of the need to add continuously to their palette of instructional approaches. This theme was supportive, both logistically and conceptually, of the transformative evidence coded as a threshold concept under Theme 3, *Student-centred instruction*. Theme 3 was where true a-ha experiences were present, in which participants first understood, in an integrative and transformative way, how crucial it is to centre instruction around the student. Implementations of that understanding were coded under *Broadening approaches*, Theme 5.

For two themes, *Teacher as questioner* (Theme 1) and *Teacher presence* (Theme 4), the difference between threshold concept and professional praxis appeared subtle at first, but it was ultimately a profound contribution to the research objective of deepening understanding of professional identity shift. Participants described a-ha moments upon grasping that teachers were not in fact ‘answering machines,’ but professionals who expertly used questions to move learners forward (Theme 1). These moments triggered changes in how they thought of themselves and in how they related to the professional community of teachers. In our coding of Theme 4, *Teacher presence*, we found participants describing the development of their classroom presence as a technique to be used and honed, an approach in support of effective teaching and classroom management.

Another important connection between themes was in how a teacher’s impact (Theme 2) and responsibility (Theme 9) are interrelated, in fact, inseparable. As was true for themes 1 and 4, Theme 2 (*Teacher impact*) demonstrated threshold concept characteristics, whereas Theme 9 (*Responsibility*) had few threshold attributes and was more closely aligned with professional praxes.

Implications

The study’s findings have implications on multiple fronts, including threshold concepts theory, learner discourse analysis, and transformative learning research. The interviewers’ questioning about the student teachers’ experiences of transformative learning provided opportunities for the participants to reflect on their learning experiences and to go deeper into their reflective writings. As Atherton and Meulemans (2020) noted, this further reflection allowed students to “make sense and find meaning in their academic experiences” (p. 15). Second, the coding and analysis methods underpin the validity of grounded theory for studying liminal experiences as a learner transition into a professional domain and experiences a nascent sense of belonging. Third, the research informs work in teacher preparation programmes by contributing to the understanding of prospective teachers’ dispositional readiness and to methods for dispositional assessments.

The analysis of the ten themes according to the eight threshold concepts theoretical characteristics contributes to the understanding of the nature of threshold concepts themselves, particularly when the research objective is to investigate markers for the characteristics related to discourse changes that accompany entry into a domain of professional knowledge. The transitions from student to student-teacher to teacher were marked by themes involving threshold concepts learning and transformative learning experiences. In addition, there was evidence of further critical learning that did not have sufficient threshold concept characteristics to be categorised as such, but which was central to understanding the domain’s professional praxes.

Teacher preparation programmes are required to assess students’ dispositional

readiness as part of teacher licensure, and this work contributes to the understanding of the multi-faceted nature of dispositions (Meineke & DeVasto, 2020; Smith et al., 2021). Existing instruments that assess dispositional readiness examine observable traits and characteristics of prospective teachers, such as communication skills, social and emotional intelligence (Johnston et al., 2018). However, they are lacking the nuance that this study provides, filling a gap in assessing actual learning experiences and learner reflections on those experiences through their discourse. The findings also reinforce the importance of accounting for affect when studying liminality in threshold learning experiences (Rattray, 2016; Timmermans & Meyer, 2020).

Our next study will consider the findings for their transferability to other domains, extending this research to other academic and professional preparation programmes (Hodge, 2019). This will also explore if threshold concepts, professional praxes, and dispositions—shown to manifest during the transition from student to teacher—may have similarities to identity shifts in transitions from novice to expert (Berliner, 1994; Tucker, 2016).

Conclusion

The research findings presented here provide a nuanced understanding of the learning experiences of student-teachers as they cross the threshold into the professional community of teachers. Using threshold concepts and professional praxes in analysing students' discourse is shown to be a productive method for evaluating their transformative learning experiences and professional identity shifts. The study has implications for the dispositional readiness standards for the domain of student-teacher education and for follow-on studies in other professional and academic communities of practice.

In summary, the research produced an insightful and rigorous approach to evaluating identity transitions and transformative learning and a keen understanding of how these transitions are integral to dispositional readiness for a professional domain. In addition, it added further distinction to the theoretical characteristics of threshold concepts, as differentiated from professional praxes and dispositions. This encompasses the soft skills, or enabling competencies, which are crucial to developing proficiency in any professional domain, yet difficult to assess.

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References

- Atherton, M. C. & Meulemans, Y. N. (2020). Threshold concepts theory as a pedagogical tool for articulating transformational learning: An initial exploration. *Journal of Transformative Education, 19*(2), 147-165. <https://doi.org/10.1177/1541344620963716>
- Barradell, S., & Fortune, T. (2020). Bounded: The neglected threshold concept characteristic. *Innovations in Education and Teaching International, 57*(3), 296-304. <https://doi.org/10.1080/14703297.2019.1657034>
- Berliner, D. (1994). Expertise: The wonder of exemplary performances. In J. N. Mangieri, & C. C. Block (Eds.), *Creating powerful thinking in teachers and students: Diverse perspectives* (pp. 141-186). Fort Worth, TX: Harcourt Brace College.
- Borko, H., Liston, D., & Whitcomb, J. A. (2007). Apples and fishes: The debate over dispositions in teacher education. *Journal of Teacher Education, 58*(5), 359-364. <https://doi.org/10.1177/0022487107309977>
- Council for the Accreditation of Educator Preparation (CAEP). (2013). *The CAEP Standards*. <http://caepnet.org/standards/introduction>
- Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.
- Coddington, L. R., & Swanson, L. H. (2019). Exploring identity of prospective math and science teachers through reflections in early field contexts. *Journal of Teacher Education and Educators, 8*(3), 207-228.
- Cousin, G. (2006). An introduction to threshold concepts. *Planet, 17*(1), 4-5. <https://doi.org/10.11120/plan.2006.00170004>
- Cousin, G. (2010). Neither teacher-centred nor student-centred: Threshold concepts and research partnerships. *Journal of Learning Development in Higher Education, 2*, 1-9. <https://doi.org/10.47408/jldhe.v0i2.64>
- Dunning, D. (2011). The Dunning-Kruger effect: On being ignorant of one's own ignorance. *Advances in Experimental Social Psychology, 44*, 247-296.
- Ergönenç, J., Neuman, K., & Fischer, H. E. (2014). The impact of pedagogical content knowledge on cognitive activation and student learning. In H. E. Fischer, P. Labudde, K. Neumann, & J. Viiri (Eds.), *Quality of instruction in physics: Comparing Finland, Germany and Switzerland* (pp. 145-160). New York: Waxmann.
- Habermas, J. (1984). *Theory of communicative action, volume 1: Reason and the rationalization of society*. Boston, Mass.: Beacon Press.
- Hodge, S. (2019). Transformative learning for knowledge: From meaning perspectives to threshold concepts. *Journal of Transformative Education, 17*(2), 133-153. <https://doi.org/10.1177/1541344618770030>
- Illeris, K. (2014). Transformative learning and identity. *Journal of Transformative Education, 12*(2), 148-163. <https://doi.org/10.1177/1541344614548423>
- Johnston, P., Wilson, A., & Almerico, G. M. (2018). Meeting psychometric requirements for disposition assessment: Valid and reliable indicators of teacher dispositions. *Journal of Instructional Pedagogies, 21*, article 182847. <https://www.aabri.com/manuscripts/182847.pdf>

- Land, R., Meyer, J. H. F., & Baillie, C. (2010). Preface: threshold concepts and transformational learning. In R. Land, J. H. F. Meyer & C. Baillie (Eds.), *Threshold concepts and transformational learning* (pp. ix-xlii). Rotterdam: Sense.
- McConn, M. L. & Geetter, D. (2020). Liminal states of disorienting dilemmas: Two case studies of English teacher candidates. *Journal of Transformative Education*, 18 (3), 231-250. <https://doi.org/10.1177%2F1541344620909444>
- Meineke, H., & DeVasto, D. (2020). The subject of subjectivity: Preparing teachers with the knowledge, skills, and dispositions needed for empowering emergent bilingual students. *Journal of Teacher Education and Educators*, 9(1), 61-82.
- Meyer, J. H. F., & Land, R. (2003). Threshold concepts and troublesome knowledge (1): Linkages to ways of thinking and practising within the disciplines. In C. Rust (Ed.), *Improving student learning: Ten years on* (pp. 1-16). Oxford: Oxford University Press.
- Meyer, J. H. F., & Land, R. (2005). Threshold concepts and troublesome knowledge (2): epistemological considerations and a conceptual framework for teaching and learning. *Higher Education*, 49(3), 373-388. <https://doi.org/10.1007/s10734-004-6779-5>
- Mezirow, J. (2003). Transformative learning as discourse. *Journal of Transformative Education*, 1(1), 58-63. <https://doi.org/10.1177%2F1541344603252172>
- Morse, J. M. (2008). Confusing categories and themes. *Qualitative Health Research*, 18(6), 727-728. <https://10.1177/1049732308314930>
- National Council for the Accreditation of Teacher Education (NCATE). (2002). *Professional Standards for the Accreditation of Schools, Colleges, and Departments of Education*. <http://www.ncate.org>
- National Center for Education Statistics (NCES). (2017). *Digest of Education Statistics, 2017* (NCES 2018-070). <https://nces.ed.gov/programs/digest/d17/>
- Neve, H., Lloyd, H., & Collett, T. (2017). Understanding students' experiences of professionalism learning: a 'threshold' approach. *Teaching in Higher Education*, 22(1), 92-108. <https://10.1080/13562517.2016.1221810>
- Park, E. J. & Light, G. (2010). Identifying a Potential Threshold Concept in Nanoscience and Technology: Engaging Theory in the Service of Practice. In R. Land, J. H. F. Meyer & C. Baillie (Eds.), *Threshold concepts and transformational learning* (pp. 259-280). Rotterdam: Sense.
- Rattray, J. (2016). Affective dimensions of liminality. In R. Land, J. H. F. Meyer & M. T. Flanagan (Eds.), *Threshold concepts in practice* (pp. 67-76). Sense.
- Schussler, D. L., & Bercaw, L. (2021). Peering through a looking glass: Deconstructing teacher candidate assumptions using dispositions. *The Teacher Educator*. Prepress: <https://doi.org/10.1080/08878730.2021.1946228>
- Shinners-Kennedy, D. (2016). How not to identify threshold concepts. In R. Land, J. H. F. Meyer & M. T. Flanagan (Eds.), *Threshold concepts in practice* (pp. 253-267). Rotterdam: Sense.
- Shulman, L. S. (1987). Knowledge and teaching: Foundations of the New Reform. *Harvard Educational Review*, 57(1), 1-23. <https://doi.org/10.17763/>

haer.57.1.j463w79r56455411

- Smagorinsky, P. (2010). The culture of learning to teach: The self-perpetuating cycle of conservative schooling. *Teacher Education Quarterly*, 37(2), 19-32.
- Smith, W. L., Crowley, R. M., Demoiny, S. B., & Cushing-Leubner, J. (2021). Threshold concept pedagogy for antiracist social studies teaching. *Multicultural Perspectives*, 23(2), 87-94. <https://doi.org/10.1080/15210960.2021.1914047>
- Timmermans, J. A., & Meyer, J. H. F. (2017). A framework for working with university teachers to create and embed 'Integrated Threshold Concept Knowledge' (ITCK) in their practice, *International Journal for Academic Development*, 24(4), 354-368. <https://doi.org/10.1080/1360144X.2017.1388241>
- Timmermans, J. A., & Meyer, J. H. F. (2020). Embedding affect in the threshold concepts framework. In J. A. Timmermans, & R. Land (Eds.), *Threshold concepts on the edge* (pp. 51-67). Leiden, The Netherlands: Brill.
- Tucker, V. M. (2016). Learning experiences and the liminality of expertise. In R. Land, H.F. Meyer, & M.T. Flanagan (Eds.), *Threshold concepts in practice (Educational Futures, 68)*, pp. 93-106. Rotterdam: Sense.
- Tucker, V. M., Bruce, C., & Edwards, S. L. (2016). Using grounded theory to discover threshold concepts in transformative learning experiences. *Theory and Method in Higher Education*, 2, 23-46.
- Tucker, V. M. & Simmons, M. H. (2021, July 7-9). Vital but not thresholds: Differentiating professional domain essentials and threshold knowledge. *Threshold Concepts Conference*, July 7-9, 2021.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, Mass.: Harvard University Press.