The Preparation of Teacher Candidates for K-12 Online Learning Environments: A Case Study

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The purpose of this study was to determine how teacher education programs may better prepare teacher candidates to teach in K-12 online learning environments. The primary research question addressed was: What specific knowledge, skills, and dispositions should teacher education programs include in their curriculum to better prepare teacher candidates to teach in K-12 online learning environments? To answer this question, the researcher employed a qualitative case study methodological approach in which the study's participant was observed for three months as he taught multiple sixth grade mathematics classes in a fully online learning environment. Findings from this study indicate that teacher education programs should offer field experiences in K-12 online learning environments and that teacher educators must learn, develop, and model the necessary knowledge, skills, and dispositions relevant to K-12 online learning environments.

According to the International Association for K-12 Online Learning (iNACOL), approximately 1.8 million students in the United States participated in one or more online courses provided by K-12 school districts in 2010. This number did not include the more than 200,000 students enrolled in full-time online schools, and this number has grown to 310,000 students in 2013 (iNACOL, 2013a). The primary reasons why school districts provide online learning opportunities to these students are "to offer courses not otherwise available, and provide opportunities for students to recover course credits" (iNACOL, 2013a, p. 1). Approximately 81% of urban schools reported the use of online learning opportunities as necessary to their credit recovery programs (iNACOL, 2013a). With rising educational costs and increasingly cash-strapped budgets, school districts are turning to online learning as a viable option for their students. However, despite the immense expansion in online learning opportunities for K-12 students, the parallel need for teachers who are prepared to teach these students is not currently being addressed in the majority of teacher education programs in the United States.

The purpose of this study was to determine how teacher education programs may better prepare teacher candidates to teach in K-12 online learning environments. More specifically, the goal of this research was to answer the following research questions:

1. What specific knowledge, skills, and dispositions should teacher education programs include in their curriculum to better prepare teacher candidates to teach in K-12 online learning environments?
2. What type of field experiences should teacher education programs include in their curriculum to better prepare teacher candidates to teach in K-12 online learning environments?

For the purpose of this study it was necessary to locate the second research question within the findings of the first question. By way of explanation, the researcher first located the knowledge, skills, and dispositions to better prepare teacher candidates for K-12 online learning environments and then, within this locale, determined the field experiences necessary to further these knowledge, skills, and dispositions.

Literature Review

Preparation for Virtual Schools via Simulation

As early as 2004, a consortium of universities led by Iowa State University responded to the U.S. Department of Education's call for a model to incorporate virtual schools into teacher education programs with appropriate assessment of the range of necessary competencies. The goal of the Teacher Education Goes into Virtual Schooling (TEGIVS) project was for teacher candidates to learn how to counsel virtual school students and to develop their practice in K-12 virtual schools. More specifically, they aimed to "prepare teachers in the four cooperating institutions to implement effective virtual school curricula at four levels of competence: counselor, assistant, teachers, and designer" (Davis & Roblyer, 2005, p. 403) through the development of a tool to immerse pre-service teachers in situations similar to that of virtual school teachers. The results of a variety of assessment instruments, including pre-post course evaluation Likert scales, virtual school scenario rubrics, a post-course rubric for online instruction, tool rating checklists, a modified standardized assessment, and pre-service and post-graduation follow-up survey items, suggest that TEGIVS "appears to be effective in helping students see the complexity of teaching and learning online and with other technologies" (Davis et al., 2007). However, there is a demonstrated need for improvements in the content and delivery of the virtual school field experience tool (Davis et al., 2007).

Preparation for Virtual Schools via Online Courses

Duncan and Barnett (2009) explored the educational experiences of teacher candidates who were enrolled in a unique, experiential, online course that focused on the content and delivery of online learning. More specifically, their research consisted of a case study of nineteen pre-service teachers who participated in a blended course with activities that explored different aspects of e-learning, such as teaching and learning online, online communication and networks, computer crimes, privacy online, online safety, access and equity online, ethics, and assessments. As part of the course, the participants were required to "build content using a variety of media and interactive course tools; upload the content to a delivery platform; and finally develop and moderate activities or discussion topics" (Duncan & Barnett, 2009, p. 363). An analysis of the course discussions, emails, instant messages, and electronic survey transcripts from a four-month period revealed that the teacher candidates found the online environment to be more efficient and productive due to the task-oriented focus. They also found the most effective aspect of the course to be the development of their own online modules. However, the researchers noted that the teacher candidates needed to be provided with opportunities to "actively practice the skills required to develop social, cognitive, and teaching presence" (p. 373).

Preparation for Virtual Schools via Field Experience Observations

To this end, Compton and Davis (2010) created a pilot virtual field experience in which teacher candidates observed a high school science class. Through their qualitative case study, the researchers analyzed the curriculum materials, reflective journal entries, synchronous session discussions, and interview responses of two teacher candidates who participated in the pilot virtual school field experience. The teacher candidates reported that the virtual school field experience had a positive impact on them, in that they had preconceptions of online learning that were changed through the experience. In addition, they learned more about the skills and roles of virtual school teachers and the role of technology in virtual schools. The researchers identified five key elements that contributed to the successful pilot virtual school experience: offering the field experience virtually; including external and internal methods of information gathering to help facilitate the teacher candidates' inquiry about the virtual schools; including self-paced and guided observation; providing guided hands-on experiential learning; and including on-site observation. Although the researchers cited the need for more virtual field experiences, in their national study of teacher education programs, Kennedy and Archambault (2012) found that only 1.3% of their respondents provided field experiences in virtual schools.

Methods

To further explore how teacher education programs may better prepare teacher candidates for online learning environments, the researcher employed a qualitative case study methodology. The researcher chose to employ such a methodology to better understand the phenomenon of how a first year teacher enacts the knowledge, skills, and dispositions learned in a teacher education program to teach in a K-12 online learning environment. The study of this phenomenon is inherently connected to the current context of teacher education programs and the corresponding curriculum, courses, and clinical field experiences within them.

According to Yin (2003), a qualitative case study methodology should be considered when: (a) the researcher cannot manipulate the behavior of the participant in the study; (b) the researcher believes the contextual conditions are relevant to the phenomenon under study; or (c) the boundaries between the phenomenon and context are not clear. In this study, the researcher could not manipulate the behavior of the first year virtual school teacher in that the teacher was required to enact the behaviors necessary to teach his classes regardless of the researcher's interest in these behaviors. In addition, the contextual conditions, such as his teacher education program and the knowledge, skills, dispositions, and field experiences afforded to him through his teacher education program, are particularly relevant to the phenomenon of his behavior. Finally, the boundaries are not clear between the phenomenon and the context in this study (Yin, 2003).

Participant

The participant in this study, John (a pseudonym assigned to protect his identity) was a first-year virtual school teacher who was previously under the researcher's field experience supervision for the entire duration of his one-year graduate teacher education program. The researcher

intentionally chose John because it was believed that this would positively benefit the study, in that the researcher observed for one year how he translated the knowledge, skills, and dispositions from his teacher education program into two different traditional brick and mortar urban school field experiences. As a result, the researcher was familiar with John as a teacher, with his teacher education program, and with how he enacted the knowledge, skills, and dispositions from his teacher education program in a traditional brick and mortar school.

It is relevant to this study to note that within John's teacher education program, the researcher was also an instructor for the required educational technology course. Although the topics of this course included blogs, wikis, social networks, Microsoft applications, video production, interactive whiteboards, etc., the use of these educational technology tools was discussed within the context of brick and mortar schools only. Virtual schools and online learning environments were not discussed in this course.

At the time of the study, John was a sixth grade math teacher in the virtual school's middle school. More specifically, his title was sixth grade math Learning Intervention Facilitation Team (LIFT) teacher. LIFT was the virtual school's Title I program to provide struggling students with small group services based on their specified academic needs. His role as a LIFT teacher was to identify, progress monitor, and provide intervention support to students who were below where they needed to be with sixth grade math content. John was also responsible for co-teaching sixth grade general education math classes.

Setting

At the time of this study, John's virtual school was the first and largest virtual school in the state in which the study was conducted. Since it opened in 2000, more than 10,000 students have graduated from the virtual school. It was a tuition-free, fully accredited online public school which marketed itself as beneficial to pregnant students, students with jobs or professional athletic or musical careers, students with medical issues, and students who had been bullied or who had other reasons to avoid the distractions of traditional classrooms. The virtual school's curriculum was fully aligned to the state department of education standards and the students participated in all state-mandated assessments. The virtual school employed a team of curriculum specialists who provided curriculum guides, resources, and tools to the teachers.

As a virtual school teacher, John taught from his home. Therefore, the researcher visited John's home on the pre-arranged observation days. The virtual school equipment consisted of a virtual school issued computer, two monitors, a microphone, speakers, a phone, a printer, a router, the wireless connection, and other necessary supplies. The equipment was set up on a table that served as a desk. The researcher would sit next to him as he taught his lessons so that student interactions could be observed on the monitors and via the microphone, speakers, and phone, as well as through John's own notes and reactions. This brief discussion of the setting and the context in which teaching was carried out is particularly relevant to the context and understanding of him as a virtual school teacher.

Data Collection

John was asked to voluntarily partake in the naturalist direct observation of his virtual school classes. More specifically, the researcher observed John for three months teaching multiple sixth grade mathematics live class sessions in a fully-online learning environment called Elluminate (more recently updated to Collaborate). These live class sessions were the equivalent of traditional brick and mortar classroom-based classes, and John's students each had a specific schedule that directed them to the appropriate live class session. In other words, the students in John's virtual school had a link for each class session and they would "move" from one class session to the next throughout the day, much like traditional brick and mortar students move from one classroom to the next classroom. John taught live general education class sessions in sixth grade mathematics with approximately 50-75 students per session. He also taught live intervention class sessions (for students below grade level) in sixth grade mathematics, with approximately 5-10 students per session. Through the observation of these live class sessions, the researcher collected the necessary descriptive data to answer the research question: What specific knowledge, skills, and dispositions should teacher education programs include in their curriculum to better prepare teacher candidates to teach in K-12 online learning environments?

Additional data was collected through John's journal which included continual reflection on the strengths, challenges, questions, comments, and/or concerns that were situated within each observed live class session. The researcher did not utilize a prepared instrument for these reflections, in that they were driven by the participant and not the researcher. John also agreed to allow the researcher to collect written, audio, still image, and video data during these observations. Additional data sources include the researcher's journal and communications, such as emails and text messages, archival records, and physical artifacts, between John and the researcher.

Discourse Analysis

To analyze the research data, the researcher employed Gee's discourse analysis. Gee (2005) argues that discourse analysis provides the researcher with the opportunity to look for "patterns and links within and across utterances in order to form hypotheses about how meaning is being constructed and organized" (Gee, 2005, p. 118). Each data source was analyzed independent of the others and coded for themes based on Gee's seven themes of significance, activities, identities, relationships, politics, connections, and sign systems and knowledge and the corresponding questions for each theme. Through the analysis of the data, four themes emerged as particularly relevant to the research questions for this study: identities, relationships, connections, and knowledge. These four themes were then cross-analyzed with the researcher's state's Standards for the Teaching Profession, which guide the curriculum and development of teacher education programs and the evaluation of teachers in the field.

Results

The results of this cross-analysis of the data between Gee's Discourse Analysis themes and the Standards for the Teaching Profession provided the answers to the research question: What specific knowledge, skills, and dispositions should teacher education programs include in their

curriculum to better prepare teacher candidates to teach in K-12 online learning environments? First, with respect to knowledge, John did not believe he received the necessary preparation from his teacher education program to select, create, and implement online-based content-specific resources, instructional strategies, or assessments. For example, he described his concern with the virtual school's selected online-based resources and his implementation of them:

> It seems we depend way too much on our students logging into the supplementary material (like Envision Math, Study Island, BrainPop, etc.). I feel like a student could go through all of that and not get anything from it. I mean I'm sure they get feedback from those sites when they work problems but the sites don't look at the process or check for understanding of related concepts that might affect their understanding of the topic being studied. I mean a kid could just click through a lesson, completely lost and frustrated because what they are seeing doesn't make any sense and we assume that they got something from it.

Throughout the observations, John did not feel prepared to incorporate and did not perceive himself as prepared to incorporate supplementary online-based resources, such as those mentioned above, into his teaching in an online learning environment. However, in his teacher preparation program's educational technology course and in his field experiences, the researcher, as his supervisor, was aware that John had excelled at the incorporation of these types of supplementary online-based resources.

John also struggled constantly with the lack of time available to implement the online based instructional strategies and assessments. As he explained,

> We are in the middle of a class and I am beyond frustrated at the moment. We have been working on adding/subtracting and multiplying/dividing integers (positive and negative numbers). It's known that students struggle with this concept and we have spent one day adding/subtracting and one day multiplying/dividing. Not enough time.

In another instance, he reflected,

> It also seems that when we don't get to something in a class presentation we just skip it and move on and count on the students picking it up from one of the supplemental materials. Our weekly math question is over something we should have covered in week one or two but didn't get to it and who knows how many kids understood it based on the supplemental material.

This theme was consistent throughout all three months. John continually reflected on how he could not implement the necessary instructional activities and assessments for his students, based on their backgrounds, knowledge, interests, or experiences, within the specified amount of time. However, time management and pacing had not been an issue for John in his teacher preparation program or in his brick and mortar field experiences.

Another theme that consistently emerged within the lack of preparation to select, create, and implement online-based content-specific instructional strategies or assessments was related to

basic technology issues. John reported that teachers and students persistently had issues with their hardware, especially their microphones, the Elluminate software, and the required supplementary resources, and this greatly impacted student learning on a regular basis:

> I think I just got really annoyed because I looked at today's PowerPoint and was like, most of this class is not ready to do this yet, but the general education teacher just went right along like they were. Like, I feel like if it were my classroom in a traditional school, I would have completely scrapped my plans and spent the day going over other stuff. Not to say we could not have done that in this setting, but I feel like the general education teacher didn't want to load up a new PowerPoint, because she had trouble loading the first one and I had to do it.

On another occasion, he explained, "We also attempted to have the kids go to Study Island, which is a great resource, but again half the class had trouble getting in and I feel like that becomes the focus as opposed to what they are supposed to be doing."

John also did not feel his teacher education program prepared him with the skills to understand or to build the necessary relationships to learn what his online students knew and were able to do and to use this knowledge to meet the needs of all students. Although his rapport with students in traditional brick and mortar schools was one of his strongest abilities, he did not learn the skills necessary to transfer this to an online learning environment. This was reflected in his struggle to motivate students to work productively and assume responsibility for their own learning and to use resources, including technology, more effectively to enhance learning. For example, at one point John stated in frustration: "We had 65 kids in math today, no possible way to check for understanding on all of them, and half of them don't respond anyway." Again, in his traditional brick and mortar field experiences, he had demonstrated a strong ability to utilize technology in his classroom, especially on the Smartboard, to engage and assess students. However, this did not transfer to the online learning environment in that he had never been introduced to or learned how to teach in Elluminate/Collaborate or taught how to build interactive instructional activities and assessments that are contained within PowerPoint presentations.

Finally, John did not feel his teacher education program prepared him with respect to the enactment of teacher dispositions in an online learning environment. This was especially true in terms of issues of student identities and his own personal identity as a teacher, as well as his ability to grow and develop as a teacher. The researcher observed, and John recognized and frequently reflected on, the fact that he was not prepared to recognize characteristics of students with disabilities in an online learning environment in order to assist in appropriate identification, instruction, and intervention; this was particularly relevant to his specific job as a LIFT teacher. As a result, he could not differentiate his online instruction to support the learning needs of all students, especially his students with special needs, as well as he could in a traditional brick and mortar school. This and other issues impacted John's personal identity as a teacher in that he struggled to take responsibility for engaging in continuous, purposeful, professional development because he often did not know how or where to begin.

Results and Implications

Results

The primary research question for this study was: What specific knowledge, skills, and dispositions should teacher education programs include in their curriculum to better prepare teacher candidates to teach in K-12 online learning environments? With respect to knowledge, the data analysis indicates that the participant in this study, John, believed his teacher education program should have prepared him to select, create, and implement online-based content-specific resources, instructional strategies, and assessments. Specifically, he needed to know more about online-based resources and how to implement them in an online learning environment, how to enact online-based instructional strategies and assessments within a realistic time frame for online learning environments, and how to provide basic technology support in an online learning environment. The data analysis revealed that in terms of skills, John believed his teacher education program should have prepared him to build the necessary relationships to learn what his online students knew and were able to do, and how to use this knowledge to meet the needs of all students, especially his students with special needs. And, finally, the data analysis demonstrated a need for John's teacher education program to prepare him for the enactment of teacher dispositions in an online learning environment. This was especially true with respect to issues of student identities and John's own personal identity as a teacher, as well as his ability to grow and develop as a teacher.

Implications

The educational importance of this work may be summarized in the answer to the second research question: What type of field experiences should teacher education programs include in their curriculum to better prepare teacher candidates to teach in K-12 online learning environments? First and foremost, it is the responsibility of teacher education programs to begin to offer *required* field experiences in K-12 online learning environments. As the results of this study indicated, such required field experiences would provide teacher candidates with the opportunity to learn and develop the necessary knowledge, skills, and dispositions to teach the students in these schools. For example, the virtual school field experience would provide candidates with the opportunity to learn how to use online-based resources, instructional strategies, and assessments with the appropriate time management and pace for student learning. The teacher candidates could also learn more about virtual school students and the technology required to teach them. They could practice interacting and engaging with these students while learning the technology so that in the future they could more easily troubleshoot with the students to keep the focus on learning.

In addition, it is the responsibility of the teacher educators in teacher education programs to also learn and develop the necessary knowledge, skills, and dispositions relevant to K-12 online learning environments that are then enacted and modeled in the teacher education curriculum and classrooms. In other words, teacher educators need to observe *and teach* in virtual schools to learn the knowledge, skills, and dispositions required of their teacher candidates. They need to model the use of technologies employed in virtual schools in their face-to-face, blended, and online courses. The teacher education program curriculum should include instruction on how to

select, create, and implement online-based content-specific resources, instructional strategies, and assessments; build relationships with students to determine the best strategies to teach them; and develop and grow as a virtual school teacher. These findings further support the research of Duncan and Barnett (2009), in which teacher educators teaching online courses required teacher candidates to "build content using a variety of media and interactive course tools; upload the content to a delivery platform; and finally develop and moderate activities or discussion topics" (p. 363).

To return to the numbers, more than half of K-12 school districts in the United States already offer, or are in the process of developing, classes in blended and fully-online learning environments (iNACOL, 2013b). However, as iNACOL reported:

> A national survey of teacher education programs conducted in 2012 found that a paltry 1.3% of them were preparing their teachers for next generation learning models. That survey and subsequent studies have identified the need for a dramatic shift in the skills and methods for education preparation toward next generation learning models, which require many of the same skills as traditional education, yet a more comprehensive set of skills to navigate a diverse range of learning environments—including blended, online, competency-based models emerging in anytime, everywhere traditional classrooms and schools (iNACOL, 2013b, p. 4).

As the findings of iNACOL and this study indicate, the time to address the preparation of teacher candidates for K-12 online learning environments is now and there is an immense need for further research in this field. First and foremost, a nationwide study of how teacher education programs prepare their teacher candidates for online learning environments, such as virtual schools, is greatly needed. This research should address the number of teacher candidates who took teaching positions in online learning environments; teacher education curriculum, courses, course activities, and key assessments related to online teaching and learning; and online field experience options. In addition, there is a greater need for researchers to elicit feedback from current virtual school teachers and students as to how they believe teacher education programs could better prepare virtual school teachers. These perceptions are increasingly important to the development of teacher education programs that seek to better prepare their teacher candidates for online learning environments. As Barbour (2012) reminds teacher educators in his "call to action" to train teachers for virtual schools, "Goodlad (1994) believed that innovation in K-12 schools needed to be matched with similar innovation in teacher education" (p. 511). If, as iNACOL reports, K-12 online learning opportunities are growing exponentially; it is beyond time for teacher education programs to match this innovation.

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