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Inquiring about Inquiry: A Research Journey

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Inquiring about Inquiry: A Research Journey

Abstract

It is the responsibility of teacher educators to ensure that novice teachers are reflective practitioners who can critically examine their own practice. One promising practice that supports the development of this reflective stance is teacher inquiry. In this descriptive case study, the authors present data collected from three teacher candidates who engaged in classroom inquiry during a required, semester-long practicum seminar. Data included teacher candidate's inquiry questions and written summaries of their inquiry projects. Data were analyzed using a priori codes gleaned from the competencies identified in the state-mandated teacher candidate assessment system implemented in the northeast state where the research was conducted. In addition, inductive codes that emerged from the data and were informed by the literature were analyzed to identify themes across inquiry questions and projects. Implications for teacher preparation are presented.

In the past decade, teacher education has come under increased scrutiny (Greenberg, McKee, & Walsh, 2013) as policymakers and school districts call for assurances that all new teachers enter the classroom ready to meet the needs of an increasingly diverse population of learners (Cochran-Smith et al., 2016; Goldhaber, Cowan, & Theobald, 2017). Although much is known about the positive impacts of effective teaching on student learning (Stronge, Ward, & Grant, 2011), preparation programs lack clear guidance about how to measure candidates' effectiveness (Goldhaber, Liddle, & Theobald, 2013; Goldhaber, Cowan, & Theobald, 2017; Waggoner & Carroll, 2014). It is not surprising, then, that pedagogical approaches and measures of effectiveness vary widely across teacher preparation programs (Darling-Hammond, Chung, & Frelow, 2002). Regardless of approach, the aim is to prepare candidates with the skills and characteristics of effective teachers, such as the ability to design and deliver effective lessons, to reflect on their practice, and adjust their instruction in response to student assessment data (Stronge, Ward, & Grant, 2011).

One promising practice, teacher inquiry, has been shown to support the development of a reflective stance that is critical for effective practice (Cabaroglu, 2014; Cochran-Smith & Lytle, 1999; Lattimer, 2012; Stremmel, 2007). Teacher inquiry, also described as action research (Goodnough, 2008; Vaughan & Burnaford, 2016), practice-based inquiry (Walton & Rusznyak, 2016), and teacher research (Stremmel, 2007), can be understood as a journey from dilemma, to problem-solving, to empowerment as novice teachers develop increasing levels

of professional expertise along with the ability to reflect on and improve their instruction (Cochran-Smith, 2012). Through inquiry, teachers learn to ask important questions, collect and analyze data, measure and reflect on the impact of their instruction, adjust their teaching in response to the findings of analysis, and engage in reflective practice (Vaughan and Burnaford, 2016). Incorporating teacher inquiry in teacher preparation programs creates opportunities for candidates to develop the skills and competencies of effective teachers.

Given a large and growing body of literature pointing to the benefits of teacher inquiry, we were interested in examining how integration of teacher inquiry in a clinically-based teacher preparation program supported the development of professional competencies as measured by one state's professional standards for teacher candidates. In fact, this research was conducted in response to a new teacher candidate assessment system mandated by our state's Department of Education, which called on preparation programs to provide evidence of candidates' impact on K-12 learners. For the purposes of this research, we considered teacher inquiry to be the systematic collection and analysis of data to answer a question or grapple with a problem of practice. We sought to answer the following questions:

- How does implementation of a teacher inquiry model prepare teacher candidates to be effective, reflective practitioners?
- How do teacher education candidates describe the benefits and challenges of their participation in classroom inquiry in their practicum settings?
- How can teacher inquiry be used as a measure of candidates' developing professional competencies and their impacts on K-12 student learning?

The Powerful Potential of Teacher Inquiry in Teacher Education

Teacher inquiry, or teacher research, is not a new idea; yet, given increased interest in teacher effectiveness, there is renewed interest in examining how teacher inquiry benefits teachers, teacher leaders, and teacher candidates (Athanases, Bennett, & Wahleithner, 2015; Cochran-Smith & Lytle, 2009). It is important to note that teacher research is described in a variety of ways (Lattimer, 2012; Rich & Hannafin, 2008). Goodnough (2008), for instance, examined a process of Participatory Action Research (PAR) that prepared teachers to examine and critically reflect on their practice. More recently, Schutz and Hoffman (2017) used the term "action research" (p. 10) to describe a systematic and fluid approach to examining one's own practice. There is agreement across these models, however, that teacher inquiry prepares candidates to think, assess, design and implement instruction, reflect, and develop a teacher researcher identity that is critical for ongoing inquiry (Davis, Clayton, Broome, 2017, Schutz & Hoffman, 2017).

Teacher inquiry is also a powerful tool for professional development of practicing teachers when used as one part of a comprehensive approach to professional development. Findings gleaned from teacher inquiry can be used to inform school-based or district-wide curriculum development and guide school change initiatives (Leat, Reid, & Lofthouse, 2015). Vaughan and Burnaford (2016) conducted a comprehensive review of the literature to better understand how inquiry benefited inservice practitioners. They found that classroom-based research supported the development of a reflective stance among practitioners as they engaged in participatory, critical inquiry and supported their development of teacher leaders. When inquiry is embedded in university-based professional development programs, faculty can leverage “the dispositions embedded within the process to guide their programs and support teachers in professional goals” (Vaughan & Burnaford, 2016, p. 282). In light of calls for greater accountability for teacher education programs and given the powerful benefits, teacher inquiry has an important place in teacher preparation programs.

There is strong evidence that practicing teachers benefit from opportunities to engage in teacher inquiry. Teacher candidates may also benefit from regular opportunities to closely examine their teaching as they reflect on how their instruction impacts student learning (Cochran-Smith & Lytle, 2009; Truxaw, Casa, & Adelson, 2011). As candidates learn how to collect and use data to plan evidence-based instruction and adjust their teaching in response to students’ performance (Athanases, Bennett, & Wahleithner, 2015; Truxaw et al., 2011), they develop the knowledge and skills needed to assess and respond instructionally (Schutz & Hoffman, 2017; Timperley, Wilson, Barrar, & Fung, 2007). Ortlieb and Lu (2011) argue that teacher candidates who develop an inquiry-based stance to learning are positioned to become change agents in their classrooms. Taken together, this suggests the potential power of inquiry to strengthen candidates’ practice and help them become effective teachers.

In response to a large body of evidence in the literature and the desire to examine how inquiry benefited teacher candidates at our university, we sought to examine if and how teacher candidates benefited from participation in an inquiry project in the context of a semester-long, field-based practicum. Similar to Cochran-Smith & Lytle (1999; 2009), we view teacher inquiry as a structured, systematic approach. The model used at our university calls for recursive and iterative data collection and analysis occurring across multiple phases. This multi-phase approach to inquiry has been integrated into our initial licensure programs for two decades. This model allows us to teach our candidates how to collect and analyze data, to closely examine the effectiveness of their instruction, adjust their practice when necessary, and develop a reflective stance. In response

to a newly developed teacher candidate assessment system in our state, we felt it was important to look closely at our model and consider how it might be used to teach and assess developing teachers' competencies.

A Teacher Inquiry Model

Similar to Murphy (2013) and others (Schutz and Hoffman, 2017), we argue that teacher inquiry is most effective when it is framed by a systematic and carefully scaffolded process. The teacher inquiry model used in this study was developed more than two decades ago for teacher education programs in the graduate school of education at our university (See Figure 1). Grounded in the work of Cochran-Smith and Lytle (1999) and Power and Hubbard (1999), this seven-step model is a useful tool to support teacher candidates as they engage in classroom-based inquiry.

The first phase requires the candidate to identify an authentic question in his or her own practicum setting. Key to this first phase is paying attention to classroom activities and experiences that cause the candidate to wonder and question. The candidate develops a hypothesis and designs an inquiry plan to study an instructional strategy or a process to answer the inquiry question or respond to the hypothesis.

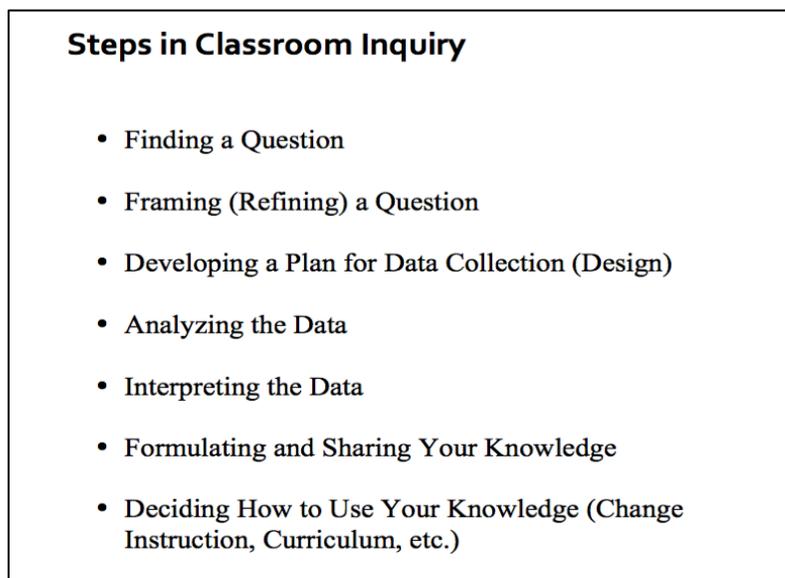


Figure 1. Steps of Classroom Inquiry
(Cochran-Smith and Lytle, 1999; Power and Hubbard, 1999)

Next, candidates collect data that aligns with the question asked or the problem posed. When inquiry is taught and modeled in the teacher education classroom, candidates become aware of the rich range of classroom data available and learn how to collect, record, and examine these data in an ongoing, iterative process (Dresser, 2007). Given the recursive, iterative nature of inquiry, the field notebook or reflection log is an important tool as it becomes a primary source of data and a record of observations. Use of a field notebook invites teacher candidates to experience and value the process of reflection in action (Loughran, 2002; Schön, 1983; Stremmel, 2007).

After candidates have completed the inquiry process in their practicum setting, they create a summary report (Figure 2), which becomes evidence of their reflection on action. Candidates reflect on the inquiry process as they consider what they learned as a teacher and what benefits, if any, they observed for their learners. Perhaps most important, they are asked to consider how their participation in the teacher inquiry project might inform their work with students and colleagues. When the instruction or intervention studied in the inquiry project is successful, the summary report becomes an artifact of impact on student learning. When the intervention does not deliver positive outcomes, preparation of the summary becomes an opportunity to consider how to adjust one's teaching to better meet students' needs. This process of "critical reflection on action" (Schutz and Hoffman, 2017, p. 8) allows candidates to develop their individual theories of practice and consider the implications for classroom practice.

Classroom Inquiry Summary Report Format

- Classroom inquiry question
- Plan to answer question
- Changes made to question and/or plan along the way
- What did you find out? What were your results and conclusions?
- What new question have you discovered?
- What did you learn? What would you do differently next time?
- Who would benefit from your inquiry? With whom might you share it?

Figure 2. Summary Report Format
(Cochrane-Smith & Lytle, 1999; Power & Hubbard, 1999; Allan & Miller, 1999)

Conceptual Framework

Two perspectives framed this research. First, a constructivist view of teaching and learning that posits the value of inquiry-based learning in shaping preservice teacher practice (Preston, Harvie, & Wallace, 2015; Truxaw et al., 2011) informed this work. This view addresses the powerful potential of classroom inquiry to support active learning, reflective practice, and teacher change (Cochran-Smith & Lytle, 1999; Price & Valli, 2005; Shagoury & Power, 2012). As teacher candidates engage in the inquiry process, they construct their identities as teachers and learn how to adjust their practice to meet the needs of K-12 learners.

In addition, Schön's (1983) view of the reflective practitioner served as a useful lens for examining how teacher candidates benefit from participation in inquiry. This view posits that an inquiry-based stance that emphasizes reflection-in-action supports continuous professional growth and the development of effective, reflective practice (Loughran, 2002). These two lenses allowed us to look closely at how participation in an inquiry project prepared teacher candidates to design evidence-based instruction, demonstrate state-defined teacher competencies, and provide evidence of their impact on student learning.

Methods

This exploratory case study examined a teacher inquiry model implemented in a required practicum seminar, the culminating course in all teacher licensure programs at our university. Data included inquiry questions and inquiry summary reports submitted by teacher candidates. To examine the ways that teacher inquiry could provide evidence of candidates' progress toward state-defined teacher competencies, data coding and analyses were informed by the six professional competencies for novice teachers identified by the state where this research was conducted (Table 1).

Table 1
State Identified Teacher Competencies

1	Well-Structured Lessons	Develops well-structured lessons with challenging, measurable objectives and appropriate student engagement strategies, pacing, sequence, activities, materials, resources, technologies, and grouping.
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2	Adjustment to Practice	Organizes and analyzes results from a variety of assessments to determine progress toward intended outcomes and uses these findings to adjust practice and identify and/or implement appropriate differentiated interventions and enhancements for students.
3	Meeting Diverse Needs	Uses appropriate practices, including tiered instruction and scaffolds, to accommodate differences in learning styles, needs, interests, and levels of readiness, including those of students with disabilities and English language learners.
4	Safe Learning Environment	Uses rituals, routines, and appropriate responses that create and maintain a safe physical and intellectual environment where students take academic risks and most behaviors that interfere with learning are prevented.
5	High Expectations	Effectively models and reinforces ways that students can master challenging material through effective effort, rather than having to depend on innate ability.
6	Reflective Practice	Regularly reflects on the effectiveness of lessons, units, and interactions with students, both individually and with colleagues, and uses insights gained to improve practice and student learning.

Research Context

This research was conducted within a graduate school of education at a mid-sized university in the Northeast region of the United States. The graduate school is not the largest university in the region, yet it prepares more teachers for the classroom than neighboring universities. Each year, approximately 175 teacher candidates complete a classroom-based practicum and its associated seminar course, the final required course in all initial licensure programs.

The university offers a wide array of teacher preparation programs; these include initial licensure programs in Elementary Education, Special Education, Specialist Teacher of Reading, ESL, and secondary licensure programs in content areas such as English and Mathematics. All teacher preparation programs in the graduate school provide candidates with opportunities to engage in teacher inquiry during the practicum, typically completed at the end of the program. It is important to note that inquiry is just one measure used to assess teacher

candidates' readiness for the classroom. In addition, all teacher candidates are assessed according to the candidate assessment system mandated by the state. Specifically, all candidates are observed four times during the practicum and assessed on their growth in each of the six competencies based on observation data and other artifacts such as lesson plans and a curriculum unit developed in the seminar and taught in the practicum setting. The competencies required by the state include evidence of a candidate's ability to make adjustments to practice and evidence of reflective practice, both of which are empirically supported benefits of inquiry. The artifacts are program-specific but all are selected to provide evidence of progress in each of the six competencies. Seminar leaders help teacher candidates shape a question that is closely aligned with the professional goals identified by the candidate and, ideally, supervising practitioners serve as mentors in the data collection and analysis process.

The Classroom Inquiry Handbook (Allan & Miller, 1999) was developed to ensure a consistent approach to teacher inquiry across the many sections of the practicum seminar taught each year. It has been a valuable resource for seminar leaders for nearly two decades. The handbook includes carefully designed materials, such as a graphic representation of the steps of classroom inquiry, that are used by seminar leaders to ensure that all candidates are prepared to use assessment data in a responsive, iterative, and recursive way. It is important to note that this is not a static document as the handbook is regularly revised in response to emerging trends in the literature and seminar leader feedback.

Using the model described in the handbook, seminar leaders instruct candidates in how to use data to inform instructional planning, collect data to demonstrate student growth, and reflect on their own practice (Schön, 1983); these skills directly correspond with the teacher competencies identified for effective practice. Seminar leaders model for candidates how to develop important questions and design evidence-based instruction or interventions that answer these questions. They provide support as candidates identify questions emanating from their classroom settings and consider how these questions might shine a light on one facet of their own teaching. As candidates begin to collect data, seminar leaders model how to analyze the data for evidence of student growth or, in the absence of growth, to adjust their practice to better meet students' needs.

The specific focus of inquiry varies across programs according to programmatic goals and objectives. For example, Special Education teacher candidates often focus their projects on development and examination of behavioral goals for a specific student whereas Reading Specialist candidates may

use reading interventions selected to address students' needs identified through assessment. Because the inquiry project and state-mandated candidate assessments are required in all teacher preparation programs in the graduate school, the inquiry project has become the focus of ongoing conversations about how to respond to newly developed state mandates, which are under an ongoing process of review and refinement. It is within this context that this research was conducted.

Assessing Teacher Competencies. At the time of this research, our state's Department of Education had begun implementing a redesigned teacher accountability system. The restructured teacher assessment model included the development of evidence-based standards, or competencies, for teachers and implementation of a redesigned system of teacher assessment. In the fall of 2015, the state also launched a redesigned teacher candidate assessment system closely aligned with the evaluation system used to measure the performance of practicing teachers. A narrow set of six competencies were drawn from the larger body of four standards and twenty-three indicators that make up the Professional Standards for Teachers. These are:

1. Design well-structured lessons
2. Make adjustment to practice
3. Meet diverse needs by making appropriate accommodations
4. Create a safe learning environment
5. Establish high expectations for students
6. Engage in reflective practice

The state-mandated candidate performance assessment system, which was piloted in the spring of 2016, called on preparation programs to provide evidence of candidates' competencies for each of the six standards. We wondered if the inquiry project, a common assessment across licensure programs, could serve as one measure of teacher candidates' developing competencies. We expected to find evidence that candidates developed a reflective, inquiry-based stance to teaching. This was a good place to begin as it was one of the essential teacher competencies identified by the state. We wondered if classroom-based inquiry would provide evidence of developing competencies in other areas as well.

Data analysis began with close examination of all inquiry questions collected from teacher candidates in the fall of 2015 ($n = 132$) and spring of 2016 ($n = 103$). Data were coded for evidence of the six teacher candidate standards. For example, inquiry questions pointing to classroom management interventions were coded with a number four to indicate the standard: Creates a safe learning environment. After the entire database of inquiry questions for the 2015-2016

academic year were coded and discussed, we closely examined the inquiry questions collected as part of the pilot of the candidate assessment system (Table 2). Twelve teacher candidates enrolled in two sections of the practicum seminar participated in the pilot of the candidate assessment system. Of these, three candidates were selected for this case study.

Table 2
Sample of Coded Questions from Pilot of Candidate Assessment System

Program	Inquiry Question	Competencies Addressed	Intercoder Agreement
MS Social Studies (5-8)	Does the use of targeted exit tickets help to reinforce understanding among students and allow the instructor to track whether lesson plan objectives are being met?	1, 6	Yes
MS Math (5-8)	Do student self-monitoring behavior checklists improve classroom behavior?	4, 6	Partial. Coder #1 also included competency #3, meeting diverse student needs. This was discussed until agreement was reached.
MS Math & Science (5-8)	Will having students self-reflect on their level of participation at the conclusion of every week improve participation?	4, 6	Yes
HS English (9-12)	Does a "Do Now" at the beginning of class help students focus more quickly and improve classroom management overall?	2, 4, 6	Yes

HS English (9-12)	How does informed student choice in assessment affect student engagement and academic performance?	2, 5, 6	Yes
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Participants

Participants in this case study were three teacher candidates enrolled in a single section of a graduate-level practicum seminar held during the spring of 2016. All three teacher candidates were completing an initial licensure program to become ESL educators in the northeast state where this research was conducted. The course was taught by a female Assistant Professor who was trained in the candidate assessment system by an experienced member of the field placement office prior to the start of the semester.

All participants in this research were white, female graduate students, representative of the demographics of the teaching profession in this northeast state. All three teacher candidates were identified as strong students. Callie, the most experienced educator, had received several awards from the university. Although all participants were completing the same licensure program, two candidates were student teachers while one teacher candidate, Callie, held an elementary education teaching license and was the lead teacher in her classroom (Table 3). This is important because the professional standards that served as the framework for the candidate assessment system had been introduced in K-12 districts during the previous year through implementation of a new teacher evaluation model. Therefore, Callie was familiar with and had been evaluated based on the standards in the candidate assessment system. Moreover, Callie was a teacher of record and had the freedom to select the students she worked with. This resulted in some unevenness in the size of the student groups candidates studied; specifically, Callie, conducted her inquiry project with 14 students while Barbara and Mary Lou conducted their inquiry projects with two students. All reported that their inquiry questions were developed according to the needs of students in their specific setting and their own questions about effective instruction for emergent bilinguals.

*Table 3***Participants and Classroom Settings**

Teacher Candidate	Setting and Grade Level	K-12 Students
Barbara: Student teacher, Grade 2 Classroom	Independent bilingual school in an urban setting, 2 nd grade	Two students for whom French is the first language
Callie: Lead teacher pursuing ESL Licensure	Small urban community school, K-5, 4 th & 5 th graders	Fourteen students with ELD levels 1 and 2, 13 Spanish speaking & 1 speaking the African language, Tegrinya
Mary Lou: Student teacher, ESL Classroom	Urban, elementary, Prek-6, 2 nd grade	2 students with English Language proficiency level 2, Pashto and Nepali language

Data Collection and Analysis

Qualitative methods were used in the collection and analysis of data for this descriptive case study (Stake, 2010). This case presented here was identified based on evidence of strong inquiry questions that addressed four of the six competencies and because this small class of three students participated in a pilot of the new candidate assessment system during the spring semester of 2016 along with another small class of nine students.

Inquiry questions and project summary reports for each of the three candidates were coded using the six competencies and further analyzed using a probe sheet developed by the first researcher for this purpose (Appendix A). The researchers independently coded and analyzed the candidates' inquiry summaries and associated probe sheets then met to discuss codes, achieve consensus, and identify patterns and themes that emerged. This process allowed the researchers to consider the strength of each candidate's question, identify evidence that the inquiry project addressed the teacher competencies, and assess the quality of the candidates' inquiry process including appropriate data collection, adjustment to practice, and reflection.

Findings

Although this exploratory research was constrained to data collected from three teacher candidates who participated in a pilot of a new state assessment

system for teacher candidates, analysis yielded three important findings. First, enactment of the inquiry project allowed teacher candidates to develop and demonstrate progress toward teacher competencies identified by the state as measures of effective practice. Second, the inquiry process allowed participants to reflect while engaged in action. This supported the development of candidates' abilities to adjust their practice in response to students' needs and provided strong evidence of developing competencies for elements two and six of the candidate assessment system. Finally, the inquiry process allowed teacher candidates to reflect on action, thus supporting development of a reflective, inquiry-based stance to teaching.

Demonstrating Teacher Competencies

Participants' inquiry projects were illustrative of the characteristics of strong inquiry: a strong clearly stated question, an appropriate design, and documented evidence of student learning. One candidate, Barbara, designed an experiential learning sequence for her second-grade class addressing the theme of waste and recycling. Her inquiry project was centered on looking at evidence of two ELL students' motivation, vocabulary growth, and oral language and writing development during a four-week lesson sequence. To provide evidence of students' growth, Barbara assessed students' knowledge of waste/recycling related words before and at the conclusion of the sequence and was able to demonstrate a positive impact of instruction on student learning. Her inquiry summary revealed evidence of meeting three of the state competencies, namely: designing well-structured lessons, meeting diverse needs of students, and demonstrating a reflective stance.

Participants' inquiry questions and summaries allowed these teacher candidates to demonstrate some of the competencies required for licensure in our state. The standards addressed were closely related to their inquiry questions and their projects became evidence of their progress toward professional competencies as they actualized the standards in a meaningful, authentic classroom setting (Table 4). In addition, their inquiry projects were specific to their instructional settings and problems of practice in those settings; as such, the inquiry projects allowed teacher candidates to demonstrate progress toward licensure competencies. For example, all three teacher candidates posed questions related to language development within the context of oral or written discourse, which deepened their preparation to become ESL teachers.

Table 4
Teacher Candidates' Inquiry Projects

Teacher candidate	Inquiry Question	Instructional Focus	Professional Competencies Addressed
Barbara	How does developmentally appropriate and culturally relevant experiential learning through problem posing education increase students' use of academic and social language within authentic conversation and writing?	Increasing ELL's use of academic and social language in thematic science related area	#1: Well-structured lessons #3: Meeting diverse needs #6: Reflective practice
Callie	How can a select # of cognitively demanding tasks and an abbreviated 6+Traits writing rubric help newcomers and emergent bilinguals strengthen language skills?	Enhance language skills associated with organization and ideas in written work as measured by 6+Traits	#1: Well-structured lessons #3: Meeting diverse needs #6: Reflective practice
Mary Lou	How does drawing before and after writing effect writing development as measured by the 6+Trais rubric?	Role of drawing before and after writing to enhance written production in English	#1: Well-structured lessons #2: Adjustment to practice #3: Meeting diverse needs #6: Reflective practice

It is important to note that the state-mandated teacher candidate assessment system requires that all candidates provide evidence of positive impact on student learning. However, teacher education programs are left to determine how this evidence is defined and measured. We suggest that the model of teacher inquiry described here allowed teacher candidates to demonstrate evidence of their impact on student learning. This is discussed below.

Reflection in Action

We define inquiry as a systematic, recursive, and reflective process designed to examine one's own practice. Data analysis revealed that for the three case study teacher candidates, the inquiry process allowed them to reflect on their teaching and adjust their practice along the way. This is apparent in the inquiry summary reports submitted by the participants. For example, when describing the process she used to assess students' writing in relation to their drawing, Mary Lou explained, "I decided to look further into some of the pieces, specifically the highest and lowest rated pieces of writing for each student." In this way, she was able to reflect on the ways that teaching students to draw as a prewriting strategy supported students' writing development.

Another teacher candidate, Callie, described the recursive, reflective process she implemented throughout the inquiry process. She used students' work and feedback in the form of self-reflections as opportunities for her own reflection in action. This prompted her to revise and narrow her question to focus on written language development. She explained:

When I initiated my plan of study, I generated an inquiry question that was far too broad. Midway through the project, an inquiry map was constructed that showed the interplay between CDT's and complex texts to address specific writing assignments. Through reflective and careful analysis, I found that when given a large number of cognitively demanding tasks, students were often confused, requiring clarification; this analysis led to focusing the project on two components of the 6+traits, namely organization and ideas, which in turn enabled students to more effectively demonstrate their knowledge of language and literacy through writing.

Callie described a mid-project change that was prompted by her creation of an inquiry map. She reported that this discovery "led me to re-evaluate my data and turn my attention towards two of the 6+1 Traits of Writing, namely, organization and ideas."

Finally, the third teacher candidate, Barbara, reflected on the time required to engage in the inquiry work and the relationship to student growth. She described one experience she created for students, explaining, “after the first experiential lesson on school yard waste, the two emergent bilingual learners wrote acrostic poems which indicated that the vocabulary and overall writing quality was richer than previous writing samples; student motivation was high with this unit, especially for the one emergent bilingual who was particularly interested in nature,” thus illustrating her awareness of the relationship between engagement and achievement. Further, in response to finding that each of the two students’ academic vocabulary increased, Barbara noted: “it is possible that students crossed certain thresholds in their English language acquisition trajectory that had been hindering their English language development previously...” This points to Barbara’s ability to consider other possibilities for students’ progress beyond those she examined in her inquiry project.

Reflection on Action

During the final phase of the inquiry project, teacher candidates have an opportunity to reflect on their teaching and the outcomes of instruction as they considered the new knowledge gained. This opportunity for reflection appeared to support the development of a reflective, inquiry-based stance to teaching among the three teacher candidates. Each of the candidates was able to look back on the inquiry process to identify the benefits for themselves and their students. For example, when reflecting on students’ gains in response to instruction, Barbara explained, “four lessons in the unit were over a one-month period, the language growth could be attributed to normal and expected student growth; implications for learning through experimentation, discovery and real-life experiences promote the use of and retention of both social and academic vocabulary in both spoken and written forms for emergent bilingual students.”

Teacher candidates also reflected on the changes made and how these supported students’ learning. In describing changes made, Callie noted:

Once change was made to focus on Ideas and Organization through a more deliberate paced approach to learning, 13/14 of the students improved their language skill through writing with 69% showing marked improvement in Ideas and 77% showing marked improvement and growth in Organization as measured by the 6+Traits. This example of modifying practice to meet individual and group needs, increased the opportunities for students to make meaningful connections between the cognitively demanding tasks and complex texts and to express themselves in writing.

Similarly, Mary Lou explained:

When drawing was first for each of the student's highest rated piece of writing, there were elaborate drawings, including smaller pictures of a different part of the story. With the lowest pieces of writing the pictures were not very well developed. Conclusion being that when a student's drawing is more developed, the writing becomes more thorough. Students were able to use drawing as a planning tool for writing. Teachers can do specific lessons on modeling how to use drawing as a planning tool, and how to organize writing from there.

It appears that these teacher candidates were able to reflect on the ways their decisions had immediate, positive impacts on students. This ability to engage in reflective practice, which developed as they engaged in the inquiry process, is one teacher competency identified in the state where this research was conducted.

Discussion

As teacher educators grapple with questions of how best to prepare teachers for the classroom, this study shines light on one promising practice, teacher inquiry. There is a large body of research centered on the benefits for in-service teachers (Goodnough, 2008); however, Mule (2006) and others (Rich & Hannafin, 2008; Truxaw et al., 2011) have asserted that there are important benefits for preservice teacher candidates as well. Our findings echo their claims. Specifically, teacher inquiry created opportunities for these teacher candidates to develop and demonstrate the characteristics and competencies of effective teachers as described in the literature examining teacher inquiry and as defined by our state. Engaging in inquiry allowed them to identify and explore authentic problems of practice, plan and deliver effective lesson, adjust their practice in response to students' needs, and provide evidence of their impact on student learning. This is important given critiques of teacher education claiming that preparation programs are ineffective in preparing effective teachers for the classroom.

One of the important benefits of teacher inquiry in the practicum is the focus on the development of an inquiring stance, particularly among graduate-level teacher candidates (Truxaw et al., 2011). Importantly, there is some evidence that such an inquiring stance may position teachers to use the critical reflection that is a part of classroom inquiry to adjust and improve their practice (Cochran-Smith, 2012; Cochran-Smith & Lytle, 2009). We found that teacher

inquiry allowed these preservice teacher candidates to develop and demonstrate an inquiry stance. For example, one candidate pointed to the benefits of inquiry as a tool to help her think about her own practice deeply. It is important to note that similar to Mule (2006), we believe that the structure of the inquiry and materials used in the practicum seminar course supported the inquiry process. Further examination of our inquiry process may yield important implications for teacher preparation.

Finally, this research suggests that inquiry may be a useful tool when preparing teacher candidates to be effective, reflective practitioners (Schön, 1983) upon entry to their own classrooms. This includes the ability to reflect in and on action such that one is able to adjust instruction while engaged in action and to consider how to improve instruction the next time a lesson is taught. It appears that the structured, systematic process of inquiry taught in the practicum seminar allowed these teacher candidates to engage in such reflective action. First, they learned how to collect and analyze assessment data on an ongoing basis such that they described a process of reflection-in-action in their summaries. This action-oriented reflective stance allowed them to adjust and reshape their instruction while engaged in their work with students. They experienced inquiry as a recursive, iterative process closely connected to their instructional moves. In addition, they developed and demonstrated a reflective stance that allowed them to reflect on their practice retrospectively. In this manner, each candidate was able to demonstrate their ability to reflect critically on her teaching and consider how to improve it (Leat et al., 2015; Truxaw et al., 2011) and additionally to discuss the benefits of their participation in inquiry for their students.

Limitations

Given the nature and small sample of this case study, it is important to acknowledge the limitations of this research. First, although the inquiry project is implemented across nearly all practicum seminar courses in the graduate school of education, these teacher candidates were selected because they participated in the state-wide pilot of the new teacher candidate assessment system described previously. The participants had a slightly different experience throughout the seminar course than did teacher candidates assessed with the assessment system used previously by the state and the teacher education programs; the new assessment system and the pilot status may have impacted the ways the inquiry project was enacted as well as how assessment of the six teacher competencies was a required as part of the practicum seminar. Further research is needed with a larger sample of teacher candidates using the new candidate assessment system while carrying out the inquiry project.

Second, neither faculty nor supervisors' data were collected or analyzed for this research. Therefore, it is not possible to determine if or how supervising practitioners, university supervisors, or faculty supported teacher candidates as they engaged in inquiry. A close examination of additional cases may reveal the roles of supervisors and seminar leaders in teacher inquiry conducted by teacher candidates. Such an examination may provide further insight into best practices in the teacher preparation classroom and the practicum setting.

Implications and Future Directions

The potential for classroom-based inquiry as a tool for teaching and assessing teacher standards is one that must be considered, particularly given current trends related to teacher accountability (Jackson, & Remer, 2014; Rich & Hannafin, 2008). Two important implications of this research emerge. First, it reinforces the value and practice of inquiry within teacher preparation, both to promote reflection in practice on an ongoing basis and to experience opportunities to demonstrate the teacher competencies in authentic settings. Second, we described a systematic, structured approach to inquiry that appropriately prepares candidates to become reflective, effective practitioners (reflection on action) as they advance from novice to experienced professional.

This research is a first effort to capture if and how an inquiry project can be used to measure developing teacher competencies. Thus, it is important to consider next steps for incorporating inquiry in teacher preparation programs. First, teacher educators must examine if and how inquiry in their programs can have positive impacts on K-12 instruction and be used to address program-specific goals. Preparing teacher candidates to collect, analyze, and reflect on assessment data may have positive impacts on their abilities to be effective teachers upon entry to the classroom, yet this has not been well studied. Additionally, it is important to examine the teacher inquiry process across educator licensure programs and with larger samples of teacher candidates to better understand how inquiry can be used as a tool to develop and measure teacher competencies and dispositions. This should include close examination of teacher candidates who struggle in the early stages of inquiry. Such research will encourage teacher educators in the future to consider how to support all candidates in the important reflective, recursive processes of the inquiry cycle. Finally, it is important to consider another necessary component, the preparation of faculty and supervisors who are charged with mentoring teacher candidates through the inquiry process.

In this study we described one approach to inquiry. The literature provides evidence of many practical and effective approaches. In the case

discussed here, teacher inquiry provided evidence of teacher candidates' progress toward the competencies and dispositions of effective, reflective practitioners as defined by the state where this study was conducted. The exploratory nature of this research and the small group of teacher candidates studied precludes broad claims about teacher inquiry as a route to preparing teacher candidates to be effective teachers. However, the powerful potential of inquiry to model and assess developing teacher competencies invites further research.

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APPENDIX A: Summary Analysis Probe Sheet

Inquiry Question:

Level of License:

Name of Intern:

Name of Seminar Leader:

Standard(s):

1. Do we find evidence of the role of the SP, either supportive of not, and of the impact of the SP's involvement on the project?
2. Does the project include an opportunity for K-12 learners to provide feedback to the teacher education candidate related to the inquiry project?
3. Does the summary provide evidence of a strong project design that supports effective inquiry? This includes the following:
 - a. Strong question
 - b. Clear purpose
 - c. Appropriate design
 - d. Evidence of reflection
 - e. Evidence of student learning
4. Does the teacher education candidate include all necessary materials/information to make clear what occurred during the intervention?