The Influence of Technology-Rich Early Childhood Field Experiences on Preservice Teachers

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Despite a comprehensive body of research on field experiences in teacher education, participation in technology-rich early field experiences in early childhood environments is one particular area of inquiry lacking substantive current research. Therefore, this study was conducted to better understand how preservice teachers’ perceptions of global concepts related to teaching, learning, and technology were influenced by participation in a technology-focused early field experience within the authentic context of an early childhood laboratory preschool. To guide our study, we examined qualitative data collected from preservice teachers who were enrolled in an educational technology course while simultaneously participating in a technology-rich early childhood-focused early field experience. Findings indicated that preservice teachers’ perceptions of pedagogy and technology are influenced by the early childhood-focused early field experience. Positive impacts included confirming existing beliefs about teaching and learning, introducing new ideas about classroom practices, and inspiring valuable awareness of innovative uses of technology in early childhood education settings.

Keywords: educational technology, preservice teachers, early childhood education
INTRODUCTION

It has been suggested that practical experiences in preservice teacher education are founded in the theory of situated cognition, in which learning occurs in highly contextulized and authentic settings (Kennedy & Archambault, 2012). Consequently, situated cognition serves as the theoretical foundation for field experiences designed to provide preservice teachers with highly authentic and contextualized learning environments in which to apply theory to practice. The advantage of a field-based approach to technology-integration preparation is that preservice teachers are able to design and implement technology-based instruction in a hands-on authentic environment. If done appropriately, the design gives preservice teachers the opportunity to analyze how the technology affects student learning.

Learning about technology integration in tandem with the opportunity to apply the concepts during a field experience might serve as a critical strategy for challenging a technocentric approach to technology use (Papert, 1990). It is important that teacher educators sequence clinical experiences for preservice teachers to provide many relevant opportunities for students to direct theory into practice (Sutton, 2011). Although teacher preparation programs often rely on a number of strategies to yield the opportunities, including the typical practicum and student teaching model, it would be prudent to explore the impact of providing students more continuous and early experiences. Early field experiences, or those that come early in the teacher training sequence before practicum and student teaching, could discourage menu-teaching or teaching technology tools either with an implied or absent context or purpose. Instead, the intent of technology integration in teacher education should be to simultaneously develop integration of technology and pedagogy skills, all aimed at the purpose of using that technology effectively to support teaching and learning.

PURPOSE OF THE STUDY

Preservice teachers need opportunities to practice integrating technology in authentic teaching and learning contexts (Ertmer & Ottenbreit-Leftwich, 2010; Gronseth et al., 2011). With authentic field experiences, preservice teachers can, in a clinical atmosphere, contend with the issues and barriers surrounding technology, teaching, and learning. Giving preservice teachers opportunities to engage in clinical practice in a variety of environments, including early childhood contexts, would be sensible. Therefore,
teacher educators must provide preservice teachers a variety of experiences across the education continuum. Providing a variety of experiences is necessary to encourage exposure to the broad set of contexts preservice teachers might face as classroom teachers. Field experience in early childhood environments provides preservice teachers first-hand knowledge and experience about the developmental needs of young learners. Regardless of the licensure area a preservice teacher is preparing for, field experiences provide exposure to broad concepts regarding teaching and learning, such as understanding about child development and classroom management.

Despite the seemingly important role of field experiences, and the large body of research focused on field experiences, a gap persists in the extant literature. Little research exists on early field experiences or those clinical experiences happening before practicum and student teaching. Moreover, limited literature exists on technology-focused early field experiences, with few, if any, researchers highlighting technology-focused early field experiences specifically within early childhood contexts.

Considering the important role of clinical experiences in teacher training, the discernible gap in the research indicates that there is a need to understand fully how early field experience that is focused on technology integration contributes to preservice teachers’ perceptions of teaching and learning, especially within the context of an early childhood environment. By focusing of the perceptions of the preservice teachers, teacher educators can better understand the factors that might influence the instructional decisions they make, and provide them the most appropriate instruction needed to positively influence those instructional decisions (Sutton, 2011). In response to the gap in the research, this study addressed the following research question to guide a qualitative inquiry: How will participation in an early field experience focused on technology integration in an early childhood context influence preservice teachers’ perceptions of teaching, learning, and technology?

**BACKGROUND LITERATURE**

Digital learning education in teacher preparation often involves a variety of approaches to training new teachers. These strategies include a combination of educational technology courses, the integration of technology into methods and other content courses, and integration of technology during the field placement (Polly, Mims, Shepherd & Inan, 2010). The most typical model is based on the single educational technology course (Gron-
senth et al., 2010; Pierson & Thompson, 2005). However, teacher preparation curriculum relying on educational technology courses alone is not sufficient (Ertmer & Ottenbreit-Leftwich, 2010). Other research indicated it is critical that content and methods faculty continually reinforce technology integration through demonstration, modeling, and opportunities for applying theory to practice (Collier, Weinburgh, & Rivera, 2004; Franklin, 2007).

Ertmer and Ottenbreit-Leftwich (2010) suggested that more is needed than simply providing field experiences for preservice teachers to explore their changing pedagogical beliefs while gaining new teacher knowledge and understandings of good teaching. In addition to the opportunities to explore teaching and learning, it is critical to provide preservice teachers with occasions to build their confidence to implement the pedagogies in specific contexts. However, these statements should not be interpreted as marginalizing the importance of discreetly teaching technology skills to new teachers; field experience alone is certainly not enough. If a field-based strategy is the only instructional mechanism employed to explore technology in teacher preparation, teachers may feel unprepared because of a lack of technical proficiencies (Hay, 2006).

Consistent with the analysis of numerous research studies on field experiences by Darling-Hammond (2006), preservice teachers who engage in field work are better able to understand theory, connect those theories to practice, and support positive student outcomes. In addition, field experiences have an important role in guiding preservice teachers toward being reflective practitioners. Varieties of designs exist for providing the field experiences for preservice teachers.

Another important aspect of field experience in teacher education is that it provides preservice teachers the chance to practice technology integration within realistic and relevant contexts with real learners in real classrooms. Technology-rich field experiences are needed to develop both preservice teachers’ understandings of, and positive attitudes about, digital learning. The knowledge emerges from teacher candidates’ experiences both contending with the affordances and constraints of the digital tools and considering the integration of the technologies within authentic experiences in school and classroom contexts (Harris & Hofer, 2011).

Additionally, preservice teachers must experience the positive effects technology has on teaching and learning. Again, technology-infused field experiences are mechanisms that can be employed to provide the opportunities to new teachers (Dawson & Dana, 2007). The advantage of a field-based approach to technology-integration preparation is that preservice teachers are able to design and deliver technology-based instruction in a
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Handson environment (Hay, 2006). If done correctly, this design affords preservice teachers the opportunity to analyze how the technology affects student learning.

Field experiences can provide preservice teachers the opportunities they need to experience technology integration, practice the strategies they are exploring in their teacher education courses, and develop positive beliefs about the use of technology for teaching and learning (Meagher, Özgün-Koca, & Edwards, 2011). If preservice teachers are given an opportunity early in their professional preparation to grapple with the typical barriers to technology integration that they might experience as a classroom teacher, they may be more prepared and likely to overcome the hurdles as they are encountered.

Combined, the statements regarding the importance of early field experiences reinforce the significance of giving preservice teachers opportunities to explore, and practice with, digital learning in relevant and authentic contexts. This is built upon the premise that instead of knowing how to simply operate technology, the focus should be on knowing how to flexibly incorporate technology into a specific content area (Dexter, Doering, & Riedel, 2006). The field experiences provide a venue where preservice teachers may improve their practice by knowing and experimenting with why certain concepts, tools, and technology resources facilitate their students' comprehension. Preservice teachers need to know why a technology resource may fit with one situation, and why it may not work for another.

RESEARCH METHODS

Context of the Study

This qualitative investigation, which is part of a larger mixed-methods study on the influence of early field experiences, focused specifically on the analysis of qualitative data provided by undergraduate preservice teachers (N=14) following the completion of a technology-rich early field experience in a preschool context. Recognizing the important role relevant field experiences play in the development of new teachers, the teacher education program in this study has incorporated a variety of early clinical opportunities for education majors. These include an early field experience for preservice teachers enrolled in the required educational psychology courses, and early field experience for elementary education majors enrolled in a children’s literature course. Additionally, students seeking the early childhood special
permissive competency complete an early field experience in a preschool classroom. In this particular state, elementary teaching licenses prepare preservice teachers for kindergarten through 8th grade. However, students have the option to pursue a more focused preparation in early childhood education. The option prepares students to teach in early childhood contexts, including the early primary grades and preschool classroom settings. The sequence of the courses often varies, meaning some students occasionally enroll in the early field experiences with little to no experience working one-on-one with children.

All the participating preservice teachers were enrolled in a foundational educational technology course. A central component of the required technology course was participation in required clinical experience so the preservice teachers could apply, in an authentic environment, the theories and strategies they had been exploring in the educational technology course. The field experience, called the Tech Club, was part of a joint venture between the university, local school districts, and a community organization that organizes the after-school programming within the district. The participating preservice teachers complete their Tech Club requirement in a variety of local elementary and middle school settings. Many complete their Tech Club requirement in a local after-school program, while others travel to one of the many small rural multigrade classroom schools in the surrounding area to deliver technology-rich instruction during the school day. Again, the intent is to provide diverse contexts in which they get practice teaching with technology.

In an effort to broaden the variety of the field experiences for the preservice teachers, a small group of students was given the opportunity to complete their work in the laboratory preschool located on the university campus. Rich qualitative data were collected over the course of two semesters, with six students participating in the first semester and eight students participating in the second semester.

Setting

Participants in this study completed their technology-rich early field experience at a laboratory preschool located on a university campus in the northwest United States. The preschool is accredited by both the state education department and the National Association for the Education of Young Children (NAEYC). The year-round program serves children 3 to 6 years of age and offers a playful learning curriculum.
Playful learning is defined in the school’s mission as learning through active investigations, discovery, and interactions with materials, peers, and adults. The mission of the laboratory preschool also includes a commitment to providing teaching, research, and service opportunities for the university community. Best teaching practices are modeled and supported among permanent staff, and student volunteers who are completing some component of their fieldwork. Students from a variety of majors and academic disciplines, including food and nutrition, marriage and family counseling, family and consumer sciences, elementary education, and early childhood education, complete field work at the laboratory preschool.

Guiding Framework: NAEYC Professional Preparation Standards

To frame the clinical experience for the elementary education preservice teachers, the NAEYC Professional Preparation Standards (2010) were used to guide the design of the early childhood Tech Club experience and to help shape the thinking of participating preservice teachers. Based on professional standards for early childhood teachers, it is recommended that educators should know, understand, and use effective strategies and tools for early education, including appropriate uses of technology.

To support emerging professionals, NAEYC encourages preservice teachers to engage in continuous collaborative learning to update their practice and to use technology effectively with young children, with peers, and as a professional resource. Effective and appropriate use includes the use of adaptive and assistive technologies in the classroom for children with special needs and the incorporation of a variety of media and tools, such as tablets, desktop computers, and digital cameras to document, assess, and collect data about learning and development of young children. In learning how to integrate technology in early childhood education, it is important to include the opportunity to apply knowledge and use developmentally appropriate teaching and learning with young children in a tech-rich preschool environment. The perspectives directly align with how the early childhood Tech Club experience was constructed.

NAEYC and the Fred Rogers Center for Early Learning and Children’s Media at Saint Vincent College (2012) shared guiding principles about integrating technology in early childhood education in a joint position paper intended for early childhood teachers. Their recommendations have implications for teacher education and could provide a strong foundational understanding of effective and developmentally appropriate use of technology.
with young learners. In the joint position paper, experts suggested that early childhood teachers provide opportunities for exploration and intentional use of a variety of classroom technologies to “accelerate learning and narrow the achievement gap between children from low-income families and their more affluent peers” (NAEYC and the Fred Rogers Center for Early Learning and Children’s Media at Saint Vincent College, 2012, p. 4). Further, young children need opportunities to develop technology-handling skills that are analogous to book-handling skills, but should not replace social interactions, play, and other developmentally appropriate learning opportunities throughout the early childhood classroom. Again, the recommendations were consciously incorporated when designing the early childhood Tech Club experiences. Participating preservice teachers were encouraged to integrate the principles in the design of their instruction.

**Participants**

The participants in this study were preservice teachers ($N=14$) enrolled in a required educational technology course. Over two semesters, data were collected from students participating in two different sections of the required educational technology course. Over 71% of respondents were female ($n=10$), and 19% were male ($n=4$). The preservice teachers who completed the early-childhood-focused early field experience were enrolled in a variety of education majors, including elementary ($n=8$), secondary ($n=4$), and K-12 Broadfield ($n=2$). In this state, students seeking licensure in areas such as family and consumer science or technology education receive a K-12 Broadfield teaching license. Importantly, several of the elementary education students ($n=3$) were also working toward the Early Childhood Special Permissive Competency Option for their teaching license.

**Preschool Tech Club Design**

During the first-semester field placement in the preschool, the participating preservice teachers planned a 3-week unit about the rainforest organized into three different learning and interest areas: (a) using technology, (b) making music, and (c) creating art. Each week the children engaged in one-on-one or small group discussions led by a preservice teacher. During this time, the preservice teachers focused their technology-rich instruction on the use of tablet computers to document the preschoolers’ projects with
both audio and video. During the second semester field placement, the participating preservice teachers engaged in a variety of teaching and learning experiences with the children, primarily using tablet computers to document children’s learning or to play educational games using various downloaded applications.

**Data Sources**

In this study, the phenomenon of preservice teachers’ understanding of teaching and learning were analyzed using a qualitative research approach. A characteristic of qualitative research involves exploring a problem and developing a detailed understanding of an unexplained phenomenon (Creswell, 2012). Further, a focus on discovery and understanding using collection of qualitative data that emerges from the preservice teachers’ immersion in the research setting are characteristic of qualitative research (Gay, Mills & Airasian, 2012). Two specific qualitative data sources were collected and analyzed for this investigation. The data sources included two key learning artifacts: preservice teachers’ reflective blog postings that were maintained during their time in the preschool Tech Club, and the transcriptions of the final reflection presentations given at the end of the semester.

Following each Tech Club visit, preservice teachers were required to compose a substantive reflection in which they responded to a series of prompts relevant to the clinical experience. These reflections were posted to a blog, and served as a key mechanism for sharing their experiences with course instructions. Prompts on the blog reflections related to what worked well with their technology-rich lesson, what presented challenges, and how they plan on addressing and remedying those challenges for their next Tech Club visit. In addition to the blog reflections composed following each Tech Club visit, preservice teachers were also required to build and submit a final presentation in which they shared a summative reflection about their clinical experiences as a whole. For the final presentations, preservice teachers built multimedia-based presentations in Prezi, and then used screen capture software to record themselves delivering the final presentation.

We began the data analysis process by coding the blog reflections and transcriptions of the final presentations. We then mined the resulting codes for patterns and resulting themes, using predetermined codes rooted in the structure and requirements for the reflective blog postings and final presentation. A dual coding approach was employed, and the researchers simultaneously reviewed both the reflective blogs as well the final presentations,
ensuring that each researcher reviewed each single data source. The essential themes that emerged from the process aligned directly with the prompts that participants were asked to respond to in both the reflective blog postings and in the final presentations. Specifically, following each Tech Club visit, participants were asked to share in their reflective blog postings, what worked, what did not work, and what they might change the next time they taught that particular lesson. For the final presentation, participants were asked to share the successes and challenges they faced in their Tech Club work and changes to, and confirmations of, beliefs they held previously about teaching. As a result of the framework, the following categories were used as an organizational scheme for the data analysis: (a) struggles, (b) successes, (c) confirmed teaching beliefs, and (d) changed teaching beliefs.

Trustworthiness

Several suggested procedures for establishing trustworthiness in qualitative inquiry have been taken into consideration and implemented during data collection and analysis, including internal reviews and triangulation of data sources (Cho & Trent, 2006; Gay, Mills, & Airasian, 2012; Lincoln & Guba, 1985). The purpose for seeking trustworthiness is to establish research credibility, transferability, dependability, and confirmability (Cho & Trent, 2006). A review of the codes and themes was conducted and exemplar selections were internally audited by the research team during analysis, and openly discussed for any issues of disagreement (Lincoln & Guba, 1985). Documenting the process and building a clear audit trail completed this check. Finally, the methodology accounted for the triangulation of multiple data sources for verification of findings. In this particular case, findings from the analysis of the reflective blog postings were compared to, and aligned with, findings from analysis of the final presentations. Combined, the checks provided an opportunity to verify specific outcomes of the participants’ experiences in a technology-rich early field experience.

FINDINGS

The following essential themes emerged during data analysis of the reflective blog postings and transcription of the final presentations: (a) struggles, (b) successes, (c) confirmed teaching beliefs, and (d) changed teaching beliefs. Again, the purpose of the reflective blog postings was to pro-
vide preservice teachers a mechanism for quick reflections and formative snapshots of their experiences during their time in the early childhood Tech Club. Contrary to this formative purpose, the intent of the final presentations was to provide a mechanism for summative rich reflection and critical thought resulting from the preservice teachers’ clinical experience in its entirety. Exemplar quotes selected from both the reflective blog postings and final presentations can be found in Table 1 and 2, respectively. Combined, these data sources provided us both formative and summative perceptions about the influence the Tech Club experience has had on preservice teachers’ perceptions of teaching and learning.

**Successes.** Preservice teachers anticipated good collaborative spirit and shared enthusiasm with their peers. Time set aside to observe and get acquainted with the children was appreciated, as the ability to change plans to accommodate children’s interest was identified as a success of the early childhood Tech Club experience. Preservice teachers were confident about their ability to provide age appropriate lessons to the preschoolers and reported that, at times, the lessons were so successful that they ran out of materials. Some preservice teachers measured success by how many children engaged in the lesson and how many children completed the task. When children shared and followed directions, the preservice teachers felt successful. Successes experienced by the preservice teachers were also manifested in the learning outcomes for the preschool students. The learning outcomes witnessed because of the preservice teachers’ technology integration included increased opportunities to practice collaboration, evidence of learner autonomy, and pivotal moments in the preschoolers’ understandings of the content and skills being addressed in the lesson. Finally, successes included a sense of relationship and rapport building with the preschool students.

Participating preservice teachers also noted the preschoolers’ use of technology as a key success encountered during the early childhood clinical experience. The children learned the technology skills quickly and could easily navigate among the icons and apps on the iPads. Not only were the preschoolers surprisingly adept at using the technology, but also in some cases, helped the participating preservice teachers troubleshoot the technology. In addition, participating preservice teachers reported students’ genuine engagement with the technology and overwhelming interest in the content and tasks-at-hand because of the integration.

**Challenges.** The preservice teachers shared that an anticipated challenge working with young children was classroom management. Students expected that the children might not follow the plan and might easily get off task amidst a lot of other classroom activity. A vast majority of participants
reported issues keeping the preschoolers engaged and focused on the learning and tasks-at-hand. Many participants reported that it was quite difficult at times both to gain the preschoolers’ attention and to keep them engaged. Some participants reported that it was because of their lack of understanding of early childhood development. However, preservice teachers did repeatedly comment in their final presentations that, as they got to know the preschoolers and understand their capabilities and interests better, it became much easier to engage them and keep them focused on the instruction.

Another primary subtheme to emerge about challenges was the difference in ability levels among the preschoolers. The discrepancy was present about both the content and the technology skills of the preschoolers. The participating preservice teachers shared that it was very exacting to contend with the diverse content and skill-related abilities among the students. For example, one group of preservice teachers planned a basic math lesson, only to learn quickly that only half of the preschoolers with whom they were working were capable of the subtraction skills needed, while the other half of the preschoolers were not able to complete the activity at all.

Lack of time and teacher support were also identified as challenges. Preservice teachers reportedly did not have enough time or materials to fully explore the technology with the children. Other participants reported that, at times, there was not enough communication between the preservice and preschool teachers. The lack of communication resulted in the teachers delivering a lesson earlier that the preservice teachers planned to implement themselves, leading to redundancy in the instruction during the day, and lack of interest on the part of the preschoolers.

Additionally, preservice teachers reported challenges regarding integrating technology. Some participants reported anxiety taking on the role of expert when they had previously used neither an iPad nor other learning technologies. Some participating preservice teachers indicated in their final presentations that there was a lack of the technology resources they needed to fully implement their instruction. The iPads were, at times, unavailable, not charged, or password protected, making access impossible. For example, one set of teachers planned on a rather elaborate and sophisticated learning documentation lesson where preschoolers would use the video and photo capabilities of a tablet to document their learning and student-produced artifacts in a unit on rainforests. However, there were only two mobile tablets available for the process, resulting in many preschoolers having to “wait in line” for the devices. In turn, this resulted in seeming off-task behavior. Some preservice teachers used this shortfall of devices to teach the preschoolers about sharing and equitable time with the devices. Chil-
children had to be reminded how to share, to wait patiently for a turn, and to be respectful of the students and their peers, which is closely connected to the challenges reported earlier regarding classroom management.

**Changed beliefs.** The most evident theme in the preservice teachers’ reflections was changed beliefs about teaching, learning, and technology. New understandings about how to use technology effectively with young children emerged because of the early childhood Tech Club experience. When asked what they would change if implementing their activities again, preservice teachers wrote about integrating technology into each activity and having a clear plan, with the option to be flexible. Many participants reported being surprised by the critical need for having a back-up plan when using technology. If the technology does not work or the content/skills intended to be addressed in the lesson are too challenging for the preschoolers, the preservice teachers recognized the value of having a second activity ready to go. Aligned with the need for a back-up plan, several preservice teachers indicated that they recognized the need to adapt to changing classroom conditions and learner needs.

Preservice teachers realized that getting to know the children by getting down on their level leads to more successful interaction. In other words, building on children’s interests and asking them questions can be motivating for learner engagement. Additionally, the participating preservice teachers learned that children enjoy doing the same activity more than once and show great variability in content knowledge and academic achievement. Preservice teachers also expanded their definition of a successful lesson by thinking about how being flexible and adapting to children’s interests can lead to more engagement and enjoyment by both teachers and learners.

Many preservice teachers also reported a new understanding about differentiating instruction. Some participants suggested that it was important to recognize the unique individualities of each learner and consider those when teaching. Other preservice teachers highlighted that some students need different types of support in order to succeed. This was complemented by the idea that technology can be used in a variety of ways; some reported that they were quite surprised by the different ways in which technology can be integrated into teaching and learning, even at such a young level, to work toward intended learning outcomes.

Finally, the preservice teachers reported having changed beliefs about how easy or challenging it is to work with young learners. They shared that their original conception before starting the early childhood field experience was that the younger learners would be easier to work with. However, after the experience, they realized there are considerable challenges unique to the early childhood context that they had not considered.
Confirmed beliefs. Participating preservice teachers shared a series of confirmed teaching beliefs following their completion of the early childhood Tech Club experience. Most often, these changed beliefs related to the age group of children they intend to teach some day. Many of the secondary level teachers reiterated that the clinical experience confirmed that they do not like teaching younger learners and want to teach high school instead. Other participants reported confirming that they liked teaching younger learners. Further, some shared, because of the early childhood field experience, they have decided to pursue the early childhood education option, a curricular choice focusing on early childhood education and child services.

Throughout the reflective blog postings, the preservice teachers reported confirmed beliefs about teaching. The beliefs included pedagogical aspects such as learner engagement, modeling, and differentiation. Preservice teachers expected the preschoolers to be off task and that they would need more open-ended activities to accommodate short attention spans. Preservice teachers confirmed the idea that young children are visual learners and that using visual cues with this age group is helpful. Further, the preservice teachers anticipated that modeling and demonstrating were strategies that could be used successfully with the preschoolers. Learner engagement and child-directed activities were expected to be motivating for the children. The early childhood Tech Club experience confirmed these beliefs about teaching.

Finally, participating preservice teachers recognized confirmed beliefs relating to both technology and pedagogy. Some participants shared they knew how important it was to use a child’s interest to make meaningful learning connections and this experience provided an opportunity to confirm this belief. Other participants reported that the experience has confirmed the critical role technology can play in supporting the learning process and that they have a better understanding of using technology across the grade levels.
Table 1
Sample of Exemplar Quotes from Preservice Teachers’ Reflective Blog Postings

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sample articulation from blog postings</th>
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<tbody>
<tr>
<td><strong>Successes</strong></td>
<td>We would ask the children to look for a variety of things: an item of a certain color, a shape, an animal, or something edible, etc. This was an awesome opportunity for the children to learn autonomously; they had the chance to show us what they know, take the picture, and sometimes decide what they wanted to find. By giving the children a little more freedom, they had more drive and were more excited to participate with us.</td>
</tr>
<tr>
<td><strong>Challenges</strong></td>
<td>One struggle I encountered was having too many children in the station at once, which was a bit difficult to manage. Because so many children required assistance with the project, it was hard for me to help each one before I started to lose their focus.</td>
</tr>
<tr>
<td><strong>Changed Teaching Beliefs</strong></td>
<td>What I have been thinking of doing differently is planning a fun music activity that takes five minutes or less to complete. I think this will help us to have more finished products, hold the kids’ interest, and provide time for them to play or use what we make from our activity, since that is a vital part of learning for this age group. It was a great experience and I learned a lot about having to be prepared [sic] and that is the thing I would have done differently in all of the meetings is being more prepared [sic] in case the students get done with an activity really early or none of the kids like the lesson that we were doing that certain day. Because of this experience, I have decided to pursue a minor in Early Childhood. I believe this experience was an incredible opportunity to work with young children while incorporating technology in ways I have never considered before.</td>
</tr>
<tr>
<td><strong>Confirmed Teaching Beliefs</strong></td>
<td>Preschool is very flexible in the way that you can have a lesson but kids might not follow it or want to participate at all and that’s okay because their learning does not need to be so structured yet. It is both exciting and rewarding working with young children. Their eagerness to learn at the preschool age is an incredible gift, and one that I feel blessed to be a part of!</td>
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Table 2
Sample of Exemplar Quotes from Preservice Teachers’ Final Presentations

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sample Articulation from final presentations</th>
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<tbody>
<tr>
<td><strong>Successes</strong></td>
<td>It was great to see how happy they were when they were trying to accomplish something, especially when they thought they did it well. Seeing their light bulb moment, or the moment they figured it out, was very empowering.</td>
</tr>
<tr>
<td></td>
<td>Getting the kids to stay focused on the task on hand was really hard every time we visited them. It was very easy for them to get sidetracked. Also, a few times we showed up, they had done some of the activities earlier in the day, so they weren’t interested in all at what we were doing.</td>
</tr>
<tr>
<td><strong>Changed Teaching Beliefs</strong></td>
<td>I now realize that I always need a back-up plan in the event our materials weren’t there or the technology was not working.</td>
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<tr>
<td><strong>Confirmed Teaching Beliefs</strong></td>
<td>Students are genuinely interested in learning if the teacher is excited. It is so important to build lessons for depth.</td>
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DISCUSSION

Analysis of the preservice teachers’ reflective blogs and final presentations revealed a series of recurring themes about the experiences in the early childhood Tech Club. Identified themes in artifact analysis were: (a) successes, (b) challenges, (c) changed teaching beliefs, and (d) confirmed teaching beliefs. The following section is used to outline the interpretation of those findings and includes a discussion on how the results align with current and past research on early field experiences in teacher education.

Successes and Challenges

According to the preservice teachers, and consistent with professional recommendations for technology use in early childhood settings, technology integration can include both teacher- and child-directed activities (NAEYC, 2010). The early childhood Tech Club provided an opportunity for preservice teachers to use technology with the children as a vehicle for documenting children’s learning. Both preservice teachers and the children used video and audio to record the processes and products of learning. Findings indicated that the preservice teachers felt they were most successful when learners were engaged and able to share their knowledge with peers, parents, and teachers. For example, one group of preservice teachers organized an end-of-the-year celebration where the preschool students presented their completed projects and resulting photo and video documentation, which brought closure and feelings of success to all involved.

Initially, preservice teachers defined success as the number of children they were able to engage and how many projects were completed. Analysis of the successes suggested that the instruction worked best for the preservice teachers when they brought excitement to the lesson and had clear lesson plans that built on children’s knowledge. While at first cautious about veering from their planned activities, the preservice teachers began to think creatively about ways to engage and extend the children’s learning by incorporating other parts of the preschool classroom, including adding art, literacy, and dramatic play to help children express their ideas. In many ways, this need to discreetly connect theory they are learning across all of their teacher education courses aligns with research indicating the need for preservice teachers to engage in field work in authentic and relevant contexts to support those connections between theory and practice (Kennedy & Archambault, 2012; Darling-Hammond, 2006).
Further reflection in the blogs and final presentations revealed a changed perception that success was also about building relationships, incorporating children’s interests, and being flexible while incorporating developmentally appropriate classroom management strategies to redirect challenging behavior. Results indicated that the preservice teachers recognized the importance of flexibility, often cited as a valued aspect of effective teaching, especially when integrating technology to support instruction (Kadjar & Parkes, 2012; Mishra & Koehler, 2006). This professional disposition is a key component of instruction in the accompanying educational technology course in which the field experience was embedded.

In terms of struggles, results indicated that learner engagement was particularly challenging. Many participants reported struggling to keep children’s attention during the activities. However, results also showed that preservice teachers were able to use technology successfully to engage those same children who were seemingly disengaged. Many of the engagement issues might be the result of unclear directions provided by the preservice teachers and lack of adequate time to complete each activity amidst the other activities taking place in the preschool classroom. The preservice teachers indicated that they felt the preschool students were unable to follow directions. However, ancillary and anecdotal analysis of the lesson plans generated for the lessons indicated that the procedures for the lessons might have been overly complicated. Further, the center-based approach to instruction in the preschool means that other instruction was happening simultaneously. For many participating preservice teachers, having competing instructional interests in a classroom was a novel challenge and one they might not yet have the skills to contend with. These findings further substantiate the potential positive influence of early field experiences as a vehicle for preservice teachers to contend with student engagement and motivation (Applegate, 1985).

**Changed and Confirmed Beliefs about Teaching**

Findings indicated that one of the key results of the study was that the early field experience could provide novice teachers confirmation of their chosen career path. The findings aligned with prior research on early field experiences (Bennie, 1982). Many participants confirmed that, although they appreciated the opportunity to work with younger learners, the experience had confirmed their desire to teach in a secondary setting. Other participants confirmed that they plan to teach in early childhood education
classrooms or in lower elementary grades. In fact, one preservice teacher decided to add an early childhood education option to the teaching license she is pursuing.

Additionally, results from the study indicated that given the appropriate context and opportunities to put their ideas into practice, preservice teachers recognized the important role of technology for any age in supporting teaching and learning. This is consistent with the expectations of the NAEYC Professional Preparation Standards (NAEYC, 2010) as well as the recommendations established by NAEYC and the Fred Rogers Center for Early Learning and Children’s Media at Saint Vincent College (2012). Although some participants were surprised by the technical ability of the preschool students, the preservice teachers were able to witness and participate in instructional successes in which the technology clearly provided the necessary support for the teaching and learning process. Finally, results indicated that the participating preservice teachers recognized how important it was to have a non-technology back-up plan, and the criticality of knowing students’ interests and aligning instruction with the interests to motivate and engage learners.

The Influence of Early Field Experiences

The design of the Tech Club, coupled with findings from the study, challenge the findings from earlier studies regarding early field experiences. Some researchers have argued that the value of the experiences is limited based on factors such as pressure on regular classroom teachers, competition for time, and lack of university involvement in early field experiences (Bennie, 1982; Goodman, 1985). Goodman (1985) suggested that the constraints leave students with little opportunity to reflect upon their teaching experiences or experiment with curriculum or instructional strategies. Other researchers have argued that the clinical experiences must be carefully coordinated and connected with campus courses to be effective (Zeichner, 2010). However, the design of the early childhood Tech Club circumvented the issues.

Although participating preservice teachers were instructed to consult with the preschool teachers and staff and develop lessons with discreet connections to the current preschool curriculum, preservice teachers were given much latitude in designing their own learning activities. Hence, time and curricular restraints did not overly influence student experiences. Secondly, reflection was a core component of the preservice for students to share
their experiences with the instructor via a private blog. Additionally, the reflections provided the foundation and content for the final presentations that students shared about their experience at the end of the semester. The strategies challenged earlier criticism of field experiences by providing the preservice teachers structured opportunities to reflect upon their teaching experiences. Finally, the clinical experience was tightly connected to the on-campus class. All instruction and preparation for the fieldwork was delivered through the educational technology course, further helping build those critical bridges between theory and practice (Darling-Hammond, 2006). Students continually discussed and reflected on their Tech Club experiences during class time, and worked toward those discreet connections between theory and application of that theory. Combined, these particular findings might be used to substantiate a framework that can be followed for teacher education programs considering technology-rich field experiences, especially those that might take place in early childhood contexts.

Early field experience might also provide opportunities for preservice teachers to practice instructional decision-making and reflective practice. Armaline and Hoover (1989) suggested that initial early field experiences are intended to “provide critique through the introduction of fundamental political, social, economic, and pedagogical lenses” (p. 46). Although the emphasis at this stage is not on specific and concrete pedagogical principles, questions such as “What worked?” and “What did not work?” are certainly important in terms of teaching and learning. In this study, preservice teachers had the opportunity to reflect and report on their successes and challenges, contributing to the idea that early field experiences can and do impact perceptions about teaching and learning.

Limitations

Several limitations constrained the study. First, a limitation of the research was that the results relied heavily on self-reported data potentially influenced by both participant and researcher biases. In the blog reflection and in the final presentations, preservice teachers were asked to reflect on a clinical experience that is, in part, a strong component of the culture of the teacher education setting. The value placed on the field experiences was made clear throughout the teacher education program. A possible drawback of the design is that participants could have been responding to the reflective blog postings and presentation prompts based on how they thought the researchers and teacher education program experts expected them to respond.
The systematic bias could have influenced the participant responses, thereby influencing validity. Further, it should be noted that we served not only as the primary researchers for the study, but also as instructors of the course. As a result, findings and interpretations might have been influenced by our personal biases and idiosyncrasies. As instructors in the course and providers of the scaffolding and support for the preservice teachers during the field experience, our influence on the preservice teachers might have shaped the way they reflected on the clinical work.

Similarly, the study was limited based on the interpretive nature of the data analysis. Although we have provided exemplar quotes aligned to the emergent themes in an effort to give others insight into the interpretation of the data, we realize multiple ways exist to explain the findings.

A final limitation of the study was the limited use of member checking as a manner of addressing trustworthiness. The critical role this strategy has in qualitative research, providing participants an opportunity to verify findings and interpretations that emerge (Cho & Trent, 2006), was recognized. However, we were bound by the typical semester structure. The preservice teachers submitted the artifacts at the end of the course and quickly departed for summer break, preventing us from thoroughly following up with them in a timely fashion to engage in a formal member checking process.

However, during the Tech Club field experiences, the researchers did consistently review the reflective blog postings and informally checked in with each participating teacher. During the informal check-ins, the preservice teachers were asked to share their early childhood Tech Club experience, and to reiterate the same ideas they were sharing in their reflection blogs. Although this did not follow a more rigorous structure for member checking, it did serve as an informal manner for the researchers to address this important strategy. Future research should ensure a more formalized member checking process.

**IMPLICATIONS**

**Implications for the Design of the Early Childhood Tech Club**

Teacher educators should provide rich clinical experiences for preservice teachers to connect theory with clinical practice. Further, a need exists to create learning opportunities where preservice teachers can “examine the role of content, pedagogy, and technologies” (AACTE, 2010, p. 19). The recommendations are well aligned with the rationale for why the Tech Club
was initiated, designed, and implemented. First, preservice teacher participation in the Tech Club requires the development and delivery of technology-based content enrichment activities. Preservice teachers are encouraged to work collaboratively to design and teach activities that connect to the curricula, and to encourage skills like problem-solving and critical thinking. The findings from the study indicated this was happening for the preservice teachers at some level. Secondly, the unique early childhood-focused field experience provides opportunities for the preservice teachers to connect the theoretical components explored in the educational technology class and other education courses with what they are experiencing in the Tech Club work (Meagher, Özgün-Koca, & Edwards, 2011). Although researchers need to learn about what the students gained in terms of actual technology integration practices, the data indicated that students are leaving the experience with more robust connections between the bigger pedagogical ideas explored in teacher education and clinical application. Third, students are placed into informal professional learning communities, encouraged to plan instruction collaboratively, and given numerous opportunities for reflection and the suggested critical peer mentoring. Finally, the design of the experience was rooted in the TPACK framework (Mishra & Koehler, 2006), with the intention to push the preservice teachers toward a new or better understanding of the interconnectedness of pedagogy, the content, and the technology they have selected for their activities.

Darling-Hammond (2006) shared a series of “pedagogical cornerstones” that she suggested be considered in the pursuit of more high-quality teacher preparation. Darling-Hammond (2006) stated there is a need for “tight coherence and integration among courses and between coursework and clinical work in schools that challenges traditional program organizations, staffing, and modes of operation” (p. 306). The Tech Club program and early field experience, as described in the study, tightly aligned the course work with the clinical work, providing preservice teachers a critical opportunity to study technology integration from within an authentic context. Similarly, Zeichner (2010) suggested the importance of aligned coursework and clinical experiences, stating, “A perennial problem in traditional college- and university-sponsored teacher education programs has been the lack of connection between campus-based, university-based teacher education courses and field experiences” (p. 91). Although more needs to be learned about what the preservice educators gained regarding actual technology integration practices, the findings indicated that students are leaving the experience with more robust connections between the bigger pedagogical ideas explored in early childhood education and clinical applica-
riage of those ideas. Additionally, results indicated that the early childhood Tech Club provided the opportunity for students to explore and strengthen their understanding of the critical concepts such as instructional planning, engagement, and differentiation, especially within the context of an early childhood environment.

Armalone and Hoover (1989) stated,

Education for critical reflection is a process by which students become aware of the perhaps unarticulated beliefs that have shaped their conception of teaching; it is a critical reflection in that those beliefs are subject to scrutiny and may be modified or replaced. (p. 42)

Field experiences are the mechanisms in teacher education that can be used to support the process of reflection. Considering the potential for the early field experiences to impact preservice teachers positively, as teacher educators, we might consider reorganizing the teacher preparation sequence and begin teacher preparation with meaningful and authentic field experiences instead of the typical theory and foundations content (Moore, 2003). Such reorganization might be used to better lay the groundwork needed to instill a sense of reflective practice and application more strongly tied to the theoretical content taught in the early coursework of teacher education programs.

Technology Integration within the Early Childhood Context

Young children encounter technology in a variety of ways and in a multitude of settings. Interactive and noninteractive media have become a daily experience for children, both at home and in early childhood education settings. Although recommendations for limited screen time and technology use persist, the prevailing notion is that technology can be meaningfully integrated into early childhood curriculum. Findings from the study supported this notion. Therefore, based on the study, two strategies are recommended to provide a meaningful technology-rich early field experience in an early childhood setting: (a) provide preservice teachers opportunities to learn and practice developmentally appropriate technology skills in meaningful and authentic contexts, and (b) provide high-quality technology integration instruction in teacher preparation programs.

Rosen and Jaruszewicz (2009) coined the term developmentally appropriate technology use (DATU) to describe ethical and responsible tech-
nology practice in early childhood education. Building on the concept of developmentally appropriate practice, based on theories about how young children develop and learn, DATU is used to incorporate important ideas about encouraging children to construct their own knowledge through interactions with their physical, social, and cultural environment. Using the DATU framework, early childhood teacher educators can (a) support preservice teachers’ technology literacy, (b) help preservice teachers understand the unique developmental and cultural characteristics of young learners in relation to technology use, (c) promote preservice teachers’ good decision making about access to technology, (d) teach preservice teachers to scaffold children’s learning with technology, and (e) encourage the use of technology to document and assess children’s emerging technology literacy (Rosen & Jaruszewicz, 2009, p. 167). The DATU framework is the result of teachers “integrating the multiple dimensions of their own knowledge base and pedagogy to develop and provide technology-rich instruction and resources for young children” (Rosen & Jaruszewicz, 2009, p. 164).

Application of DATU has important implications for teacher preparation programs. Although fieldwork was not discussed in the DATU model, teacher educators could model appropriate technology use in coursework, then provide many opportunities for preservice teachers to use technology in their fieldwork experiences to scaffold and document children’s learning, as demonstrated in this study. Thoughtful interactions with technology and scaffolded learning opportunities provided by highly qualified and well-prepared early childhood teachers supported children’s learning and development in the most meaningful and intentional ways. Further, technology tools “can support the ways educators measure and record development, document growth, plan activities, and share information with parents, families, and communities” (NAEYC, 2010, p. 8). Professional development, beginning in teacher education programs, can ensure that early childhood teachers have the ability to make informed decisions regarding what technologies to use, when to integrate technology into home and classroom use, and how to use the chosen tools with children and families. More specifically, preservice teachers can benefit from in-depth hands-on experience using technology in both their coursework and fieldwork experiences.

To bolster preservice teacher technology skills, teacher educators could integrate various technologies into coursework instruction and require completion of assignments using some of the tools and resources that were demonstrated in the study. In the study, preservice teachers were required to set up and post to a blog to reflect on early childhood Tech Club experiences and were required to present their final reflections using an online
presentation format, such as a screencast or Prezi presentation. Secondly, preservice teachers could apply their knowledge of child development in clinical experiences by developing technology-rich, age-appropriate lessons and activities. Making good choices about what technologies to use in lessons had much to do with access. Preservice teachers participating in the study thought creatively about how to use the limited preschool classroom resources and incorporated turn taking and sharing as goals of their instruction. Consistent with the DATU framework, the preservice teachers in the study scaffolded children’s learning by teaching safe and responsible use of the iPads and digital cameras, then encouraging the children to document and present their learning to their peers, teachers, and parents.

CONCLUSIONS

Results from the investigation indicated that preservice teachers are positively influenced by the early childhood-focused early field experience in the Tech Club, which included confirming existing beliefs, introducing new ideas about classroom practice, and inspiring valuable awareness of innovative uses of technology in early childhood education settings. The findings aligned with earlier literature and research, indicating early field experiences allow preservice teachers to develop a sense of purpose for teaching, acquire deeper understandings of the definition of good teaching, affirm career decisions, opportunity to assess motivation to teach, develop self-confidence, and gain an understanding of children (Bennie, 1992). Preservice teachers need these critical opportunities to practice with the technology in authentic teaching and learning contexts (Ertmer & Ottenbreit-Leftwich, 2010; Gronseth et al., 2010; Meagher, Ozgun-Koca, & Edwards, 2011). Further, technology-rich early field experiences, like the one outlined in the study, are used to provide the critical opportunities for preservice teachers to learn and practice how to teach children with technology and to develop their own understanding of technology integration (Dexter, Doering & Reidel, 2006).

By successfully guiding preservice teachers’ early exploration of technology integration, teacher educators will be presented with opportunities to more appropriately and effectively guide them in their understandings of how pedagogy, content, and technology interact, ultimately improving the teaching and learning process at all grade levels.
References


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