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From the Editor

Dear Readers of *The Field Experience Journal:*

This edition of *The Field Experience Journal* begins with a submission from Kelly A. Welsh and Connie Schaffer from the University of Nebraska at Omaha. Their article details how video can be utilized to aid in reflection by teacher candidates.

The University of Alabama's Stephanie Livers addresses "The Importance of Preparing University Supervisors for Coaching Elementary Mathematics", so that teacher candidates will not continue to carry with them traditional approaches. This is vital to encourage a climate of change.

Roya Scales of Western Carolina University and Debra Wellman of Rollins College examined the nuances in field experiences comparing and contrasting the variances in their article titled "Field Experiences Required in K-6 Teacher Preparation Programs: Similarities, Differences, and the Need for Common Terminology".

"Exploring School Counseling and Principal Candidate Internships: Observations of the Principal-Counselor Relationship" provides a look at how the internship for pre-service counselors and principals is a critical experience as they develop their professional ethos. This submission is provided by UCCS faculty Sylvia Mendez, Joseph Wehrman, and Rhonda Williams.

Catherine O'Callaghan and Jody Piro, in their article, "Virtual Simulations in a Practice Based Teacher Education" share how virtual simulations prior to clinical experiences may provide preparation for teacher candidates.

"Summer Institute Adds STEM Spin for Pre-Service Teachers' Alternative Field Experiences" from Lori Goodson of Kansas State University provides the reader with an account of this developmental experience for teacher candidates.

Finally, my thanks to those who have contributed their manuscripts for our consideration and to our reviewers for their time and expertise.

Kim L. Creasy

Improving Reflection:

Using Video to Improve Teacher Candidate Performance in the Field

Kelly A. Welsh and Connie Schaffer

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Abstract

Using video analysis allows teacher candidates to reflect more deeply and more purposefully on what they did in a classroom than if they just relied on memory. Using the theoretical construct of "noticing," a secondary teacher preparation program at a large public university implemented this pedagogical approach with undergraduates pursuing teacher certification. The use of video reflection was incorporated into four field experiences prior to clinical practice. Using video allowed candidates more opportunities for explicit noticing as opposed to memory-based reflection that is more generalized. Teacher candidates learn to pay closer attention to their own teaching. Faculty must be coordinated on the use of video analysis to insure candidates are held to the same standards and expectations throughout the teacher preparation program. More research needs to be conducted to determine the optimal number and length of videos.

Keywords: video analysis, reflection, teacher candidates, explicit noticing

Introduction

Teachers and pre-service teacher candidates have long been using reflection as a method of learning from their teaching. Because of the ubiquitous nature of video recording and sharing capabilities in today's society (Pew Research, 2013), video has the potential to shift the basis of teacher reflection from relying on what may be the less than reliable memory of people to more evidence-based recordings that can be rewound, replayed, and easily shared with others. Within teacher education, reflection based on video has the potential to increase teacher candidates' awareness of their own teaching.

The use of video to support reflection offers a potential and innovative means for teacher education programs to support clinical experiences, including those that occur prior to student teaching. This is an important consideration given continued calls throughout the profession to improve clinical experiences, the most recent of which was a collaborative effort of the National Teacher Fellows of the Hope Street Group, the United States Department of Education, and the American Association of Colleges for Teacher Education (Hope Street Group, 2016). This article describes the initial design and implementation of video facilitated reflection during the early field experiences of teacher candidates.

Literature Review

Teacher candidates have been using video for self-analysis since the early 1970s. While these early users of the technology often found the act of viewing themselves teaching was very stressful, there were several benefits that continue today (Fuller & Manning, 1973). Recent studies have found that teacher candidates find watching videos of themselves to be a valuable experience (Downey, 2008; Wu & Kao, 2008). There are three central benefits to using video-

facilitated reflection in teacher education programs: change of perspective, improvement of instruction, and improvement of classroom practices.

The first benefit is that teacher candidates are able to see themselves from an alternative perspective. They can see themselves as their students do and they can develop a new way of "seeing" what is happening in their classrooms. Sherin & van Es (2005) reported that when video reflection is used, changes "took place in *what* the teachers noticed and in *how* they interpreted those events (p. 476).

This explicit noticing takes place because the teacher candidate does not have to rely on memory alone for what happened during a teaching segment. Video provides access to classroom interactions that are not possible during the act of teaching itself. For example, video can allow the teacher candidate to shift from focusing on memory-based classroom management reflections to focusing on their instruction (Rosaen, Lundeburg, Cooper, Fritzen, & Terpstra, 2008; Tripp & Rich, 2012). By watching a video, teacher candidates are able to recognize their own instructional actions and the subsequent student reactions they may have missed when relying on memory alone. Rich & Hannafin (2009) found when teacher candidates engage in video self-analysis, they "(a) stepped back, (b) noted discrepancies between what they remembered and what they saw, and (c) adapted their teaching accordingly" (p. 140).

Written reflections based on video are more focused, more accurate, and more detailed than those from memory alone. Teacher candidates are able to make specific comments connected to the video. Viewing the video multiple times can lead to better clarification and more accurate analysis by the teacher candidate (Welsch & Devlin, 2007; Rosaen, et. al, 2008; Santagata & Angleici, 2010; Snoeyink, 2010; & Tripp & Rich, 2012). The final piece in developing perspective is for the teacher candidate to watch the video with a supervisor. The

video serves as a common form of evidence on which to base the discussions between the candidate and supervisor. The teacher candidate can learn from the perspective of the supervisor by observing what the supervisor notices (Tripp & Rich, 2012).

The second benefit of video self-analysis is improvement of instruction. For video to be most effective, Frederiksen, Sipusic, Sherin, and Wolf (1998) found the need to provide a common ground for reviewing lessons and discussing teaching and learning. By providing a clear framework to analyze video, teacher candidates can learn to pay attention to what is important by focusing on what they need to do to improve and identifying ways to make those improvements. There is also the potential for growth as candidates can use video to move past concentrating on personal idiosyncrasies to begin to draw their attention to student learning and teaching effectiveness (Knight, 2014; van Es & Sherin, 2002; Welsch & Devlin, 2007; Santagata & Angleici, 2010; Snoeyink, 2010). Welsch & Devlin (2007) reported teacher candidates "need to be prompted to think, respond, and act in new ways. . . . in essence, videotaping promotes self-improvement with feedback from multiple sources. Merging this tool with other strategies found to be useful in promoting reflection is likely to have the great potential for promoting higher-level reflection" (pp. 59-60).

The third benefit of using video is the opportunity it provides to improve teaching practices in the classroom, specifically the teacher candidate's "withitness." Snoeyink (2010) defines withitness as "continuously surveying the class, noticing the behavior of each individual student, being able to attend to two events simultaneously, and taking corrective action before any potential problem [gets] out of hand" (p. 101). As teacher candidates become more adept at noticing classroom management issues in videos, they are better able to notice students' behaviors in the classroom. They are also better able to notice when the PK-12 students are

engaged versus being compliant in the learning. The video reflections also help the teacher candidates become skilled at noticing classroom interactions, which may lead to them being better at reflecting in the moment and determining if they needed to take action or to ignore student behavior (Santagata & Angelici, 2010; Snoeynik, 2010).

Video analysis allows teacher candidates an opportunity to reflect more deeply and more purposefully on what they do in the classroom than if they just relied on their memory. Candidates can view the video with a specific purpose as they reflect on their own practice and their students' learning. By removing themselves from the demands of the classroom, they have the time to step back to examine the events in the classroom more closely.

Theoretical Framework

The implementation of video in the early field experiences within the program described in this article was framed within the theory of professional noticing (Mason, 2002). Professional noticing is defined as focused attention on specific moments or events in order to revisit and re-examine them. Professionals use this reconsideration of a past occurrence to inform future practice. While noticing may occur without prompting, it can be deliberately fostered and practiced (Mason, 2002). When teachers watch video recordings of their teaching, both *what* is noticed and *how* it is interpreted is important (van Es & Sherin, 2002).

According to van Es and Sherin (2002), using video to facilitate the process of noticing involves three components. First, teachers identify important elements within a classroom situation. While teaching a lesson, effective teachers orchestrate multiple and simultaneous actions, interactions, and situational variables impacting teaching and learning. As they manage and integrate these, they also notice which of these elements warrant increased attention and focus. This type of noticing is instantaneous and relentless during the act of teach a lesson.

Video allows teachers the opportunity to return to a lesson and notice important elements they may have overlooked during the actual teaching of the lesson. This may be particularly important for teacher candidates who have not mastered the ability to manage the simultaneous events within a classroom let alone have the metacognitive ability to notice what is or is not important.

Second, noticing incorporates contextual knowledge of an environment with the analysis of a situation. PK-12 students, content, and classroom environments vary. Understanding a specific context and using this to inform teaching and learning within a classroom or during a lesson is an important skill for teachers. Because noticing factors contextual information into teaching, it provides an opportunity for teachers to adapt their instruction based on knowledge of their students, environment, and content. As such, noticing is particularly salient to preparing teacher candidates to become culturally responsive practitioners who will be able to incorporate knowledge of diverse learners into their teaching and connect content to learners in relevant ways (Ladson-Billings, 1995).

Finally, noticing connects practice to theory. Effective teachers are able to connect "specific events to the broader principles of teaching and learning" (van Es & Sherin, 2002, p. 574). Noticing implies teachers not only describe isolated events within a lesson, they also analyze these based on pedagogical theory. In this process, teachers ground their practice on established principles of teaching and learning. Teacher education programs should "recognize practice alone does not make perfect, or even good, performance. Opportunities to connect practice to expert knowledge must be built into learning experiences for teachers" (Darling-Hammond, Hammerness, Grossman, Rust, & Shulman, 2005, p. 402). Noticing is one avenue for this to happen.

Description

The construct of noticing guided the design and implementation of using video within a secondary teacher education program at a large public university located in the Midwest region of the United States. Specifically, this pedagogical approach was implemented with undergraduate teacher candidates pursuing certification in language arts or social studies. The use of video was incorporated into each of four field experiences completed prior to their clinical practice experience.

Technology Resources & Administrative Support

Planning the technology resources and administrative support were part of the initial discussions regarding the use of video and involved staff from the program's technology office. Together, the program faculty and staff tried to anticipate and address the non-academic issues that might limit the potential impact of video. Teacher candidates recorded their teaching on touch-screen tablets provided by the teacher education program via a technology checkout system. Each tablet had the ability to compress video and allowed students to trim videos to the required size and length.

The program used a web-based assessment management system, which allowed for the secured uploading and storing of video. Recorded video segments were directly uploaded from the tablets into the assessment management system. Step-by-step recording and uploading instructions for teacher candidates were co-written by faculty and technology staff. To ensure privacy, when the tablets were returned or checked in, staff within the technology office erased the video files from the devices.

Within the assessment management system, faculty members viewed the videos and provided feedback by embedding annotated comments within the videos, making general

comments in a textbox, and/or using a rubric, which provided a numerical score as well as the ability to associate feedback to a specific element of a rubric. Teacher candidates could then review this feedback via the assessment management system.

Prior to the start of the field experience, program administrators worked with PK-12 school administrators to secure permission for candidates to videotape within their field experiences. The use of tablets owned and managed by the institution, rather than the personal devices of teacher candidates, and the secure storage of video addressed concerns related to the PK-12 student privacy.

Program Curriculum and Noticing

The use of video within field experiences was spiraled throughout the scope and sequence of the program curriculum. The program was sequenced into four blocks: (a) beginning; (b) intermediate; (c) advanced; (d) final. Each block included required course work and a co-requisite field experience. After successful completion of the final block, candidates were eligible for clinical practice.

Video was used in each of the blocks. In the beginning block, teacher candidates watched approximately two hours of synchronous video of master teachers in classrooms in PK-12 schools in the surrounding area. Candidates watched the videos in conjunction with the faculty member teaching their beginning block course and were taught general observational skills. This had been a long-standing practice within the program and the program's pedagogical innovation used this experience as a foundation to build the observational skills of teacher candidates that would be important for subsequent program requirements related to video.

The innovative use of video began in the intermediate block and continued through the final block. During these program blocks, teacher candidates were required to video themselves

during their field experiences and were guided through the three components of noticing. In each field experience, candidates submitted video of themselves teaching lessons as well as the corresponding lesson plans and reflections. The field experiences for each of the three blocks were completed in middle or high schools. Each candidate was matched by content areas to work with a specific classroom teacher throughout the entirety of the experience. Candidates were assigned to different schools and teachers for each of the three experiences.

The requirements of each block are summarized in Table 1.

Table 1
Video Requirements and Components of Noticing

Block	Length of Field Experience	Number of Videos	Components of Noticing
Intermediate	60 hours	2	Identifying what is important
Advanced	50 hours	3	Identifying what is important Incorporating contextual knowledge
Final	50 hours	4	Identifying what is important Incorporating contextual knowledge Connecting theory to practice

Identifying What Is Important

During the intermediate block, candidates recorded themselves teaching on two occasions. The first video recorded the candidates teaching a short (approximately 10 minute) lesson to their peers. Although this initial video requirement did not focus on the process of noticing, it did addressed an important element in the use of video. This initial recording allowed teacher candidates to become accustom to the technology processes of recording, compressing, and uploading their videos and gave them the opportunity to get used to seeing themselves on a video recording.

In the second video of the intermediate block, candidates recorded themselves teaching during the field experience and began the process of noticing. During the experience, teacher candidates collaboratively planned a lesson with their classroom teachers and recorded themselves teaching the lesson. Candidates submitted a 10-15 minute video segment of their choice along with the corresponding lesson plan and a written reflection. The reflection required them to identify what was important in the segment. Faculty viewed the submissions and provided feedback to the candidates. Faculty provided feedback regarding what candidates noticed and, when necessary, prompted candidates to notice other important elements.

Incorporating Contextual Knowledge

In the advanced block, candidates recorded themselves teaching three lessons during the field experience. Each video was approximately 15 minutes in length. While they again collaborated with their assigned classroom teacher to plan the lessons, they assumed more independence in the design and delivery of these lessons than they had during the previous block. As in the previous block, they submitted videos, lesson plans, and written reflections for each of the three lessons.

The advanced block course was focused on classroom management and instructional strategies and stressed the importance of teachers knowing their students and understanding their teaching environments. The required video reflections mirrored this focus and connected it to the second component of noticing. The reflections again required teacher candidates to identify what they saw as important but added a requirement to include a contextual analysis of the student, content, and environmental variables that impacted their teaching.

Connecting Theory to Practice

The third component of noticing, connecting general theories to specific events, was incorporated into the video requirements of the final block. The course in the final block centered on teaching strategies. During the course, candidates reviewed Marzano's research-based effective teaching practices (2003). Once in the field, candidates independently planned lessons with minimal collaboration with their assigned classroom teachers. Candidates recorded themselves four times and submitted video segments (15-20 minutes in length) with corresponding lesson plans and written reflections. The reflections required candidates to identify specifically how their teaching reflected Marzano's teacher factors of effective instruction. The Marzano factors included instructional strategies, classroom management, and curriculum design.

In addition to the four video reflections, the final block included a culminating project in which teacher candidates selected one of their four videos and expanded their analysis of the video segment. In this project, candidates were required to elaborate on each of the three components of noticing. Specifically, candidates were given a series of prompts to notice evidence of student learning (identifying what is important). Candidates were prompted to describe the student demographics and group personality of their classroom, what happened before and after the video segment, how this single lesson fit into the broader curriculum unit, and how these impacted teaching and learning (incorporating contextual knowledge). They were also asked to analyze their instructional design by connecting the strategies they used in the lesson to Marzano's research-based pedagogy related to effective teaching (connecting theory to practice).

Discussion

While the use of video to examine teaching has been used extensively with in-service teachers and during teacher candidates' culminating experience during clinical practice, it has not been intentionally and systematically woven into the early field experiences within teacher preparation programs. After two years of systematic implementation, the faculty have identified a number of opportunities and challenges related to the use of video within teacher preparation programs. Both the opportunities and challenges will be used to guide program improvement and present areas of research regarding teacher preparation.

Opportunities

Using video allows teacher candidates to go beyond a classroom experience to actually learning from the experience by having evidence that provides opportunities for explicit noticing. Memory-based reflection appears to lead to more generalized, classroom management reflection while the video helps the teacher candidates to write more specific comments about their teaching and student learning. For example, one student noted in her reflection that she "did notice that [she] had the students move to their stations before [she] gave them the directions for filling out the sheet. What [she] should have done was have students wait at their desk, give the directions and then have them move. This would have eliminated some of the problems [she] had regaining their attention and it would have allowed [her] to know who was paying attention and who wasn't." Video lets candidates replay what happens in the classroom and find what may have been missed the first time or forgotten if left to memory. Another student reflected, "After watching the video, it was obvious that the students started the lesson with a little hesitation. It took some prodding from [him] and [his] mentor teacher to get our students going.

After talking to [his] academic coach, [they] agreed that this was because [he] needs to work on [his] modeling to the students."

Teacher candidates also learn to pay attention to more than their own teaching. They seemed make connections between specific classroom interactions and pedagogical theory. A third candidate identified a strength be "my 'withitness' and personal voice control. [He] connects with the kids fairly easily and uses techniques like learning their names right off the bat and making personal connections to aid in [his] classroom management and to help spark their engagement. [He] moved around the room as much as [he] could during the presentation and would get up and check on them during the writing process." With video analysis required with each field experience, faculty feel the teacher education program has increased coherency throughout its curriculum adding to the teacher candidates' improvement and growth. A methods faculty member noted, "Candidates come into [her] final block knowing how to use video to guide their reflection and their development as teachers. Both the students and [she] can refer back to recordings from previous blocks and know what has already been mastered and what other skills need to be addressed before they move into clinical practice."

The use of video required a number of conversations between faculty members and the technology staff as well as program and district administrators. In both incidences, there was an increased understanding of how these groups might work in partnership to improve the experiences of teacher candidates. In many cases, the conversations related to the technical aspects of devices, software, and securing privacy began by a detailed explanation of what was required by teacher candidates and why it was required. This prompted the technology office to consider other ways to support teaching candidates and faculty. The discussions also gave PK-12 districts an opportunity to clarify how they could support the teacher education program as

well as their own classroom teachers who worked with the teacher candidates during their field experiences.

Challenges

Using video for teaching reflection and analysis presents many challenges. Using the video to assess and provide feedback by the field supervisor and/or instructor requires time and causes delays. For example, in the final block, a faculty member with 18 teacher candidates had approximately 20 hours of submitted video to watch and estimated the total amount of time to watch the videos and provide feedback exceeded 35 hours.

The challenge of the amount of time it takes to watch the videos is exacerbated by the timeframe in which the video must be watched and feedback provided. From the time the teacher candidate records the lesson, uploads the video to the appropriate place for sharing, and a faculty member views the video, a week or more may have passed. When compared to a live observation when feedback can be immediate, the delay may be detrimental to the teaching experience.

Reducing the number of required videos or the length of the video submissions may address the above challenges; however, program faculty posed a number of questions related to this. Does a ten-minute video provide better analysis than a twenty-minute video? How many videos are required in order to fully assess the knowledge and skills of a teacher candidate?

Despite proactive planning, there were still challenges related to the technology resources and administrative support. These included the number of available devices for checkout. Candidates who did not plan ahead, were not always able to check out a device on the exact date and time they wanted to do so. As a result, some candidates may have resorted to using their own device, and the program had no way to make certain candidates did not do this. Although

this was not a widespread problem, when and if it occurred it had the potential to breach the trust established between the program and the PK-12 schools.

Teacher candidates' confidence related to video technology varied. For some candidates who lacked confidence or had limited experience with recording and uploading video, their concerns regarding technical aspects of the process competed with their focus on teaching their lessons. Finally, there must be a coordinated effort on the part of the faculty to insure fidelity of the analysis of video. Teacher candidates will grow and learn if they are held to the same standards and expectations throughout their teacher preparation program when the faculty commit to the benefits of video analysis.

Conclusion

If teacher education departments are developing a sequence of video facilitated reflection within their programs, the approach described here will be informative. However, programs will have to answer questions unique to their context. What equipment are teacher candidates going to use to record their lessons? Where will videos be stored? What protection is there for PK-12 students who may appear in the videos? Who has access to the videos? How will permission be granted and how will trust by maintained with PK-12 partners? Answers related to these resources and relationships issues are best resolved within specific settings.

This is not to discount the considerable need for research contributions to inform practices. Although the program featured in this article had anecdotal evidence of the impact of video facilitated reflection, research is needed to determine if video facilitated reflection yields candidate growth similar or different than the growth resulting from other types of reflection.

Given the time required to watch videos, research is needed to determine the optimal number and length of videos. Determining the point of diminishing returns will be important to

preserve faculty resources for other important matters. This is also important information as programs select the technical resources needed to support video facilitated reflection.

Finally, the preliminary findings of this program should be confirmed and other methods to frame video facilitated reflection should be explored. Based on the initial implementation within the program described here, explicit noticing seems to be a critical for teacher candidates; if they do not notice, they may not improve.

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The Importance of Preparing

University Supervisors for Coaching Elementary Mathematics

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Teacher candidates enter elementary teacher preparation programs with grounded beliefs about teaching and learning. These long-held beliefs can be especially problematic in the area of mathematics education, where they are known to hinder instructional decisions (Karp 1988, 1991; Kolstad & Hughes, 1994; Pajaras, 1992, Wilkins, 2002) and encourage the maintenance of a traditional approach for the teaching of mathematics (Beswick, 2006; Wilkins, 2002). Teacher education programs must address these beliefs in order to create a climate for change.

As accountability for teacher preparation institutions increases and requires proof of effectiveness, all aspects of the program have to be evaluated and supported (Data Quality Campaign, 2010). Elementary student test scores in mathematics will be linked directly to their teachers and then back to the teacher preparation program (Data Quality Campaign, 2010). The integrity of a program is based on the consistency and effective implementation of the expectations. This means that teacher preparation programs are responsible for all faculty providing support and education for the teacher candidates. A critical influence on teacher candidates is the university supervisor assigned to their field placement site. The supervisor provides the connection between theory and practice during the critical time just prior to and during student teaching (Grossman et al., 2008). Therefore, the performance of the university supervisors who are expected to bridge both worlds – the theoretical course work and the practice in the clinical placement is especially significant.

The purpose of this study was to analyze the impact of providing professional development to university supervisors on both coaching strategies and effective mathematics pedagogy on the university supervisors' supervision and on teacher candidates' beliefs about mathematics and their instructional practice. This programmatic change was made on the belief that university supervisors must be provided with the necessary professional development in order to prevent the disconnect that is possible with that role - between the philosophy of the teacher education program and the reality of the field placement particularly in regard to teaching elementary mathematics.

Literature Review

University Supervisors

"The quality of clinical experience depends heavily on the kind of coaching, supervision, and support prospective teachers receive as they develop their practice" (Grossman, 2010, p.5)**.** University supervisors provide a necessary role within teacher education programs: their supervision of teacher candidates is vital to the success of the program and the candidates (Albasheer et al., 2008). The university supervisors are the link that provides the communication between the university and the field placement schools. As communication increases between these two stakeholders the gap between theory and practice shrinks for teacher candidates (Ngoepe& Phoshoko, 2014; Zeichner 2002). Many studies have identified university supervisors as critical players in the education and development of teacher candidates (Blanton, Berenson & Norwood, 2001; Freidus, 2002; Frykholm, 1998; LaBoskey & Richert, 2002; Smith & Souviney, 1997), and well worth the cost to fund this expensive part of teacher preparation (Abernathy, Beck, & Taylor, 2014).

University supervisors who engage their teacher candidates in conversation using questioning strategies targeted at the candidate's "zone of proximal development (ZPD)" provide the necessary support to impact the learning and growth of the teacher candidate (Blanton, et al., 2001). This behavior has been labeled as "educative supervision" (Blanton, et al., 2001) and has been noted as a successful model that fosters a reflective teaching practice that allows the teacher candidates to grow and internalize concepts (Blanton, et al., 2001; Fernandez & Erbilgin, 2009; Long, van Es, & Black, 2013). This role identifies the university supervisor as an instructional coach in contrast to the evaluator in the supervisory model (Anderson & Radencich, 2001). By being "mediators of action" university supervisors can provide the opportunity for teacher candidates to think about their thinking (Wertsch, 1998), and providing them with opportunities to converse about their development and growth (Fernandez & Erbilgin, 2009). By mediating the thought processes of teacher candidates, internalization can take place and teacher candidates can grow into effective teachers (Wertsch, 1998).

Few studies have examined the roles of university supervisors in the content area of mathematics (Fernandez & Erbilgin, 2009). It is critical that university supervisors who work in the content area of mathematics have beliefs, expectations, content knowledge and pedagogy congruent with the current reform standards and expectations in mathematics (Slick, 1998). Fernandez & Erbilgin (2009) found that university supervisors spent more time conferring about the content of mathematics and the teaching of mathematics in comparison to cooperating teachers. This makes the university supervisor a key player in the internalization of standards based mathematics instruction among teacher candidates. University supervisors need to have an expertise in mathematics content and pedagogy in order to provide effective support (McDuffie, 2004; Fernandez & Erbilgin, 2009). McDuffie (2004) found that university supervisors must use

teacher candidates' beliefs and experiences as the "context for learning" mathematics (p.55). Intentional planning of conferences by the university supervisors is crucial to the growth and development of teacher candidates in the teaching of mathematics (McDuffie, 2004). University supervisors must foster a reflective practice with the teacher candidates in order for them to have an awareness of their thoughts and beliefs (McDuffie, 2004.)

Teacher Candidates Beliefs

Teacher candidates' beliefs and attitudes have been studied extensively and influence the instructional decisions that teachers make in their classroom (Beswick, 2006; Karp 1988; Pajares, 1992). The teaching of mathematics is a complex endeavor that is influenced by three elements: the teacher's system of beliefs, the social context, and the teacher's level of thinking and reflection (Ernest, 1989). Ideas about what it means to teach are embedded in the minds of students after spending thirteen years going to school (Kagan, 1992; Nosich, 2009; Stuart & Thurlow, 2000). In *Beliefs and Attitudes in Mathematics Education*, Maaβ and Schlöglmann (2009) stated, "These beliefs can be a barrier to developing new teaching competencies – we should therefore find out more about these beliefs (p. ix)." This experience was labeled as "the apprenticeship of observation" by Lortie (1975). The experience of being a student is connected to the beliefs that one holds about the role of the teacher and how to teach. The longer the belief is held the more difficult it is to change (Pajares, 1992), so beliefs that begin in second grade are deeply rooted. Teacher candidates that experience anxiety with mathematics often have negative beliefs about mathematics (Swars, Daane, & Gliesen, 2006). These negative beliefs lead to traditional, less engaging teaching, and lower student achievement (Kolstad & Hughes, 1994).

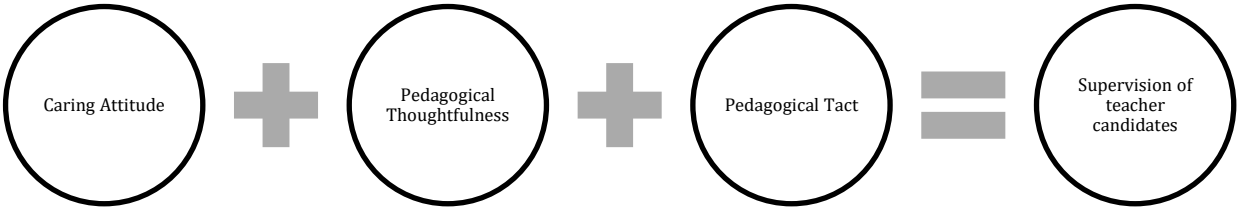
Nosich (2009) labels these attitudes and beliefs as background stories and concludes that they are almost impossible to alter. These background stories are the reason why teachers tend to

teach mathematics the way that they were taught (which is likely to be a traditional teacher directed approach). These background stories need to be explicitly challenged and checked in order for learning to truly take place. Teacher candidates must bring their beliefs to a "conscious level" in order to analyze and challenge them; without this consciousness traditional teaching practices will continue to be the norm (Stuart & Thurlow, 2000).

Theoretical Framework

The theoretical framework for this study is Cuenca's (2010) framework for university supervisors. Cuenca (2010) outlined a conceptual framework for university supervisors: caring attitude, pedagogical thoughtfulness, and pedagogical tact in the supervision of teacher candidates as displayed in Figure 1.

Figure 1
Conceptual Framework for University Supervisors



Caring attitudes provide security in the relationship between the teacher candidate and the university supervisor. It allows the university supervisor to remain "sensitive and receptive" to the problems and issues of teacher candidates. Caring attitudes provide a "pedagogical eros" or love. Pedagogical thoughtfulness fosters a reflective practice. It allows the university supervisor to highlight the elements of student teaching that allow the teacher candidate to grow. Pedagogical tact allows the university supervisor to help the teacher candidate understand the "meaning" behind their actions. The university supervisor must have patience and look for

opportunities to connect theory and practice. This framework paints a picture much like that of a coach.

Methodology

Participants and Setting

The setting for this study was a College of Education at a large mid-western public, urban research university. The college defines itself as having an urban mission and is dedicated to enhancing the intellectual, cultural, and economic development of diverse communities. The college ranks within the *US News and World Report's* Top 75 best graduate schools in education. This site was chosen because it is the largest teacher-training institution in the region; it is dedicated to the local public school districts, and it is recognized nationally for its involvement in teaching, learning, service, and research.

This college has full time staff dedicated to field placement and clinical practice. The office of clinical practice annually makes approximately 2,500 placements of teacher candidates in preK-12 partnership schools aligned with the college's mission and conceptual framework. Teacher candidates are required to spend one half day per week in their school placement for each methods course in which they are enrolled. Teacher candidates are commonly placed in fifteen surrounding districts in order to give candidates experiences that rotate within urban, suburban, and rural settings. All placement schools have an assigned university supervisor to provide on-site support to teacher candidates during their methods semester and during their student teaching experience. Typically university supervisors are retired teachers from the area. They are supported with routine meetings to assist with paper work and procedures. They haven't been required to attend professional development for over ten years.

The sample for this study consisted of both university supervisors and teacher candidates. In order to evaluate the impact of the professional development on the university supervisors and teacher candidates, data had to be collected prior to this professional development (baseline). Three elementary university supervisors were selected based on their years of experience with the program as the baseline sample. There were thirty-one teacher candidates taking either the undergraduate or MAT version of Elementary Mathematics Methods and seventy-seven students in the student teaching phase of the elementary teaching programs. This ensured the largest sample size possible for this setting. Table 1. Provides a synopsis of the sample for the baseline data.

Table 1
Baseline Sample

	Elementary University Supervisors	Students enrolled in Elem. Math Methods	Elementary BS Student Teachers	Elementary MAT Student Teachers
Total Numbers	10	31	59	18
Number participating	3	11	0	7

All eleven elementary university supervisors were included in the professional development and the study that followed the baseline collection. They all had more than 11 years of teaching experience and were all female. Mathematics was chosen as the topic of interest as the elementary supervisors had a greater disparity in evaluating teacher candidate performance in mathematics lessons as compared with the methods instructors, meaning that they evaluated lessons high that methods instructors scored low. Additionally, most supervisors self-described their expertise as teaching reading.

There was a slight difference in the total number of students registered compared to the previous semester due to the course rotation at the university. Also, the university supervisors did not include data on their undergraduate (BS) student teachers. The sample for the study is provided in Table 2.

Table 2

Study Sample

	Elementary University Supervisors	Students enrolled in Elem. Math Methods	Elementary BS Student Teachers	Elementary MAT Student Teachers
Total Numbers	11	78	41	10
Number participating	11	78	0	4

Research Questions

This mixed-methods study was designed to answer the following two questions: What are the effects of professional development for university supervisors in mathematics pedagogy and coaching practices on their observation of mathematics lessons taught by elementary teacher candidates? What are the effects of professional development for university supervisors in mathematics education and coaching practices on elementary teacher candidates' beliefs and their instruction in mathematics?

Research Design

A mixed methods design was chosen for this study to capture the relationship and interactions between the university supervisors and the teacher candidates. Using both quantitative and qualitative data is important in the examination of research questions because it

allows the researcher "to draw from the strengths and minimize the weaknesses of both" the qualitative and quantitative data (Johnson & Onwuegbuzie, 2004).

Quantitative Data. The research design for the quantitative data is shown below. The NR represents a non-random sample. The O represents the measure, and the X represents the treatment. This quantitative data will be used to test the hypotheses that the treatment of professional development will impact the university supervisors' instructional support and thereby the teacher candidates' beliefs and teaching practices.

N R: O_1 X O_2

The pre-test represented by O_1 is the Mathematics Beliefs Instrument (MBI) and the background information. This was administered and collected prior to the treatment. After the treatment, quantitative data represented with O_2 was taken from observations by the university supervisors and the researcher using the Reformed Teaching Observation Protocol (RTOP) instrument of teacher candidates teaching mathematics, coded data from observations of university supervisors conferring with teacher candidates, coded data from interviews, and the MBI administered as a post test (see Table 3).

Table 3

Pre and Post Data

Subject	Pre-Treatment Data	Post Treatment Data
University Supervisor	MBI Background information	Observations of conferring Interviews MBI
Teacher Candidates	MBI Background Information	Observations of Teaching Interviews MBI

Qualitative Data. Qualitative data are the source of well-grounded, rich descriptions and explanations of processes in identifiable local contexts. With qualitative data one can preserve chronological flow, see precisely which events led to which consequences and derive fruitful explanations" (Miles & Huberman, 1994, p. 1). In order to explain the relationship between the university supervisor and the teacher candidates and to triangulate the quantitative data, qualitative data are necessary in describing the experience. The qualitative data for this study includes both interviews and observations. These data was collected from both the university supervisors and the teacher candidates.

To triangulate the quantitative data, interviews (semi-formal), observations of the teacher candidates teaching mathematics, and observations of the university supervisors' conferencing with teacher candidates using the RTOP were employed to understand the influence of university supervisor professional development (treatment) on teacher candidates' beliefs, attitudes and practices related to mathematics instruction.

This study utilized a quasi-experimental design (Shadish, Cook, & Campbell, 2002). The dependent variable was identified as teacher candidates' attitudes and beliefs. Professional development for the university supervisors was defined as the independent variable or treatment. Professional development provided to the university supervisors included coaching practices infused with research and pedagogy on reform-based mathematics instruction and the components and use of the RTOP (2000).

To ensure that the research questions were answered, both quantitative and qualitative data were collected from different sources as shown in Table 4.

Table 4
Research Questions and Data

Research Question	Type of Data	Instrument
What are the effects of training university supervisors in mathematics pedagogy and coaching practices on their supervision practices in observing mathematics lessons of teacher candidates?	Quantitative Qualitative Qualitative	RTOP Observations of university supervisors conferring Interviews with university supervisors and teacher candidates
What are the effects of training university supervisors in mathematics education coaching practices on teacher candidates' beliefs and instruction in mathematics?	Quantitative Qualitative/ Quantitative Qualitative	MBI Observations of teacher candidates (RTOP) Interviews with university supervisors and teacher candidates

Procedures for Data Collection

*A*ll university supervisors participated in a series of professional development sessions. All teacher candidates (BS and MAT) taking elementary mathematics methods and student teaching were invited to participate. University supervisors were administered the MBI and background information questionnaire prior to the professional development. If the university supervisors participated in the baseline collection, their previous data were used. Teacher candidates were given the MBI and background information questionnaire during the first class meeting of mathematics methods and/or their student teaching capstone course or orientation meeting. Scheduling the observations was set in collaboration with the university supervisors' schedules. The researcher collected observation data from the university supervisors' conferences with teacher candidates on a t-chart observation form that included both

observations and reflections. In addition, both the university supervisors and the researcher simultaneously used the RTOP to assess the candidate's mathematics teaching episode. The university supervisors set goals for their coaching of the teacher candidates' teaching of mathematics. Observation notes and reflection forms were collected during the two follow-up meetings. Reflection forms included the university supervisors' reflections about the professional development. Observations and reflection forms were transcribed and coded for analysis. Data from the RTOP instrument were coded for analysis. At the close of the semester, semi-structured interviews were conducted with both the university supervisors and a random sampling of teacher candidates. These interviews were recorded, transcribed, and coded for analysis.

Description of the Professional Development (Treatment)

As part of this study, the university supervisors were given two options of dates to attend the professional development sessions. The design for the professional development was chosen based on the literature regarding best practices for professional development and data from phase one of this study. According to Obara (2010), professional development should include topics of curriculum and content knowledge, so the professional development included the pedagogy connected to high quality mathematics instruction at the elementary grades. The professional development also included support with the effective skills and methods of a coach (Gordon & Brobeck, 2010) which included: questioning strategies, observation approaches, documentation, conferencing, and relationship building. Supervisors were trained in the use of the RTOP by reviewing the instrument, watching a video of an exemplary elementary mathematics teaching episode, and by assigning ratings to the observed teaching. Then university supervisors debriefed and shared their results. They asked clarifying questions, and examples of descriptors were given.

To begin the professional development, two common coaching strategies were selected as the main focus: paraphrasing and questioning as they are universal strategies of many coaching models (Costa & Garmston, 2002; NBPTS, 2008; Sherris, 2010; Staub, West, & Bickle, 2003). Techniques for coaching using these two strategies were presented, modeled, and practiced. The expectation was that supervisors would paraphrase after each time the teacher candidate speaks and before asking a question. Four types of questions were shared in the professional development: open-ended, mediating, probing and closed questions. In addition to the coaching strategies, the professional development included best practices in teaching elementary mathematics. Expectations for instruction provided by the National Council of Teachers of Mathematics and the elements of instruction identified in the RTOP (Piburn & Swanda, 2000) were the key components of the mathematics portion of the training (all aligned with the Common Core Standards in Mathematics (CCSSO, 2010). At the end of the professional development, the university supervisors set one or two professional goals to focus on during the semester to establish a commitment to meeting their own personal objectives and professional growth.

A scheduled follow-up session was held at the midpoint of the semester. During this time, coaching strategies were reviewed and modeled. The university supervisors also revisited the goals that were set at the beginning of the semester. Questions were also addressed in a review of the RTOP. University supervisors were also provided with an article on coaching that pertained to one of the focal coaching strategies - questioning.

Data Analysis

The pre-post data were analyzed using descriptive statistics and graphs to determine the shape and spread of the data. Data points were categorized as outliers if they were more than two

standard deviations away from the mean. The relationship between teacher candidates' beliefs and their university supervisor and methods instructor were analyzed. These variables were used to explain any differences found in the paired samples t-test analysis between the pre and post test data. Paired samples t-tests are generally used when subjects are tested twice in a pre-post design. A sample size of 33 is needed for a medium effect size at an alpha of 0.05 and a power of 80%. The significance level was established at $p < .05$ prior to significance testing, however Bonferroni correction had to be made due to the number of tests being ran setting an alpha of 0.02.

The analysis of the qualitative data was on-going during the data collection process due to its interactive, cyclical nature of qualitative data analysis (Miles & Huberman, 1994). The data from the background information were analyzed upon receipt to provide an initial understanding of the university supervisors and teacher candidate's background and experience; this provided a lens for the analysis and a starting point for identifying themes.

Interviews were recorded and transcribed. After transcription they were analyzed and coded. A folder system was used to house the field notes and contain the summary sheets and document summaries. An Excel spreadsheet detailed the key elements of the folders and summarized the contents; this was used as a form of indexing and for maintaining a table of contents.

The coding of the data was done after an observation session or interview. Data were coded using descriptive, explanatory, and interpretive codes. The *reflective analysis* process requires continual examination of the data (Gall, et al., 2005). A "start list" of codes was established a priori based on the literature review; this list was not an exhaustive list and codes were added or removed based on the qualitative data collected (Miles & Huberman, 1994) in

addition to the *reflective analysis* process. These steps aided in the review and analysis of the qualitative data.

Results and Discussion

Research Question One. What are the effects of training university supervisors in mathematics pedagogy and coaching practices on their supervision practices in observing mathematics lessons of teacher candidates?

The university supervisors experienced some slight changes in their beliefs and practices due to the professional development. According to the pre-post assessment data from the Mathematics Beliefs Instrument, beliefs about curriculum and learning changed toward a more constructivist view, but they did not make a significant change.. The results of the analysis are presented in Table 5.

Table 5

MBI Pre-Post Comparison for the University Supervisors

Construct	N	Pre MBI Mean	Pre MBI SD	Post MBI Mean	Post MBI SD	t score	p-value
Curriculum	11	1.77	.14	1.77	.15	-.15	.88
Learning	11	3.36	.40	3.40	.35	-.53	.61
Efficacy	11	2.91	.89	2.82	.93	.80	.44

This pre-post belief data were important to understand the beliefs about mathematics held by the university supervisors. When analyzing the MBI by individual questions, six university supervisors went from agreeing to the statement that mathematics can be right or wrong to only four believing that at the end of the semester. Two university supervisors changed

their belief about having K-5 students justify their thinking in a single way to a more constructivist view of having students justify in a variety of ways. One supervisor changed her thinking about problem solving being a distinct part of the curriculum to a more integrated view of problem solving.

Overall the practice of the supervisors changed. One supervisor summed it up by stating:

> It was affirming. It held me accountable and I was forced to change some of my habits. And unfortunately if we (university supervisors) aren't held to be accountable in some way, we just keep on doing the same thing because it's comfortable. And it's been interesting for me to hear the other supervisors' discussions of their practices and that's been extremely helpful as well.

According to interviews and observations with the university supervisors the way they led post-conferences with student teachers changed with the addition of paraphrasing and using mediating questions. Another university supervisor shared she will never go back to the old approach she used. She also stated:

> I feel that that out of all the training that I've had in a long time, this has been one of the most valuable that I could possibly have, and I'll have to keep revisiting it (the materials and ideas). So, it's really had a big impact on the help not just with the university students that I work with, but with the teachers I also work with.

The university supervisors' expectations for teacher candidates' mathematics lessons changed as a result of the RTOP training. A university supervisor found that the RTOP made her "more aware of the expectations for mathematics teaching." She said that she learned that the "teacher candidates should be using manipulatives;" She did not know that it was an expectation of methods that the teaching should be interactive. She also realized they should engage the students prior to teaching, and that there should be a beginning, middle, and end. She became more cognizant of what a mathematics lesson should include and "found the specifics (of the RTOP) very helpful."

All teacher candidates enrolled in elementary mathematics methods were assessed teaching mathematics to elementary students (grades K-5) in their field placements by their university supervisor using the RTOP. The RTOP is an observation tool used to assess reformed or standards based mathematics (and science) lessons. Observers rate twenty-five elements on a scale from 0 to 4. The highest possible score is 100; 50 or higher represents reformed-based teaching.

Each of the eleven supervisors was observed twice to test for accuracy and fidelity in the use of the instrument after receiving professional development; the researcher and the university supervisor observed and assessed the same lesson. One supervisor failed to schedule two observations, and one supervisor only scheduled one observation. Table 6 compares the scoring for the observations displaying that typically the university supervisors scored a lesson higher than the researcher.

Table 6

RTOP Comparison

University Supervisor	TC1 RTOP	Researcher	TC2 RTOP	Researcher
A	85	46	85	58
B	93	31	72	20
C	23	16	34	15
D	98	71	33	37
E	53	30	89	49
F	82	43	96	41
G	76	42	65	39
H				
J	86	76		
K	70	54	75	58
L	66	79	51	36

Independent paired samples t-tests were run using SPSS. The SPSS output tables are found in Table 7. On average, teacher candidates received higher RTOP scores from the university supervisors (M=70.11, SE= 5.08), than from the researcher (M=44.26, SE=4.26). This difference was statistically significant $t(18)=5.79$, $p<.05$; it represents a large sized effect $r = .65$.

Table 7

Paired Samples t-test Comparison

	N	Un. Sup. Mean	Un. Sup. SD	Researcher Mean	Researcher SD	t score	p-value
RTOP	19	70.11	22.15	44.26	18.58	5.79	.00

The university supervisors consistently used the RTOP as a reference for high quality mathematics instruction. They repeatedly stated in interviews and follow-up conversations that they expected more rigor and higher level thinking as a result of the focus on the RTOP rather than the open-ended general observation form used in the past. This intensified level of expectations in the mathematics instruction included the requirement of K-5 students justifying and sharing their strategies. Interviews highlighted an increase in the expectancy of real world and hands-on learning. They wanted to see the teacher candidates actively involving students. Even though two university supervisors did not assess the teacher candidates themselves, but instead used the teacher candidates' self-assessment on the RTOP, the use of the RTOP did increase the emphasis on the mathematics content knowledge and the pedagogical content knowledge.

The university supervisors approach to the post-conference changed between the baseline semester and the study. They described that they listened more carefully to the teacher candidates' reflections and put an emphasis on teacher candidates' reflections. They allowed the

teacher candidates to problem solve and come up with their own strategies and ideas for improving their instructional practice versus telling them their strengths and weaknesses. Comparing the interviews from the baseline to the study, teacher candidates did experience an increase in mathematics support from the university supervisors.

Observations revealed that in 15 out of 19 post observation conferences, paraphrasing was used. Closed and probing questions were the most common types of questions asked versus the more reflective mediating and open-ended questions. The data revealed that the coaching practices of the university supervisors are in the novice stage. In reviewing the post-conferences, the limited use of paraphrasing with the teacher candidates displays a need for more professional development, modeling and practice. In order to facilitate change in beliefs and practices, university supervisors need to practice active listening, which is demonstrated through the use of paraphrasing. Some university supervisors need to examine the type of questions they are asking. Closed questions dominated their conferences and that type of question should be used sparingly as they often require a single answer and don't foster reflection. Questions should also be connected and based on the teacher candidates' response to the paraphrase or previous question.

Research Question Two. What are the effects of training university supervisors in mathematics education coaching practices on teacher candidates' beliefs and instruction in mathematics?

The findings revealed subtle changes in beliefs on the part of the university supervisors and the teacher candidates. Forty-five percent of the university supervisors did have teacher candidates whom experienced a significant change in beliefs according to the results of the paired t-test on the MBI scores. Fifty-five percent of university supervisors had a belief change in the learning construct. The belief construct curriculum was an area that teacher candidates' exhibited a significant change under the supervision of thirty-six percent of the university

supervisors. One university supervisor had a significant change in efficacy beliefs for her teacher candidates. The results of the teacher candidates' MBI scores are found in the Table 8.

Table 8

Analysis of teacher candidates' MBI scores

Supervisor	Construct	N	Pre MBI Mean	Pre MBI SD	Post MBI Mean	Post MBI SD	t score	p-value
1	Curriculum	5	1.7	.07	1.8	.11	-3.0	.04
	Learning	5	3.1	.46	3.4	.30	-2.5	.07
	Efficacy	5	2.9	.42	3.3	.45	-1.6	.18
2	Curriculum	9	1.63	.09	1.77	.11	-4.6	.00
	Learning	9	3.14	.48	3.65	.39	-2.4	.04
	Efficacy	9	2.89	.65	3.33	.75	-2.1	.07
3	Curriculum	6	1.65	.03	1.64	.07	.36	.74
	Learning	6	3.08	.48	3.28	.27	-1.23	.28
	Efficacy	6	3.08	.63	3.00	.63	.54	.61
4	Curriculum	11	1.61	.12	1.73	.08	-3.31	.01
	Learning	11	3.05	.25	3.39	.36	-.03	.04
	Efficacy	11	3.23	.88	3.36	.64	-.61	.56
5	Curriculum	6	1.62	.11	1.80	.05	-3.43	.02
	Learning	6	3.1	.43	3.57	.50	-2.84	.04
	Efficacy	6	2.92	.66	3.50	.55	-1.56	.18
6	Curriculum	10	1.65	.07	1.74	.12	-2.13	.06
	Learning	10	2.84	.55	3.46	.51	-3.93	.00
	Efficacy	10	3.05	.80	3.20	.79	-.90	.39
7	Curriculum	5	1.69	.11	1.79	.03	-1.81	.15
	Learning	5	3.05	.61	3.35	.33	-1.08	.34
	Efficacy	5	2.90	.22	3.40	.42	-2.23	.09
8	Curriculum	4	1.70	.05	1.82	.04	-1.29	.29
	Learning	4	3.48	.27	3.61	.23	-2.38	.10
	Efficacy	4	2.63	.55	2.88	.13	-.42	.70
9	Curriculum	5	1.61	.16	1.70	.14	-1.11	.33
	Learning	5	3.21	.80	3.52	.22	-.74	.50
	Efficacy	5	2.20	1.44	3.40	.55	-1.67	.17
10	Curriculum	4	1.64	.05	1.72	.10	-1.03	.38
	Learning	4	2.94	.37	3.4	.24	-3.08	.05
	Efficacy	4	2.75	.32	2.9	.52	-.52	.64
11	Curriculum	12	1.63	.02	1.71	.04	-2.12	.06
	Learning	12	3.08	.09	3.38	.10	-3.74	.00
	Efficacy	12	2.83	.21	3.25	.20	-3.46	.01

Three of six university supervisors who did not experience change in their teacher candidates' beliefs exhibited some negative behaviors or comments during the study. These negative factors could have attributed to the insignificant results of their teacher candidates. Another supervisor was new to the position with the university, so her getting acclimated to the role could have impacted her influence on the teacher candidates. The fifth supervisor had three years of experience. Examination of her two post-observation conferences found that she did not pose any questions related to mathematics in the lesson during one conference and the second conference included only two questions out of the twelve she asked that were related to mathematics. So the inconsistent focus on mathematics content and instruction could be a contributing factor to her insignificant results. Likewise, in interviews with the teacher candidates it was noted that the university supervisors with no change in beliefs were the ones who weren't as strong supporting mathematics teaching.

In order to examine the impact of the methods course on the teacher candidates' beliefs, the data were also analyzed by methods instructor. Two instructors had significant change in all three of the belief constructs (curriculum, learning, and efficacy). A third instructor had a significant change in two of the constructs, and the fourth instructor did not have any significant change in the beliefs of her teacher candidates. This instructor was a part-time adjunct instructor who was teaching the course for the first time. Also seven of the sixteen teacher candidates in her class were not observed by a university supervisor which may have been due to a lack of accurate communication of requirements. This means that a university supervisor did not have a post-conferences with these teacher candidates. Therefore, these teacher candidates did not have the same opportunity to be coached and reflect on their teaching of mathematics as other teacher

candidates in the program. The results for the MBI were also grouped by instructor and are found in Table 9. Regrettably, the data could not be analyzed to compare mentor teachers.

Table 9

Instructor	Construct	N	Pre MBI Mean	Pre MBI SD	Post MBI Mean	Post MBI SD	t score	p-value
1	Curriculum	21	1.62	.02	1.77	.02	-5.49	.00
	Learning	21	2.98	.10	3.46	.09	-3.85	.00
	Efficacy	21	3.05	.18	3.40	.13	-2.31	.03
2	Curriculum	23	1.65	.02	1.69	.22	-1.56	.13
	Learning	23	3.01	.09	3.32	.08	-3.44	.00
	Efficacy	23	2.91	.16	3.15	.15	-2.31	.03
3	Curriculum	19	1.65	.11	1.80	.02	-5.83	.00
	Learning	19	3.20	.54	3.61	.08	-3.73	.00
	Efficacy	19	2.71	.90	3.42	.10	-2.89	.01
4	Curriculum	16	1.65	.09	1.65	.31	.00	1.00
	Learning	16	3.09	.49	3.27	.93	-.76	.46
	Efficacy	16	3.03	.53	2.84	1.03	.68	.51

The interviews from the university supervisors also revealed a change in the teacher candidates' instructional practice. The university supervisors noticed a greater focus on student centered mathematics instruction that incorporated questioning strategies, student thinking, manipulatives, and problem solving strategies.

Additional Findings. An issue that became apparent during the interviews with the university supervisors is their knowledge and understanding of the mathematics methods assignments. Four supervisors mentioned a need for the mathematics methods instructors to align their assignments to the curriculum of the field placement schools and districts. This was an interesting request, because the assignments are designed to fit any mathematical strand to accommodate the differences in curriculum maps across the diverse field placements. If this is a common belief, this means there is a disconnect in the communication of the assignment goals or possibly in the

full understanding of the mathematics curriculum used in the schools by the supervisors (Ngoepe& Phoshoko, 2014; Zeichner 2002).

Another issue that was highlighted in the interviews was most (80%) of the university supervisors did not feel that they were responsible for bridging the expectations of the university and the field placement school. Three of them felt that the methods instructors should provide this link. They were more inclined to have the teacher candidates teach like the cooperating teacher regardless of the effectiveness of those approaches or use of research-based practices instead of meeting the expectations of the mathematics methods course and nationally recognized standards.

A positive finding from the interviews was that all but one university supervisor valued the professional development; the one university supervisor shared in her interview that she understood her role well enough and did not need the additional support. They stated that they "were glad to get support in what they do." They highlighted the differences in the professional development and the traditional "paperwork" meetings that were common place. Ten university supervisors advocated for the professional development to continue every year.

Limitations

There are two limitations to this study. The first is that the data could not factor out other important variables that influence the beliefs and practices of both the university supervisors and the teacher candidates. The data presented shares the best picture possible for this situation and does provide evidence of impact in addition to a need for a more inclusive, and broad look at this topic. The second limitation is the short time frame for the study. The results show glimpses of positive changes, yet due to time the changes were not as significant as a longitudinal study. This limitation also points to a need for another study that is more in-depth.

Implications

University supervisors need professional development and support. Coaching is an effective form of support that can provide a change in thought and practice. The university supervisors found the support to be helpful in their practice. This type of support is necessary as the accountability of teachers and the performance of their elementary students is placed squarely on teacher preparation programs. In addition to the continuation of professional development, education programs need to continue their evaluation of all faculty that provide support to teacher candidates in the field. This includes analyzing the best practice for selecting university supervisors and providing them with support in the appropriate content and practices expected. Most of the university supervisors in this study described themselves as having expertise in literacy, yet they were required to assess and evaluate mathematics teaching as well as science and social studies.

This study aligns with the other research that identifies the university supervisor as a necessary role in teacher preparation (Albasheer, et al., 2008; Blanton, Berenson & Norwood, 2001; Freidus, 2002; Frykholm, 1998; LaBoskey & Richert, 2002; Smith & Souviney, 1997). The supervisor provides the necessary support for teacher candidates to fuse the foundational theories provided by coursework to the practice of teaching (Zeichner, 2002). The results do align with Cuenca's (2010) framework displaying the importance of *pedagogical thoughtfulness* and *pedagogical tact.* The professional development allowed the university supervisors to shift their practice from total evaluator to one that fosters a reflective practice and one that was more meaningful for teacher candidates. Slowing down the post conference with paraphrasing and increasing the number of questions asked created a discourse for improved learning and

understanding. Because the university supervisors received professional development in coaching strategies their practice of "coaching" and supporting teacher candidates changed.

Mathematics educators should also continue to identify the beliefs of teacher candidates and also assist in fostering reflection. This study also supports previous research about the importance of university supervisors supporting the teaching of mathematics (Fernandez & Erbilgin, 2009). This makes the role of the university supervisor a key player in the internalization of the practice of teaching standards based mathematics. University supervisors need to have expertise in mathematics education in order to provide effective support (McDuffie, 2004; Fernandez & Erbilgin, 2009). It is critical that university supervisors who provide supervision in the content area of mathematics have their beliefs, expectations, content knowledge and pedagogy congruent with the current reform standards and expectations in mathematics (Slick, 1998). The need for high quality clinical supervision and support of teacher candidates in teacher education programs is imperative to meet the demands placed on teacher education programs (Data Quality Campaign, 2010; NCATE, 2008).

Summary

Changing beliefs is a complex shift in ideas that require intentional experience, education, and reflection. The members of the teaching triad (mentor teacher, university supervisor, teacher candidate) must be cognizant in understanding the power of beliefs, refection, and experience, in addition to strong mathematics pedagogy and content knowledge. Those coaching teacher candidates need support and professional development in order to increase their effectiveness. Without expertise in mathematics content and pedagogy, the coaching conversations lack the power to spark instructional change. The present study was designed to fill a gap in the literature to investigate the impact of university supervisors play in changing

teacher candidates' beliefs about mathematics and their instructional practice. By examining the effects of professional development, this study provided research about the type of support university supervisors need to effectively develop teacher candidates' positive beliefs about mathematics and enhance candidates' pedagogical practices.

Dr. Stefanie Livers has research interests in the preparation of teacher candidates, mathematics coaching, and instructional strategies to meet the needs of all students. She is beginning her fourth year as an assistant professor. Dr. Livers was a classroom teacher for nine years and an instructional coach for three years. She has a total of 19 years in education.

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Field Experiences Required in K-6 Teacher Preparation Programs: Similarities, Differences, and the Need for Common Terminology

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Abstract

This study investigated field experiences required in 14 public and private elementary teacher preparation programs across the United States. Teacher educators were surveyed to determine the nuances of field experiences, including 1) the nature of field experiences, specifically the number required, types, length, what they were called; 2) if and how field experiences connected to coursework; and, 3) how field experience decisions are made. Data analysis indicated wide discrepancies across teacher preparation programs. Commonalities included 1) an early observation of classrooms; 2) an early field experience linked to a methods course; and 3) extended student teaching capstone experience.

Keywords: field experiences, teacher preparation, pre-service teachers, elementary education

Beginning teachers are expected to be highly qualified upon graduation from their institutions and three months later enter elementary classrooms and "do essentially the same job on their first day of employment as a 20-year veteran" (Huling-Austin, 1990, p. 535). This may be the driving impetus fueling the trend of earlier, longer, more frequent, and higher quality field experience requirements for future teachers enrolled in today's teacher preparation programs (Greenberg, Walsh, & McKee, 2014).

Background

This research stemmed from a discussion among teacher educators during a national conference's special interest group meeting. The initial question that spurred this research was, "What are the field experience requirements at our institutions?" The variety of answers given during this initial discussion, along with a charge from Clift and Brady (2005) to create common language so we could draw comparisons across institutions, led us to believe that this was an important research question. However, the simplicity of the question quickly became multi-faceted because we were really asking how many field experiences were required; what types of field experiences were required and what names were used to label each experience; and, how many hours were required for each experience in each teacher preparation program. Through discussions, we realized that we lacked common terminology and spent several hours attempting to translate responses for comparisons across institutions.

In the days that followed, we decided to refine our questions to get more specific information. The questions further evolved into the following research questions:

1) What is the nature of the field experiences?

- How many field experiences are required?
- What types of field experiences are required?

- How long are the field experiences?
- What are the field experiences called?

2) How are field experiences connected to coursework?

3) How are field placement decisions made?

As stated earlier, it was evident from preliminary conversations that teacher preparation programs had created their own names for field experiences, and in some cases unique descriptions. This made it difficult, if not impossible, to discuss field experience attributes across institutions because of lack of commonalities. This was reminiscent of Anders, Hoffman, and Duffy's (2000) review of reading teacher preparation, in which they revealed that vastly different descriptions and requirements of field experiences existed:

What does field-based mean? Miller and Rand (1978) described a practicum experience totaling 22 hours. In the 1998 reading concentration program at the University of Texas, students spent a total of 1,000 hours in field and practicum settings. This difference suggests questions about when is a field-based program a field-based program, what are expectations for the quality of the experience, the supervision involved, and the responsibilities of all concerned. (p. 727)

Further, they acknowledged that it is problematic that "we have no coherent, comprehensive data base, or reference point, for pre-service teacher education programs. Attempts to describe the organization, content, and structure of pre-service teacher education programs have been less than successful" (Anders, Hoffman, & Duffy, 2000, p. 725). More recently, the National Council for Accreditation of Teacher Education (NCATE) Report of the Blue Ribbon Panel on Clinical Preparation and Partnerships for Improved Learning (2010) stated, "clinical preparation is poorly defined" (p. 4) and there is "great variation in how and where clinical training is delivered" (p. 4). This is still the case, as the American Association of

Colleges for Teacher Education (AACTE) issued a press release stating that a Clinical Practice Commission had been charged with the task of "…identifying a set of criteria that define clinical practice, lifting up exemplary models in the field and ultimately publishing a set of recommendations for teacher preparation programs nationwide" (AACTE, 2015, para. 1).

We found it troubling that teacher education had not yet developed a shared vocabulary for various types of field experiences, including what is commonly referred to as student teaching. This study was designed to describe differences and complexities of field experiences by surveying teacher educators from 14 teacher preparation programs across the US.

Supporting Literature

The question of "What is the best way to prepare elementary teachers?" has been debated over the last 200 years. Early preparation of teachers in the US occurred in one-room schools using apprentice-style training. A growing emphasis on improving what teachers knew about subject areas they taught and the focus on developing pedagogy brought about the creation of Normal Schools in the mid-1800s (Wright, 1930). Indeed, Goldstein (2014) noted the following:

> Between the 1920s and 1960s, as the high school diploma became more universal and states passed laws requiring teachers to earn bachelor's degrees, often in education, many normal schools transitioned into regional state colleges with lower admissions standards than flagship state universities. (p. 26)

Teacher preparation programs still attempt to strike a balance between those same three important areas of developing teachers: subject area knowledge, pedagogical knowledge and apprenticeship.

Illustrating the importance of field experiences, Denton (1982) found that early field experiences had more of an impact on later courses than in the course that was paired with the

field experience. Through the following statement, AACTE's 1985 National Commission on Excellence in Teacher Education advocated field experiences as part of all coursework to provide a context for learning:

> Quality teacher education programs do not have a mechanical separation of classwork and field experiences; instead, field work and on-campus laboratory experiences should accompany all classes, and classes or seminars should accompany all field work, such as student teaching or internships. (pp. 12 - 13)

However, McIntyre, Byrd, and Foxx (1996) questioned simply expanding the length of field experiences, claiming that "it appears that what occurs during the field experience is more important than the length" (p. 176). Indeed, in order to bridge what students learn in coursework with realities of what goes on in elementary classrooms, efforts have been made to create university-school partnerships. Both Darling-Hammond (2010) and NCATE (2010) made compelling cases for teacher preparation programs and school districts to establish cooperative programs to better prepare aspiring teachers. Further, NCATE (2010) provided 10 design principles for what they called clinically based preparation. While field experiences were woven throughout the design principles, the second principle specifically stated, "Clinical preparation is integrated throughout every facet of teacher education in a dynamic way: The core experience in teacher preparation is clinical practice. Content and pedagogy are woven around clinical experiences throughout preparation, in course work, in laboratory-based experiences, and in school-embedded practice" (p. 5).

In 2010, the AACTE policy brief recommended that there should be "uniform clinical requirements for all providers" (p. 12). While AACTE (2010), like NCATE (2010), provided specific recommendations for field experiences, recent literature on field experiences (e.g.,

Clark, Byrnes, & Sudweeks, 2014; Gelfuso, Dennis, & Parker, 2015; McDonald, Kazemi, & Kavanagh, 2013; Zeichner, 2012, 2010) does not reveal research-based evidence on what that uniform requirement should be. The Council for the Accreditation of Educator Preparation (CAEP) Standard 2.3 states:

> The provider works with partners to design clinical experiences of sufficient depth, breadth, diversity, coherence, and duration to ensure that candidates demonstrate their developing effectiveness and positive impact on all students' learning and development. Clinical experiences, including technology-enhanced learning opportunities, are structured to have multiple performance-based assessments at key points within the program to demonstrate candidates' development of the knowledge, skills, and professional dispositions… (2013, p. 6)

Thus, according to CAEP's Standard 2.3 (2013), field experiences may be in different formats (i.e., observations, assisting, tutoring, instruction), including "simulations and other virtual opportunities (for example, online chats with students)" (p. 7) and occur at various points in time throughout the preparation program. Indeed, our study uncovered vastly different field experience requirements in teacher preparation programs and the terminology varied widely. This is timely because McDonald, Kazemi, and Kavanagh (2013) state:

> Bridging research and the practice of teacher education has the potential to help the field: (a) articulate a common language for specifying practice, which would facilitate the field's ability to engage in collective activity; (b) identify and specify common pedagogies in teacher education; and (c) address the perennial and persistent divides among university courses and between university course work and clinical experiences. (P. 379)

While searching the literature, we discovered interesting taxonomies of terms for student teaching and for field experiences. See Table 1 for a sample of terms from the ERIC and Education Source databases. These lists further illustrate the need for common terminology. Nearly four decades ago Salzillo and Van Fleet (1977) claimed that field experience was "the largest unvalidated segment of professional teacher education" (pp. 27-31). More recently, Clark and colleagues (2014) reminded us that the only distinct changes made to the student teaching model since the mid-1800s include "the length of student teaching, the amount of supervision provided, and the field-based experiences prior to student teaching have all increased" (p. 172).

Methodology

To understand the field experiences required in teacher preparation programs, we began a discussion with other teacher educators attending a national literacy organization's conference during a special interest group meeting focused on teacher education research. As the group informally shared their institutional requirements, we were fascinated by the variety of experiences described and decided to create a survey to better understand those differences. During the initial information gathering stage, teacher educators from 20 institutions attending the special interest group meetings were given open-ended surveys (Fowler, 2002) which asked what the required field experiences were in their preparation programs. We chose surveys because they provide a quick way of gathering descriptive data (Mertens, 2010). Surveys were returned electronically or in paper form. We met twice in person to review responses and quickly discovered that open-ended questions did not provide the structure needed to be able to make comparisons across programs. Participants thought they were being clear in their responses, but because of differences in what each field experiences was called and the intention of specific experiences, it was impossible to tease out what was going on in individual

preparation programs. The initial survey did little more that verify that the nuances were many and complex.

After the conference, we met with a psychometrician and shared our difficulties getting to precise commonalities and differences in each of the programs. With his help, we redesigned the survey, refining the questions to make them more specific. They were followed by more detailed leveled questions to help teacher educators completing the survey explain what their teacher preparation programs required in each of their field experiences. This required one survey for each field experience. In order to reduce the amount of paperwork required by participants, we decided to collect data only from university-based undergraduate elementary (K-6) teacher preparation programs. This refined survey was composed of 12 open-ended questions with an additional 25 supporting or clarifying questions (see Appendix) that we generated, based on the special interest group discussion of field experiences. Once we had obtained IRB permission from our institutions, we sent the refined survey electronically to our 20 participants from the study group. We used convenience sampling (Mertens, 2010) because special interest group members were readily accessible teacher educators. Additionally, they had expressed interest in participating in the study during special interest group meetings. Participants were from public and private teacher preparation programs representing each geographic region across the US.

Once we received completed surveys, we verified information through examining program requirements on institutions' websites and noted discrepancies in what was reported on the survey versus what was present online. Since participants were used to the rhetoric from their institutions, we had difficulty understanding terminology or nuances of some of their field experiences. In some instances we called and/or emailed participants in order to get clarification. By conducting these checks and through peer debriefing with an outside researcher, we

established accuracy and credibility in our findings, which aided with qualitative validity (Creswell, 2014).

Fourteen out of 20 surveys were returned, which provided us with a 70% response rate. While this was a desirable response rate for a survey (Fowler, 2002; Nulty, 2008), we kept in mind that this was a dedicated group of teacher educators who, based on discussions in special interest group meetings, had a vested interest in the findings.

Participants were directed to send their completed survey to the first author, via email or the US mail. The first author's email and physical mailing address were provided in the survey directions. Upon receipt of completed surveys, pseudonyms were assigned to each institution. We made sure that the species of birds used were not the institutions' mascots.

Data Analysis

Upon receiving the data, we quickly realized that we needed to create a system for looking at each institution's information, as well as across institutions by question. We decided to create charts to display findings by question. We divided the surveys to create charts in various layouts and then met to share charts before deciding on one format for consistency. Designing charts to capture the wealth of data in a user-friendly format was challenging. As we entered data into the chart, we verified information reported by going to the institution's undergraduate teacher preparation program website. When information could not be verified from websites, phone calls and/or emails to the participant completing the surveys provided further clarification. Once data were organized, we used frequency counts to tally responses to each question. The depth of data provided an opportunity to view institutions' similarities and differences in field experiences after stripping away the jargon. For example, two descriptions that first appeared to have substantially different expectations for field experiences within a

reading methods course turned out to be similar when we distinguished that different *terms* for field experiences were used, even though each institution had the same expectations for students. Clarification of terms helped with data analysis.

Findings

The first research question was multi-faceted: What is the nature of the field experiences? To address this question, we asked the following four sub-questions: How many field experiences are required? What types of field experiences are required? How long are the field experiences? What are the field experiences called?

First, we noted that the number of field experiences varied greatly, as the 14 teacher preparation programs required a range of one to 15 field experiences (see Table 2). Three institutions required one field experience, one required two experiences, three required three experiences, three required four experiences, one required five experiences, one required seven experiences, one required nine experiences, and one required 15 experiences. The majority of institutions (six out of 14) required three or four experiences (see Table 2), and most of the field experiences were completed during the last two years at the institution (see Table 3).

Next, we discovered the data indicated vastly different requirements for each field experience across institutions. The types of field experiences included observations, working with one child, or small group instruction, to independent full-time student teaching (see Table 3). Although they had various time commitments, three commonalities across programs were noted: 1) an early field experience in which students were required to observe what is happening in classrooms, usually in their freshman or sophomore year, 2) some kind of early field experience prior to student teaching was typically connected to a literacy methods course, and 3) the student teaching experience. See Table 3 for the types of field experiences and the

terminology used. The complexities and variety of experiences prior to the student teaching capstone prevented us from being able to draw effective comparisons across institutions except during the student teaching semester. It is important to note that institutions requiring the most field experiences did not necessarily have the most required hours in the field (see Table 2).

While one field experience is typical for student teaching, some institutions require two different placements during that time. AACTE's (2010) policy brief recommended pre-service teachers to have "a minimum length of one semester, or 450 hours (15 weeks at 30 hours per week) should be required of and provided to each candidate" (p. 9), but our data from these 14 institutions surpassed that with an average of 940 hours (see Table 2). Indeed, the duration of student teaching ranged from 12 to 16 weeks, depending on the institution. As illustrated in Table 2, the length of time spent in elementary schools during student teaching ranged between 515 – 1083 hours.

Terminology for field experiences varied greatly across the 14 institutions (see Table 3). For example, early field experiences required prior to student teaching were called many different things, including Early Field Experience, Clinical Field Experience, Methods Block, Methods Courses, Internship, Internship I, and Block (I, II, III). Further, what is typically referred to as student teaching, the full time practice teaching in the final semester of the teacher education program, was called Interns, Block IV, Internship II, Intern II, or Associate Teaching by our 14 participating institutions (see Table 3).

Our second research question was: How are field experiences connected to coursework? We examined requirements in each field experience to answer this question. Survey responses indicated that field experiences aligned with coursework in 12 out of 14 institutions and one field experience tended to serve as the placement for the semester instead of for each particular

course. For instance, a reading methods course may be paired with science methods and math methods in a semester with one field experience requirement that is a co-requisite for all three courses.

While most teacher preparation programs have at least one field experience connected to coursework (see Table 4), the ways in which field experiences were connected varied greatly from institution to institution. Requirements within the various field experiences (see Table 3) included observations, supervised teaching, working with small groups of students or individuals, completing coursework requirements, documenting a certain amount of time visiting an assigned classroom (with no other expectation), and/or supervision of K-6 students.

Our third research question was: How are field placement decisions made? All 14 teacher preparation programs reported providing pre-service teachers a variety of experiences, including grade levels, diversity, and location (urban, suburban, and rural), as much as their locations would allow. For instance, some institutions were geographically located in remote areas so they had access only to rural and suburban schools, or only urban and suburban schools. Much research (e.g., Darling-Hammond, 2008; Darling-Hammond, 2010; Zeichner, 2010) and recommendations from organizations (e.g., AACTE, 2010; CAEP, 2013; NCATE, 2010) supports clinical experiences that are in collaboration with schools as partnerships, where university faculty members work closely with cooperating teachers to better support pre-service teachers. Our data revealed a continuum of cooperation from schools and school districts that work closely with the teacher preparation program to the opposite, where one district refuses to allow education faculty members into the decision making process of field experience placements. Indeed, one participant shared:

> We submit our student teacher names to the county and they place the students throughout the county. We are not allowed to contact schools and discuss placements and [we] are reprimanded by the county coordinator if she hears we have even talked to an administrator about placements.

By contrast, two participants described their close work with professional development schools and how they collaborate with the teachers in those schools to make placements. An illustrative example of this was from the participant who wrote, "We have specific professional development school sites. University and elementary school faculty conduct interviews and make placements jointly."

Once again, field placement decisions across the 14 institutions varied greatly as to how placements were made and who the decision-makers were in those processes.

Limitations

While we had 14 out of 20 surveys returned (70% response rate), we cannot predict how those who did not participate would have responded. Follow-up interviews with participants could have provided more information. Further, we cannot generalize to the larger population of teacher educators. Participants were attendees of a national literacy organization's special interest group on teacher education research, so they may have had different perspectives than the general population of teacher educators. Another limitation was that we did not pursue other avenues for increasing our sample size. For instance, we could have tapped into various teacher education organizations' mass communication techniques, such as email lists or listserv features. Further, our data collection and organization was cumbersome, so we recommend that future surveys should be created using online survey programs where participants are sent a web link to the online survey. By doing so, multiple researchers could access data already organized by

question. Having a psychometrician assist with initial survey creation would have allowed for clarity of measures and overall survey construction. Additionally, this was a small scale exploratory, descriptive study so reliability was not established.

Conclusion

Educating teachers was the impetus for building colleges and universities across the US. Those of us who have made our livelihood preparing the next generation of teachers are certain there is no greater profession. Our findings reveal that we need to align terminology, such as names of experiences across teacher preparation programs, in order to enhance communication and facilitate collaboration across programs. By adopting common terminology we would demystify requirements, which could then promote more open dialogue about teacher preparation programs and set the stage for large scale, collaborative research on promising practices related to field experiences and coursework connections, while exploring the effects on developing pedagogical practices and elementary students' learning.

Teacher educators need to critically examine the importance and relevance of field experiences. Clearly, student teaching alone is not enough and the research supports early field experiences being linked to coursework, such as in methods courses. Each field experience needs to be carefully planned so as to reduce redundancy or more time doing unstructured "observing," something pre-service teachers already experienced as PK-12 students. Darling-Hammond (2008) said it best, "Developing the ability to see beyond one's own perspective – to put oneself in the shoes of the learner and understand the meaning of that experience in terms of learning – is perhaps the most important role of the teacher education" (p. 343). Field experiences are uniquely positioned, when aligned with curriculum, to open the eyes, hearts and minds of aspiring teachers.

Future Research

After examining the data, we must ask the following: How much field experience is enough? Can teacher preparation programs require too many or too few hours? Is the freshman year too early for the first field experience?

Due to widely varying experiences, we wondered if perhaps there may be differences between types of institutions and field experience expectations. Hence, is there a difference between field experience expectations in a public versus a private institution? What differences exist between institutions placing a heavy emphasis on research versus institutions with more of a teaching focus (e.g., 4/4 load)?

Future research on field experiences should aim to link with teacher effectiveness research. Thus, does elementary school student data indicate that pre-service teacher preparation field experiences make a difference? Another possibility includes examining how prepared teachers feel as a result of their pre-service teacher preparation field experience requirements. Hence, what do our teacher preparation program graduates ultimately learn from these experiences and what can they attribute to each field experience placement? Finally, administrators' voices should be included. Future research should explore whether elementary administrators can tell a difference from teacher education graduates with varying experiences; and if they can, what are those differences?

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Appendix

Survey of Elementary Teacher Preparation Program Field Experiences

For the purpose of this study, we define a **field experience** as a requirement of your undergraduate elementary teacher preparation program in which students are assigned to elementary classrooms. The field experience may go by a variety of names such as practicum, field work, early field experience, block, intern 1, intern 2, student teaching, etc.

Please complete a separate survey for **each** required elementary field experience in your college or university's teacher education preparation program.

How many field experiences are required in your elementary teacher education program? _____

Are your program's field experiences **sequential** or **non-sequential**?
If they are **sequential**, which field experience is this? (first, second, third, etc.)
If they are **non-sequential**, please explain how your field experiences are structured.

What do people at your institution commonly call this particular field experience?

Is this field experience conducted as a stand-alone course? ___Yes ___No
If **yes**, how is it listed in your college catalogue?
Course number(s) _____
Course name(s) _____

If **no**, what is the name of the course associated with this field experience?
Course Number(s) _____
Course Name(s) _____

How many hours in the elementary classroom are required in this field experience?

_____ hours _____ days per week for _____ weeks

What is the required format of this field experience? Select **one** of the following:
____ schedule set by faculty or college
____ preservice teacher completes hours as his/her schedule allows
____ other (please explain):

If this field experience is organized in one of the following ways, please check the best description and explain in detail the expectations of this experience.

____Observational. What/who are they observing?
____ One-on-one interaction (i.e. tutoring).
How are the elementary students chosen to work with this preservice teacher?
____ Small group work.
How are the small groups of elementary students organized?

____ Whole class instruction.
Do you have a phase-in and phase-out plan for the preservice teachers?
____ Other (Please explain):

In this field experience, are the preservice teachers expected to teach elementary students?
___Yes ___No

If **yes**, do the preservice teachers plan the lesson or use a lesson the teacher gave them?

Location of experience (Please check **all** that apply):

___ Private	___ Rural	___ Low Socio Economic Status (SES)
___ Public	___ Urban	___ Middle SES
___ Lab School	___ Suburban	___ High SES
___ Charter School		___ Title 1

How are elementary school sites chosen for this field experience? Please check **all** that apply.
____College/University chooses field experience sites
____School District assigns field experience placements
____Other (please explain):

Who supervises the preservice teacher in this field experience? Please check **all** that apply.
____ Tenure-track college professors (Assistant, Associate, Professor)
____ Adjunct college instructor. Please check:
___Ph.D. or Ed.D. ___ MS or MA ___ BA or BS with teaching experience
____ Assigned Cooperating Teacher
____ Administrator from the elementary school site (Principal/Asst. Principal)
____ Teacher from the elementary school site
____ Reading Coach or Specialist from the Elementary School
____ No program supervision from college
____ Other (please explain):

How are cooperating teachers chosen to work with the preservice teachers in this field experience?

The following information **will not be disclosed** to any other person or group. The identity of your institution will be kept strictly confidential.

College/University Name:
Department Name:

May we contact you if we have follow-up questions? If so, please provide your name, work

number and/or email address.

Table 1

Number of Field Experiences and Length of Time Spent in Schools by Institution

Institution	Experiences	Hours
Wren University	1	640
Oriole University	5	940
Egret College	4	725
Meadowlark University	4	1083
Hummingbird University	4	670
University of Ibis	10	780
Blue Heron College	3	640
University of Finch	15	764
University of Blue Jay	5	995
Purple Martin University	2	515
Cardinal University	6	905
University of Robin	5	885
University of Roadrunner	4	840
University of Loon	6	555

Table 2

Terminology for Field Experiences by Types of Experiences

Type of Experience	Terminology Used				
Observation	Early Field Experience	Intern I	Block I	Practicum	Clinical
Tutor	Early Field Experience	Intern II	Block II		
Teach in small groups or whole class	Field Experience	Intern II	Block III	Methods	
Day to day teaching for short periods of time (2 - 5 weeks)	Plus 2 Methods	Intern III	Block III	Methods	Intern I
Final 15 week Internships	Student Teacher	Intern II; Intern IV	Block IV & Block V	Associate Teacher	Internship

Exploring School Counseling and Principal Candidate Internships: Observations of the Principal-Counselor Relationship

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Introduction

Internships can serve as the core authentic learning experience that encourages theory-to-practice connections at an organizational level. The internship is a critical experience for pre-service school counselors and principals, as it provides the opportunity for candidates to integrate the knowledge, skills, and dispositions they have acquired in their graduate and licensure coursework and to apply them in the field. This is of particular importance as they develop their work ethos as educational professionals under the supervision of a mentor (Capasso & Daresh, 2001; Coker & Schrader, 2004; Cunningham, 2007; Daresh, 2001; Geer, Anast-May, & Gurley, 2014; Jackson et al., 2002; Ringler, Rouse, & St. Clair, 2012; Studer, 2006). The purpose of this study was to explore the internship experiences of school counselor and principal candidates, with specific attention to candidates' observations of the principal-counselor relationship and knowledge and awareness of counselor roles and functions. The literature is sparse in helping educators to understand candidates' personal and professional struggles during internships regarding the principal-counselor relationship, as well as the collaboration responsibilities of school counselors and principals as they enter their profession.

Internships set the tone for one's early professional experience and methods of interactions with staff and students in a school building. They allow candidates to gain awareness of the complex socialization process that underlies day-to-day school leadership,

while exposing them to a balance of all areas of counselor and principal responsibilities (Browne-Ferrigno, 2003; Cooner, 2006; Geer et al., 2014). Woodside, Ziegler, and Paulus (2009) described the internship "as developing a regime of competence, including mutuality of engagement, negotiability of the repertoire, and accountability of the enterprise" (p. 23). According to the Transforming School Counseling Initiative by The Education Trust (2009), these skills—competence, engagement, negotiability, and accountability—must be practiced in genuine settings for candidates' effective professional transition to the field.

Despite the ability to understand the importance of the internship experience, researchers have found that pre-service candidates observe, much more than lead, in their internships and lack opportunities to practice leadership and professional responsibilities in a meaningful way (Anast-May et al., 2011; Bemak, 2000; Clark & Stone, 2000; Fry, Bottoms, & O'Neill, 2005; Geer et al., 2014; Hines, 2008; Petzko, 2008). Inconsistency can be seen in the expectations of internships, often leading to a conflict between educational preparation and the realities of the professional work environment (Akos & Scarborough, 2004; Anast-May et al., 2011; Brott & Myers, 1999; Ringler et al., 2012). Moreover, Shoffner and Briggs (2001) noted that, despite the encouragement for professional collaboration, school counselors and principals typically are trained in isolation, with little to no interaction or intentional instruction regarding the art and science of developing collaborative relationships. Further, few structured opportunities are available to learn about one another's roles and functions or to challenge one's professional expectations and assumptions of responsibilities (Carnes-Holt, Range, & Cisler, 2012; Milstein & Krueger, 1997).

Although the intention of collaboration between school counselors and principals is to focus on enhancing student achievement, the roles and task allocations of each may place them

in opposing courts (Kaplan, 1995; Mason & Perera-Diltz, 2010; Shoffner & Briggs, 2001; Zalaquett & Chatters, 2012). As educational leaders, principals focus on the macro level of the educational system—student success, visioning, school culture, instructional leadership, budgetary concerns, and personnel management (National Policy Board for Educational Administration, 2015). Conversely, school counselors approach student success from the micro level of the educational system—working with individual students and small groups, and offering classroom guidance to build community in the school (Clark & Stone, 2000).

In 2009, a collaborative effort of The College Board's National Office for School Counselor Advocacy, the American School Counselor Association (ASCA), and the National Association for Secondary School Principals (NASSP) investigated the relationship between principals and school counselors (Finkelstein, 2009). This research clarified the role of principals as providing leadership and direction in the school, as well as creating and sustaining a school climate with high expectations for all students, essentially cultivating a college-going and career-ready academic focus. Whereas, the role of school counselor involves unique skills to help all students and their families successfully attain rigorous academic preparation in ensuring college and career readiness and helping students develop coping skills for social/emotional intelligence. Of the 10 characteristics for effective principal-school counselor relationships identified in this research, three areas emerged as critical for the maintenance of the relationship—mutual trust and respect, communication, and shared vision and decision-making. Without training during internships regarding these valuable relationships and an understanding of one another's roles, much is lost in the collaboration for students' academic success.

Method

Methodological Framework

Given the lack of empirical research on the internship experiences of pre-service school counselors and principals and their perceptions of the principal-counselor relationship, the qualitative methodology of phenomenology was chosen to explore these experiences (Creswell, 2013). The current study emanated from the need to understand professional relationships and roles at the internship level among pre-service counselors and principals. Interviews allowed for a rich description of the relationship between school counselors and principals during the internship experience, which could be useful for pre-service preparation and training in the field. Qualifying the perceptions of internship candidates on the principal-counselor relationship allowed for an insider-outsider perspective on the observed relationship. In phenomenological research, participants' perspectives are described and interpreted in order to understand the essence and structure of the phenomenon under study (Creswell, 2013; Hycner, 1999; Moustakas, 1994)—in this case, the meaning related to pre-service internship experiences of school counselors and principals regarding the principal-counselor relationship.

Research Site

The study was conducted at a public university in southern Colorado. The university is considered a mixed residential-commuter campus and is one of the fastest growing institutions in the country. The student body includes nearly 20% students of color and an almost equal female-to-male student ratio. Additionally, 30% of students are eligible for Federal Pell Grants.

Participants

The study participants included 12 graduate candidates in a pre-service internship; six were enrolled in the master's school counseling licensure program and the other six were

enrolled in the master's principal licensure program. A criterion for sample selection was based on maximum variation to achieve a diversity of backgrounds and experiences within the sample (Creswell, 2013). The requirement for the school counseling internship is 600 hours, and the requirement for the principal licensure internship is 300 hours; hours are completed at more than one school site. All candidates were in their last year of their respective programs. The study included equal representation of males and females, ranging in age from 23 to 40 (M = 31) whose years of professional experience in the educational field ranged from 1 to 15 years (M = 6). Last, two of the 12 candidates were Hispanic, and the others were Caucasian.

Data Collection Procedures

Internship candidates were contacted for interviews upon approval from the Institutional Review Board. Prior to the interview, participants were provided with consent forms detailing the purpose of the study and the interview processes and procedures. The interviews averaged one hour in length, were digitally recorded, and conducted through a one-on-one interview process to ensure data accuracy (Creswell, 2013). A semi-structured interview protocol was developed, describing the process of the interview and the areas to be explored from the internship experiences. Adherence to the interview protocol ensured that questions were asked in a specific order and were carefully worded, and probing questions were embedded to provide opportunities to seek clarification and meaning (Creswell, 2013).

Data Analysis

A phenomenological approach was utilized for the data analysis of the interview transcriptions by focusing on the systematic application of this method for coding credibility and dependability (Creswell, 2013; Hycner, 1999; Moustakas, 1994). Moustakas' (1994) phenomenological reduction method was used to develop a synthesis of the meanings and

essences of the observed principal-counselor relationship during the candidates' internship experience. The researchers began by engaging in reflexivity to foster dialogue on the preconceptions, beliefs, values, and assumptions each individual brought to the study so these biases could be mitigated in the analysis process. Open coding of significant statements was conducted by horizonalization, reviewing each statement with equal value; approximately 35 codes were developed by each researcher and, through parsimony and refinement, 14 significant statements were consensually established. Researchers then collectively revisited the transcriptions and significant statements and identified themes in the data to create two textural descriptions of the phenomenon: (1) positive modeling of the principal-counselor relationship and (2) the need to educate principals regarding school counselor role confusion. Thus, the essence of the findings was that although pre-service candidates experience primarily positive modeling in the principal-counselor relationship during their internships, they also observe traditional school counselor role confusion and suggest that principals be educated on counselor roles and functions. See Table 1 for a code mapping of the data analysis.

Study Trustworthiness

In order to confirm accuracy of the perceptions and meanings shared by the interviewees regarding their internship experiences and observations of the principal-counselor relationship, five of the Creswell and Miller (2000) validation strategies were employed in building study trustworthiness. First, as a means with which to engage in peer review and debriefing, Moustakas' (1994) data reduction method was utilized to ensure dependability in the coding process across researchers. Random member-checking also was employed for interpretive confirmation of the textual descriptions and essence of the findings through open-ended follow-up interviews, in which reactions and clarification were sought on the credibility of the findings

from the participants (Creswell, 2013). Rich, thick descriptions also were employed to provide transferability of the findings. Additionally, the researchers were engaged in the internship sites over the course of the year with each faculty member responsible for oversight of the sites. Last, the potential biases of each researcher was acknowledged through the researcher reflexivity process, noting previous relationships as, and with, counselors and principals could factor into the research analysis of this study.

Findings

Positive Modeling of the Principal-Counselor Relationship

The internship experiences shared by the interviewees appeared to shape many of their thoughts on the professional relationship between school counselors and principals. One school counseling candidate explained the importance of the internship experience in observing a model relationship between school counselors and the principals:

> I'm fortunate to be at a school . . . [where] my administration is awesome, I really lucked out. Each [administrator] is responsible for something specific, so . . . I know right who to go to, and it works great. . . . So if I have to go to another district or another school, I hope to have the same kind of support and the same amount of autonomy.

A pre-service principal shared that the internship put her at ease with the principal-counselor relationship, as she expected to experience tension:

> Before my internship, I was really uncomfortable thinking about potential tensions with administrators and counselors and wondering what the norms were for that relationship. At my school, I was relieved to see from my administrator and school counselor that that is not a given and that it's about how you decide to make that relationship work.

Most candidates had predominately positive experiences in their internships, and some stated that they hoped to foster similar principal-counselor relationships. One principal candidate stated, "The school counselor and the principal work really close together, and that's the kind of relationship I would like to have in my future school." All the candidates reflected that, through their experiences, they saw a need to build trust and support in order to be successful educational leaders. One pre-service school counselor shared, "If trust was not built up, I can see how that [relationship] could be difficult." Another shared that the internship experience made her "super aware of how that relationship needs to be built up because without that relationship it doesn't matter, and people can be very territorial as administrators and school counselors."

Both pre-service school counselors and principals viewed maximizing student success as the most important task for principals and counselors to jointly address. One pre-service principal noted, "Collaborative work influences student achievement . . . and if there is not a collaborative environment, students will suffer." When candidates described the need for cooperation, common phrases surfaced, such as "purposeful interaction," "be on the same page," "be open to communication," "show respect to one another," "take a team approach," "bounce ideas off each other," "align goals," and "trust each other." These descriptions aligned closely with the positive modeling behaviors experienced and described by pre-service counselors and principals.

The Need to Educate Principals about School Counselor Role Confusion

All candidates observed role confusion for school counselors during their internship. Generally, the pre-service school counselors felt that, in their experiences, principals and other administrators had a "misperception about what counselors do or just [had] a lack of

understanding." One principal candidate stated, "I've never been told what the school counselor is supposed to do, so expectations can be unclear, which can cause conflicts." One pre-service school counselor noted:

> I think administrators in the building often get involved in performing duties or functions that would better be left to school social workers or school counselors. I think administrators feel a great responsibility for what happens in the school building, so because of that, they frequently step on the toes of school counselors who are trained to handle those specific issues . . . and get themselves involved in things that are outside the purview of administrators.

Additionally, principals in the field tended to mis-utilize school counselors through their expectations that counselors should assume roles for which they have not been trained. Candidates observed counselors covering classes, lunch, recess, and bus duty; performing scheduling tasks; and coordinating standardized testing to a higher extent than teachers and other staff. One principal candidate noted that these duties "take counselors away from being accessible and available to students." The frustration voiced most often in regard to these extra duties involved testing. Nearly all of the candidates observed school counselors coordinating the schools' standardized testing, yet they felt this was beyond their role or consumed too much of their time. One school counseling candidate stated, "No one [was] fulfilling the role of the school counselor when they were tasked with other duties," and another school counseling candidate noted that "Their counseling groups get put on hold. . . . From February to April they are busy [with testing]."

A pre-service principal remarked that testing should "be shared equally among staff, not placed on counselors at the expense of their work with students' needs." Another pre-service

principal stated that, in regard to counselors performing testing duties, “I would prefer them used for home life issues with the students, running small groups on friendship, anger management, and all of those kinds of things.” The pre-service counselors agreed. As a part of the educational environment, school counselors understand the necessity of sharing responsibilities such as lunch and recess duties. However, when these duties are allocated chiefly to the school counselor, this minimizes the value and educational contributions these specialized professionals can offer to the academic success of students.

Another frequently voiced frustration in relation to role confusion in the field involved discipline of students by school counselors. All interviewees discussed this role as harmful to students, but it was an “all too common expectation” that principals placed on school counselors. This practice is not “positive or effective” for counselors or students. One principal candidate shared:

> One of the biggest issues is when they [school counselors] have to discipline students that they are supposed to be helping and advocating for, so how can they be the one[s] to reprimand them. . . . It damages that relationship and all future interactions.

Candidates also considered it imperative to hold conversations and educate principals on counselor education and training. They felt that expectations become misaligned, and relationship dynamics become strained, if this does not occur in internship experiences and pre-service program curricula. One pre-service principal stated:

> I think the tension [between school counselors and administrators] comes from lack of knowledge, lack of understanding. I can see where administrators would come to the conclusion that counselors should be used for scheduler or whatever else because there is no one else that can do it . . . and may even see it as part of the role of school counselors

because it is helping students. So the tension comes from lack of resources, knowledge, communication, and understanding on both parts.

One of the most recurring areas of tension reported by both groups was the prominent role of confidentiality in the work of school counselors. Mixed reactions were noted regarding information that should be shared. One principal candidate said she wants "to be informed when issues arise that I need to be aware of." Another leadership candidate stated:

> I think the counselors need to know that administrators need to know what's going on in the school. . . . It's about personal respect, recognizing that we are all responsible for the school, and I know that comes from building a trusting relationship with counselors.

Many of the pre-service school counselors noted their surprise that principals thought confidentiality should be broken for them, based on the premise that principals hold the "ultimate responsibility and liability in a school." Pre-service counselors were cognizant of the delicate balance between informing principals about "the health of the school" and maintaining confidentiality. One pre-service counselor expressed "fear that principals might want to be involved when they don't need to be." Despite the range in responses to confidentiality, both pre-service school counselors and principals stressed the need for more dialogue on the meaning and practice of confidentiality in schools, particularly when students are involved. Further education around ethical and legal professional paradigms was emphasized as necessary in order to assist with the development of a collaborative relationship and the elimination of role confusion.

Discussion and Implications for Practitioners

Candidates clearly experienced positive modeling in the professional relationship of principals and school counselors during their internships, but they also observed traditional role

confusion for school counselors. All candidates shared a need to educate and cooperate with one another relative to their respective roles, functions, and limitations. Observations of model principal-counselor relationships increased the confidence of candidates to fulfill their professional responsibilities, and the majority completed their internships feeling optimistic about their ability to foster a collaborative principal-counselor relationship. As noted by Browne-Ferrigno and Muth (2004), internships allow for the development of professional confidence, as candidates integrate that which they have learned in coursework with practices and applications in the field. Appropriate modeling and mentoring in the internship builds candidates' capacity and confidence through the proper balance of support and challenge, which leads to effective professional practice (Geer et al., 2014; Ringler et al., 2012; Williams, Matthews, & Baugh, 2004; Wood, Swank, & Tyson, 2012).

Some misunderstanding was expected on the part of the principals as to the roles and responsibilities of counselors. As noted by Woodside et al. (2009), counselors in their internships found that principals held differing views on counselor roles, occasionally as clerical assistant or as school leader. Furthermore, Peterson, Goodman, Keller, and McCauley (2004) reported that counselors were mis-utilized and under-utilized, and principals did not respect or fully understand some of the tenets of counselors, such as confidentiality. Often school counselors felt the need to justify their role in students' academic, career, and social domains while taking on extraneous tasks as duties are assigned (Dahir, Burnham, Stone, & Cobb, 2010; Foster, Young, & Hermann, 2005; Mason & Perera-Diltz, 2010). These superfluous tasks diminished the impact of school counseling programs on the culture of the school. During their internship and in their professional roles, counseling candidates soon discovered that they must earn professional credibility with all education stakeholders who may or may not understand

counselors' roles (Johnson, 2000; Peterson et al., 2004). Indeed, counseling candidates often were confronted with the reality of negative attitudes toward their profession by principals and other staff members, which served to isolate them in their career (Peterson et al., 2004). Utilizing school counselors in accordance with their professional training would certainly maximize the benefit to the administration and the school as a whole.

Several recommendations emerged from this study, consistent with prior recommendations, in order to guarantee the proper preparation of future educational leaders who are confident in their abilities and competent in their practices. First, it is important that school counselor and leadership educators ensure meaningful internship experiences for their candidates and prepare them for the reality of the principal-counselor relationship. Principals and counselors are occasionally collaborative, at times they operate in isolation, and the relationship can be adversarial when roles and responsibilities are misunderstood and utilized inappropriately. However, it is important to provide candidates with opportunities to collaborate during the internship process to avoid the reality of leadership in isolation upon entering the field (Mullen & Cairns, 2001).

Modifications in educational training environments have been strongly suggested in order to provide direct models of change and teamwork and to engage school counselors and principals in collaborative leadership that is needed to develop a better understanding of one another's roles and to build on their respective professional expertise (Carnes-Holt et al., 2012; Janson, Militello, & Kosine, 2008; Shoffner & Briggs, 2001). As noted by Dahir et al. (2010), "at the heart of the relationships between school counselors and principals is the convergence of goals about student achievement and school success. Both groups are committed to see students succeed" (p. 288). The first pre-service experiences of counseling and principal candidates often

occur in internships, as their programs are not linked through coursework; thus, many candidates experience a disconnect between the theory of collaboration and its practice. Educators must expose candidates to possible experiences in their internships in order for candidates to maximize student learning and development (Mullen & Cairns, 2001).

Second, university internship coordinators should ensure stronger relationships with the school sites to strengthen internship experiences and future professional practice. Increased collaboration is needed between counseling and leadership educators and site mentors, as well as agreements on the leadership experiences that candidates will encounter and direct (Akos & Scarborough, 2004; Anast-May et al., 2011; Cunningham & Sherman, 2008; Geer et al., 2014; Jackson et al., 2002; Williams et al., 2004; Wood et al., 2012). Third, this study clearly revealed that counseling candidates must possess the ability to articulate and clarify their background and training for principals and other staff. Woodside et al. (2009) and Peterson et al. (2004) found this to be an important role for counselor educators in helping their candidates' successfully transition into the profession.

Finally, counselor and leadership educators need to provide opportunities for candidates to receive and reflect on feedback regarding their internships. Earley (2009) also suggested allowing time for dialogue with their peers on the successes and challenges they encountered in their internships. Providing opportunities for pre-service candidates to discuss their internship experiences and observations across programs would be beneficial for strategizing how best to handle their future principal-counselor relationship. Formalizing the requirement of reflection on internship experiences offers opportunities for candidates to be mindful of the professional and personal growth they are experiencing, as well as provides an outlet for acknowledging their wellness needs (Lenz, Sangganjanavanich, Balkin, Oliver, & Smith, 2012; Smith & Koltz, 2015).

Several study limitations are important to note and provide directions for future research. An increase in the sample size and the inclusion of other universities would aid in greater understanding of the internship experiences of pre-service school counselors and principals. Additionally, a quantitative approach to these experiences would allow for generalizability of the findings.

Conclusion

All pre-service candidates shared an eagerness to support one another in order to serve students more effectively and to perform their respective duties with faithfulness and confidence. Their pre-service experiences led these interviewees to rethink their anticipated roles in a school building and now enter the field with a strong desire to nurture shared decision-making responsibilities amongst all school staff. They realize school counselors and principals occupy key, and sometimes divergent, points of information and data flow, thus, they aspire to interact collaboratively, rather than independently to ensure the successful functioning of a school.

All of the interviewees agreed that a positive working relationship, in which the collective wisdom of all educational leaders is utilized efficiently and effectively creates a healthier school climate and promotes student success for all. This is particularly important as a result of the ever-expanding expectations placed on educational professionals and the changing dynamics of students and schools. These expectations and dynamics can be shaped by the cultivation of a collaborative working relationship between school counselors and principals that can be taught and modeled in pre-service curricula. If improving school climate is important to educational leaders, collaboration and cooperation are necessary between counselors and principals ((Dahir & Stone, 2009; Janson et al., 2008; Kaplan & Evans, 1999; Niebuhr, Niebuhr, & Cleveland, 1999; Riddile, 2009). Candidates should be able to complete their internships with

a clear understanding of their roles and functions in order to successfully enter the profession, and that transition is the responsibility of counselor and leadership educators.

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Table 1

Code Mapping: Three Iterations of Analysis for Exploring School Counselor and Principal Internships

First Iteration: Significant Statements from Transcriptions and Open Coding	
Scheduled collaboration time	Structural and financial pressures
Established trust and confidence	Added responsibilities
Successful working environment	Unclear expectations
Leadership equals	Student needs suffer
Utilized resources effectively	Professional frustrations
Understood role and function	Strengthen communication
Collaboration benefits all	Develop mutual support and trust
Second Iteration: Textural Descriptions from Significant Statements and Themes	
Positive modeling of the principal-counselor relationship	Educate principals regarding school counselor role confusion
Third Iteration: Essence of the Textural Descriptions	
Although pre-service candidates experience primarily positive modeling in the principal-counselor relationship during their internships, they also observe traditional school counselor role confusion and suggest principals be educated on counselor roles and functions.	

Virtual Simulations in a Practice Based Teacher Education

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Abstract

For two decades, the field of teacher education has been shifting towards the medical model of teacher education (Doyle, 1990). Despite efforts to use case study methods and clinical rounds, the field has struggled to provide a cohesive, integrated curriculum that prepares candidates for the classroom. Practice-Based Teacher Preparation (PBTE) provides a model for programs to situate practice within the context of use. Part of the challenge facing teacher educators is the act of teaching itself. In order to teach effectively in today's diverse classroom, pre-service teachers need contextualized preparation on high leverage practices in a supportive environment (Matsko & Hammerness, 2013). The use of virtual simulations such as TeachLivE (Dieker, Kennedy, Smith, Vasquez, Rock, & Thomas, 2014) in pre-service education has the potential to bridge the theory to practice divide for situated cognition, supporting the notion that what is learned cannot be separated from how it is learned and used (Brown, Collins, & Duguid, 1989). TeachLivE simulations enhance the clinical experience by providing a virtual situated learning environment with avatar students prior to clinical experiences with live students.

Teacher preparation in the 21st century continues to be a profession under siege. During the past two decades, calls for more accountability in teacher education have led to increased federal regulation of the profession and exploration of alternative pathways to teaching (Lewis & Young, 2013). In 2010, the National Research Council released its report on teacher preparation programs (TPP). The report noted the wide variety of teacher preparation programs and the lack of a national outcome driven accountability system. Critics of traditional teacher education programs also argued that beginning teachers were woefully underprepared and therefore radically new models were needed to address today's diverse classrooms (Bullough, 2014; Zeichner, 2010). Further, it has been contended that teacher education needs to situate learning to connect the theory of learning to the actual practicing of teaching (Washburn-Moses, Kopp, & Hettersimer, 2012).

The critical question facing the profession is what should these new models of teacher preparation entail? Critics contend that the traditional model of teacher preparation is too generic and has not resulted in impact on student learning (Cochran-Smith & Zeichner, 2005; Haberman, 1996). Part of the challenge facing teacher educators is the act of teaching itself. The complex, inchoate nature of teaching involves situated cognition and performance (Janssen, Westbrock & Doyle, 2014). In order to teach effectively in today's diverse classroom, pre-service teachers need contextualized preparation on high leverage practices in a supportive environment (Matsko & Hammerness, 2013). This has resulted in a shift towards a practice-based teacher preparation program.

Practice-Based Teacher Education

Practice-Based Teacher Education (PBTE) is a model that focuses on high leverage practices in the situated context of use (Grossman, Hammerness, & McDonald, 2009; Zeichner, 2012). Practice-based teacher education programs are defined as preparation pathways with a systematic focus on developing pre-service teachers' abilities to implement high leverage practices that impact student learning (Grossman, 2011;Zeichner, 2012). PBTE programs represent the shift in teacher preparation towards a medical model of education where pre-service teachers explore the contextual nature of their profession and understand the nature of the content they teach (Matsko & Hammerness, 2014).

Transforming Teacher Education through Clinical Practice: A National Strategy to Prepare Effective Teachers (2010), a report by the National Council for Accreditation of Teacher Education's (NCATE) Blue Ribbon Panel on Clinical Preparation and Partnerships for Improved Student Learning, posited that teacher preparation programs need to be "fully grounded in clinical practice and interwoven with academic content and professional courses" challenging programs to meet the needs of 21st century classrooms by creating "a system built around programs centered on clinical practice that offers shared responsibility for teacher preparation, supports the development of complex teaching skills, and ensures that all teachers will know how to work closely with colleagues, students, and community" (p. ii)

This report and successive supporting documentation (Berry, Montgomery, Curtis, Hernandez, Wurtzel, & Snyder, 2008; Darling-Hammond, 2005; Elliott, 2010; Howey & Zimpher, 2010; NCATE 2010a, 2010b; National Governors Association, 2010; NGSS Lead States, 2013) undergirds the practice-based framework and its focus on high-leverage core practices.

The program's focus on high-leverage core practices is to enable pre-service teachers to learn how to use knowledge in action and to reflect the situated decision-making that in-service teachers perform daily (Forzani, 2014). High leverage core practices used in this program have the following characteristics as defined by research:

- Occur with high frequency across different contexts
- Focus on impacting student learning
- Reflect the complex nature of the act of teaching
- Occur across different curricula or instructional methods

(Grossman, Compton, Igra, Ronfeldt, Shahan & Williamson, 2009). As teacher education moves towards a practice-based preparation program in alignment with medical school residencies, the danger is to create a 'technician' model that fails to recognize the messy complexities and inchoate nature of teaching (Grossman, 2011; Zeichner, 2012). Therefore a new curriculum design for PBTE is needed that presents these high leverage practices within the context of use.

Program and Curriculum Design

Effective practice-based teacher education programs are grounded in research and provide pre-service teachers with the opportunities to enact high leverage core practices (Forzani, 2014). An innovative curriculum design incorporates the characteristics of effective PBTE programs with a learning cycle that provides pre-service teachers with myriad opportunities to engage in situated practice. Effective PBTE programs include a learning cycle with the following components: *representations of practice, approximations of practice, enactment of practice, and investigation of practice* (McDonald, Kazemi, & Kavanagh, 2013). *Representations of practice* enable pre-service teachers to view videos of exemplary teachers

modeling high-leverage core practices such as facilitating student led discussions. In the second component, *approximations of practice*, pre-service teachers try out the high-leverage core practice with their peers or in simulated scenarios through immersion software with coaching by their teacher educator. *Enactment of practice* is the implementation of the practice in the classroom situation with coaching and feedback by the mentor teacher. The final component, *investigation of practice*, is a reflective, collaborative analysis where pre-service teachers view videos of their instruction and dialogue with their mentor teacher and teacher educator. Furthermore, the Teacher Work Sample, a summative performance assessment at the end of the program is an in-depth *investigation of practice* that requires all pre-service teacher residents to implement a unit of study, collect student artifacts, video their teaching, and reflect on student achievement.

Pre-service Teachers and Situated Cognition

The myriad opportunities to implement high-leverage practices in context of use entails situated cognition. Situated cognition is defined as the contextualized nature of knowledge, bound by agent and situation (Brown, Collins & Duguid, 1989). Situative theorists posit that the physical, social context of the activity where knowledge is constructed and interaction during it are critical to transfer and application to new settings (Putnam & Borko, 2000). Teacher education programs for the past decade have shifted towards residency programs and professional development schools to enable pre-service teachers to construct knowledge within the context of use.

Pre-service Teachers' Knowledge Structures

Pre-service teachers construct and apply knowledge in different ways from expert practitioners. The instructional strategies that teachers utilize are derived from their problem-

solving abilities. The inchoate nature of teaching has complicated the issue of teacher problem-solving. Research on novice/expert teachers' problem solving confirms that experts organize their instructional strategies/solutions into problem type schemata (Bernardo. 1994). Their rich, deep representational knowledge based allows them to 'chunk' problems into categories and to process information (Bruer, 1993). Conversely, novices due to their inexperience, depend upon the surface level of the problem and utilize lower level reasoning skills (Ericsson & Simon, 1993).

Teaching, as in medicine and law, contains many problems that demand novel solutions. According to Leinhardt & Greeno (1986), teaching is a set of complex cognitive skills that further complicates the process. In order to problem solve, the teacher must attend to incoming data and organize it into existing schemata, which depends upon types and context of prior experiences. Pre-service teachers' knowledge base is therefore often inadequate due to lack of experience (Reynolds, 1995).

Re-conceptualizing Pre-service Teachers' Problem-Solving Abilities

Re-conceptualizion of pre-service teachers' problem-solving during instruction is facilitated when they are given opportunities to verbalize their 'reflection in action' within the context of use (Schon, 1983, 1987). Reflection in action entails pre-service teachers' examining their cognition while teaching in the context of use. Approaches to develop situated cognition entail the use of case studies where pre-service teachers discuss multiple perspectives and pedagogical practices (Doyle, 1990).

However the profession has only recently begun to explore how technology may be used to augment these efforts. In 1998, early efforts by Lampert and Ball explored how to use hypermedia to explore pedagogical problems related to math. The Casebook of Project Practices

(CaPP) was another endeavor to use multimedia case studies to showcase innovative pedagogy in science for in-service teachers (Marx, Blumenfeld, Krajcik, & Soloway, (1998). Limited research has investigated the use of technology to develop pre-service teachers' schemata in regard to problem-solving. According to Carter & Doyle (1989), expert teachers' knowledge is event structured or episodic, context-based, and is organized according instructional features or patterns. Situated cognition takes place in the "context of task-related inputs and outputs (Wilson, 2002, p.626). Mixed reality immersive simulations, such as TeachLivE, are a new tool for the profession to explore for pre-service teachers to develop their schemata regarding instructional problem solving within situated learning environments that resemble a real classroom.

Situated Learning through Mixed Reality Simulations

Virtual learning has been used in other disciplines, such as in law enforcement and health care (Richards & Szilas, 2008) and in aviation (Salas, Bowers, & Rhodenzier, 1998). Virtual learning has been under-employed in educational contexts (Dodd & Antonekko, 2012), yet it holds great promise for teacher education. The use of technology in teacher education continues to develop and TeachLivE is an emerging innovation in that expansion (Dieker, Kennedy, Smith, Vasquez, Rock, & Thomas, 2014). TeachLivE was originally created in 2008 with an interdisciplinary team of education and computer science faculty at the University of Central Florida in Orlando (Dieker, Hynes, Hughes, & Smith, 2008). According to Nagendran, Pillat, Kavanaugh, Welch, & Hughes (2013), TeachLivE is an avatar-mediated teacher training system that operates with a "human-in-the loop approach" [that] combines digital puppetry (Hunter and Mapes, 2013; Mapes, Tonner, & Hughes, 2011) with basic Artificial Intelligence processes.

Milgram & Kishino (1994) proposed a reality-virtuality continuum that traverses a complete physical reality to a complete virtual reality. In the middle of the spectrum is augmented reality. Augmented reality (AR), also known as mixed-reality (MR), combines both real and virtual realities for an interactive learning environment (Milgram and Kishino, 1994). Mixed reality denotes an environment that is both virtual and real, allowing students to connect with prior learning (Squire & Klopfer, 2007) and to contextualize learning beyond the classroom (Liu, Tan, & Chu, 2009).

Lindgren and Johnson-Glenberg (2013, p. 447) suggest that there are two characteristics of mixed reality environments. First is that they situate the student inside the simulation and, as in the case of TeachLivE, the students become a part of the simulation. Second, the technology is responsive to the student's movements within the simulation. TeachLivE satisfies both requirements for mixed reality learning environments. As the teacher trainee enters the TeachLivE simulation, on the television screen is a virtual classroom with five avatar students. A camera and speakers allow the off-site interactors who control the avatar students to see the teacher trainees as they interact with the avatar students. In TeachLivE, the Kinect X Box tracks the teacher trainees' actions so that they appear to move through the avatar mediated space on the screen, shifting closer to an avatar student to address her individually or addressing the class as a whole group. Teacher trainees experience a sense of immersion that *feels* like a real classroom with real students. This sense of immersion into the virtual classroom necessitates that the teacher trainees experience *situational plausibility*—the possibility that they could actually be teaching a real class—and *place illusion*—the feel that the mixed reality space has the sensation of a real classroom (Hughes, 2014)—as they negotiate a seemingly physical environment that mingles both real and virtual spaces.

TeachLivE utilizes virtual characters involving human interactors who control the personality of the student avatars acting as students in a classroom with the human teacher trainees. The interactors—who regulate the avatar students—have previously studied and prepared for the teacher trainees' lesson and objectives and respond as typical students. Avatar classroom behaviors may be modulated on a scale from 1 to 5 (with 5 representing the most intense behavior problems), depending on the goals of the session.

As teacher trainees engage in the immersive mixed reality lab, they interact with the five middle school level or high school level avatars. The avatar-students are based in descriptions of adolescent development using William Long's classification of adolescent behavior, combined with Rudolf Driekur's theory of adolescent maladaptive behavior and other developmental theorists (Andreasen & Hacimeroglu, 2009), allowing teacher trainees to practice instructional problem-solving and reflection in a mixed-reality, immersive classroom that is based upon a real classroom with live students. Two extremes of the personality types of the avatar students within TeachLivE are Sean—who is the aggressive-dependent style and who requires ample teacher attention from the teacher trainees, and Maria—who is the passive-independent style and who does not appear to demand any attention from the teacher trainees (Hughes, 2014). The other avatar students—Ed, Cindy (CJ), and Kevin—are comprised of various personalities within the dependent-independent and aggressive/passive polarities. Ed is the passive-dependent who desires the teacher trainee's attention but is too polite to demand it; CJ is the aggressive-independent avatar student who is a class leader, but who has disregard about the teacher trainee's rules or expectations; and Kevin, who is the dependent-aggressive style and who relies on CJ's attention within the immersion experience (Hughes, Nagendran, Dieker, Hynes, & Welch, 2015, p. 136). Figure 1 (TeachLive, n.d.) depicts the middle-school student avatars (Ed in

the front left and Sean in the front right; Maria in the back left; CJ in the back middle; and Kevin in the back right).

Figure 1: Middle School Avatars

The avatar-students will respond to questions and join in multiple forms of pedagogy at an individual, paired or classroom level approach (Hayes, Hardin, & Hughes, 2013), resulting in an a sense of deep presence, immediacy, and immersion (Bronack, 2011) and with that engagement, the development of cognitive flexibility in classroom situations (Dieker, et.al., 2013). Teacher trainees may practice higher-order questioning, classroom management, or other high leverage instructional skills based upon the professor's goals for the session.

A further extension of situated cognition within TeachLivE concerns the time constraints that may be built into the simulation in the virtual classroom (for example, requiring a fifteen minute lesson) that allow a real-time application of teaching; this is known as "time pressure" in situated cognition (Brooks, 1986; Pfeifer & Scheier, 1999) and it suggests learning that occurs as it would happen within a classroom where time is a crucial challenge facing teachers. A teacher trainee can practice repeatedly until mastery is achieved without any harm to actual students and

without students remembering the learning curve toward mastery of a high leverage practice (Judge, Bobzien, Maydosz, Gear, & Katsioloudis, 2013; Katsioloudis & Judge, 2012).

Following the mixed reality immersive session with avatar students, teacher trainees may then employ "reflection in action" (Schon, 1983, 1987) within the context of their virtual classroom experience. Through coaching and peer feedback that can occur before, during (e.g. Elford, Carter, Aronin, 2013) or after the TeachLivE immersive simulation, teacher candidates begin to develop instructional problem solving abilities before they enter their clinical placement through the simulations.

The use of TeachLivE in pre-service education has the potential to bridge the theory-to-practice divide for situated cognition, supporting the notion that what is learned must be presented within the context of use (Brown, Collins, & Duguid, 1989). Situated learning from a learner-centered perspective (Koc & Bakir, 2010) provides a useful framework for virtual environments (VE's) in teacher education contexts. TeachLivE has been found to provide a safe place to practice and to provide corrective advice (Dieker, et al., 2013) in a simulated learning environment. Figure 2 pictures a teacher trainee interacting with a high school class of avatar students.

Figure 2: Teacher trainee in TeachLivE

TeachLivE within Practice Based Teacher Education

Coupled with research based practices (e.g. Lowenberg-Ball, 2012) and traditional clinical placements, mixed reality simulations such as TeachLivE can provide a powerful application of situated learning for pre-service candidates. For example, making content explicit through modeling and explanations is one of Lowenberg-Ball's (2012) high leverage practices. A TeachLivE simulation that focuses on this practice prior to implementation in a clinical placement increases the effectiveness of the practice in a clinical placement at a later time. Similarly, pre-service students may practice appraising, choosing, and modifying a learning goal (Lowenberg-Ball, 2012) within a specific learning segment with the avatar students before implementation with live students. Situated learning within an immersive learning environment connects high leverage practices and clinical placements. TeachLivE can be used in a Practice-Based Teacher Preparation Program to prepare candidates for the field as illustrated in Figure 3.

High Leverage Practice (Lowenberg-Ball, 2012)	edTPA	TeachLivE Simulation	Clinical Placement
Making content explicit through modeling and explanations	Task 1: Planning a Learning Segment	Implement content specific learning segment with avatars.	Implement content specific learning segment in field placement.
Appraising, choosing, and modifying a learning goal	Task 1: Planning a Learning Segment Task 2: Instruction	Differentiating a learning segment with avatars	Differentiating a learning segment in field placement.

Figure 3. Implementing high leverage practices with TeachLivE

Simulation learning within a mixed reality environment such as TeachLivE provides teacher candidates with a "safe space" to be introduced to the high leverage practices (Lowenberg-Ball & Forzani, 2011) that impact student learning, such as making content explicit. Teacher trainees may practice critical high leverage strategies without risk to real students. The situated learning that accrues through the immersive learning instructor between teacher-trainees and avatar students serves as the conduit for those high leverage practices to dependably emerge in the clinical setting.

TeachLivE delivers a mixed-reality environment in which novice teacher education candidates may immerse themselves in high leverage classroom practice with avatar students. Specifically, TeachLivE provides McDonald, Kazemi, & Kavanagh's (2013) *representations of practice, approximations of practice, enactment of practice, and investigations of practice.* Additionally, unlike the situated learning within traditional clinical placements, TeachLivE supports a laboratory learning environment where teacher trainees may practice their instruction with low risk to both the trainees and to human students. While the situated learning of simulations such as TeachLivE has the potential to promote learning, the specific activities that teacher trainees perform within TeachLivE "must be designed such that they engineer the desired instances of understanding" (Lindgren & Johnson-Glenberg, 2013, p 448). To design a PBTE, the four phases of learning need to be incorporated into TeachLivE as a mediation system that bridges the classroom learning and the systematic use of high leverage practices in clinical field experiences. The following components of the learning cycle of a PBTE program reflect this linkage. Figure 4 depicts the learning cycle with TeachLivE outcomes and edTPA tasks.

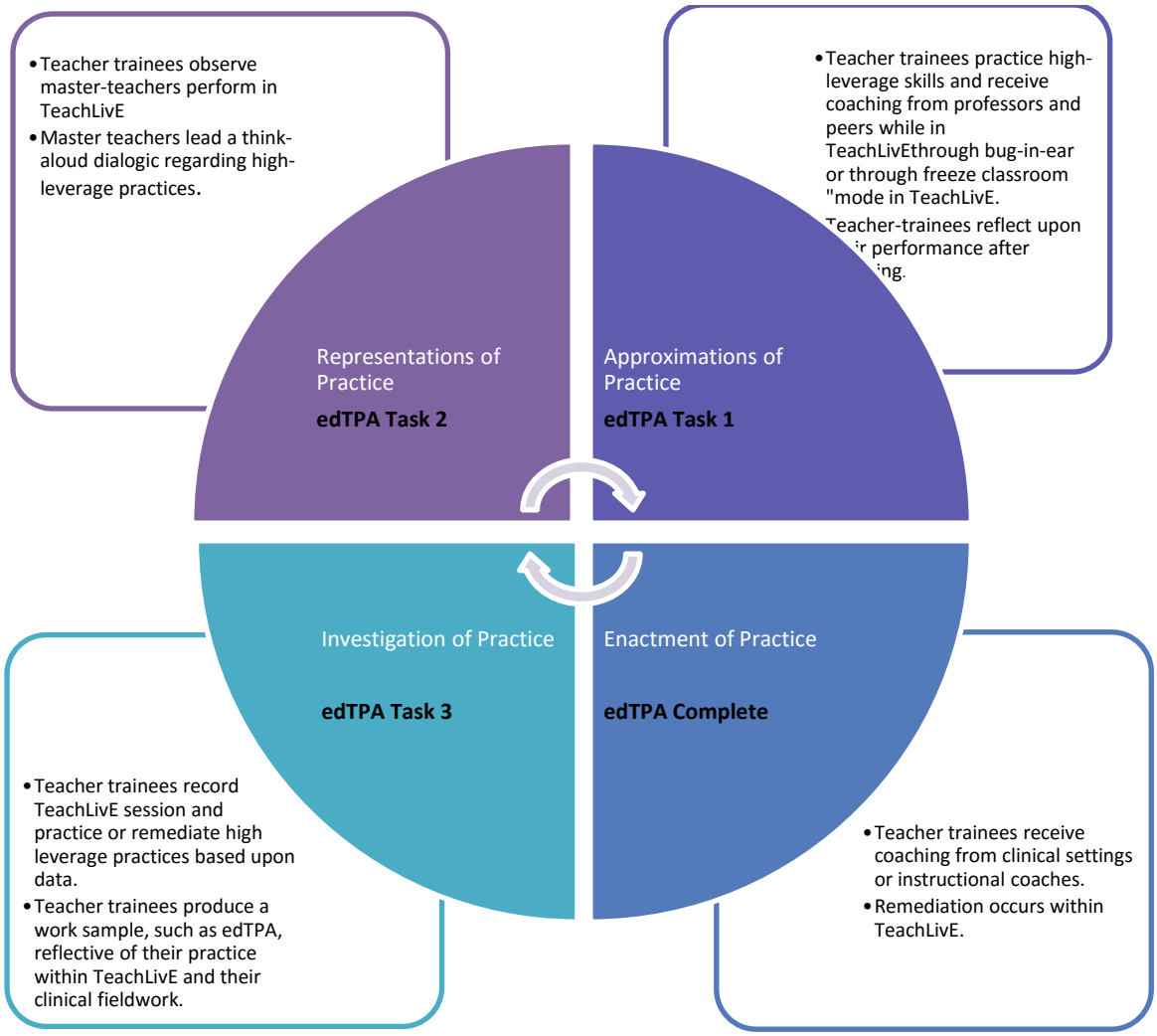

Figure 4: O'Callaghan & Piro's Practice-Based Teacher Education Program

Representations of Practice

Representations of practice are experiences that help novices in a profession see and understand their future profession (Grossman, Compton, Igra, Ronfeldt, Shahan, Williamson, 2009). Previous technologically oriented uses of situated learning employed videos of practicing teachers to represent professional practice. In TeachLivE, the student-trainees see a virtual representation of a classroom with students, desks, bulletin boards, etc. If the laboratory accommodates the space, an entire class can observe a master teacher implement a lesson with

the avatar students and then debrief to unpack the session. Through a 'think-aloud' master teachers can share their rationale for selecting specific core practices in response to avatar students' behaviors. This dialogic process provides teacher trainees with a more transparent representation of practice.

Approximations of Practice

Approximations of practice allow teacher trainees to repeatedly try the more complex skills of the profession within a safe environment where they are coached and supported (Grossman, et al., 2009). Teacher trainees try out the high-leverage core practices in simulated scenarios; they receive feedback from their professors and peers from the simulated classroom. Feedback may occur during the simulation through bug-in-ear coaching(Elford, Carter, Aronin, 2013), in "freeze classroom" mode—where the trainees may step out of the simulation, acquire coaching, step back into the simulation and "start classroom" again—and in post-simulation instructional sessions. Teacher trainees may then self-reflect upon their experiences within TeachLivE after the coaching, challenging their previous assumptions and formulating future action plans based upon their experience and feedback (Kitychenham, 2008). Through this approximation of practice, teacher trainees are able to repeat complex, high-leverage practices within their context of use to gain confidence and mastery.

Enactment of Practice

Enactment of practice provides teacher trainees with opportunities to apply their pedagogical skills in classroom settings (McDonald, Kazemi, & Kavanagh, 2013). Teacher trainees use the knowledge and skills they gained through TeachLivE and apply them in the diverse field setting. If problems arise, the TeachLivE simulation lab provides a vehicle to remediate those skills. Coaching within TeachLivE can additionally be garnered from

professionals in clinical settings and from school district personnel for practicing teachers. A student teacher's mentor teacher or a practicing teacher's supervisor or instructional coach may provide coaching before, during or after a TeachLivE session that specifically focuses on remediation of a high leverage practice. This practice supports university/school district partnerships.

Investigation of practice

Investigation of practice entails reflection on action and the use of data as evidence of impact on student learning (McDonald, et al., 2013). Teacher trainees complete a teacher work sample such as the edTPA (SCALE, 2013) to analyze their planning, implementation, and impact on student learning. Each of these skills may be practiced or remediated in a TeachLivE simulation. Working with their mentor, the teacher trainees analyze their actions from recorded TeachLivE sessions and determine changes in practice based upon the evidence, coaching and the after session reflection. This investigation of practice completes and re-generates the pedagogical cycle as their analysis often points to the need for teacher trainees to further develop their high-leverage practices outside of the TeachLivE mixed reality immersion.

Conclusion

Ideally, teacher education programs will provide multiple clinical experiences that span years and milestones in learning as candidates learn to teach—from early field experiences to pre-student teaching field experiences, and then to the capstone experience of student teaching. Yet, virtual simulation experiences provide one more layer of situated learning experiences within a clinical setting that is not quite "real", but that provides the feel of reality and immersion for the teacher education candidate. TeachLivE simulations situate the learning that will support subsequent clinical placements. Whether they are planning and implementing the pedagogy of a

lesson or focusing on content, teacher trainees can use multiple forms of instruction within TeachLivE. McDonald's, et al., (2013) *representations of practice, approximations of practice, enactment of practice, and investigations of* ground a practice based teacher education when TeachLivE simulations precede and occur simultaneously in clinical experiences in schools. In essence, TeachLivE enhances the clinical experience by providing a virtual situated learning environment with avatar students prior to clinical experiences with live students. When augmented with a focus on research based practices, mixed reality simulation experiences provide situated learning experiences prior to clinical experiences as part of Practice-Based Teacher Preparation Program.

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Summer Institute Adds STEM Spin for Pre-Service Teachers'

Alternative Field Experiences

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At 8 a.m., the school busses start rolling onto the Kansas State University campus, slowly wiggling their way through the tight bends of the curved campus streets. They ease to a stop, and hundreds of middle school students step off, greeted by KSU College of Education students. It's the first week of June, so it's unusual seeing so many students—large or small—swarming into the College of Education's Bluemont Hall.

Approximately 350 fifth- through ninth-grade students chatter with excitement as they gather around KSU students holding signs designating the name of their respective classes. KSU students hand out name badges and lead the group into their classrooms. But, unlike many traditional classrooms, the chatter rarely stops and the students seldom sit down as the teaching begins. For nearly four hours each morning, the students are predicting, creating, and experimenting, while KSU students assist a licensed classroom teacher in the hands-on activities.

It's Summer STEM Institute, and for five years, the camp has turned Bluemont Hall into a lively, bustling center for learning, providing an alternative field experience for the KSU pre-service teachers.

The Basics

For years, the COE's Department of Curriculum and Instruction has provided a fairly traditional approach to teacher training for students in its secondary education program; it includes an early field experience, followed by a Block 1 experience, then Block 2 (which

involves the various content methods courses), and culminating with their student-teaching semester.

Each semester, the COE offers Core Teaching Skills, an introductory course in which secondary students in the Teacher Education program have their first field experiences involving preparing and teaching mini-lessons and interacting with students in a significant way. The course includes a seven- to eight-week field experience in partnership secondary schools; Field Experience Office staff work to place the students in their content areas, if possible.

They spend two and a half hours two days a week for a total of approximately 30 hours in middle school or high school classrooms. In pairs or groups of three, the students use that time to observe their cooperating teacher, interact with students as much as possible, and teach a minimum of two 15- to 20-minute lessons, one in their team and one individually.

This system has worked well for the fall and spring semesters; however, due to the program requirements, many students need to make use of the summer semester to keep moving through their courses. In previous years, the COE has been able to offer a version of Core Teaching Skills in the summer semester, but it involved either eliminating the field experience or making use of local schools' summer sessions. However, due to budget cuts throughout the state, summer school in many districts is no longer an option. Therefore, since the COE could no longer rely on traditional summer school, there needed to be another option so students could get valuable experience with secondary students during the summer semester.

Starting STEM

A few years ago, the COE and a partner district began examining other possibilities to strengthen the summer Core field experiences. The solution was found in a federal grant that provided enrichment opportunities for local school students, as well as the KSU undergraduates.

Begun in summer 2011, the camp is a collaborative venture between Manhattan-Ogden USD 383 and the Curriculum and Instruction Department of KSU's College of Education. Funded through a U.S. Department of Defense Education Activity (DoDEA) grant designed to "increase understanding of the unique needs of military children, as well as academic support to improve educational opportunities and outcomes for military children" (Manhattan-Ogden USD 383, 2015), the camp provides a learning opportunity for fifth- through ninth-grade students from the local school district—15 percent military-connected students, as well as for the pre-service teachers as they take their introductory class in the College's teaching program. The initial 3-year grant, for $677,000, was extended in 2014 with another $1.7 million.

The local school district uses the camp as an opportunity for summer enrichment in the STEM fields—science, technology, engineering, and mathematics, while providing the young students with an opportunity to explore a university campus and see a college degree as a possibility down the road. Meanwhile, the College uses the course to provide a field/classroom experience for the summer Core Teaching Skills course for its secondary students.

For its first summer, the camp had 169 middle school students in grades six through nine, working with 20 USD 383 faculty and administrators and 39 KSU pre-service teachers. Through the years, the camp has added two supporting locations, Manhattan Area Technical College and STARBASE, a Department of Defense youth program that uses hands-on activities to enhance the math & science programs in schools at the Manhattan National Guard Armory, where additional courses are offered. For the 2015 summer, the camp had grown to 348 USD 383 students, 54 COE students, 18 possible offerings on the KSU campus, and 26 USD 383 teachers and administrators. Tables 1 details the ages and gender of students attending; it should be noted that the program was opened to fifth graders in summer 2014. Because the grant that supports

this STEM Institute is military related, officials record details of the number of military-connected students who enroll in the summer program, as shown in Table 2.

Table 1

Who is attending?

Yr	5th	6th	7th	8th	9th	Totals	M	F
2015	120	110	60	46	13	349	194	155
2014	110	95	62	35	13	315	186	129
2013		90	69	26	6	191	124	67
2012		93	56	31	11	191	114	77
2011		76	49	33	11	169	87	82

Table 2

Military students: 52 students, 15.1%

June 11, **2015**

	Grade					
Gender	**5**	**6**	**7**	**8**	**9**	**Total**
F	54	49	26	24	2	155
M	66	61	34	23	10	194
Total	**120**	**110**	**60**	**47**	**12**	**349**

June 11, **2014**

Grade Level	Male	Female	Total
5	60	48	108
6	56	35	91
7	36	26	62
8	27	8	35
9	4	8	12
Total	**183**	**125**	**308**
	59 %	41 %	

Tables and information provided by USD 383.

How It Works

From the middle school perspective: Each spring, students in grades five through nine can sign up for the voluntary camp, which is used to enhance learning, rather than for remediation. The students can select a class from several options for each of the four weeks; administrators for the program then pair the students with classes, trying to match their choices as closely as possible. They then attend a class, 8:30-11:30 a.m. Monday through Thursday,

before switching to another course the following week. Topics for the most recent camp included: outdoor biology; GPS; Monster Storm; Need for Speed; Science of Sports; 3D printing; wind energy; solar construction; electronic textiles; roller coasters; chemistry of candy; vet med; Hollywood science; CSI; Flour, Food and Fido; City of Minecraft; Mission to Mars; and Video Game Design.

From the undergraduate perspective: Pre-service teachers in Core Teaching Skills spend approximately two weeks in class for the lecture portion of the course, where information is frontloaded before starting the field experience. They are required to spend a minimum of 30 hours in public school secondary classrooms through the semester. For the summer course, they spend nearly 50 total hours working face-to-face with students. It's an intensive experience for the students, yet it continues to receive outstanding feedback—much higher than what is received regarding the more traditional fall and spring semesters when KSU students travel to various schools for their field experiences. Throughout the experience, the KSU professor and instructor are meeting with their students to check in on their progress, while also visiting the classrooms to evaluate their students' lessons they're teaching. On Fridays of each week, the undergraduates spend half the morning meeting with their KSU instructors and the other half of the morning meeting with their USD 383 teachers to reflect on the previous week's lessons and to plan for the upcoming week.

Reflections

A great deal of research exists regarding STEM-related teacher training. It includes documenting the need for more science training for elementary pre-service teachers (Marcum-Dietrich, et. al., 2011; Wallace and Brooks, 2013) and a move away from the traditional approaches to developing more hands-on learning as they prepare to teach science in their own

classrooms. Robnett (2015) addresses gender bias that can alter students' abilities to see themselves in a STEM-related career and the need for a supportive network. These are obvious connections to the KSU STEM summer project, especially since Summer 2016 will include elementary pre-service teachers in addition to secondary.

Likewise, further research exists regarding the value of pre-service teachers in a variety of content areas gaining from field experiences through non-traditional approaches such as camps related to their content (Canizales, et. al., 2003; Pane and Salmon, 2011).

While the KSU STEM program provides content-specific training through this non-traditional field experience for its preservive teachers in STEM-related fields, other pre-service teachers do not have that luxury. Therefore, the most obvious issue with the camp is that not all of the KSU students will be future STEM teachers; instead, the contents represented by students enrolled in the course include music, language arts, agriculture, family and consumer sciences, and modern languages. Our project attempts to merge all of these contents into a single program that emphasizes STEM subjects and pushes some students out of their content comfort zone.

During the fall and spring semesters, students are placed in pairs or groups of three in their own content area—or the most related content available. This lack of their content in Summer STEM continues to be a concern initially for the non-STEM college students before the actual field experience begins. However, those concerns quickly dissipate when they get involved with the middle schoolers.

Undergraduate Feedback Themes

The pre-service students provided feedback about the STEM experience. In studying the responses, they fell into five main categories: Overall/general comments; the people involved in the program; the STEM students; teaching skills; and the uniqueness of the experience.

Overall/General

Several students' remarks were overall comments about their experiences.

"Getting to work with the STEM program was the best part for me."—Student 1, whose content was biology.

"I loved it…."—Student 2, math.

"…I wouldn't trade my summer block experience for the world."—Student 3, agriculture.

"It was one of the best courses I've taken."—Student 4, English.

"…I don't think this summer could have gone any better. The experience and knowledge I gained…is irreplaceable."—Student 5, English.

"I loved it!"—Student 6, music.

"I thought it was a great experience."—Student 7, chemistry.

An English major, student 8, when explaining what she enjoyed the most, stated, "Pretty much everything."

"The experience was very busy yet very enjoyable."—Student 9, chemistry.

The People

Several noted the individuals they were working with through the camp, from cooperating teachers to fellow undergraduates.

"All the awesome people I've gotten to work with."—Student 10, FACS.

"I got to meet a lot of great people: 383 teachers, classmates and students. Everyone is so cool!"—Student 2, math.

"The relationships we built with our FE (field experience) groups were awesome! I know that these future teachers will be amazing and I am so glad I got the opportunity to work with them and build friendships with them."—Student 11, social studies.

Several commented on their cooperating teachers from the school district.

“Being placed with such a great teacher. It was truly a great experience.”—Student 12, art.

“I was lucky to work with (a teacher) who was a special ed teacher. I learned so much by just observing her in the classroom.”—Student 13, agriculture.

“How much I was able to take away ‘from my co-teacher. She was very helpful and had a lot of good insight about teaching.”—Student 14, agriculture.

“Being placed with such a great teacher. It was truly a great learning experience.”—Student 12, art.

STEM Students

“Meeting all the different students and building relationships with them.”—Student 15, chemistry.

“Getting over my fear of little kids.”—Student 16, agriculture.

“How much experience I got with students even though I won’t be teaching middle school. It was a great experience and made me think that middle schoolers aren’t as bad as we were in middle school.”—Student 17, agriculture.

“How enthusiastic the students were to be there and to learn.”—Student 18, English.

“It reminded me I enjoy working with kids….”—Student 19, social studies.

“I love children and this has really solidified to me that I am in the right major. :)”—Student 6, music.

“The biggest positive from the summer was working with the STEM students. Core was a bright point of the summer semester; I wouldn’t change a thing.”—Student 20, social studies.

“I really enjoyed getting to work with the kids.”—Student 14, agriculture.

“Great instructors and great interactive experience with STEM students.”—Student 21, chemistry.

“The connections made with youth.”—Student 22, social studies.

Teaching Skills

“I loved teaching STEM because I learned flexibility and how to relate to students! I love seeing students…come back from past weeks to say hello to me.”—Student 23, agriculture.

“A low risk opportunity to interact with students and try different teaching techniques.”— Student 24, math.

"This summer has got me much more comfortable with teaching and being myself in the classroom.”—Student 25, chemistry.

“I’ve gained so much confidence in my teaching abilities throughout the summer.”—Student 26, social studies.

“I learned about what I need to improve on.”—Student 27, social studies.

“I learned tons about classroom management!”—Student 28, English.

“Getting experience in a classroom.”—Student 29, music.

“I really enjoyed the curriculum for this class and lab. I think it did a great job to lay the foundation to our teaching skills by offering plenty of hands-on experiences.”— Student 30, business.

“…I was taught everything I need to know to be efficient within the classroom and working with all the kids in STEM!!”—Student 31, agriculture.

“Learning how to better interact with students, and how to handle rowdy students.”—Student 32, chemistry.

"I have become more comfortable with teaching and no longer get nervous when teaching."—Student 33, math.

Uniqueness of the Program

Some commented that the summer program providing a unique opportunity as compared to traditional field experiences what what they enjoyed the most.

"Working with teachers and students in a non-school setting."—Student 34, English.

"Being a part of the entire teaching experience, not just coming every other day like we would in a normal classroom."—Student 35, chemistry.

"I really enjoyed the creative learning that I got to watch and participate in everyday with the STEM students."—Student 36, English.

"I really enjoyed working with kids in a very unique setting. Most people just have another field experience, but we got to see a whole new look at education."—Student 30, business.

Additionally, these field experiences support the research of Richards (2007), as it provides more experience for pre-service teachers and middle-level students working together. Yet it adds another element—providing extensive time for the pre-service teachers to collaborate with their cooperating teachers, in this case licensed teachers from various levels in the local school district. They are provided valuable lesson-planning and reflection time so they can learn from teachers with whom they work side by side.

Final Thoughts

In a class discussion, one university student commented that the field experience had felt more like summer camp than actually teaching and was wondering if it was a legitimate field experience preparing them for their chosen career.

A few days later, upon completing one summer of camp, planners discussed its success and how all teaching and learning should follow this format. Organizers laughed, at the time, believing it was wishful thinking, but changes may be on the way that could help accomplish that vision. While the camp has been successful for numerous years, the COE has reached a point where it wants to consider expanding the project. The most natural fit would seem to be using the KSU field experience students to help lead after-school programs during the fall and spring semesters.

Ideally, organizers could add an "A" to STEM, to bring it to STEAM, and including elements of the arts. This could be in the form of writing, music, and art-related classes.

The STEM program was created out of a dual need—for summer enrichment opportunities for the local school district's students and for pre-service teachers to be able to have a valuable field experience in the summer. In the past five years, this program has developed into a popular summer program for all groups participating, from public school fifth- through ninth-graders to university undergraduates to teachers, instructors, and administrators. It is a STEM program that has spread beyond the science, technology, engineering and mathematics boundaries.

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