CONNECTED AT A DISTANCE: EXPERIENCES AND EFFORTS WITHIN A SYNCHRONOUS, ONLINE MATHEMATICS SPECIALIST PROGRAM

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ABSTRACT
Online learning offers flexibility and convenience to students regardless of their proximity to a traditional campus. However, online programs can also feel isolating. Beth, a mathematics specialist candidate, completed a graduate program while living 7000 miles and seven time zones away from her instructor and peers. Through intentional planning by instructors, Beth found community by making personal connections, celebrating life experiences, and sharing a passion for mathematics education with her peers. Furthermore, Beth felt empowered to take academic risks and expose professional vulnerabilities in the learning community. The instructors within the program valued learning as a social construct and therefore designed opportunities for candidates to make ongoing personal and professional connections. In this mathematics specialist program, participants and instructors each took responsibility for forming and sustaining the online community. Although the examples shared in this manuscript are one student's experiences in a specific context, mathematics leaders may be able to extend the idea of forging connections into other virtual contexts. Specifically, we value and highlight the importance of creating an environment that recognizes the learner as a whole person with competing personal and professional priorities.

KEYWORDS
mathematics specialist, online learning, online community

Learning is an inherently social endeavor because knowledge is socially constructed (Vygotsky, 1978) and takes place within communities of practice (Wenger, 1998). These beliefs have long guided teachers in face-to-face settings and have more recently been considered in regard to online learning environments. As we examine community and connectedness in our synchronous virtual learning experiences, we draw from Swan's (2001) model that joins Community of Inquiry in online learning (Garrison et al., 1999; Rourke et al., 2001) with Moore's (1989) theory of interactions between learners, content, and the instructor. This model posits that online learners' experiences are products of interactions between learners, content, and the instructor, and that those interactions are influenced by teaching presence, cognitive presence, and social presence. Early research into online Communities of Inquiry focused on asynchronous learning experiences, and our work adds to the expanding literature base about synchronous learning (e.g., McDaniels et al., 2016; Brown, et al., 2016; Hjalmarson, 2017; Hoffman, 2019). In our references to community, we use Conrad's (2005) definition, which describes community as "a general sense of connection, belonging, and comfort that develops over time among members of a group who share purpose or commitment to a common goal" (p. 2).

Though students in synchronous courses meet and interact online in real-time, merely attending class sessions together does not ensure that students will have meaningful interactions with the content, instructor, or peers. Rather, research from asynchronous settings suggests that instructors and students both have agency in developing a sense of community within online courses (Arasaratnam-Smith & Northcote, 2017; Conrad, 2005). In synchronous online learning contexts, strong teaching presence can increase student engagement and sense of community. For example, to facilitate effective communication and connections between students, instructors can utilize and manage multiple modes of online communication, including the microphone and chat messages (Hoffman, 2019; McDaniels, et al., 2016). Also, Hjalmarson (2017) linked collaborative, authentic projects to students' sense of community. To date, there is a dearth of research from the student perspective about forming community in synchronous online learning.

Working loosely in the tradition of narrative inquiry, this paper captures a recent graduate's reflections on being a candidate in a synchronous online master's degree program for mathematics specialists. We highlight links between her experiences and instructors' intentional efforts to help students feel connected in a distance learning environment. The intent of our paper is for readers to experience "a vicarious testing of life possibilities…[and] a new sense of meaning and significance" (Clandinin & Connelly, 2000, p. 42) around creating community in online courses. Our narrative contributes to the literature base by exploring a student's perspective about forming community in synchronous online learning while illuminating her instructors' intentionality to facilitate such community.

Context

Mathematics specialists are professionals "with an advanced certification as a mathematics instructional leader or who works in such a leadership role" (McGatha & Rigelman, 2017, p. xiv). Their titles, roles, and responsibilities vary, but nonetheless, they consistently act as leaders within their unique contexts, advocating for productive mathematics teaching and learning (Fennell, et al., 2013; National Council of Teachers of Mathematics, 2014).

The Mathematics Specialist Leader (K–8) program at George Mason University was first established in 2005 as a traditional, face-to-face program, then, a few years later, transitioned to

a hybrid model (virtual and face-to-face courses) as well as offering fully online programs through synchronous classes. Upon completion of this 10-course program, candidates obtain state licensure as a K–8 mathematics specialist in addition to a master's degree in Education Leadership with a concentration in Mathematics Specialist Leadership (K–8). The synchronous online courses are conducted through Blackboard Collaborate Ultra, which offers video, audio, screen, and text sharing, as well as small group formations in "breakout rooms" within a class session. During class, students also interact via shared Google presentation slides that function as media for both presentations and collaborative work, much like a whiteboard. Occasionally, candidates utilize their camera function to share work such as modeling with manipulatives, but the camera is not usually on during discussions.

Specialist candidates complete the ten courses in loosely formed cohorts. Based on course offerings each semester, most students follow a typical progression of course completion. However, students are not required to take courses in a lockstep order or begin and end the program on a rigid schedule. Though this is not a true cohort program, because of limited course offerings, many students complete most of the courses together.

A Recent Graduate: Beth

Beth attended the online synchronous classes from Bahrain, seven time zones ahead of her colleagues and instructors in Virginia. Because of the flexibility of being online and knowing colleagues who spoke highly of the program, Beth decided it would be worth the effort of completing the program from afar. She graduated in December 2019 and subsequently worked as a mathematics coach at an international school in the Middle East.

Beth's Reflections

To explore feelings of connection while in the program, Beth retrospectively wrote a series of reflective memos for this paper. In these memos she freely wrote but allowed the following questions to guide her:

- How, if at all, did I feel connected to my class peers?
- What experiences stick out to me most, across the coursework, as a time that I felt connected to my class peers?
- Why did it matter that I felt or wanted to feel connected to my class peers?
- How else did I feel connected to learning within this program?

Next, the first two authors holistically analyzed the memos for overall themes that best captured Beth's experiences. In reading her memos, we saw how connections with peers allowed Beth to take risks in her own learning, which supported her knowledge development. We share purposeful selections of key recollections from her memos, as well as perspectives of intentional design behind the learning experiences that Beth highlights across several different courses. We understand that Beth's experiences are unique, and we do not claim that they are representative of all program participants. Rather, we examine her experiences in the hope that "in-depth exploration of an individual life-in-context brings us that much closer to understanding the complexities of lives in communities" (Cole & Knowles, 2001, p. 11).

Feeling Connected to Class Peers

> I very clearly remember the first day (morning...2am in the morning) when I was sipping peppermint tea and nervously introducing myself to others via a Google Slide...It was my first time creating a Google Slide and using the various tools. I was nervous, but willing to take a risk. The community was supportive, and I was reminded that we are all there for the same reasons and the same goals. (B. Terry, personal communication)

Beth sat in front of her laptop, 7000 miles away from her instructor and peers. While the flexibility and relative convenience of the online program were appealing, the idea of isolation was a worry. Beth wondered, "Will I be successful in a program where I never see my class peers face-to-face? How will the instructors be able to support me from afar? Will I be motivated to attend class if I feel lonely?" Delightfully, from the onset of her first class, Beth began to connect to her class peers.

> I learned on that day that there were teachers who knew some of my former co-workers, that a cohort member was expecting her first child, that there were members who were new to coaching and some who have never coached, that others were tuning in from outside of Virginia and that we ALL had a passion for mathematics education. This initial assignment and opportunity to work with Google Slides was day 1 of our learning community and I couldn't wait for more. (B. Terry, personal communication)

Not only did the instructors intentionally design opportunities for candidates to connect initially within a course, but we planned for ongoing personal and professional connections. Similar to how a face-to-face class session may have small talk or informal discussions as learners enter a space, we created an intentional space and time for our candidates to share and connect each time they entered our virtual classrooms. Within our interactive class slides, we provided space for candidates to use a textbox and/or upload pictures to share updates and celebrations.

> Throughout each course, we shared personal stories about our families, our health, our fears, our successes and were also encouraged to share about professional moments. It was this intentional invitation to reach out to each other that allowed us to feel recognized as individual humans with life beyond Blackboard and Google Slides. (B. Terry, personal communication)

Through making such personal and professional connections, we believed that the candidates felt supported by one another. This support and trust enabled Beth and the other candidates to connect not only in a social sense but also as they developed their mathematical knowledge and leadership skills.

> With each small group discussion and collaborative assignment, I continued to grow in my own professional understanding while the personal connections continued to strengthen as well. As we continued to grow together and as our community was fostered by each other and the instructors, we became more comfortable in our abilities as leaders. By the end of our first two courses, we were also connecting, personally and professionally, with one another on social media. (B. Terry, personal communication)

Connections Allowed for Risk Taking

Because Beth felt connected to others in the class, she was willing to take risks in her learning. In instances when she lacked confidence to perform the mathematical task, she leapt

towards opportunities to learn the mathematical perspectives alongside her trusted peers.

> In one particular course, we were asked to form small groups to learn about and develop materials to demonstrate a progression of a particular content area. Not always a risk-taker but always a learner, I chose to assign myself to a group focusing on proportional reasoning, an unfamiliar content area. (B. Terry, personal communication)

Candidates are often given choice when forming small groups within our learning community and work in both grade level groups and among peers with a broad range of backgrounds. In the example above, Beth chose to partner with peers for a learning project that had a different grade-level focus than her own. She was uncomfortable due to her unfamiliarity with the mathematical topics related to the middle grades but trusted her peers to include her in what their experiences had been. She knew that in taking this risk, even within her distanced community, her own learning would increase. By trusting her connections with her peers, she was able to safely explore a mathematical topic out of her comfort zone.

Even though the community provided trust through strong connections, there were times that Beth lacked confidence around her peers.

> In the third semester of the program, I was required to interview a student and select video clips to share with the whole class. I am admittedly nervous in situations like this and was not looking forward to sharing my video clip to my peers. (B. Terry, personal communication)

After Beth presented her video-clip, the connections between her and her class peers allowed for meaningful feedback and mutual respect through the vulnerability.

> Immediately upon receiving peer feedback and suggestions for improvement, I was reminded of the support and network related to this community of adults. (B. Terry, personal communication)

To align to practical experiences of mathematics specialists, instructors carefully planned assignments that often require shared video or a synchronous presentation among peers. Through such interactions, giving and receiving peer feedback—a practice common for mathematics specialists (Fennell et al., 2013)—was repeated and refined. Throughout the program, Beth was afforded the opportunity to learn from her trusted peers, working through feelings of vulnerability while also building confidence in a common practice of mathematics specialists.

Discussion

Isolated from her fellow mathematics specialist candidate peers through distance and time zones, Beth found community in an online synchronous program. By making personal connections, celebrating life experiences, and sharing a passion for mathematics education with her peers, Beth felt empowered to take risks and expose vulnerabilities in the learning community. The instructors within the program valued learning as a social construct and therefore designed opportunities for candidates to make ongoing personal and professional connections. In this program, participants and instructors each took responsibility for forming and sustaining the online community.

Returning to the online Communities of Inquiry model (Garrison et al., 1999), Beth's meaningful learning experiences can be framed by the productive interactions she had with peers, instructors, and the content. Building on initial social and interpersonal connections during the five semesters of coursework, Beth deepened her cognitive presence to build knowledge

about mathematics content and best practices for coaches. This included risk-taking when working with course content and reflecting on her ongoing work as a coach.

The lessons learned in the program about the importance and potential benefits of connections between professionals can be expanded outward from university coursework. Mathematics specialists often try to form a learning community or Community of Practice with stakeholders in their school and local contexts. It is our hope that Beth and other students in our program will understand that beneficial risk-taking and meaningful knowledge building can occur when participants feel socially and academically connected to colleagues. We hope that mathematics specialists who complete our programs value the community we intentionally built and see the potential for building such community within their own practices.

Although the examples shared in this paper are one student's experiences in a specific context, we feel that mathematics leaders may be able to extend the idea of forging connections into other virtual contexts. Specifically, we value and highlight the importance of creating an environment that values the learner as a whole person with competing personal and professional priorities. We ask our candidates to share and celebrate throughout each of the courses, and we ask instructors also do the same. For Beth, the social presence of instructors and peers ultimately allowed her to take risks in her learning, thereby further developing our online community of inquiry.

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