

WHAT DOES IT MEAN TO BE ME? A PRESERVICE MATHEMATICS TEACHER'S IDENTITY DEVELOPMENT DURING AN EDUCATION ABROAD PROGRAM

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A review of the literature underpinning mathematics education illustrates that in order to achieve an equitable mathematics education, we must consider other methods of preparing mathematics teachers—methods that encourage identity development, specifically cultural awareness and open-mindedness as two key facets of this construct. This study describes and interprets a preservice mathematics teacher's identity development during a semester-long mathematics-focused education abroad program. Findings suggest that we can foster alternative visions of identity—ones that have a better understanding of culture and a greater sense of open-mindedness—through participation in such culturally-rich international programs.

Keywords: Cross-cultural Studies, Equity and Diversity, Teacher Beliefs, Teacher Education-Preservice

Purpose

A review of the literature underpinning mathematics education illustrates that in order to achieve an equitable mathematics education, one that is free of systemic forms of inequality, we must consider other methods of preparing mathematics teachers—methods that encourage identity development, specifically cultural awareness and open-mindedness as two key facets of this construct. For example, the National Council of Supervisors of Mathematics (NCSM) and TODOS: Mathematics for ALL (TODOS) have suggested that mathematics teachers must take a stance that “interrogates and challenges the roles power, privilege, and oppression play in the current unjust system of mathematics education—and in society as a whole” (2016, para.1). In addition, the National Council of Teachers of Mathematics (NCTM) has suggested that in order to promote a culture of access and equity within mathematics education, teachers should be “responsive to students’ backgrounds, experiences, cultural perspectives, traditions, and knowledge” (2014, pg. 1). Furthermore, others have noted preservice or in-service mathematics teachers initially dismiss the idea of teaching social justice, believing that it does not belong in mathematics (de Freitas, 2008; Ahlquist, 2001; Weissglass, 2000). As De Freitas has said, “Those frequently heard comments—‘I’m just a math guy,’ ‘I’m one of those people who likes math for the sake of the math only,’ ‘I’m not one for social justice’—share a particular vision of identity as being a fixed, unmovable, and irresolvable entity” (2008, p. 50), and unfortunately that is a mindset we often see in mathematics.

So, what kind of preparation program do preservice mathematics teachers need? Weissglass has said “any serious attempt to achieve equity in mathematics education must be rooted in an ongoing process of increasing our understanding of how individual prejudices, unaware biases, and systemic societal discrimination affect teaching and learning” (2000, p. 10). Gutstein has asserted that more work needs to be done to alter teachers’ personal belief systems built on deficit thinking, specifically when working with diverse children (2000). De Freitas has suggested, “Alternative visions of identity are required” in order to change the fixed, closed mindsets of mathematics teachers and begin to develop a critical mathematics education (2008, p. 49). As Neumayer-Depiper has said, it is not enough to simply develop a set of effective mathematics teaching practices (2009). We must consider other methods of preparing mathematics teachers, methods that encourage identity development. Rather than having a fixed, closed mindset as De Freitas describes, we want preservice mathematics teachers to develop an identity that is more open-minded. We also want our preservice mathematics

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teachers to have a developed sense of their own cultural identity and, as Weissglass says, an increased understanding of how their individual prejudices and unaware biases affect teaching and learning.

Participation in an education abroad program can address these needs and help foster mathematics teachers that are open-minded and have an established sense of their cultural identity. As such, the purpose of this study is to examine how education abroad influences the identities of preservice mathematics teachers in ways that they become more culturally aware and open-minded.

Theoretical Framework

Research has indicated that throughout an education abroad experience, students “challenge their beliefs about the world and its people, develop empathy for and trust in others, learn a significant amount about at least one other culture, and often to their surprise, learn quite a lot about their own culture” (Cushner, 2009, p. 160). Much of this learning comes from being immersed in another culture and having the experience of feeling like a cultural outsider. Merryfield (2000) found that those who left the US and experienced living in another culture “came to understand temporarily what it feels like to live outside of the mainstream.... They became conscious of what happens to identity when people know they don't belong” (p. 439). This reality of feeling like a cultural outsider is a feeling that many mainstream teachers in the US have never experienced, and it leads to a personal understanding of what it is like to be marginalized and stereotyped. This is an impactful experience that facilitates teachers “to become more ethnorelative in their understanding of others, more skilled at crossing cultures, and committed to bringing about change through their work” (Cushner, 2009, p. 165).

Beyond impacting students in these ways, education abroad also has the potential to impact identity on a deeper level. Teacher professional identity is a core aspect of the teaching profession (Sachs, 2005). “It provides a framework for teachers to construct their own ideas of ‘how to be’, ‘how to act’ and ‘how to understand’ their work and their place in society” (p. 15). The development of teacher professional identity is an ongoing process (Beijaard, Meijer & Verloop, 2004) that cannot be forced. Instead, “it is negotiated through experience and the sense that is made of that experience (Sachs, 2005, p. 15). Participation in an education abroad program can impact the identities of preservice mathematics teachers in ways that they become more open-minded and culturally aware, ultimately inspiring a more updated and progressive vision of teaching mathematics. However, little is known regarding the impact of education abroad programs on the identity development of preservice mathematics teachers—specifically their intercultural competencies and open-mindedness as two key facets of this construct. This research explores this timely area of inquiry.

Methods and Data Sources

This is a qualitative case-study of one preservice mathematics teacher's identity development throughout a semester-long education abroad program in England. This program was meant specifically for preservice mathematics teachers (elementary and secondary). Students work at a mathematics education research center, intern in schools, and take mathematics education classes at a university.

This study began the summer prior to their semester abroad and ended shortly after their return to the United States. Three main data collection methods were used: semi-structured interviews, in-country participant observation, and document review. Documents such as student journals, coursework, and the Intercultural Development Inventory (IDI) were used within this study.

The IDI (Hammer, Bennet & Wiseman, 2003) was administered to participants prior to their departure and again upon return to the United States. This assessment places participants on a continuum ranging from “ethnocentric” to “ethnorelative.” Ethnocentrism is defined as “the

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experience of one's own culture as 'central to reality'", in which "the beliefs and behaviors that people receive in their primary socialization are unquestioned: they are experienced as 'just the way things are,'" (Bennett, 2004, p. 62). Ethnorelativism is "the experience of one's own beliefs and behaviors as just one organization of reality among many viable possibilities" (Bennett, 2004, p. 62). There are three categories related to ethnocentrism: Denial, Polarization, and Minimization, and two categories related to ethnorelativism: Acceptance and Adaptation. Teachers with an ethnorelative mindset would be more inclined to engage with students in ways that respect their cultures, backgrounds, and experiences, ultimately meeting NCTM's (2014) call for a responsive mathematics education.

The interviews and in-country observations provided insight into their experiences and day-to-day activities within the program and enabled me to explore and uncover in what ways participants' thinking about culture, mathematics teaching, and open-mindedness evolved throughout the program.

Results

The case presented in this study, whom I will refer to as Ben, showed growth in both cultural awareness and open-mindedness. Ben is a white male who turned 22 years old while participating in this program. Prior to departure, Ben fell in the "ethnocentric" category of the IDI, specifically within minimization (see figure 1). A person within minimization is typically color-blind, "focusing on commonalities and universal values, emphasizing similarities, and holding the belief that all people are fundamentally the same" (Cushner, 2009, p. 156).

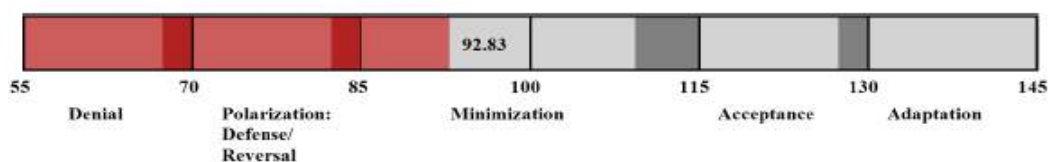


Figure 1: Ben's IDI score at the start of the program

This aligns with some of Ben's comments from the start of the program in which he expressed that he avoided seeing culture because it would prevent him from understanding the individual person at hand. Ben described that he preferred to pay attention to individual (not cultural) differences, saying, "Generalizing cultures, in my opinion, is a bad thing as it takes away the ability for the individual to be themselves."

Ben also had trouble describing his own culture. In our first interview, he described himself as "Caucasian," "Polish," and "Italian," but indicated these weren't identities that he felt connected to. Rather, he said "culturally, it would be more accurate to say my family is a family of helpers over any specific background" because his mom was an occupational therapist and his dad taught in an elementary school. He described that his family was privileged in the sense that they didn't need to identify with "race," or "culture," and that they could identify with something else entirely, like being "helpers."

To Ben, America was too multifaceted to generalize, and he had trouble articulating what it meant to be American. He discussed that there may be "things [people] in the US share, but a majority of those people have vast differences... The culture of the US is close to not being generalizable at all." He was also tentative to label himself as American:

I guess I consider myself American in the sense that I was raised in America, but I feel like America is too broad of a thing for me to consider myself as.... So, I would say in a manner of speaking, I identify as American because I grew up in America. But I don't really identify with anything that I know could be a generalization of Americans, that I'm aware of.

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Throughout the program, Ben wrote journals documenting his beliefs of what qualifies as good mathematics teaching. At the beginning of the program, Ben had little awareness of his own culture, his students’ cultures, and how these identities would influence his classroom. When reflecting on what qualifies as good mathematics teaching, Ben spoke of his own views of the subject and what he deems important, saying, for example, that he values conceptual understanding of the subject and views procedures as “tedious,” and “a mindless waste of time.” However, he never mentioned his students or the experiences and perspectives they may bring to the classroom.

Once Ben arrived in England, he began to notice surface-level cultural differences like driving on the other side of the road, but throughout the program, he began to notice deeper cultural differences such as how the concept of time was viewed in England versus the United States along with contrasts in professional communication styles. He discussed the experience of feeling like an American, a concept he had never thought about previous to this education abroad experience, as he said, “once you open your mouth, people already have all these views of you.” He also discussed how he was constantly asked to speak for all of America: “Right off the bat, people were asking me about Trump, school shootings, and violence in America. It was weird being the spokesperson for that.” These experiences forced Ben to consider his culture, and he began to notice differences across cultures.

Throughout the program, Ben also began to recognize aspects of American culture. He discussed how America was founded on “sticking it to the man,” and “standing up for itself at a time where they felt taken advantage of.” He acknowledged that there is a spirit of rebellion in England, saying “there is plenty of public protesting” relating to Brexit, but that he sees this value as being more prevalent in American society. He wrote, “In England, being rebellious is not seen as something valuable,” giving as examples, “Students wear uniforms to class, rather than getting to express themselves in different ways,” and “They have a formal relationship with their teachers that revolves around the teacher being the head of the classroom.” He also described how there was no desire to own a weapon in England, but that America was “founded on the ability to rise up against oppression and rebel,” and that “We have a right to bear arms in America so that if we are oppressed, we can take appropriate measures to challenge what is there.” He went on to say, “I would argue that the times have changed and we need to reconsider this value,” but at the end of the day, the right to bear arms comes from “the spirit of rebellion, a crucial piece of our founding virtues.” These types of reflections about cultural differences occurred throughout the entire program.

By the end of the program, Ben’s IDI report demonstrated growth (see figure 2). While he still fell within the category of minimization, he was approaching acceptance, an orientation that reflects a recognition and appreciation of cultural differences.

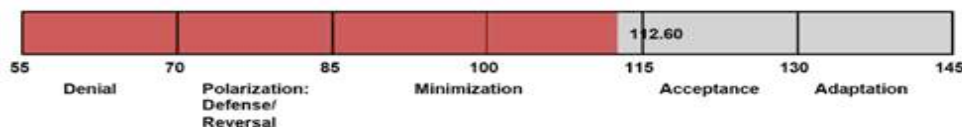


Figure 2: Ben’s IDI score at conclusion of the program

Ben also expressed that he was now more interested in culture and that he “keeps cultural and identity in mind, rather than solely the individual.” Additionally, he expressed a new understanding of himself and his students, saying:

I can say my time in Europe has changed what I enjoy about math. I still believe in what I said previously, that the best piece for me is problem solving and the conceptual. I also think that’s the most important piece of math. But I think that I’ve missed something crucial about math. Reflecting on different cultures and understanding of the world has helped me understand some of the disconnect between my students and I back when I was student

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teaching. The truth is, they valued getting a correct answer. They didn't care how. It was the beauty and relief of finishing a problem with a tool they had that pushed them forward. It wasn't their skill, but their ability to use a tool that connected them to the mathematics. Up until studying here and thinking deeply about cultural differences I failed to see some people fundamentally don't feel the way I do.

Throughout the program, Ben began to notice and appreciate cultural difference, ultimately saying:

Looking at what my students' value, how my students view math, how my students view education, and applying it to my own understanding to grow and change my teaching style overtime is going to be fundamental to my practice.... I will be careful to not push my own view of the mathematics on the students, rather I will shape my strategies and methods to what they enjoy, value, and believe. Over time, after gaining my students trust, I will offer different options to pieces already in place.... Careful reflection on my students and their situations and their founding principles will lead me to become a better, more effective, efficient teacher that can reach out to students in many different ways rather than simply through the mathematics.

By the end of the program, Ben expressed a deeper understanding of his culture and a greater need to pay attention to his students' cultural identities. His descriptions of teaching mathematics had evolved to more closely align with NCTM's call for mathematics teachers that are "responsive to students' backgrounds, experiences, cultural perspectives, traditions, and knowledge" (NCTM, 2014, pg. 1).

Conclusions

Ben's journey throughout this program suggests that through participation in education abroad programming, preservice teachers can become more culturally aware and open-minded. At the start of the program, Ben had little understanding of his own cultural identity, and he avoided noticing cultural difference. His orientation towards cultural difference fell within the category of minimization, reflecting "a tendency to highlight commonalities across cultures that can mask important cultural differences in values, perceptions, and behaviors," (Ben's IDI profile, pg. 6). In addition, when Ben would reflect on his beliefs of what qualifies as good mathematics teaching, he never mentioned his students or the importance of including their perspectives, experiences, and backgrounds into his classroom. Proponents of culturally responsive teaching argue that "Explicit knowledge about cultural diversity is imperative" (Gay, 2002, p. 107) to meet the needs of the diverse student population. As such, Ben was far from achieving this.

However, by the end of the program, he was recognizing that culture influences the experiences, values, beliefs, and perspectives that people have, and he was aware that his students' culture, specifically their experiences and values, were different from his own. He indicated that he now believed his, and his students', cultural identities would influence their experiences in the classroom, and he discussed a desire to incorporate his students' perspectives and values into his teaching. He said that within his teaching, he would take "it slow and not make assumptions" about his students based on his prior experiences, and that he would instead consider his students' prior experiences.

Ben's orientation of minimization is a reflection of the orientations of many teachers across the country. For example, Mahon (2003) studied 155 teachers in the midwestern US, and found that 100% of them fell at minimization or below. This is problematic on many levels. When we avoid noticing culture, it's the dominant culture that is assumed to be "the" culture, and any other cultures may be ignored, or even worse, shut down or demonized. Furthermore, a minimization mindset would limit our ability to create an equitable mathematics education for all students. In order to address issues of racial, cultural, and socioeconomic inequity, we need to see race, culture, and

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socioeconomic status. Rather than ignoring culture, we want our teachers to acknowledge and include various cultural perspectives within the classroom.

Given Ben's evolution throughout this program, there appears to be potential for shifting the ways in which we prepare mathematics teachers. If we look to NCTM, NCSM, TODOS, and others, we can see calls for addressing issues of equity, access, and social justice in mathematics education. NCTM (2014) has articulated that teachers should be responsive to students' cultures, experiences, and backgrounds. NCSM and TODOS (2016) have suggested that mathematics teachers interrogate the roles of power, privilege, and oppression within mathematics education. At the beginning of this study, Ben was ignoring culture—not recognizing his own culture or the culture of others—making it nearly impossible to achieve the calls from NCTM, NCSM, and TODOS. This study highlights that we can foster alternative visions of identity—ones that have a better understanding of culture and a greater sense of open-mindedness—through participation in such culturally-rich international programs.

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