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Changes in Teachers' Constructivist Beliefs and Practices from Preservice to Inservice Teaching: A Mixed Methods Approach

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CHANGES IN TEACHERS' CONSTRUCTIVIST BELIEFS AND PRACTICES FROM
PRESERVICE TO INSERVICE TEACHING: A MIXED METHODS APPROACH

By

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Abstract

Teacher candidates' development into novice teachers is a social process that depends on their teaching context as well as the mentors who help them through the process. Viewed through the lens of social identity development theory and mentoring theory, this study used an embedded, mixed methods design to understand how and to what extent six Alternative Route to Licensure teacher candidates' beliefs and practices differed from preservice to inservice teaching. Mixed-methods data were collected using observation, semi-structured interviews, and partial interval recording. The six participants included secondary math, English, science, and social studies preservice-turned-novice teachers. In order to understand the extent to which novice teachers' beliefs and practices changed from preservice to inservice teaching, a benchmark for their constructivist practices was established during a summer practicum program, and subsequently the novice teachers' practices were observed during their first year as novice teachers. Teacher candidates in this study developed constructivist beliefs and practices in six domains: activating prior knowledge, generating cognitive dissonance, applying knowledge, feedback, reflecting on learning, and student-centered practices. Some aspects of activating prior knowledge, providing feedback, and generating cognitive dissonance remained constant from preservice to inservice teaching, but there were significant changes in the areas of reflection and student-centered teaching. This study suggests that authentic preservice experiences that focus on feedback and assessment are crucial for Alternative Route to Licensure teacher candidates. Preservice programs must provide mentorship for all field experiences, and research on the development of constructivist practices must consider the teaching context of the participants.

Keywords: novice teachers, constructivism, identity development

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For in spite of language, in spite of intelligence and intuition and sympathy, one can never really communicate anything to anybody. – Aldous Huxley (1959)

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Dedication

This dissertation is dedicated to my sister, Missy. This journey, like all others, would not have been possible without your constant support.

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Chapter 1: Introduction

One in five students does not graduate from high school within four years, and a large number of those who drop out are traditionally marginalized students, such as students who are racial and ethnic minorities or are economically underprivileged (Stetser & Stillwell, 2014). While White students graduate at a rate of 84%, Hispanic, Black, and American Indian/Alaskan Native students graduate at a rate of 71%, 67%, and 65% respectively; students who are economically underprivileged, have disabilities, and have limited English proficiency graduate at rates of 70%, 59%, and 57% respectively (Stetser & Stillwell, 2014). There is no single, clear explanation for this academic disproportionality, but students cite personality, family, social, and school-related issues as influencing their choices to leave. In a national, ten-year study, 77% of all dropouts cited school-related causes for leaving school such as disliking school, failing classes, and poor relationships with teachers (Rumberger, 2001). The high dropout rate requires that teachers develop dynamic, student-centered curriculum to ensure student engagement.

Importance of Constructivist Practices

School engagement is considered the primary factor in student retention (Fall & Roberts, 2012) and is related to academic outcomes such as grades and test scores (Caraway, Tucker, Reinke, & Hall, 2003). In order to support student retention, this study focuses on teachers' beliefs and practices regarding engaging, constructivist teaching during field experiences and the first year of teaching. The school-related variables that influence students' choices to leave school include boredom, irrelevancy, dissatisfaction with teachers, lack of motivation, and underachievement (Hansen & Toso, 2007; Schwartz, 1995). Consequently, poor engagement hinders achievement and increases the possibility of attrition (Sinclair, Christenson, Lehr, & Anderson, 2003).

Effective teacher preparation that focuses on curriculum, strategies, management, and student needs can mitigate the issues related to student retention (Coates & Thoreson, 1976; Linek et al., 2012). This preparation can help new teachers exercise a stronger influence on student achievement than language barriers, poverty, minority status, and background (Darling-Hammond, 2000).

In teacher education, field experiences (i.e., hands-on classroom teaching experiences with a mentor teacher) are likely the most significant component of teacher preparation (Hammerness et al., 2005). Administrators and teacher educators agree that many problems encountered by new teachers (such as isolation, poor student discipline, and lack of collaboration) result from deficient field experiences; they believe that one semester of student teaching does not allow teacher candidates to persist through pedagogical frustrations, experience extensive pupil boredom and apathy, or comprehend the seclusion of prolonged, isolated teaching (Haynes, 2014). In order to truly understand these realities, field experiences must allow teacher candidates (TCs) to develop “analytic and flexible thinking” (Haynes, 2014, p. 5) that is engaging and responsive and deepens learners’ abstract thinking. In this type of constructivist teaching, lessons are developed and executed to create the greatest opportunity for learning, irrespective of the strategies used (Baviskar, Hartle, & Whitney, 2009). Constructivist lessons combine “external processes” such as peer tutoring, scaffolding, and collaboration with “internal processes” (Bruning, Schraw, & Norby, 2011, p. 192) such as memory strategies, reflection, and self-motivation. Constructivism will be further discussed in Chapters 2 and 3.

The Interstate Teacher Assessment and Support Consortium (InTASC) standards (2013) are widely adopted standards of knowledge that teachers should possess and practices they should implement in order to ensure that all students receive an adequate education. These

standards indicate that while teacher education has many goals, its primary goal is to prepare TCs to meet the diverse needs of their students. InTASC defines effective teaching in four major areas: (a) The learner and learning—emphasizing collaboration, implementation of a rigorous curriculum, and high expectations of students; (b) Content—emphasizing a profound and flexible understanding of content and implementation of curriculum in diverse ways to help learners of all ability levels and learning styles; (c) Instructional practice—emphasizing planning and assessment for standards and objectives through integration of multiple instructional strategies; and (d) Professional responsibility—emphasizing engagement in professional development and collaboration with other educators to meet student needs (Council of Chief State School Officers, 2013). The InTASC standards demonstrate that utilizing multiple, engaging, flexible teaching strategies is necessary for effective teaching (Haynes, 2014), and constructivist practices allow teachers to incorporate these strategies in their classrooms.

The Current Study

This study explored the experiences of first-year teachers who were previously enrolled in a summer practicum experience; the practicum focused on engaging, student-centered teaching practices for middle school students. During the practicum, TCs worked with mentor teachers who utilized student-centered projects and inquiry and problem-based learning strategies, and their course instructors used constructivist practices. The middle school students constructed knowledge by engaging with and investing in instructional activities (Kain, 2003). Constructivist teaching practices were designed to meet the needs of both TCs and at-risk students in order to help increase the student retention rate. The choice to investigate first-year teachers who participated in a practicum is strategic to understand if and how teacher preparation is useful in facilitating the development of constructivist practices that could increase student

engagement. This study provides thick description of the first semester of novice teaching after a constructivist practicum. While a study of teachers who did not attend the practicum may be useful, a comparative dataset is beyond the scope of this dissertation.

Studies in novice teaching have been consistent in demonstrating that novice teachers tend to revert to traditional, teacher-centered teaching practices learned throughout their K-12 education (Grossman, 1991) and that teacher education courses have a limited impact on teacher candidates (Borg, 2004). The term Apprenticeship of Observation, coined by Lortie (1975), refers to the idea that teachers enter the field after having observed teachers as students for many years, resulting in preconceptions about what teaching will be like. The impact of this Apprenticeship of Observation is that novice teachers, rather than utilizing innovative, constructivist, or student-centered teaching practices, tend to implement teacher-centered practices as they were taught. Although this body of research is crucial to the understanding of novice teachers' practices, it does not specifically account for the field experiences during teacher preparation. Few studies have been conducted on the implementation of constructivist practices in a novice teaching context when a meaningful, constructivist preservice experience is provided. Thus, the purpose of this study is to determine how constructivist practices implemented in a practicum experience are utilized in the first year of teaching.

Because of the importance of constructivist practices in teacher education, the following chapter will discuss the development of constructivism; the rationale for using constructivist practices in education; the utility of social identity development theory (supported by mentoring theory) in explaining how TCs develop their pedagogy; and the significance of these theories to the study of teachers' changing constructivist beliefs and practices. Figure 1 visually demonstrates the connections among the sociocultural theories used in this study to understand

the changes in beliefs and practices and thereafter identity construction. This study determines how engaging constructivist practices learned during a practicum change as participants become teachers of record.

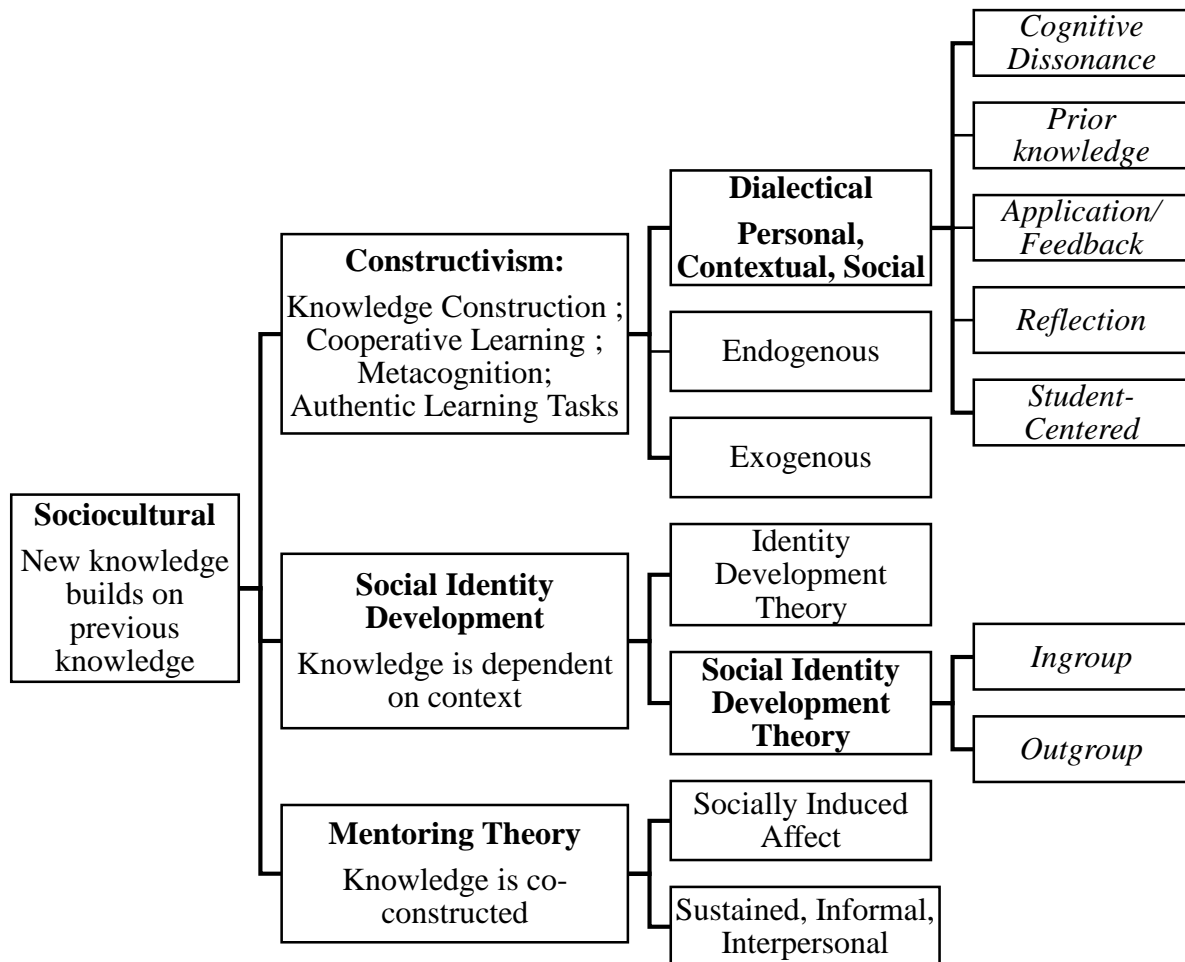


Figure 1. Theories related to the transfer of knowledge. The bolded sections are most related to the study.

Definition of Terms

Teacher Candidate (TC): Throughout this study, the term “teacher candidate” (TC) is used to refer to a student enrolled in an Alternative Route to Licensure (ARL) teacher education program at the researched university. All of the TCs in this study held bachelor’s degrees and were working toward a master’s degree and secondary teaching license. Although they became

teachers of record during novice teaching, the participants were still considered TCs because their licenses were provisional until all coursework was completed and all high-stakes exams were passed. They were TCs until provisions were removed from their licenses.

Alternative Route to Licensure (ARL): The ARL program prepares TCs who hold bachelor's degrees in specific content areas related to science, mathematics, social studies, or English language arts. Through the program, TCs receive a license to teach secondary students after they complete required courses and they are provided with three years to complete their coursework. The program will be further described in Chapter 3.

Mentor teacher: Mentor teachers for this study were selected by the faculty at the researched university, and all were current middle school teachers in the school district where the university is located. Their role was to act as models, support, and teacher educators for the TCs throughout the summer practicum experience.

Constructivism: There are many definitions for constructivism, and the history of the term will be discussed in Chapter 2. However, for the purposes of this study, constructivism is defined as student-centered teaching that integrates prior knowledge, cognitive dissonance, application, feedback, and reflection. All of these components are necessary for a lesson to be considered constructivist.

Activating prior knowledge: The teacher incorporates prior school-based knowledge or knowledge from the students' non-academic lives into the lesson. For example, a history lesson on the Bill of Rights references previously learned material on the Constitution, or an English lesson on persuasion includes a reference to advertisements students have seen on television. In this study, the definition of activating prior knowledge was expanded to include establishing

relevance (see Chapter 4). Activating prior knowledge would not include introducing a new concept, showing a video, or having students apply knowledge.

Generating cognitive dissonance: The lesson builds on students' prior knowledge in a way that creates internal conflict and requires students to struggle to understand the material. For example, a mathematics lesson on similar figures requires students to incorporate knowledge of similar triangles into their work with similar polygons. The teacher requires them to adapt the formula from the previous day. Cognitive dissonance often manifests in visible frustration and questioning. Cognitive dissonance does not mean that students are simply learning new information or applying knowledge in a new or different way.

Applying knowledge: Students are required to use current and previous knowledge to answer questions or solve problems. For example, students learn about velocity in science and are required to draw graphs demonstrating increasing and decreasing velocity. Applying knowledge can also refer to using knowledge from one class in another class. It does not refer to using knowledge outside of school (that would fall under establishing relevance).

Feedback: The teacher provides clear, direct, and concrete oral or written feedback to an individual student or group of students. Also, students may provide feedback to each other. The feedback must be specific; therefore, phrases like "good job" or "well done" do not constitute feedback. An example of feedback would be if, during a class discussion in English, a student states that the protagonist of the story is depressed and the teacher clarifies that, while that is a good prediction, there is not enough evidence to know the character's state of mind for certain.

Reflecting on learning: Students consider their learning processes and make decisions about their learning. For example, in science class the students must determine which type of material is best for insulation and explain why they made that choice. Reflecting on learning also

includes metacognition about the learning process. It does not include questioning for understanding or requiring students to support an argument.

Student-centered methods: This type of learning is defined by the students' influence on the content, activities, or direction of the lesson, and lecture is replaced by active learning experiences (Collins & O'Brien, 2011). Students are engaged in activities such as small-group discussions, peer instruction, use of technology for learning, quickwrites, experimentation, predicting, studying cases, concept mapping, guided discovery, problem-based learning, pre-reading activities, analytical challenges, group work, and peer reviewing (Olson & Riordan, 2012). Student-centered methods would not include lecture, note-taking, using technology to distribute information (e.g., watching a video), or independent reading.

Significance of the Study

Because of the increased focus on constructivism in teacher education (Henson, 2015), understanding which practices constitute constructivist teaching and how these practices change from preservice to inservice teaching is beneficial to the field. Accordingly, it was necessary to understand how other theorists or researchers have previously defined constructivism in order to refine the definition that was used in this study. A thorough understanding of the four constructivist areas (prior knowledge, cognitive dissonance, application with feedback, and reflection) was also necessary for accurate data collection.

Development of these definitions is useful for future research in the area of constructivism in order for the field to come to consensus on this term. The use of social identity development theory in this study provides some understanding of the importance of social contexts on the participants' development of constructivist identities and use of constructivist practices in their first year of teaching. Mentoring theory will also add to the body of literature

on constructivist teaching practices because, while the importance of a supportive environment in developing a teacher's social identity is clear, few studies have incorporated this social influence on novice teacher constructivist practices (Chen, 2001; Dangel, 2011). With support of mentoring theory, social identity development theory helps explain if and how constructivist practices are used in novice teaching.

In the field of teacher education, studies often focus on either teacher preparation or inservice teacher beliefs and practices (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009; Clift & Brady, 2005; Kosnik, Beck, Cleovoulou, & Fletcher, 2009). Teacher beliefs are influential in their "instructional choices and teaching practices, and potentially determine when, why, and how teachers interact with students" (Hoffman & Seidel, 2015, p. 106). Thus, in order for novice teachers to implement constructivist practices, they must also hold constructivist beliefs. This study aimed to support student retention by understanding the gap between preparation and novice teaching; inclusion of beliefs and practices at both the preservice and inservice levels provided insight into how these beliefs and practices change over time. These insights can help teacher educators design coursework and professional development that align more closely with what TCs and inservice teachers need to be more effective in the classroom.

Research Questions

This study employs an embedded mixed-methods design. The mixed methods research question is: How do TCs' beliefs and practices differ from preservice to inservice teaching? The qualitative research question is: What are the TCs' constructivist beliefs and practices after a semester of novice teaching? The quantitative research question is: To what extent do TCs differ in their implementation of constructivist practices during their practicum experience and novice teaching? The mixed methods question utilized both quantitative and qualitative data sources

while the quantitative and qualitative questions utilized those sources exclusively. These three questions helped determine the changes in TCs' beliefs and practices from their practicum experience to novice teaching, to what extent changes in beliefs and practices occurred, and how and why the changes occurred. By using both quantitative and qualitative methods, I examined changes in constructivist beliefs and practices from preservice to novice teaching in a way that had not been explored previously.

Chapter 2: Literature Review

Student-centered teaching methods, a component of constructivist teaching, are crucial in maintaining student engagement in the technology age (Schlechty, 2001), but these methods do not have a long history in the United States. Traditional American education at the end of the 18th century focused on students' future responsibilities and prevented individualized instruction and active student participation (Ravitch, 2000). Dewey (1938) and the other early progressive thinkers viewed the role of education as more extensive than the traditional curriculum of recitation from textbooks, elocution, public speaking, patriotism, and "mental gymnastics" (Ravitch, 2000). They believed education was the most important social institution not because it creates obedient citizens, but because it encourages social progress by advocating social and individual improvement (Morrison et al., 2008). In opposition to the traditional view of school as the imposition of "adult standards, subject-matter, and methods" (Dewey, 1938, p. 19) on students, Dewey developed a progressivist philosophy that advocated: (a) expression and cultivation of individuality; (b) freedom of choice; (c) the ability to learn from experience; (d) the chance to make the most of opportunities; and (e) the chance to become acquainted with the changing world. Progressivism took a more individualized approach than traditional education, and constructivism expanded this understanding of student learning.

The following review of literature discusses the development of constructivist ideology followed by its adoption and refinement in the field of education. Next, the sociocultural theories used to explain the study's findings, including identity development theory, social identity development theory, and mentoring theory, are delineated. Finally, literature is discussed related to beliefs and practices in teacher education, shaping teacher candidate (TC) social identities, and the transition from field experiences to novice teaching.

Table 1

Three Constructivist Paradigms

	Exogenous Constructivism	Endogenous Constructivism	Dialectical Constructivism
Root Metaphor	Mechanism	Organicism	Contextualism
Current Examples	Social Learning Theory Information Processing Theory	Piaget (as usually interpreted)	Vygotsky Riegel
Major Emphasis	Learning	Development	Dynamic Interactionism
Source of Knowledge	External Structures (environment)	Internal Coordinations (previous knowledge)	Interaction (subjective experience)
Mechanism of Construction	Empirical Abstraction	Reflective Abstraction	Dialectical Synthesis
Locus of Activity	Environment (accommodation)	Organism (reciprocal assimilation)	Strong Interaction (equilibration)
Characterization of Knowledge	Elementaristic Structures (no systemic properties)	Holistic Structures (systemic properties)	Population of Concrete Concepts
Predictability of Change	Function of Environment	Invariant Sequences	Unpredictable Syntheses
Criterion of Truth	Adaptation to Reality	Internal Organization	Continuing Transcendence of Contradiction

Note. Three constructivist paradigms. Reprinted from “Exogenous, Endogenous, and Dialectical Constructivism” by D. Moshman, 1982, *Developmental Review*, 2, p. 376

Constructivist Paradigms

Constructivism developed when psychologists began to study learning as both an individual and social activity impacted by culture and collaboration with capable peers (Bruning et al., 2011). Vygotsky’s (1962, 1978) work began the conversation about constructivist practices. It concentrated on “social processes,” such as interactions with peers and adults, and

“internal processes,” such as tutoring, scaffolding, and collaboration, and their impact on higher mental functions (Bruning et al., 2011, p. 192). From Vygotsky’s sociocultural perspective, new knowledge complements and builds upon previous knowledge (Kouzin, 2003), and learning is co-constructed through cultural and social activities (John-Steiner & Mahn, 1996). This thinking, originated through the progressivist movement, shifted the traditional view of teachers as dispensers of knowledge to facilitators of student learning.

As constructivism advanced, it developed into several distinct branches. These included exogenous, endogenous, and dialectical constructivism (Moshman, 1982), which are delineated in Table 1. Briefly, exogenous constructivism views knowledge as resulting from reconstruction of structures including “cause-effect relationships, presented information, and observed behavior patterns” in one’s environment (Bruning et al., 2011, p. 194); this reconstruction requires guidance through presentation or modeling (Moshman, 1982). In other words, the learner’s environment determines the knowledge that will be constructed, and outside environmental structures are reflected in the learner’s mental structures.

The difference between exogenous and endogenous constructivism is illustrated through Piaget’s (1970, 1971) emphasis on the learner rather than the environment. Piaget suggested that knowledge is not gained solely from the social environment or presented information, but instead knowledge is internally constructed and transformed through mental reasoning. This concept of internal knowledge construction requires that new and prior knowledge are combined, and Moshman (1982) distinguished it from exogenous learning by incorporating metacognition and reflection, which helped to assimilate new information into previously learned structures. In this type of constructivism, all structures are linked sequentially and coherently to one another rather than to the environment. Piaget’s (1964) stages of cognitive development are an example of

endogenous constructivism in that each of the four stages is contingent upon previous stages. Practical knowledge is developed in the first, sensory-motor, pre-verbal stage. Representational knowledge—language and thought—is reconstructed (but not converted into action) from practical knowledge in the second, pre-operational stage. In the third stage, concrete operations such as classification, ordering, spatial and temporal operations, and elementary logic build on pre-operational knowledge. In the final stage, deductive operations that allow for reasoning about concepts and complicated structures emerge. Each of Piaget's (1964) stages relies on previous stages, but the environment is not considered.

The final constructivist paradigm is dialectical constructivism, which is the interaction between learners and their environment. This paradigm stems from Riegel's (1979) definition of dialectical psychology. His concept was in contrast to Piaget's (1964) theory of cognitive development because it emphasized development as a synthesis and continuum rather than separate stages. He claimed that Piaget's stages indicate that a level of development is completed, but he argued that learners and their environments are never synchronized (though synchronization is the major goal of learning). Riegel's (1979) definition stated that dialectical psychology focuses on: (a) development's need for crisis and conflict; (b) both short- and long-term developmental changes; (c) concurrent endogenous and exogenous dialectics; and (d) diverse concrete and idealistic conceptions.

Moshman (1982) expanded on Riegel's (1979) definition to incorporate Vygotsky's (1935) idea of zone of proximal development, which is the cognitive location where the learner requires help to reach a solution due to the difficulty of a problem. In this type of constructivism, exogenous and endogenous learning are reciprocal; new knowledge is constructed through contradictions and interactions (Moshman, 1982) and "thought and

experience are intertwined with the context in which they occur” (Bruning et al., 2011, p. 196).

Dialectical constructivism is the interaction of biological, psychological, sociological, and physical environments (Moshman, 1982, p. 375).

Although the three constructivist paradigms are unique, they can be integrated, and they all share four characteristics (Loyens, Rikers, & Schmidt, 2009). These include: (a) “Knowledge construction” in which learners incorporate prior knowledge to create knowledge structures through discovery and reconstructing information; (b) “Cooperative learning” in which learners interact with others to negotiate learning; (c) “Metacognition” in which “goal setting, self-observation, self-assessment, and self-reinforcement” are used to negotiate new information; and (d) “Authentic learning tasks” that are based on realistic situations (Loyens et al., 2009, p. 503). Even though these characteristics apply to all constructivist paradigms, dialectical constructivism is most suited for a discussion of constructivist teaching practices because it highlights social interaction as integral in knowledge construction and cognitive growth.

Constructivism in Education

The utility of constructivist teaching practices in education has been debated (Crowther, 1999; von Glassersfeld, 1991), and most findings from research on this topic focus on the principles of constructivism rather than practical application of constructivist practices (Loyens & Gijbels, 2008; Richardson, 2003; Vermette et al., 2001). While there are differences among definitions of constructivism in education, the basic principles include: (a) the use of cooperative methods including discussion; (b) incorporating strategies that encourage cognitive dissonance, active development and reflection; (c) using student-centered teaching methods that incorporate input from students; (d) integrating prior knowledge and authentic learning tasks; (e) flexibility of curriculum and pedagogy; and (f) viewing the teacher as a facilitator who encourages students

rather than as a dispenser of knowledge (Brooks & Brooks, 1993; Crowther, 1999; Saunders, 1992; Wheatley, 1991; von Glassersfeld, 1991). The articles that do include specific constructivist practices tend to espouse group work as the defining characteristic of a constructivist lesson (Blatchford, Kutnick, Baines, & Galton, 2003; Jones & Brader-Araje, 2002). One recent article by Baviskar, Hartle, and Whitney (2009) took both the definition and basic tenets of constructivism into consideration and claimed that group work is not necessary for a constructivist lesson. The Baviskar et al. (2009) article and an accompanying field guide (Hartle, Baviskar, & Smith, 2012) include examples of practical constructivist research and will be used throughout this section to describe constructivism in the classroom.

In addition to debating the definition and utility of constructivism in education, current literature exhibits confusion between personal and social constructivism. Social constructivism espouses that knowledge is constructed through social interactions among cultures or groups “rather than through the discoveries of individuals or the dictation of authorities” (Baviskar et al., 2009, p. 542). Omission of individuals’ experiences and knowledge is inconsistent with the three paradigms described above; thus, personal constructivism is more suited to education research. In personal constructivism, social and interpersonal elements are integral in constructivist practices, but individuals are the principal creators of their constructions (Raskin, 2002). Arguably even more applicable to education than personal constructivism is contextual constructivism which includes the learner’s interpretation and internalization of phenomena based on the individual’s culture and previous experiences (Crowther, 1999). In this study, social and interpersonal elements included the school context, the preservice mentor teacher, previous teaching and related work experiences, and university courses.

In personal and contextual constructivism, group work is not absolutely necessary because knowledge does not have to be negotiated through interactions. Because constructivism is a learning theory rather than a curricular theory, social interactions and environments are important but not essential (Baviskar et al., 2009). In education, though, practical application of a theory is crucial. When all of the basic tenets of constructivism are refined, there are four criteria—in addition to their student-centered, motivational nature—that designate teaching methods as constructivist: (a) activating prior knowledge; (b) generating cognitive dissonance; (c) applying knowledge with feedback; and (d) reflecting on learning (Baviskar et al., 2009). Although the current study built on the findings of Baviskar et al., the quantitative portion of the study necessitated a deviation from their model. Applying knowledge and feedback were separated to allow for accurate interval data collection (this will be further explained in Chapter 3). The requirements and their practical integration in the classroom are discussed in-depth, and Table 2 is included to help clarify practical application of the criteria.

Activating prior knowledge. The first requirement of a constructivist lesson is that it elicits prior knowledge. Activating prior knowledge refers to stimulating knowledge that is applicable to the exercise (Bruning et al., 2011). According to Ausubel (1968), the most influential factor in student learning is what the student already knows about the subject. Prior knowledge impacts the amount and quality of information recalled as well as the learner's perceptions of the purpose for learning (Tierney & Cunningham, 1980). Because new learning always builds on prior learning, extensive background knowledge will help guide learners' thinking and will help them grasp new concepts (Bruning et al., 2011).

Hartle et al. (2012) described constructivist practices that activate prior knowledge as “opening activities that emotionally and cognitively engage students in the topic at hand” (p. 33).

These assignments are not homework or high stakes assessments; rather, they elicit relevant ideas about previous learning and require observable access and application of it (Hartle et al., 2012). These activities might include demonstrations, concept mapping, solving a problem or explaining a new idea, conducting open-ended discussions, creating lists or conducting informal surveys, or discussing current events or applications to the students' lives (Hartle et al., 2012). Any activity that elicits prior knowledge in relationship to new knowledge and allows discussion of misconceptions is a constructivist implementation of this concept.

Table 2

Practical Application of Constructivist Practices

Criterion	Definition	Practical Example
Activating Prior Knowledge	Stimulates relevant knowledge; opening activity emotionally and cognitively engaging; access and apply prior knowledge in observable way; prior knowledge related to new knowledge; allows discussion of misconceptions	Demonstrations; concept mapping; solving a problem; explaining a new idea; conducting open-ended discussions; creating lists; conducting informal surveys; discussing current events; applications to the students' lives
Generating Cognitive Dissonance	Elaborate differences between prior knowledge and new knowledge; conflict; psychological imbalance that changes behavior; cognitive disequilibrium; reorganize and reconceptualize	Expose misunderstandings; compare prior and current learning; discuss missing evidence; create discomfort; ask provocative questions; introduce surprising or counterintuitive statements
Applying Knowledge with Feedback	Extended practice; compare understanding with peers/new situations; feedback is direct and concrete	Formative or summative assessment; discussions; quizzes; presentations; detailed comments on assignments; whole-class discussion; presentation; peer discussion; self-correction
Reflecting on Learning	Reflection-in-action: metacognition; explore and test hypotheses; interdisciplinary; integrate diverse topics; assessments	Students explaining variables or procedures or developing conclusions; compositions; demonstrations; reports; peer teaching

Note. Field guide to constructivist teaching and learning. Adapted from “A Field Guide to

Constructivism in the College Science Classroom: Four Essential Criteria and a Guide to their Usage” by R. Hartle, S. Baviskar, and R. Smith, 2012, *Bioscience*, 38(2), p. 32

Generating cognitive dissonance. The second requirement for a constructivist lesson is that it creates cognitive dissonance. While the goal of activating prior knowledge is to make connections between new and old knowledge, the goal of cognitive dissonance is to magnify differences between prior and new knowledge (Rogers, 1995). It creates conflict between elements in a learner's perception, and this psychological imbalance can change behavior (Rogers, 1995). When "cognitive disequilibrium" is created and the learner's ideas are challenged, they will realize that they need to "reorganize" and "reconceptualize" their ideas (Wheatley, 1991, p. 18). In these situations, it is crucial that students realize the conflict between their prior knowledge and new knowledge.

In order to capitalize on cognitive dissonance, teachers must realize that the learner's cognitive structures are different from the teacher's constructs. In practice, cognitive dissonance occurs in the classroom when students have misconceptions or "are presented with information...that their current constructs cannot account for" (Hartle et al., 2012, p. 33). Lessons that capitalize on cognitive dissonance will use strategies that expose misunderstandings, compare prior knowledge with current learning, discuss missing evidence, create discomfort, ask provocative questions, and introduce surprising or counterintuitive statements (Hartle et al., 2012).

Applying knowledge with feedback. The third constructivist criterion is application of new knowledge with feedback. In order to develop cognitive skills, extended practice is necessary (Bruning et al., 2011). Application generally consists of formative or summative assessment such as discussions, quizzes, or presentations in which students are able to compare their understanding with their peers or with new situations (Baviskar et al., 2009).

In addition to applying their new constructs, feedback is essential to helping students integrate knowledge into their existing schema. Feedback is integral in ensuring that a learner's understanding and application of the new concept is correct, so feedback and application are not separated in constructivist literature. However, in this study, feedback and application were separated to allow for interval observations. Feedback and application do not always occur simultaneously, and only recording instances in which they happened at the same time would have skewed the data. Constructivist feedback is direct and concrete (Strommen & Lincoln, 1992) and can be implemented through detailed teacher comments on assignments, through whole-class discussion or teacher presentation, or through peer discussion (Hartle et al., 2012). Additionally, group work and assignments that allow for self-correction as well as individual conferences between the teacher and student can provide effective feedback.

Reflecting on learning. The final condition of a constructivist lesson is that it allows for reflection on learning. Schön (1983) was instrumental in developing a concept of reflection that relates to constructivist teaching practices known as reflection-in-action. Reflection-in-action is a type of metacognition that occurs when learners explore and test hypotheses; they act and are required to think about their actions (Schön, 1983). According to Roglio and Light (2009) effective reflection is “interdisciplinary in nature, including resources and implementing activities that integrate diverse topics and stimulate reflection on patterns, interactions, and relationships in different fields of knowledge and practice” (p. 162). Constructivist lessons give students the opportunity to express their learning through assessments or metacognitive activities (Baviskar et al., 2009). These assignments could consist of students explaining variables, procedures, or conclusions and might include compositions, demonstrations, reports, or peer teaching (Hartle et al., 2012).

In order for a lesson to be considered truly constructivist in nature, it must be student-centered and consist of prior knowledge, cognitive dissonance, application with feedback, and reflection. Most literature on constructivism in education neglects one or more of these requirements, and this neglect perpetuates misconceptions of student-centered, constructivist teaching. Baviskar et al. (2009) and Hartle et al. (2012) provided a framework for understanding practical application of constructivist theory in the classroom (see Appendix A). While there are many manifestations of the theory in educational psychology literature, dialectical and personal or contextual constructivism are most suited to studying how students and teachers construct knowledge (Crowther, 1999; Raskin, 2002).

Sociocultural Theories

This mixed methods study was informed by social identity development theory, and it employed a pluralistic, pragmatic view to answer the research questions as they were influenced by context and culture (Creswell & Plano-Clark, 2011). Sociocultural theories posit that learning is positioned in and shaped by socially, culturally, and historically consequential contexts in which the learner and the environment negotiate authority, responsibility, and tasks (Anderson & Stillman, 2013; Vygotsky, 1978). In other words, learning occurs in a person's social environment through active involvement in the learning process, language, and culture. In this study, the contexts in which participants taught as novice teachers were extremely diverse in student demographics, class size, grade level, and subject area. Therefore, it was necessary to account for social and cultural influences on TCs' identity development. Sociocultural theories emphasize the importance of interactive participation that includes social relationships between learners and among learners and teachers (Rogoff, 1990; Vygotsky, 1997). Examining novice teaching through a sociocultural lens underscores tensions between preservice and inservice

teaching and the incongruence between the two experiences. Social identity development theory, supported by mentoring theory, is used to emphasize the pressures, paradoxes, and conflicts that arise when TCs attempt to utilize their university and preservice knowledge in the classroom. TCs learn to mediate practices in their practicum and what students already know in order to facilitate student learning, and they leave their field experiences with conceptions based on culture, background, and their previous students (Anderson & Stillman, 2013). Social identity development theory illuminates how practices change from a practicum experience to novice teaching, and mentoring theory highlights the importance of mentors and peers in shaping those practices.

The participants in this study took part in a practicum that provided TCs with experiential knowledge of constructivist practices through work with a mentor in a school-based setting. After completion of the practicum, the TCs became teachers of record and were expected to be provided with a mentor at their school site. Previous research related to field preparation of teacher candidates has often focused on field experiences without continuing to the first year of teaching (Anderson & Stillman, 2013). From Vygotsky's sociocultural perspective (Kouzin, 2003), however, new knowledge complements previous knowledge rather than displacing it, and learning is co-constructed through cultural and social activities (John-Steiner & Mahn, 1996). Therefore, field experiences, novice teaching contexts, and mentors are important. As Klausmeier (1961) concluded, the primary purpose of formal education (for TCs, their university-based and school-based training) is to promote learning in settings outside of school. If TCs do not build upon their university knowledge and preservice training to their inservice teaching, then their teacher education could be superficial.

Sociocultural concepts of learning and development situate learners and their social environments as “recursive and mutually constitutive...across time” (Beach, 1999, p. 111). Experiences are not solely dependent on the person or the situation but also on their relationship. Novice teachers’ realities are shaped by the social contexts of their practicum experience and their first year of teaching, and they develop practices by building on their preservice knowledge in the classroom (Burke, Jones, & Doherty, 2005). They construct complex, subjective meanings about curriculum and their students based on the contexts of their field experiences and first classrooms.

Identity development theory. Identity is defined as situating oneself within and finding one’s place in the world (Jenkins, 2014). Teacher identity has been studied to understand the relationship between TCs’ learning and their identity during and after teacher education programs (Beijaard, Meijer, & Verloop, 2004; Bloomfield, 2010; Chong, Low, & Goh, 2011; Cooper & He, 2012; Korthagen, 2004; Olsen, 2008; Trent, 2010). Although there are a number of definitions of teacher identity built on different perspectives, the general consensus is that identity development is an on-going, dynamic process that is influenced by group interactions (Stets & Burke, 2000). Teacher identity is a process of interpreting oneself as a teacher and being contextually recognized as a teacher (Freedman & Appleman, 2008). In this study, TCs are evolving into novice teachers, and I was interested in understanding if and how their constructivist beliefs and practices developed. Teachers negotiate their identities among dynamic contexts and phenomena (Beauchamp & Thomas, 2009; Beijaard et al., 2004; Olsen, 2008). Their identity is built upon what teachers view as important based on personal and professional experiences; it is influenced by their professional context and interactions within the context (Beijaard et al., 2004). Just as social constructivism demonstrates a connection between

knowledge and social interactions among cultures or groups, identity development theory incorporates contextual experiences. As they create identities, TCs reflect on the development of dispositions, knowledge, and competence (Mezirow, 1978). Meaningful practice in field experiences allows candidates to reflect on what they have learned in university courses, and novice teaching allows them to extend their reflections as teachers of record in order to change their constructivist beliefs and practices.

Social identity development theory. According to socio-cultural theorists, teacher identity develops when and where teachers negotiate the meanings of their experiences as members of social communities (Wenger, 1998) within social, cultural, and political contexts (Duff & Uchida, 1997; Toohey, 2000). In this study, those contexts included the preservice teaching context, the university context, and each TC's individual school context. Within these contexts, groups that share a concern or a passion for something and build upon it as they interact regularly evolve naturally because of the members' common interest in a particular domain (Lave & Wenger, 1991). Through the process of sharing information and experiences with the group, members of a community learn from each other and have an opportunity to develop themselves personally and professionally.

As TCs interact with other TCs, inservice teachers, and university faculty, they begin to develop a social identity. As novice teachers, they interact further with mentors and peers to expand on their already developing identities. Social identity theory, developed by Hogg and Abrams (1990), discusses how people develop a social identity by categorizing themselves in reference to others:

People tend to classify others on the basis of their similarities and differences to self; they constantly perceive others as members of the same category as self (ingroup members) or

as members of a different category to self (outgroup members)...The outcome of this process of self-categorization is an accentuation of similarities between self and other ingroupers and differences between self and outgroupers, that is self-stereotyping. (p. 21)

For example, a novice teacher might identify his ingroup as Grade 9 English teachers, and an outgroup might consist of administrators. In this study, because the participants were ARL TCs who were also provisionally licensed teachers, the outgroup could also consist of traditionally-prepared teachers. As Hogg and Abrams (1990) argued, the novice teacher would begin to emphasize the similarities between himself and his peers while simultaneously highlighting the differences between himself and the administration of the school. This categorization is the development of a social identity.

As delineated by identity development theory, contexts influence a TC's identity development. The process of categorizing ingroup and outgroup members is a method of social classification that serves two functions: to divide and organize the social environment and to place oneself within that environment (Ashforth & Mael, 1989). Therefore, social identification involves classifying oneself as part of groups and defining groups in relationship to other groups. Within teacher education, TCs begin to identify themselves as part of the ingroup of educators. This identity develops within the university courses and in the school-based practicum setting. Their social identity develops through self-evaluation and social categorization, and the comparison and evaluation process brings TCs into the group (Jenkins, 2014). According to Knowles (1992), TCs' identity development is influenced by role models, teaching experiences, teacher education courses, and their own experiences as students. Novice teachers, however, "derive their professional identity from (mostly combinations of) the ways they see themselves as subject matter experts, pedagogical experts, and didactical experts" (Beijaard, Verloop, &

Vermunt, 2000, p. 751). In other words, while TCs' social identities are shaped through their status as learners, novice teachers' identities are shaped through their status as burgeoning experts. In this study, because the TCs were also novice teachers, they experienced a unique combination of identifying as both students and teachers.

Mentoring theory. Because knowledge is co-constructed, mentoring is an important factor in its development. Kram's (1985) original definition of mentoring viewed it as a relationship in which a knowledgeable person provides career advice and psychosocial support to a protégé. After the original definition, mentor theory grew but was not clearly defined in most of the literature (Bozionelos, 2004; Eby & Allen, 2002; Ragins, 1997). Bozeman and Feeney (2007) developed an operational definition of mentoring that will be used in this study:

A process for the informal transmission of knowledge, social capital, and psycho-social support perceived by the recipient as relevant to work, career or professional development; mentoring entails informal communication, usually face-to-face and over a sustained period of time, between a person who is perceived to have greater relevant knowledge, wisdom or experience (the mentor), to a person who is perceived to have less (the protégé). (p. 17)

Thus, for this study, mentoring refers to a sustained, informal, interpersonal exchange of knowledge and psychosocial support that is related to teaching. For most of the participants, their only mentor was the preservice mentor. However, two of the participants were provided a mentor by their school site, and three were provided with a mentor from the university.

Druckman and Bjork (1994) indicated that "socially induced affect" (p. 251) is crucial in the development of knowledge. Socially induced affect occurs when the TC observes the mentor's emotions or feelings and internalizes them even though the mentor does not transmit

them intentionally (Druckman & Bjork, 1994). The participants in the proposed study had a mentor during field experiences and some had a mentor as novice teachers, so they had either one or two sources from whom to draw social affect. The importance of the mentors' opinions about constructivist teaching methods must be considered when analyzing the changes in the TCs' constructivist beliefs and practices.

Research on TCs' first year of teaching often compares novice and experienced teachers (Swanson, O'Connor, & Cooney 1990; Tschannen-Moran & Hoy, 2007) or focuses on their learning to teach and reflect (Clotfelter, Ladd, & Vigdor, 2005; Ladson-Billings, 2001). Sociocultural theory requires that preservice experiences are included in this discussion because knowledge is co-constructed among multiple contexts and interactions, and it builds on and transforms previous knowledge (Bruning et al., 2011). Therefore, the relationships between the two contexts and among mentors and TCs are necessary to understand changes in beliefs and practices.

Because of the increasing importance of student engagement (Fall & Roberts, 2012), this study targeted constructivist teaching methods to understand how they change from preservice to inservice teaching. The influence of the social context (including the school site, various mentors, and peers) on identity development were considered. Knowledge gathered from literature on identity development during field experiences and the transition from preservice to novice teaching were used to inform the changes in the beliefs and practices of novice teachers.

Review of Preservice and Inservice Teacher Education Literature

In order to understand changes in constructivist beliefs and practices in field experiences and novice teaching, it is necessary to review extant literature on: (a) the importance of beliefs and practices in education; (b) factors that shape TCs' social identities during field experiences;

and (c) the transition from field experiences to novice teaching. Researchers found that beliefs and practices are generally interdependent, but, for beginning teachers, their beliefs and practices may not align. Field experiences were found to help TCs develop a social identity, and mentor teachers and experiential learning are crucial components of those field experiences. Studies about the transition from preservice to inservice teaching did not observe both contexts, but they did focus on mentor relationships. Literature on beliefs and practices will be reviewed first, followed by literature on field experiences, and finally the transition from preservice to inservice teaching. Appendix B demonstrates the themes, findings, and gaps in literature.

The body of literature related to beliefs and practices was collected from the *International Handbook of Research on Teachers' Beliefs* (Fives & Gill, 2015), and the references were mined for additional sources. The literature related to field experiences was located using the search terms “social identity development” and “field experiences” and was confined to 2010 and after. However, in order to fully understand the subject, article reference pages were mined for older articles that remain relevant to the field. The literature on the transition from field experiences to novice teaching resulted from a search of the Academic Search Premier database using the terms “teacher education,” “field experiences,” and “novice teaching.” Variations of these terms such as “practicum,” “student teaching,” and “first year teacher” were also used to locate more articles. Only studies published between 2010 and 2015 were included. In order to be considered for review, studies needed to focus on teacher preparation of participants who were enrolled in a teacher education program and a field experience (practicum or student teaching). Of the located studies, only eleven fit the criteria. Therefore, an additional search of studies published in the two top teacher education journals, *The Journal of Teacher Education* and *Teaching and Teacher Education*, was conducted.

In a critical review of mentoring literature, Wang and Odell (2002) found that the current reform, standards-based movement in education requires new teachers to develop constructivist teaching beliefs and practices in order to meet the diverse needs of their students. While curriculum is being standardized, it is necessary to use diverse methods to accommodate all student needs. Teachers must help their students (a) develop profound conceptual understandings and relationships among concepts; (b) make connections with prior knowledge; (c) apply learning to real-life scenarios; (d) examine what they learn; and (e) engage in discourse about concepts. These practices aim to engage all students and promote social justice (Wang & Odell, 2002). Both traditional and alternative teacher education programs encourage constructivist teaching practices (Cochran-Smith & Fries, 2001).

Teachers' beliefs and practices. The existing body of research on teacher beliefs has demonstrated that beliefs come from multiple sources. In their research on the origin of teacher beliefs, Buehl and Fives (2009) built on Shulman's (1987) work. He claimed that the four sources of teacher knowledge resulted from practice and included: (a) formal study of content; (b) the curriculum and context of formal education; (c) researching pedagogy, student development, human learning and cognition, and the social aspects of education; and (d) experiential knowledge. Buehl and Fives (2009) found that, although these formal sources were influential, teachers' beliefs developed from multiple sources that "were external to the person, such as formal preparation and formalized bodies of information" (p. 380) and those that required active engagement. These findings included six knowledge sources: (a) "formal preparation" including university training and professional development; (b) "formal bodies of information" including literature and research; (c) "observational and vicarious experiences"; (d) "interactive and collaborative experiences with others"; (e) "enactive experiences" including

experiences as a student and as a teacher; and (f) “self-reflection” (pp. 380-381). Because most research on teacher beliefs focuses on formal education, this study aims to fill the gap in research by incorporating contextual sources and a short-term longitudinal design (Nesselroad & Baltes, 1979; i.e., examining TC constructivist beliefs and practices at both preservice and novice stages).

Interdependence of beliefs and practices. As the apprenticeship of observation literature has shown, novice teachers tend to return to teacher-centered beliefs and practices in spite of student-centered training (Borg, 2004; Grossman, 1991; Lortie, 1975). This tendency may be due to the fact that “belief change is a complex, arduous, and long-term process” (Ashton, 2015, p. 43). Some research has indicated that beliefs impact teachers’ choices and behaviors (Levin, 2015; Levin, He, & Allen, 2013). Beliefs influence teaching and, thus, the students’ learning environment; therefore, beliefs are a crucial component of education research (Levin, 2015; Shulman, 1986). Because of the fluid nature of beliefs and their dependence on context (Fives & Buehl, 2012), longitudinal research is required but lacking in research on teacher beliefs and practices.

Independence of beliefs and practices. Context is also crucial in the development of beliefs because “teachers’ beliefs and actions cannot be separated from situations in which they occur” (Levin, 2015, p. 51). Changes in teaching contexts influence how a teacher enacts his or her beliefs in practice (Levin et al., 2013). After a thorough review of literature on the connection between teachers’ beliefs and practices, Buehl and Beck (2015) concluded that teachers exercising their beliefs may be either encouraged or prevented due to both personal and contextual factors. Beginning teachers’ beliefs fluctuate and may not align with their practices while they experience changes. Researching the changes in teachers’ beliefs and practices from

preservice to inservice teaching provides a unique opportunity to understand their influence on each other and how teacher education can more effectively support novice teachers as they form their teacher identities.

Field experiences and identity development. Existing literature has demonstrated that field experiences are crucial to TCs' social identity development (Rozelle & Wilson, 2012; Zeichner, 1985). Qualitative literature utilizing questionnaires, observations, and narratives found that several factors influence identity development. Specifically, these studies demonstrated that field experiences are crucial to TCs' development of inclusive practices and reflective practices (Harris & Clarke, 2011; Florian & Linklater, 2010; Nolan, 2011; Walton & Rusznyak, 2013). Moreover, TCs reflect on their practices during field experiences and develop and transform through interaction with students and participation in the classroom (Dunphy, 2010). Three themes emerged in the field experience literature: (a) the importance of an effective field placement on identity development (Florian & Linklater, 2010; Jenkins, 2014; McNaughton, 2012; Morton & Bennett, 2010; Nolan, 2011; Ong'ondo & Borg, 2011; Rodriguez, 2013; Walton & Rusznyak, 2013; Wright, 2010); (b) the influence of mentor teachers on identity development during field experiences (Bullock, 2004; Clift & Brady, 2005; Harris & Clarke, 2011; Huffman, Holifield, & Holifield, 2003; Kaufman & Moss, 2010; Lave & Wenger, 1991; Meister & Melnick, 2003; Moore, 2003; Putman, 2009); and (c) experiential learning and identity development (Beeth & Adadan, 2006; Clift & Brady, 2005; Ensor, 2001; Freudenthal, 1991; Kolb, 1984; Kolb & Kolb, 2005; Korthagen & Kessels, 1999; Moore, 2003; Zeichner, 2010).

Effective field placements and identity development. TCs tend to begin their field experiences by focusing on their own practices, but they eventually shift their focus to content

and curricular knowledge (Jenkins, 2014). As their identities develop, concentration on pedagogy diminishes, and they shift from focusing on their own content knowledge to the learner (Wright, 2010). An effective field placement is crucial to TC identity development. Walton and Rusznyak (2013) found that completing a practicum in a diverse placement helped TCs learn several inclusive strategies including recognizing student differences, using multiple and applicable representations of information, and using strategies to effectively manage behavior and help students develop social skills. Support during these field experiences may also help TCs learn to modify lessons to address strengths and interests of each student (Morton & Bennett, 2010).

Field experiences that focus on reflection are also important in TC identity development. One study found that TCs began to identify as inclusive teachers through reflection on the idea of “transformability,” where teachers have the opportunity and responsibility to enhance learning for all (Florian & Linklater, 2010). This transformability can be accomplished through dialogue among TCs, university faculty, teachers, students, families, and administrators (Rodriquez, 2013). A case study found that TCs did not critically reflect on their own practices, but they did see growth in general knowledge including lesson planning, using objectives, incorporating student knowledge, timing activities, and using resources (Ong’ondo & Borg, 2011). While one action research study found that critical reflection allows teacher candidates to gain confidence in their opinions about student-centered pedagogy and allows them to describe and demonstrate success (McNaughton, 2012), another found that persuading TCs to take risks in their lessons and teaching habits in order to further develop their methods was particularly difficult despite their reflective journaling throughout the program (Nolan, 2011). These studies suggest that critical reflection is necessary for TC growth and development, but at times reflective journaling did not necessarily encourage development. This body of literature revealed that social identity

begins to form during field experiences through interactions with mentor teachers and students, and TCs tended to focus less on pedagogy and more on student learning as they spent more time in the classroom.

Influence of mentor teachers on identity development. Literature on TC identity development has found that mentor teachers are influential in TCs' implementation of knowledge in practice, and they can be effective or ineffective at assisting TCs in developing a diverse and inclusive identity (Harris & Clarke, 2011). Lave (1991), for example, found that mentor teachers influence the extent of TCs' development in their communities of practice. In a three-semester longitudinal study of 77 teacher candidates' practicum experiences, Moore (2003) found that TCs implemented the mentor teacher's style and strategies even when they conflicted with knowledge gained in university courses. Theory was often eclipsed by procedural concerns such as lesson planning and classroom management that the mentor teachers viewed as more important than theory (Moore, 2003). The majority of mentor teachers felt that TCs were prepared to enter the classroom, and the field experience held few opportunities for TCs to reflect on the connection between theory and the pedagogical decisions they made in the field experience (Moore, 2003).

Other studies concurred, finding that TCs retained some policies or ideas from their university courses, but their mentor teachers were more influential in developing their practices (Huffman, Holifield, & Holifield, 2003; Putman, 2009). TCs may even "act against their beliefs in order to avoid conflict with cooperating teachers or supervisors, and they may perceive some conflict even when others involved do not share this perception" (Clift & Brady, 2005, p. 332). This willingness to abandon their values and the resulting conflict may be due to TCs having

theoretical understandings of practical concepts but not being prepared to deal with them in practice (Meister & Melnick, 2003; Moore, 2003).

Similarly, Bullock (2004)—in a case study of pedagogical knowledge transfer from the university to field experiences—found that mentor teachers who did not use technology for teaching or learning hindered the TCs’ use of technology. Huffman et al. (2003) found that, of their 592 participants, 30% of TCs changed their classroom management styles upon completion of student teaching, and a significant correlation existed between the mentor teachers’ and TCs’ beliefs at the end of the semester. Their findings suggest a connection between the mentor teachers’ and TCs’ beliefs, which could indicate that the mentor is more influential than university courses. Putman (2009) found that the 71 TCs in his study were not able to fully implement their own plans during student teaching, which demonstrates that their practices were shaped by their mentors. Kaufman and Moss (2010) also found that while their 42 participants wanted to create a student-centered classroom, they did not apply that desire in practice. These findings suggest that, while still in the teacher education program, TCs do not use much of their university coursework in practice due to the influence of their mentor teachers.

Experiential learning and identity development. Many TCs abandon theory when they enter the classroom because of practical issues (Clift & Brady, 2005). Therefore, experiential learning is necessary in TC identity development. Experiential learning—originally Dewey’s (1938) “theory of experience” (p. 33)—is a philosophy of education that views learning as a knowledge-creation process in which: (a) learning is always relearning because it draws on prior knowledge; (b) learning is caused by resolution of conflict; (c) learning involves all aspects of a person’s identity— thinking, feeling, perceiving, and behaving; and (d) learning is a consequence of interactions between a person and the environment (Kolb & Kolb 2005).

Accordingly, learning is a process in which experiences are understood and transformed to create knowledge (Kolb, 1984). Experiential learning is dependent upon the person's relationship with the environment—or learning space—where “person and environment [are] interdependent variables” (Kolb & Kolb, 2005, p.199). This hybrid space concept illustrates that multiple factors influence the sense individuals make of the world (Zeichner, 2010). In teacher education, these factors include university and school-based settings as well as the people in them (mentors, students, instructors, etc.). The reviewed literature demonstrates the importance of all of these factors in identity development.

Traditionally, TCs have few opportunities to implement methods and strategies learned during their teacher education programs (Korthagen & Kessels, 1999). However, identity development in the university setting and the school-based setting is linked to opportunities to reflect on realistic cases (Freudenthal, 1991) and to position theory into specific teaching situations (Moore, 2003). In other words, experiential knowledge is developed when learners are able to interact with difficult, concrete circumstances which they can reference throughout the course of learning (Korthagen & Kessels, 1999). Conversely, Beeth and Adadan (2006) found that the separation between theory and practical application is unavoidable in teacher education due to the university's simulated nature. Therefore, teacher educators should address TCs' practical concerns during field experiences rather than trying to “lessen the tension or bridge the gap that exists between theory and practice” (Beeth & Adadan, 2006, p. 118). While these studies contradict one another, they all demonstrate the need for experiential learning.

Through an analysis of 105 studies, Clift and Brady (2005) found that both university coursework and fieldwork can influence TCs' thoughts, beliefs, and actual practices. However, practical implementation of their beliefs was not easy or straightforward, supplementing the

findings by Buehl and Beck (2015) that beliefs and practices are connected in complex ways and influenced by contextual factors. TCs struggle to integrate theoretical and practical content and pedagogical knowledge in the field, and they have difficulty dealing with conflicting beliefs in their coursework, fieldwork, and practices (Clift & Brady, 2005). The meta-analysis found that during university courses, TCs could reflect and concentrate on their future students' learning; however, when they become novice teachers, reflection on student learning was replaced by responsibilities such as "curriculum planning, time and group management, assessment, and communication with parents" (Clift & Brady, 2005, p. 332). During field experiences and novice teaching, these responsibilities often overshadow constant individualized attention and can cause new teachers to become discouraged with their students and with teaching. Similarly, in a two-year longitudinal case study, Ensor (2001) identified a "disjuncture" (p. 316) between the practices encouraged in university coursework and those novice teachers used. While the participants tended to incorporate more teacher-centered instruction once they became novice teachers, they continued to use "discrete tasks" they learned in their methods course, and they incorporated argumentation techniques learned in the class.

Based on the reviewed literature, TCs leave the university-based component of teacher education with certain beliefs and practices that shape their identity as TCs. However, when they become student teachers and novices, TCs change their practices, and their mentors are instrumental in these changes. Therefore, mentors are critical in shaping TC social identities.

Transition from preservice to novice teaching. Extant research on novice teachers' transition from preservice to inservice teaching has primarily utilized case study methods. Also, most studies published within the last ten years on this topic use self-report as the primary data source (Caudle & Moran, 2012; Clark, Byrnes & Sudweeks, 2014; Lee & Zeppelin, 2014;

Schmidt, 2013); many of the reviewed studies are from the late 1990s and early 2000s. The following two themes emerged from the reviewed literature: (a) novice teachers struggle to implement their teaching vision (Beach & Pearson, 1998; Brouwer & Korthagen, 2005; Bullough 1990; Caudle & Moran, 2012; Clark, Byrnes, & Sudweeks, 2014; Kilbourn & Roberts, 1991); and (b) the relationship between novice teachers and their mentors is important (Gratch, 1998; Hezlett, 2005; Orland, 2001).

Tensions during the transition from preservice to novice teaching. As TCs grow into novice teachers, their practices and beliefs change based on their experiences (Caudle & Moran, 2012). In a four-year longitudinal study of three novice teachers, Caudle and Moran (2012) found that beliefs and practices were reciprocal. However, other literature has found that, early in their careers, novice teachers struggle to implement the goals developed during teacher education. One mixed-method, longitudinal study found that the practices in novice teachers' schools and their students' expectations led them to use teacher-centered strategies rather than the student-centered strategy of "activating pupils" encouraged by their teacher education programs (Brouwer & Korthagen, 2005). A case study of a first-year Spanish teacher found that she was frustrated by her lack of background knowledge and the amount of time required to enact her teaching goals (Bullough 1990). This frustration caused the teacher to abandon her constructivist goals and adopt the role of a caring adult instead of the teacher she aspired to be. Another case study found that the novice teacher had a different vision of literacy instruction from that espoused by her school, and, due to this conceptual disparity, the teacher developed feelings of ineffectiveness and failure. The novice eventually lost confidence in her constructivist approach and developed the teacher-centered approach utilized by her first-year mentor (Kilbourn & Roberts, 1991).

Beach and Pearson (1998) conducted a more extensive study of 28 TCs during their student teaching experience, and subsequently half of those 28 participants in their first year as teachers of record. They found that novices cite multiple struggles including the tension between: (a) the novice teacher's expectations and the mentor's teaching style; (b) the school curriculum and the novice's intended curriculum; (c) the school culture and the novice's view of what his or her role should be; and (d) the novice teacher's beliefs and attitudes about the school and the school culture (Beach & Pearson, 1998). The transition from TC to novice teacher enhanced these tensions and conflicts and required the novices to find solutions.

When TCs complete student teaching, they tend to have strong self-efficacy regarding instruction (Clark, Byrnes, & Sudweeks, 2014), but many novice teachers find the first-year teaching environment to be more influential than their teacher education courses or field experiences. In spite of a desire to retain student-centered practices, novice teachers will often abandon them in favor of teacher-centered practices common in their schools.

Mentor and TC relationships. Another theme in the literature is the importance of novice teachers' relationships with mentors. Through a review of research on mentor and novice teacher relationships, Hezlett (2005) found that mentors help improve their mentees' "cognitive, skill-based, and affective learning, ...organizational knowledge and technical knowledge," as well as "technical, interpersonal, time management, and self-organization skills; and...self-confidence" (p. 512). Hezlett's (2005) review demonstrates the influence of a first-year teaching mentor on multiple areas of the new teacher's development. Another case study showed that experienced teachers who become mentors may face struggles and development similar to that experienced by novice teachers (Orland, 2001). While this concurrent growth can cause mutual understanding and sympathy, not all mentors experience it. A case study of the relationship between a mentor

and novice teacher found that the mentor's style focused on modeling, which frustrated the novice and deterred her from seeking support (Gratch, 1998). The novice teacher had a successful field experience and desired to develop her own cooperative teaching style. This finding is consistent with Hazlett's (2005) synthesis of research on mentor influence.

These studies demonstrate that novice teachers seek support to face difficulties as they transition from teacher candidates to teachers of record. However, the research is not current and generally consists of case study. Also, little attention has been given to the link between learning during field experiences and novice teachers' practices during their first year. The studies show that mentors are important in supporting novice teachers' teaching practices, and potentially their constructivist teaching practices, and that candidates' struggles may be important in understanding how they develop these practices.

Suggestions for Future Research

Throughout the literature, there are very few quantitative studies related to identity development or changes in beliefs and practices. Additionally, while the literature suggests that mentor teachers are influential, there is little research on their influence regarding constructivist beliefs and practices specifically. The search also demonstrated a lack of literature on both preservice to inservice teaching; rather, most literature focuses on the gap between university-based teacher education and school-based teacher education.

The body of research on field experiences is generally focused on development through teacher self-report because few instruments exist that allow for empirical research of observable practices (Kesal, 2003). Additionally, the observation instruments that do exist define constructivism in a way that does not align with this study (Fouts, Brown & Thieman, 2002).

Therefore, an instrument that allows observation of constructivist practices of teachers and TCs must be developed.

The literature demonstrated a gap in research regarding the examination of both preservice and inservice contexts. One study did observe both contexts, but it only discussed the university-based methods course and first year of teaching instead of also incorporating experiential learning during teacher education (Ensor, 2001). Therefore, new studies should focus on changes in constructivist beliefs and practices from field experiences to novice teaching. The methods used to observe transition in education tend to be case study or incorporate teacher self-report, so new literature should also focus on observation of actual practices and incorporate a mixed-methods approach. The next chapter will propose a study to address some of these gaps in the literature.

Chapter 3: Methods

This study employed an embedded, mixed methods design in order to understand if and how a cohort of teachers' constructivist beliefs and practices changed from preservice to novice teaching. The following section will describe the chosen sites and participants, how they were selected, the rationale for using a mixed methods approach to the study, data collection procedures, and methods of data analysis. The purpose of the study is to understand the changes in one cohort of teacher candidates' (TCs') constructivist beliefs and practices from preservice to inservice teaching. Constructivist beliefs were selected for investigation because of their importance in facilitating student engagement, promoting critical thinking and problem solving, and deepening learners' abstract thinking (Haynes, 2014). Additionally, beliefs and practices are interdependent and especially fluid during preservice and early novice teaching.

Institutional Review Board Process

The institutional review board (IRB) protocol proposal form to study the overall lab school was originally submitted for initial data collection in March 2015. In September 2015, I revised and resubmitted the protocol proposal for my dissertation and received approval at the beginning of October (see Appendix C). A modification request form was submitted shortly thereafter to change the name of the study. Along with the proposal form, several documents were included in the IRB for recruitment including an informed consent form, a recruitment script, and a debriefing script (see Permissions in Appendix D). Additionally, several data collection instruments were used including a Teacher Candidate Interview Protocol (see Appendix E), an Observation Protocol (see Appendix F), an Interval Protocol (see Appendix G), and a Novice Teacher Interview Protocol (see Appendix H). Methods used for recruitment and data collection are described further in this chapter.

Research Context

Due to the focus on changes in beliefs and practices in two contexts (preservice teaching and novice teaching), there was one set of participants but multiple sites. The following section delineates the selection of the site for the first phase of the study (preservice teaching). The sites for the second phase (inservice teaching) varied based on where the teachers were hired upon completion of the first phase, and those are described in the individual participant sections. The study was a short-term longitudinal design (Nesselroad & Baltes, 1979). Although the study only lasted 7 months, it is longitudinal because each participant was measured during preservice teaching and again during novice teaching. It used “repeated measurement of the same individuals over time” (Axinn & Pearce, 2006, p. 163).

Phase 1: Practicum experience. I identified Southwestern University¹ for the present study because it has an accelerated Alternative Route to Licensure (ARL) program that allowed for some flexibility in teaching methods used by the University mentor teachers. I chose to study an ARL program because of the current teacher shortage in the school district near the observed university and subsequent growth in popularity of alternative teacher education (Feistritzer, 2011; U.S. Department of Education, 2004). In this ARL master’s program, the students receive a provisional teaching license in secondary mathematics, science, social studies, or English language arts after taking two courses (classroom management and pedagogical practices) and a practicum, and they are hired as teachers of record in the Western School District or nearby charter schools as they continue working towards their standard license and master’s degree.

According to the U.S. Department of Education, a school is eligible to receive federal funds under a Title 1 designation when at least 40% of the students at the school are from low-

¹ All names of people and places are pseudonyms

income families² (U.S. Department of Education, 2014). In the Western School District, the school district neighboring Southwestern University, almost 75% of the schools qualify for Title 1 funding (citation withheld to preserve confidentiality). According to the American Community Survey Profiles (ACS, 2006-2010), which is part of the Education Demographic and Geographic Estimate (EDGE) powered by the National Center for Education Statistics (NCES), the demographic information for students in the Western School District demonstrated that 40% of the students were Hispanic or Latino, 38% were White, 12% were Black, and 7% were Asian; other students identified as American Indian and Alaskan Native, Native Hawaiian and other Pacific Islander, another race not listed, or two or more races.

ACS also reported the demographic information of students at Central Middle School—where TCs completed their practicum—from 2006-2010. The demographics of the school were similar to those in the district as 41% of students were Hispanic or Latino, 35% were White, 13% were Black, and 8% were Asian; other students also identified as Native Hawaiian and other Pacific Islander, another race not listed, or two or more races (U.S Department of Education, Institute of Education Sciences [IES], 2010). For the 2013-2014 school year specifically, Central Middle School reported 71% Hispanic students, 9% White students, 12% Black students, and 5% Asian students (citation withheld to preserve confidentiality). While the summer practicum experience did not exclusively consist of students from Central Middle School, the ethnic demographics of the district were represented.

Southwestern University demographics are similar to those of the Western School District. The students are 23% Hispanic or Latino, 38% White, 16% Asian, 8% Black, and 8%

² While there is some debate over the definition of this term, low-income in federal documents tends to refer to an individual whose “family’s taxable income for the preceding year did not exceed 150 percent of the poverty level amount” (U.S. Department of Education, 2015).

two or more races. Other students identified as Native Hawaiian/Pacific Islander, Race/Ethnicity Unknown, or Non-Resident Alien (citation withheld to preserve confidentiality). Fifty-six percent of the population is female and 44% is male. In the current study, five TC participants were White and one was Asian. Two of the participants were female and four were male. Of the preservice mentor teachers, three were male and three were female; five of the mentor teachers were White and one mentor was Black. Although these demographics are not typical of the researched university, they are more closely related to national data on teachers. In the 2011-2012 school year, although overall 76% of teachers were women, in secondary public schools 58% were women and 82% of teachers were White (Goldring, Gray, & Bitterman, 2013). The participant demographics are delineated in Table 3.

Table 3

Participants

Discipline	Mentor Teachers	TC	Gender	Ethnicity	Novice Placement	Grade Level	Novice Context
Science	Keith & Tony	Melissa	Female	Asian	Math	6 & 7	Charter
		Lucas	Male	White	Science	6 – 8	Public Behavior
		Hannah	Female	White	Science	6 & 7	Public
English Language Arts	Edward & Bridget	Patrick	Male	White	English	7 & 10	Charter
		Arthur	Male	White	English	9	Public
		George	Male	White	Social Studies	5 & 6	Charter

This ARL program is unique because, at the time of the first phase of the study, Southwestern University implemented an accelerated, five-week summer version of the classes and practicum to respond to the teacher shortage in the region. During the first four weeks, the TCs completed their practicum program at Central Middle School. They would arrive at Central

in the morning for the University portion of their practicum course, they had an online classroom management course, and they met at Southwestern for their pedagogy course twice each week after the practicum. At the end of the four-week practicum, the TCs had one week of six-hour pedagogy classes. The practicum portion of the ARL program lasted from 8:00 a.m. to 12:00 p.m. each day for a total of seventeen days. Two additional days were reserved for field trips; one was an educational field trip to Southwestern University for a tour and science fair, and one was a reward trip to a water park which the TCs did not attend. In addition to the shortened time period, the classroom experience was unique for the TCs as well. The school day was divided into three, 70-minute class periods; the student numbers in each class were low (approximately ten to fifteen students in each class); and the number of TCs in the classroom ranged from four to eight. Generally, there were also two mentor teachers in each classroom.

Phase 2: Novice teaching context. Upon completion of the summer program, five out of the six TCs continued taking courses at the University while teaching full time as teachers of record. One TC was still completing testing requirements for the school district, so she taught as a long-term substitute and postponed her university courses. After three additional semesters of coursework, TCs will earn a full teaching license, and after five semesters, those who are degree-seeking will earn a master's degree. During their first semester of teaching, the five participants who were teaching full time enrolled in a content area methods course and two student teaching courses. The next semester will consist of an assessment course, a parental engagement course, and a course on secondary curriculum. Next, they will enroll in a special education course, Teaching English as a Second Language, and a technology course. In order to complete the master's program, they will take two elective courses, a multicultural course, and an individualized culminating experience.

The faculty's selection of mentor teachers for the four-week practicum experience allowed for some control over the teaching methods used in the practicum classes. Because of the study's focus on constructivist teaching practices and the difficulty in ensuring their use in field experiences, this program was ideal. While it was not possible to control for constructivist practices as defined in this study—student-centered teaching methods that activate prior knowledge, generate cognitive dissonance, require application of knowledge with feedback, and require reflection (Baviskar et al., 2009)—an expectation of student-centered, engaging methods was made clear to the mentor teachers who developed the curriculum. The summer program was not compulsory for middle school students, so it was imperative that teachers maintained constant student engagement. Therefore, while I cannot claim that the TCs in this study were exclusively exposed to constructivist teaching practices, I argue that their practicum was more student-centered than most traditional field experiences. I also observed regular, though not consistent, use of the constructivist domains in the three subject areas.

Selection of Participants

My unit of analysis for this mixed-methods, multiple case study is TCs' constructivist beliefs and practices when they transition from TCs to novice teachers. Therefore, the participants for both phases of the study remained the same. In order to get a true picture of both beliefs and practices, it is necessary to study the participants in two phases. During summer 2015, 15 of the 20 TCs (four math, seven science, and four English language arts TCs) enrolled in the program agreed to participate in the study. Of those participants, six novice teachers remained eligible to participate (because they secured employment) and elected to participate. Two science mentor teachers (Tony and Keith) and two English language arts mentor teachers (Edward and Bridget) were assigned TCs from their discipline during the first phase of the study

(see Table 3). Two math mentors were also involved in the study, but of the four math TCs, three either did not secure employment or remain employed for the duration of the study, and one elected not to participate. All of the mentors have five or more years of teaching experience. Additionally, with the exception of one science mentor, all of the mentor teachers had previously worked with TCs from the university.

Participant descriptions. Although 20 teacher candidates were originally enrolled in the preservice summer program, only six participants remained eligible for study. Five TCs did not elect to participate in the first phase of data collection. Of the 15 remaining TCs, five either did not secure employment or did not remain employed for the entire first semester of novice teaching and four chose not to participate in the second phase of the study. The six participants in the study include two male English teachers, one male and one female science teacher, one female math teacher who was trained as a science teacher, and one male social studies teacher who was trained as an English teacher (see Table 3). An in-depth description of each participant's school context is provided below.

Mentor teachers. The mentor teachers for the two content areas worked together to mentor each of the TCs in a given subject. In this study, three of the TCs were trained in science and three were trained in English. Below, a brief description of each of the mentor teachers is provided.

Science: Keith and Tony. Keith taught for 14 years and believed that student-centered practices are crucial. When working with TCs, he liked to emphasize the challenges of novice teaching and the importance of preparation. As a mentor, he modeled constructivist practices such as eliciting prior knowledge and establishing relevance and student-centered instruction specifically focusing on inquiry and hands-on learning.

Tony taught for 20 years and believed that all students learn differently, so it is important for teachers to utilize multiple instructional strategies and individualized practices. Tony believed that inquiry-based instruction is beneficial in science. As a mentor, he believed that TCs should have a “growth mindset” and continually develop their professional practice.

English: Edward and Bridget. Edward taught for five years and had experience as a mentor teacher. When working with students and TCs, he believed that the most important motivator is building relationships. He believed that, in mentoring, it is important to build trust with TCs, provide structure, and help them develop their cultural competence. He provided individualized, direct, and focused feedback to TCs.

Bridget taught in multiple cities for more than 15 years, and she spent the last 7 years in the observed school district. She believed that students learn best in a structured environment, and she believed that every child has the capacity to learn. In working with TCs, she believed that it was important to let them begin teaching right away so that they could learn from their mistakes.

Science teacher candidates. The three science teacher candidates had previous experience in fields outside of education. Below, their background experiences and novice teaching contexts are described.

Hannah. Although Hannah was the first of the TCs to secure employment, she was hired as a long-term substitute rather than a full-time teacher of record. Hannah previously worked as a contractor for the federal government and left her career to pursue her passion for teaching middle school science. Prior to enrolling in the ARL program, she worked as a long-term substitute for a full year. After the summer practicum, she found a job teaching in a low-income school as a long-term substitute teacher while she completed the science testing requirement.

Unfortunately, due to a learning disability, Hannah was not able to pass the test before the Western School District's school enrollment count day. Because of her substitute status, she was moved from the school where she was hired. At her observed school, she taught Grade 6 and 7 science, and although she enjoyed the content, she was unhappy with having to change schools after a month of building relationships with her students. Even though she was unhappy about having to transfer schools, Hannah viewed her learning disability as an asset that allowed her to understand students with special needs and help them learn without judgment. Her observed school was a performing arts magnet school that had demographics similar to the overall district, and her classes consisted of between 30 and 40 students. She taught on a block schedule, so on certain days she taught some of her students for 94 minutes. She had her accelerated Grade 6 students for 54 minutes, and on some days she saw her regular students for a 56-minute class period. The school schedule was constantly changing which was a concern for Hannah because she felt that the students' routine was disrupted too often, and it was difficult for her to lesson plan appropriately.

Lucas. Lucas was a second-career teacher candidate who retired from the Army before pursuing his goal of becoming a secondary science teacher. He originally wanted to become a high school physics teacher, but he was instead hired at an alternative, behavior-focused school to teach Grades 6 through 8 science. His classes each consisted of between 2 and 6 students; therefore, he only had about 15 students throughout the day. Students at Lucas's school were enrolled after they were expelled from other schools in the Western School District. Because he worked in this alternative setting, students transitioned in and out of the school quickly. Therefore, it was difficult to denote the demographics of the school. The majority of students in the observed classroom were Black and Latino, and almost all of the students were male. Most

students attended the school from between six and ten weeks and then returned to the school district. Although Lucas taught science content, the goal of the school was to help students become better at controlling their behavior in order to be more successful in a traditional classroom. The students followed a strict schedule and were only in Lucas's class for 43 minutes.

Melissa. Melissa was a second-career teacher candidate who was originally from Pakistan. After leaving her job in the private sector, she worked in a private, international school. The lack of job security and disagreements with administration led Melissa to attend the Southwestern University program to earn her teaching license and master's degree. She had a background in physics and was interested in teaching high school; however, she had difficulty securing a job through the school district. About two weeks into the school year, Melissa was able to secure a job teaching Grades 7 and 8 mathematics in a charter school located in the same city as Western School District. The charter school had 4,500 students across the elementary, middle, and high school, and the average number of students in each of Melissa's classes was 28. The student demographics consisted of 55% White, 23% Latino, 9% Black, 8% two or more races, 3% Asian and 2% Pacific Islander. The school also consisted of 9% students with individualized education plans, 4% students who were English learners, and 5% students who receive free or reduced lunch. The demographics of Melissa's charter school were similar to the Western school district, and she taught two classes with a special education co-teacher.

English teacher candidates. The three participants from the English cohort were all male and had different prior experiences with teaching. Their background experiences and novice teaching contexts are described below.

Arthur. Arthur's teaching background consisted of individual tutoring, and he was previously an anthropologist who decided to pursue a master's degree in English education. He

began his master's program before enrolling in the accelerated summer practicum program. After completing the practicum, he was hired as a Grade 9 English teacher at a high school in the Western School District. Of his seven classes, six were co-taught with a special education teacher. His classes consisted of between 30 and 40 students, and, like Hannah's school, the demographics in his school were similar to the district average. Of all of the participants, Arthur was the only one to secure a job in a traditional school in the school district as a full-time teacher of record and to remain in that position. Like Hannah, he taught on a block schedule. He saw each of his classes for 85 minutes, but because of the block schedule he only taught each class three times each week.

Patrick. Patrick was a 24-year-old male who decided to become a teacher after working in food service briefly. His mother was a teacher, and although his family lived across the country, he decided to move to the studied area in order to earn his teaching license and master's degree. He was hired to teach Grades 7 and 10 English at a small, science- and math-focused charter school. The charter school was one of three campuses, and among the campuses there were 1,500 students. The average class size was 24 students, and the demographics of the charter school deviated from the demographics of the surrounding Western school district. The students in the high school were 43% White, 29% Asian, 14% Latino, 10% Black, and 3% Pacific Islander, and only 5% of students received free or reduced lunch (citation withheld to preserve confidentiality). In the middle school, students were 53% White, 21% Asian, 16% Latino, and 7% Black. Eight percent of students received free or reduced lunch. The schedule at all of the observed charter schools was the same, with students attending each class for approximately 50 minutes.

George. Before entering the ARL program at Southwestern University, George was in the military and worked for a public charter school system. After realizing that his beliefs about education differed from the charter school, he decided to enter the ARL program at Southwestern University. Because of some issues securing employment with the school district, George was offered a job with a school in the Western School District, but he was not actually hired. After approximately two months of searching for a job, he was hired by a dual elementary and middle school charter school in the same city as the Western School District. Although he was licensed to teach secondary English, he was hired to teach middle school social studies. He taught Grade 5 (which was treated as a middle school grade in this charter) United States history, Grade 6 World Civilizations, and Grade 6 Career and Finance. His school consisted of approximately 1,000 students across the elementary and middle school, and his average class size was 28 students. Like Patrick's school, the student population at George's school was not representative of the surrounding school district. Seventy-six percent of students were White, 11% were Latino, 5% were Black, 3% were Asian, 2% were American Indian/Alaskan Native, and 1% were Pacific Islander. Also, 15% of students received free or reduced lunch, 11% had individualized education plans, and 4% were English learners.

The TCs' novice teaching locations and backgrounds demonstrate the diversity that exists in teaching and the need for a multiple case study. Of the six participants, only Arthur and Lucas were assigned a mentor teacher at their school site. Also, two of the participants, Hannah and George, elected to participate in a professional development run by the University. These factors in addition to the school culture they experienced provided another layer to their social identity development.

Role of the researcher. Due to the short-term longitudinal nature of this study (the participants were studied at different points throughout a 7-month period), I developed a rapport with the participants (Given, 2008). During the actual observations, I was a non-participant observer (Labaree, 2002) and did not interact with the students or the teachers. However, because I developed friendships with the participants, they often asked for advice on their teaching or university courses. I shared materials with them and even helped one participant study for the Praxis exam. While these relationships required careful consideration of data in order to avoid bias, they also allowed for rich interview data. Efforts to ensure credible data collection and analysis are included in the Validity and Reliability section.

Research Design

The current study was a multiple case study including six separate, but linked, cases. The rationale for utilizing multiple case study was that each individual case was interesting in part because of its connection to the other cases (Stake, 2006). All of the participants were bound together because of their preservice teaching experience—they were members of a group of individuals who experienced the same ARL teaching context—but their novice teaching contexts were varied. In order to better understand the phenomenon of transitioning from a TC to a novice teacher, it was necessary to study the transition as single cases that were part of a larger whole. The similarities and differences among the cases helped to explain the overall phenomenon and extend beyond understanding a single case (Baxter & Jack, 2008; Stake, 2006). In this multicase research, I began with the phenomenon of transitioning from preservice to inservice teaching, studied each case in its own context, analyzed the cases individually, and interpreted findings to understand broader themes. According to Stake (2006), multicase study is essential because each case is complex and impacted by social conditions, cultural and historical contexts, and

backgrounds. Because of the social nature of teaching, illustrating the context in which each participant taught was essential.

This multiple case study was bound by time and place (Creswell, 2013) in that the study specifically focused on TCs' summer ARL cohort and their first semester of novice teaching within the city surrounding Southwestern University. It was also bound by time and activity (Stake, 2006) because I specifically studied the changes in beliefs and practices from one practicum experience to the first semester of novice teaching. All data collection was completed before the end of the first school-site semester. Finally, multiple case study is also bound by definition and context (Miles & Huberman, 1994). The participants were defined through their use of constructivist teaching practices and their beliefs about those practices, and the study was confined to their individual school contexts. The choice to utilize multiple case study over a holistic case study hinged on the fact that a multiple case study allowed analysis within and across settings which resulted in "robust and reliable" evidence (Baxter & Jack, 2008, p. 550).

Table 4

Qualitative and Quantitative Research Questions and Data Sources

Research Question	Data Sources
How do TCs' beliefs and practices differ from preservice to inservice teaching?	<ul style="list-style-type: none"> • Partial interval recording (phase 1 and 2) • Classroom Observation Protocol (phase 1 and 2) • Video recording (phase 1) • Interviews (phase 1 and 2)
What are the TCs' constructivist beliefs and practices after a semester of novice teaching?	<ul style="list-style-type: none"> • Classroom Observation Protocol (phase 2) • Interviews (phase 2)
To what extent do TCs differ in their implementation of constructivist practices during their practicum experience and novice teaching?	<ul style="list-style-type: none"> • Partial interval recording (phase 1 and 2)

This study employed an embedded, mixed methods design in order to understand what changes occurred in TCs' constructivist beliefs and practices from a student-centered practicum experience to a novice teaching experience. The mixed methods research question was: How do TCs' beliefs and practices differ from preservice to inservice teaching? The qualitative research question was: What are the TCs' constructivist beliefs and practices after a semester of novice teaching? The quantitative research question was: To what extent do TCs differ in their implementation of constructivist practices during their practicum experience and novice teaching? The mixed methods question utilized both quantitative and qualitative data sources while the quantitative and qualitative questions utilized those sources exclusively. Table 4 demonstrates the research questions and data sources.

Several of Bryman's (2006) sixteen reasons for mixing methods were used as the rationale for a mixed methods design in this study. First, triangulation among quantitative and qualitative data sources allowed for triangulation of findings which should, in turn, enhance the credibility and integrity of the findings (Jick, 1979). The quantitative question determined the measurable extent to which TCs believed in and used constructivist practices during the practicum while the qualitative question helped explain their beliefs and practices as novice teachers.

Bryman's (2006) second applicable rationale was that quantitative and qualitative research approaches have different strengths and weaknesses that are offset through mixed methods research. The use of a sociocultural theory in the proposed study suggested an interpretation and paradigm that was typical of a qualitative study, and a quantitative approach arguably mitigated some issues of bias and interpretation. Alternatively, quantitative research is limited in discussion of context and setting, which the qualitative research question addressed

(Creswell & Plano-Clark, 2011). Accordingly, Bryman's (2006) third related rationale was that including both quantitative and qualitative data sources allowed for a more complete understanding of the change in constructivist beliefs and practices. Finally, using mixed methods research allowed for both quantitative and qualitative research questions. The quantitative question permitted the use of measurement instruments to determine the extent to which a phenomenon occurred, while the qualitative question encouraged a focus on trustworthiness and a thematic analysis of how the change occurred (Bryman, 2006).

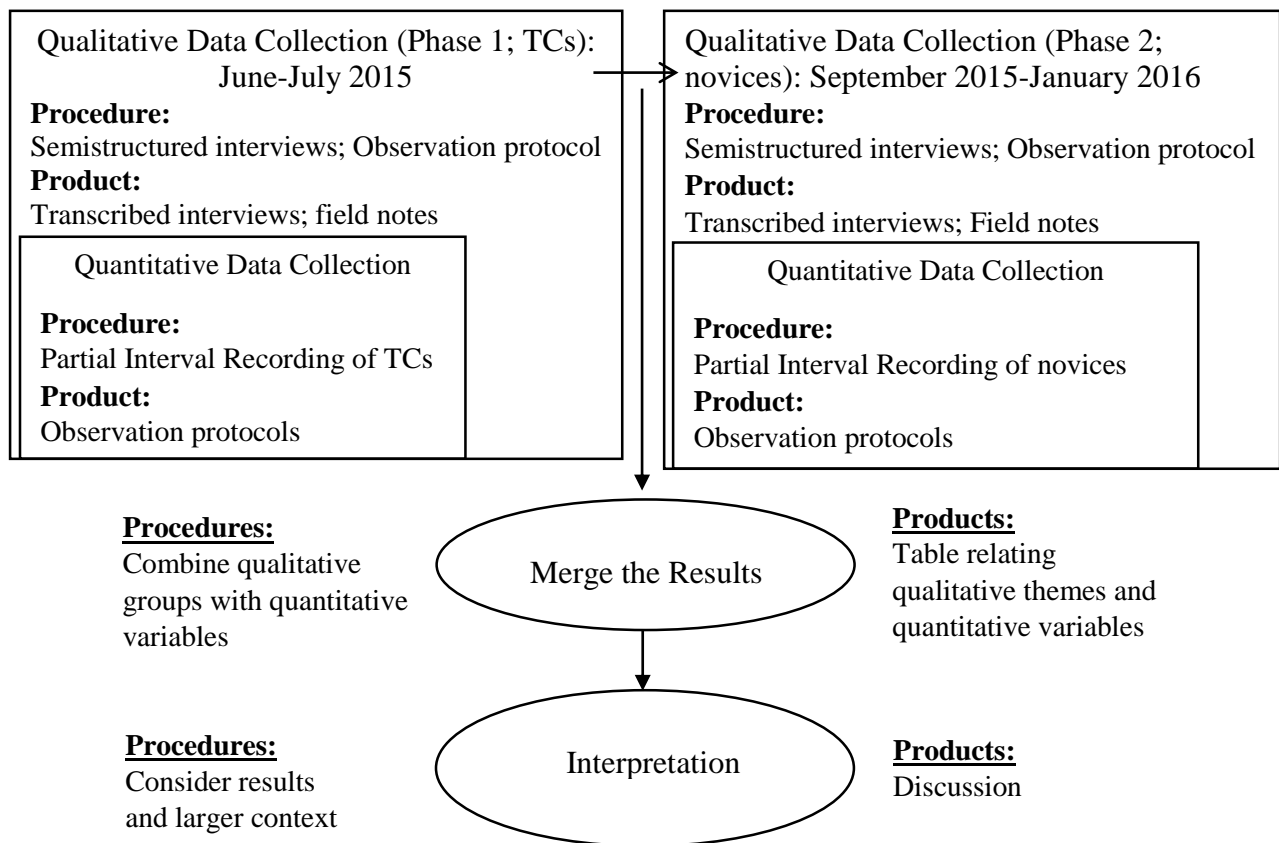


Figure 2. Diagram for an embedded mixed methods design

Note. Diagram for a Study that Used the Embedded Design. Adapted from *Designing and Conducting Mixed Methods Research* by Creswell and Plano-Clark (2011, p.126).

Mixed Methods Design

This study employed an embedded design in which qualitative methods were more significant and quantitative methods were used as support (Creswell & Plano-Clark, 2011). More specifically, the design was a fully mixed, concurrent, qualitatively dominant study (Leech & Onwuegbuzie, 2009); during both phases of the study, all of the strands—asking research questions, data collection, data analysis, and data interpretation (Teddlie & Tashakkori, 2009)—were fully mixed. In both phases, qualitative data (interviews and field notes) were supported by quantitative data (partial interval recording). The interpretation of quantitative and qualitative strands was mixed after separate data collection and analysis. The qualitative results were analyzed through the functional framework of social identity development theory (Stets & Burke, 2000), which also guided the overall research design (Green, 2007). The following section describes the embedded design of the two phases of the study, beginning with qualitative methods followed by quantitative methods. Figure 2 explains the embedded design.

Table 5

Qualitative and Quantitative Data Collection

Type of Data	Phase 1: Summer Teacher Education	Phase 2: Fall Novice Teaching
Qualitative Data Collection	<p><i>Participants:</i> 6 TCs; 6 mentors</p> <p><i>Data Collection:</i> Mixed method observation protocol 1 40-60 minute observation (6 total) Semi-structured interviews of TCs 2, 57ldg.5757. 30-60 min (12 total) Semi-structured interviews of mentors 1, 57ldg.5757. 30-60 min (6 total)</p>	<p><i>Participants:</i> 6 novice teachers</p> <p><i>Data Collection:</i> Mixed method observation protocol 400 min. of observation (2400 total) Semi-structured interviews 6 1-hour interviews</p>
Quantitative Data Collection	<p><i>Participants:</i> 6 TCs</p> <p><i>Data Collection:</i> Partial Interval Recording</p>	<p><i>Participants:</i> 6 novice teachers</p> <p><i>Data Collection:</i> Partial Interval Recording 400 min. of observation (2400 total)</p>

Data Collection

In order to understand changes in beliefs and practices, data collection happened in two phases. Additionally, data collection was divided by qualitative and quantitative methods. This section will discuss the participants and context of the study in both the quantitative and qualitative strands. Table 5 demonstrates the study's organization.

Phase 1: Summer Teacher Education Program. In order to understand the change in TCs' beliefs and practices as they transitioned to novice teachers, it was necessary to establish a benchmark of their beliefs and practices during their practicum experiences. During this phase of the study, the TCs were enrolled in a nine-credit, five-week summer teacher education program at a mid-sized university in the southwestern United States. During the practicum class, the TCs spent the first four hours of their day observing, working with, and practicing teaching with mentor teachers hired from the school district. During this time, two other graduate assistants and I video recorded the TCs, and these videos were analyzed both qualitatively and quantitatively (described below). Additionally, interview data were collected.

The qualitative strand utilized multiple case study (Collins, 2003) to provide insight into TCs' reasoning and allowed exploration of changes in beliefs and practices that is not afforded by quantitative methods (Yin, 2014). Because each of the participants had similar training but unique novice teaching experiences with different mentors and in different classroom and school cultures, describing their experiences as part of a common phenomenon was not appropriate. Also, unlike grounded theory, case study afforded the researchers the opportunity to study an experience. Using a multiple case study as opposed to a single case or narrative allowed diverse

perspectives to emerge; the concepts of constructivist teaching practices and identity development were not conducive to one, common experience.

Mixed methods data collection. In order to determine how TCs' beliefs and practices varied from preservice to inservice teaching, mixed-methods data collection was required. During phase 1, the classroom observation protocol (see Appendix F) was used to understand the TCs' teaching practices during the practicum. The observation protocol used the established constructivist domains (activating prior knowledge, generating cognitive dissonance, applying knowledge, feedback, reflecting on learning, and student-centered practices), and it allowed the researcher to record field notes. The protocol also had a quantitative component that required quantifying the amount that each constructivist domain was used. The protocol was useful in explaining both constructivist and traditional teacher practices and allowed me to provide specific examples of each domain. In order to ensure accuracy in reporting the use of constructivist practices, a rubric that defines each practice and provides a numerical score was employed. The rubric (see Appendix I) provided a relatively objective determination of constructivist practices.

Although the literature explicitly combined feedback and application, in both the mixed methods and quantitative observations for this study I chose to separate the two behaviors. Because of the large class sizes in the observed district, often teachers did not provide feedback to each student during application, or they required students to provide feedback to one another. I wanted to be able to note when these specific behaviors occurred. Additionally, I believe that it was important to note when application was present without feedback. Because of the fluid nature of novice teacher identity development and changes in beliefs and practices, it was

necessary to understand when each behavior happened to determine the novice teacher's degree of constructivist beliefs and practices.

Qualitative data collection. Qualitative data collection in this phase included two semi-structured, one-on-one interviews (see Appendix E). One interview was conducted during the first week of the summer practicum program, and the other interview was conducted after the TCs completed the practicum. The purpose of conducting two interviews was to understand if their beliefs about constructivist practices changed from the beginning to the end of their practicum experience. Measures to ensure reliability and validity are described below.

On average, the interviews lasted 32 minutes, and there were over 150 pages of transcripts. The purpose of the interviews was to determine each participant's background, beliefs about constructivism before and after the preservice teaching experience, and knowledge about certain teaching practices like data collection and assessment.

Quantitative measures. In order to determine the frequency with which TCs used each of the constructivist domains, this study employed direct behavioral observation (Suen & Ary, 2014). Data collection was done through 20-second partial interval recording in which "an observation interval is scored if a response occurs during any part of the interval" (Harrop & Daniels, 1986, p. 73). The partial interval recording instrument (see Appendix G) was used to code the same videos that were coded for qualitative data collection. The instrument was designed to determine the frequency of TCs' use of constructivist, student-centered practices. Inter-rater reliability was conducted on one 50-minute video clip as well as one live observation, and 83% agreement was ultimately achieved. The instrument was developed to include constructivist practices deemed important through the literature review and theoretical framework. The definitions and examples for the domains established in the theoretical

framework are delineated in Appendix B. These domains include: (a) activating prior knowledge such as incorporating previously-learned academic knowledge or non-academic knowledge; (b) generating cognitive dissonance by creating cognitive conflict for students; (c) applying knowledge through application of current or previously-learned information in order to answer questions or solve problems; (d) feedback that is specific, clear, and direct; and (e) reflection on learning that is metacognitive and allows students to make value judgments about material they learned in class.

In addition to these domains, constructivist teaching practices must be student centered. Therefore, a section for student-centered methods was included in the instrument. These methods include activities such as small-group discussions, peer instruction, use of technology for learning, quickwrites, experimentation, predicting, studying cases, concept mapping, guided discovery, problem-based learning, pre-reading activities, analytical challenges, group work, and peer reviewing (Olson & Riordan, 2012).

Phase 1 procedures. The consent process for qualitative and quantitative research took place on the second day of the practicum experience during a break from the TCs' pedagogy course. Participants were afforded the opportunity to participate in data collection, to be audio recorded, and to be video recorded. Phase 1 observations were conducted from video recordings because of the shortened practicum; both quantitative and qualitative data were gathered from each video. Two other graduate assistants and I videotaped the TCs, and each observation lasted for one class period which was approximately 60 minutes. Because of the limited time and limited number of instances in which each TC taught, only one observation was video recorded. While three observations of each candidate would have been ideal to ensure that practices occurred at a rate greater than or less than 50%, this number of observations was not possible.

Additionally, because the practicum was so short, it is unlikely that additional lessons would have revealed much difference in teaching practices.

Phase 2: Novice teaching. Upon completion of the practicum and two initial courses, the TCs were eligible for conditional hire by the school district. These novice teachers were the participants for the second phase of the study. The qualitative strand of this phase situated the novice teachers' decisions and beliefs in the culture and context of their new schools; the quantitative methods aimed to explain if the constructivist beliefs of novice teachers changed, and if the frequency with which they used constructivist practices changed. Qualitatively, constructivist practices and beliefs were studied using observation and interview. Quantitatively, the partial interval recording instrument was used to determine the frequency with which constructivist practices occurred in the novice teachers' classrooms.

Participants and context. I utilized purposive sampling to gather participants for this study. Once they completed their practicum experience, the 6 TCs became teachers of record with their own classrooms. They were hired at middle or high schools located in the Western School District area (see Table 3), and their classrooms became the sites for data collection. As this was the second phase of the study, I developed relationships with the participants and was welcomed in their classrooms. Access was difficult to maintain, however, because principal consent was required. Because of consenting issues and variation in hiring dates, the observation times were not consistent (see Table 6).

Mixed methods data collection. In order to support the mixed methods research question, all of the previously mentioned data sources were implemented in the second phase. The mixed methods observation protocol was used again (see Appendix F), but in this case a minimum of 400 minutes of observation of each novice teacher was conducted. Due to the diverse nature of

the novice teaching contexts, the number of observations and length of each observation varied. Table 6 demonstrates both the mixed-methods and quantitative observations. These observations provided a picture of the frequency with which the constructivist domains were used throughout the semester.

Table 6

Phase 2 Observational Data Collection

	Qualitative	First Observation	Last Observation	Quantitative	First Observation	Last Observation
Hannah	405 min 3 days 6 classes	10/21/15	11/4/15	392 mi 4 days 6 classes	10/21/15	12/2/15
Arthur	425 min 4 days 5 classes	10/22/15	12/3/15	441 min 5 days 5 classes	10/22/15	12/17/15
Lucas	430 min 5 days 10 classes	10/15/15	11/19/15	387 min 5 days 10 classes	10/15/15	12/15/15
Patrick	400 min 5 days 8 classes	11/18/15	1/6/16	400 min 6 days 8 classes	11/18/15	1/12/16
Melissa	400 min 5 days 8 classes	10/20/15	12/15/15	395 min 5 days 8 classes	11/6/15	1/7/16
George	424 min 5 days 8 classes	12/4/15	1/13/16	420 min 5 days 8 classes	12/4/15	1/13/16

Qualitative data collection. I conducted one additional, semi-structured, one-on-one interview with the participants during phase 2 and utilized informal interview on observation days if applicable. The interviews conducted during phase 1 were used to understand TCs'

beliefs before becoming novices (see Appendix E). A follow-up interview was conducted after the first twelve weeks of teaching to help understand the changes to the novices' beliefs about constructivist practices (see Appendix H). On average, the interviews lasted 55 minutes, and they resulted in a total of over 130 pages of transcription. The final interviews focused on each of the constructivist teaching domains, the novice teachers' mentoring experiences, and their perceptions of their teacher preparation program.

Quantitative measures. The second phase of quantitative data collection used the same instrument as phase 1. The Partial Interval Recording Instrument (see Appendix G) was used to observe the frequency with which novice teachers used constructivist practices. Based on literature about novice teachers' tendency to adopt teacher-centered practices when they become inservice teachers (Grossman, 1991), the hypothesis was that TCs' beliefs in and implementation of constructivist practices during their novice teaching would decrease from their beliefs and practices during the practicum.

Phase 2 procedures. The mixed-methods observations used the same observation protocol from the first phase of data collection (see Appendix F). In order to see if changes occurred throughout their first semester of novice teaching, at least three observations of each novice teacher were conducted. The length of each class period and time allowed in each classroom prohibited consistency in this area. For all participants but one, five separate observations were conducted. Hannah's schedule was constantly fluctuating and the class periods were lengthy, so three observations were conducted of her teaching. Each observation lasted for one or two class periods, and a total of approximately 400 minutes of mixed-methods observations were conducted for each novice teacher.

In addition to the mixed-methods observations, approximately 400 minutes of quantitative observations (between five and six observations) were conducted of each novice using the Partial Interval Recording Instrument (see Appendix G). The duration of each observation depended on the length of the class periods and the amount of time I was permitted to be in the class. Most observations lasted for one block period or two class periods (approximately two hours); however, occasionally observations could only last for one period. Because the observations were conducted in several schools, video recording was not possible during this phase. Using multiple observations afforded the opportunity to determine if constructivist practices were used more often than teacher-centered practices, and spacing the observations allowed tracking of whether and how changes occurred throughout the semester. Another researcher accompanied me to collect data during one observation in Hannah's classroom during the second phase to ensure reliable data collection. We also conducted interval recording of a video from the first phase to reach an acceptable rate of interrater reliability. This process is described below in the Validity and Reliability section.

The semi-structured interviews took place outside of the novice teachers' contract time and utilized the aforementioned protocol (see Appendix H). The first interview occurred at the beginning of the practicum to establish a benchmark for TCs' beliefs about constructivism. The second interview occurred at the end of the practicum to understand the TCs' beliefs about teaching and constructivism before becoming teachers of record. The final interview was conducted at the end of the first semester of teaching to determine if beliefs and practices changed. The interviews were transcribed verbatim for analysis.

To summarize, there were two phases of data collection, and each phase incorporated mixed methods. The first phase occurred during the summer teacher education session to

establish an understanding of the TCs' constructivist beliefs and practices and the frequency with which they used each of the constructivist domains. The second phase occurred when the TCs became novice teachers and examined if those beliefs and practices changed and, if so, the degree to which they changed.

Data Analysis

Because the study was an embedded design, data were mixed in order to compare the results. In order to do so, the following steps were followed: (1) preparing for data analysis; (2) exploring the data; (3) independent quantitative and qualitative analysis; (4) representing the analysis; (5) interpreting results—comparing the data sets; and (6) validating the data and results (Creswell & Plano-Clark, 2011). Each stage is delineated in this section.

Preparing for data analysis. The first phase of quantitative analysis included assigning numeric values to responses and cleaning errors from the database through the Statistical Package for Social Sciences (SPSS). After entering the interval data into SPSS, a 10% data validation check was performed to ensure accuracy. TC data from the two phases remained separate until the final stage of analysis to ensure the first phase of data did not influence the second phase of data. For qualitative analysis, the first phase included creating and organizing Microsoft Word files of each qualitative data source catalogued according to the teacher and date. These included summer and fall observation field notes and transcribed interview data.

Exploring the data. Qualitatively, data were explored through initial memoing and creation of a codebook to guide coding in the next phase. Quantitatively, the data were explored through initial frequency tables (see figures in Chapter 4).

Independent analysis. Qualitative data were analyzed manually using descriptive open coding (Creswell, 2007) to identify codes, categories, and themes (Saldaña, 2015). Data were

then classified through axial coding and themes were finally developed using a priori codes (Saldaña, 2015). The a priori codes included in the analysis resulted from literature on constructivist teaching practices and encompassed the aforementioned constructivist criteria of activating prior knowledge, generating cognitive dissonance, applying knowledge, feedback, reflecting on learning, and student-centered practices. After themes were determined, I interpreted the data through a sociocultural theoretical lens by incorporating knowledge of the TCs' school contexts and previous mentoring experiences.

Table 7

Frequency Table of Constructivist Teaching Practices

Domain	Preservice Teaching		Novice Teaching	
	Frequency/Total	Percent	Frequency/Total	Percent
Eliciting Prior Knowledge/ Establishing Relevance	97/852	11.4%	708/7428	9.5%
Cognitive Dissonance	60/852	7.0%	1182/7428	15.9%
Requiring Students to Apply Knowledge	306/852	35.9%	3303/7428	44.5%
Providing Specific Feedback	192/852	22.5%	1437/7428	19.3%
Requiring Reflection	215/852	25.2%	240/7428	3.2%
Student Centered Methods are Used	385/852	45.2%	2391/7428	32.2%

Quantitative data were analyzed in two different ways. First, a frequency analysis was run using a contingency table to determine the percentage of total time each constructivist domain was incorporated in the preservice and novice classrooms (see Table 7). The contingency tables were developed for the preservice and novice teaching contexts as a whole and then for each TC individually. Next, a non-parametric statistical analysis (i.e., McNemar Test) for each of

the constructivist domains was conducted using the null hypothesis (H_o) that novice teachers' constructivist beliefs and practices in each domain would not change. In other words, the alternative hypothesis (H_a) would indicate a change among novice teachers' constructivist beliefs and practices. The McNemar Test was chosen because of the dichotomous, matched design of the study and the nominal nature of the data. The test assessed if a statistically significant change for each of the constructivist domains occurred by comparing the final interval observations of the novice teachers and their preservice observations.

In the McNemar Test, the related-groups independent variable (Sedgwick, 2014) was the TC/novice teacher. The interval data were gathered through observations to determine if the frequency with which novice teachers used constructivist practices changed from preservice to novice teaching. The interval observations counted the number of times each constructivist domain was used in a lesson. In order to understand the frequency with which constructivist domains were used, each interval was analyzed for the use of each domain. The observations were combined for each participant and resulted in bar graphs which compared the frequency of each domain during preservice and inservice teaching. These graphs are included in chapter 4.

The frequency tables include the preservice observations and all novice observations while McNemar's Test compares the preservice observation and only the last novice observation. The rationale for including only the final observation was twofold. First, the final observation provided the greatest amount of time for the teachers to grow and change in their new social environments. Second, the number of intervals in the final observation was similar to the number of intervals during the preservice observation. Thus, it was easier to compare the two observations than it would have been to include approximately 300 additional novice teaching intervals and multiple observations of each participant (i.e., both groups were balanced).

Representing the results. Qualitatively, data were presented in a table of the major themes and subthemes that were used to support the findings (see Tables 9, 10 and 11 in Chapter 4). Quantitatively, data were visually represented using tables to illustrate tendencies and distributions in the data set (these are included in Chapter 4). The results of the alternative hypothesis (H_a ; that novice teachers' constructivist beliefs and practices would change) are reported in a table to demonstrate the effect size and confidence intervals (see Table 12 in Chapter 4).

Interpreting results. After representing the results, quantitative data were interpreted to determine the larger meaning related to change in constructivist beliefs and practices. The results were compared with the quantitative research question to determine if and how they were answered. Qualitative results were interpreted similarly, but qualitative findings were interpreted through the lens of past research and social identity development theory.

Validity and Reliability

Threats to internal and external validity were minimized in this study through the use of an embedded, mixed-methods approach. The strengths of qualitative research (such as thick description) mitigated the weaknesses of quantitative data, and the strengths of quantitative data (such as limiting research bias) minimized the weaknesses of qualitative data. The sample size ($n=6$) is small for a quantitative study; however, studies using partial-interval recording in order to observe behaviors tend to use small sample sizes (Dunlap et al., 1994; Meany-Daboul, Roscoe, Bourret, & Ahearn, 2007; Rapp et al., 2007).

Moreover, appropriate tests were used for this small sample size. While there are few participants, there is a substantial amount of data on each participant's behaviors. Qualitatively, a sample size of six participants decreased the amount of time spent observing at each site and

interviewing each novice teacher. Therefore, triangulating with multiple data sources helped increase the credibility of each finding (Creswell, 2007). There are threats to validity in all research, and the following threats still remain in this study. Table 8 represents the threats as well as the steps taken to minimize those threats.

Table 8

Threats to Validity and Reliability

Threat	Steps to Minimize the Threat
Trustworthiness	<p>“Prolonged engagement in the field and the triangulation of data of sources, methods, and investigators” (Creswell, 2007, p. 203-204)</p> <p>Internal validation (Lincoln & Guba, 1999)</p> <p>External validation through member checking</p> <p>Inclusion of the participants’ emic perspective through thick description (Creswell, 2007)</p>
Bias due to unclear constructivist definitions	Interrater reliability to ensure accuracy
Teacher self-report data; may be inclined to exaggerate practices	The true purpose of the study (constructivist beliefs and practices) was withheld from the participants
Contextual differences	Context considered in the theoretical framework
Six participants; decreased time with each participant	Triangulating with multiple data sources

Qualitatively, results were validated through efforts to establish trustworthiness. I followed Lincoln and Guba’s (1985) suggestions and used “prolonged engagement in the field and the triangulation of data sources, methods, and investigators to establish credibility” (Creswell, 2007, p. 203-204). Another method that I used to mitigate the threats to trustworthiness was internal validation (Lincoln & Guba, 1999). Thematic coding can be highly subjective, so I triangulated codes with another, more experienced researcher by discussing the

codes for one transcript and coming to a consensus on the themes present in the data. The second researcher has experience conducting and publishing research that is both quantitative and qualitative, and she specifically has experience conducting case studies. She is experienced in multiple types of qualitative coding. Analysis of participants' pre-interviews was triangulated once before continuing to code independently, and one post-interview was triangulated to ensure that established relationships with the participants did not influence my findings.

External validation was also employed through member checking. After the three interviews were transcribed, field notes were compiled, and the quantitative and qualitative data were analyzed and combined, I wrote a narrative that focused on the participants' backgrounds, mentoring experiences, constructivist beliefs and practices, and novice teaching contexts. The participants were given the opportunity to read and comment on their narratives, and three out of six participants provided feedback on them. The final method used to enhance trustworthiness and increase dependability and confirmability was inclusion of the participants' emic perspective through thick description using multiple verbatim examples within each theme (Creswell, 2007).

While the study did not rely solely on teacher self-report data, as much education research does, the inclusion of interviews does raise the question of accurate reporting. Having gone through a student-centered practicum experience, the novices knew the importance of engaging practices and may have been inclined to exaggerate their actual practices or utilize practices in order to please the researcher. To minimize this threat to validity, the true purpose of the study (i.e., studying constructivist beliefs and practices) was withheld from the participants until after the study was complete. Also, because the novice teachers' fall teaching placements were not determined by the university, each participant was hired at a different school. The contextual differences introduced multiple variables that may have influenced the use of

constructivist practices, and while these variables were considered in the theoretical framework, they were not accounted for in the instruments used for the study.

A final threat to validity is researcher bias. The literature on constructivist teaching does not have clearly defined, operational definitions of each constructivist domain. Because of my prior experiences as a secondary teacher, the definitions used in this study may be subject to bias. In order to combat that bias, I conducted interrater reliability with another researcher to ensure that I was accurately defining the behaviors I observed in the participants' classrooms, and 83% agreement was ultimately achieved.

Limitations

The greatest limitation in this study was lack of participation. Although the ARL summer program consisted of 20 individuals, only 6 were eligible for or willing to participate in the research. A more accurate idea of the changes in participants' constructivist beliefs and practices would have been possible with greater participation. Additionally, the participants were somewhat similar demographically. The summer preparation program included more ethnically diverse candidates, but the participants who continued in the study during their first semester of novice teaching were mostly white. There are several reasons why some TCs would choose not to participate in the study: apprehension of being judged as a new teacher; a desire to protect what little free time they had as new teachers; and a desire to keep their university and school lives separate.

The inauthentic nature of the practicum experience was also a limitation. While most teacher preparation programs provide TCs with the opportunity to develop skills in classroom management and lesson planning, the summer practicum experience did not provide that opportunity. There were often eight or more adults in the classroom at a time, and there were

roughly 10 to 15 students in the room. Therefore, TCs did not have the opportunity to practice managing a classroom. Also, the lesson plans were created by the mentor teachers, so the TCs did not experience creating a lesson and implementing it in an actual classroom.

In addition to limitations related to participants, there were also limitations in data collection. The short, alternative nature of the summer program only allowed for four weeks of data collection on preservice beliefs and practices, which may not provide an accurate view. The novice teaching context allowed for approximately 800 minutes of observational data collection on each novice teacher while the preservice context only afforded the opportunity for one videotaped observation. TCs taught a limited number of lessons, and their lessons were written and approved by their mentor teachers. Also, while this study may provide insight into other ARL programs, the findings are not generalizable to the larger body of teacher education research. Some readers may see this as a limitation; however, the value of case study research is analytic generalizability (Yin, 2014).

Significance

The mixed methods approach to this study allowed the inclusion of both self-report and observational data. This approach is significant in teacher education research because many current educational studies exclusively rely on self-report data (Caudle & Moran, 2012; Clark, Byrnes & Sudweeks, 2014; Lee & Zeppelin, 2014; Schmidt, 2013). The utility of exclusive self-report data can be questioned because of researchers' inability to determine how honest participants are about their beliefs. This study allowed for inclusion of practices to triangulate findings based on self-report. Additionally, a multiple case study approach allowed for a deep understanding of changes in participants' beliefs and practices in context, while quantitative data collection permitted examination of the extent to which their practices changed.

By following participants from the preservice to the inservice context, the short-term longitudinal nature of the study allowed for discussion of the influence of constructivist teaching practices during the practicum experience on teachers' actual practices. These findings can inform practices in teacher preparation and help teacher educators determine the best methods to use in preparing future teachers. The inclusion of mentoring practices also has implications for the importance of mentoring in teacher preparation as well as during the first year of teaching.

Chapter 4: Findings

In this chapter, I will describe the main themes that emerged from this study of changes in teachers' constructivist beliefs and practices from preservice to novice teaching. These findings are in response to three research questions: (a) How do teacher candidates' (TCs') beliefs and practices differ from preservice to inservice teaching? (b) What are the TCs' constructivist beliefs and practices after a semester of novice teaching? And (c) To what extent do TCs differ in their implementation of constructivist practices during their practicum experience and novice teaching? There are several layers of analysis incorporated in addressing these questions. First, the themes are organized within each of the constructivist domains defined by the literature. There are six separate a priori categories each sub-divided into themes. These categories are: (a) activating prior knowledge; (b) generating cognitive dissonance; (c) applying knowledge; (d) feedback; (e) reflecting on learning; and (f) student-centered practices (Baviskar, Hartle, & Whitney, 2009). The domains are further dissected to examine preservice and novice teachers' beliefs and practices. Table 9 demonstrates the organization of the findings.

In order to give a holistic view of the data, qualitative and quantitative results are presented together in each domain. Each of the domains responds to all three research questions, which are delineated at the end of the chapter. Figure 3 demonstrates the overall frequency findings of the interval observations for preservice (Pre) and novice (N) teaching, but smaller graphs are provided within each domain. Additionally, the non-parametric McNemar's Test was used to assess if a statistically significant change occurred in practices within each domain from the preservice observation to the final novice observation. The frequency tables incorporated data from the preservice observations and all novice observations while McNemar's Test included the preservice observation and only the last novice observation.

Table 9

Themes Related to Changes in Constructivist Beliefs and Practices

Constructivist Domain	Theme	Preservice Teaching	Novice Teaching
Activating Prior Knowledge	Consistency	All TCs utilize prior knowledge consistently; beliefs and practices coincide	No change
	Establishing Relevance	Relevance is equally as important as prior knowledge	Slight change: Question the utility of curriculum
Generating Cognitive Dissonance	“Challenge” is subjective	High beliefs but not always high practice	Change: Apprehension about difficult curriculum
	Mistakes/ leading questions	Mistakes lead to learning	No change
Applying Knowledge	Data-driven instruction	TCs are focused on the utility of formative assessment	Slight change: increased focus on discussion
	Implementation of diverse assessment	Belief in the utility of multiple types of assessment but inability to implement them	Slight change: most enact the beliefs they professed as preservice teachers
Feedback	Practices are context-dependent	Feedback practices differed across content areas	No change: feedback practices differed across school sites.
	Overwhelming	TCs were not prepared to provide feedback	Change: TCs learned through experience
Reflecting on Learning	Importance of mentors	Almost all TCs utilize reflective practices	Change: Significant decrease in reflective practices
Student-Centered Practices	Loss of confidence	TCs were confident in implementing student-centered methods	Change: TCs lost confidence in student-centered methods
	New methods	TCs did not express beliefs regarding student voices or student interests	Change: TCs developed beliefs regarding student voices and interests

The findings of this study are based on data collected from TCs who were enrolled in an Alternative Route to Licensure (ARL) program at Southwestern University and were in their first semester of teaching during the second phase of the study. As discussed in chapter 3, the ARL

program prepares TCs who hold bachelor's degrees in specific content areas related to science, mathematics, social studies, or English language arts. Through the program, TCs receive a license to teach secondary students after they complete required courses. Multiple factors were considered within several of the domains including the school context, the TCs' experiences prior to entering the summer practicum experience, and mentoring experiences.

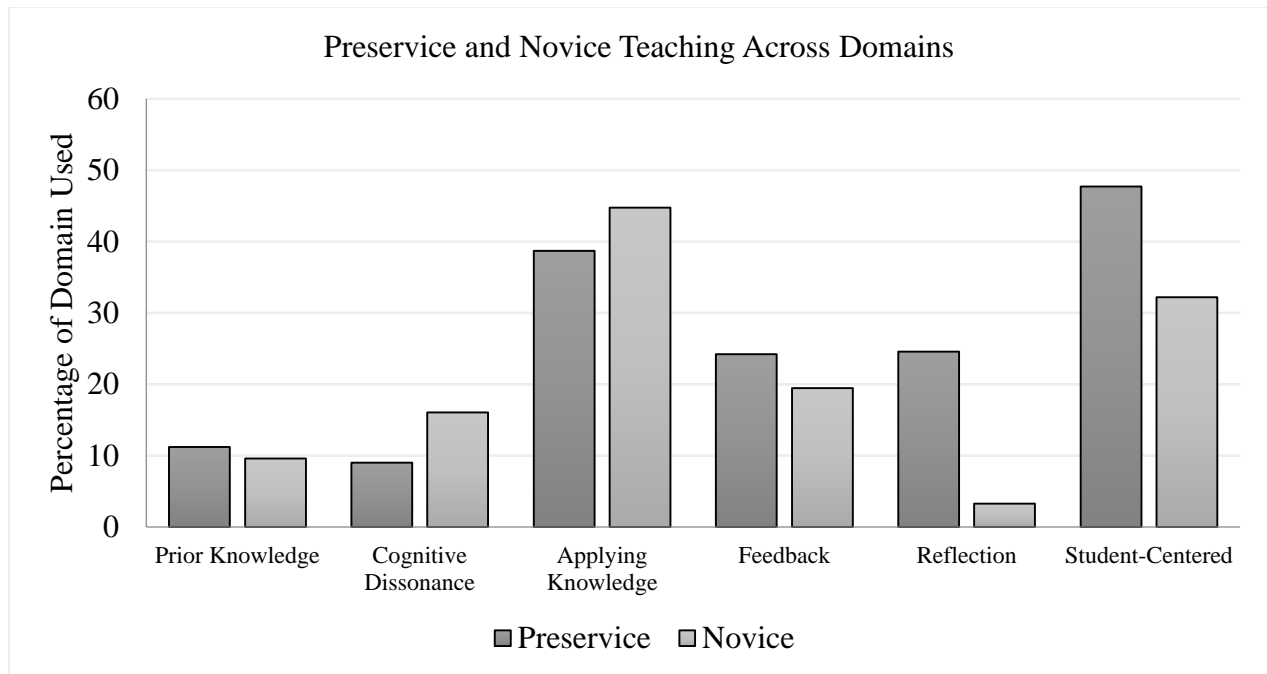


Figure 3. Average values during preservice and novice teaching across constructivist domains

Activating Prior Knowledge

In teacher education research, activating prior knowledge refers to stimulating applicable knowledge so that students can relate it to current learning (Bruning et al., 2011). In this domain, two major themes emerged: (a) Activating prior knowledge was consistent from preservice to novice teaching, and (b) TCs believed establishing relevance was just as important as eliciting prior knowledge.

Consistency in activating prior knowledge. The findings for all of the other constructivist domains take several factors into consideration including school context, teacher

beliefs, and previous experiences. However, in spite of the vast differences among participants in this study, they all consistently supported the exploration of prior knowledge in the classroom. Figure 4 demonstrates that, unlike the other domains, every TC elicited prior knowledge approximately 5% of the time or more. George is somewhat of an outlier in this category because, unlike the other participants who either elicited prior knowledge about the same amount between preservice and novice teaching or elicited it less often during their novice teaching, he elicited prior knowledge more often during his novice teaching. In comparing eliciting prior knowledge among preservice and novice teaching, McNemar's Test indicated that there was no statistically significant change in the total proportion of TCs activating prior knowledge during the practicum experience (11.6%) when compared with the proportion during novice teaching (9.1%). Therefore, the null hypothesis (H_0) could not be rejected. This is not a surprising finding because it was consistently used.

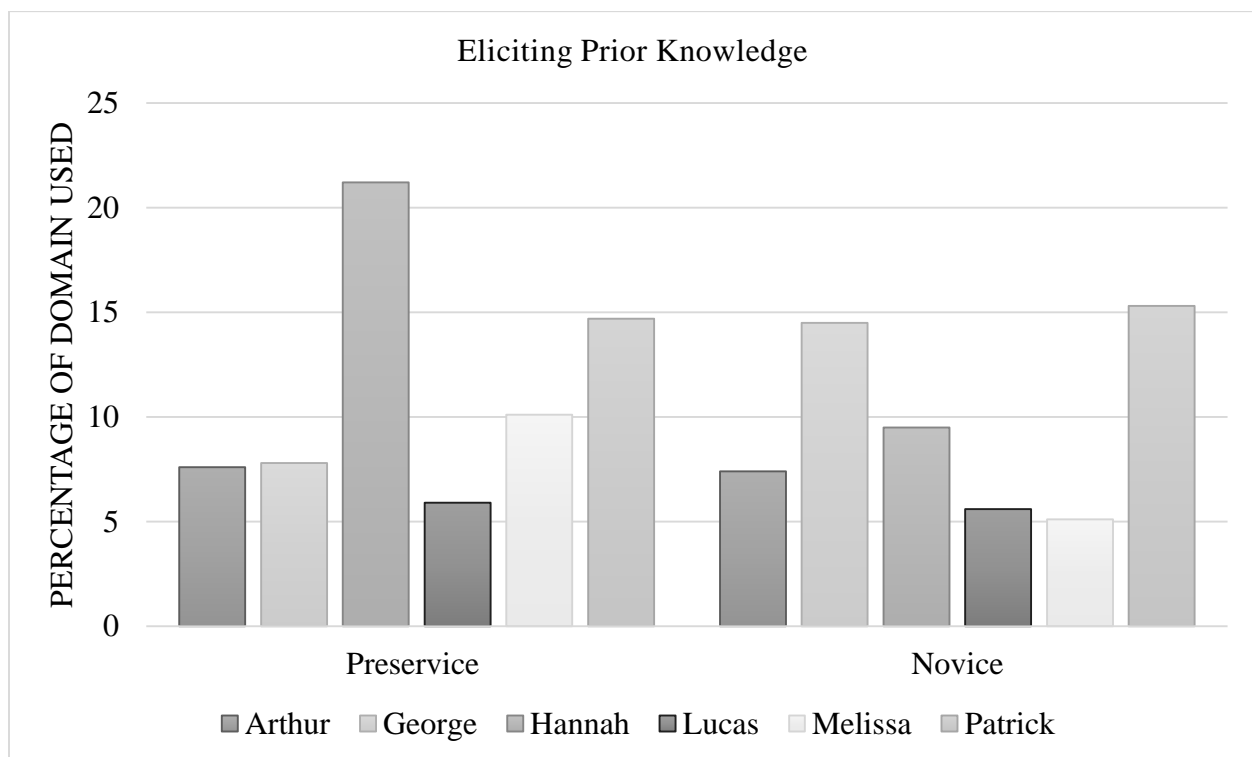


Figure 4. Comparison of eliciting prior knowledge in preservice and novice teaching.

During the preservice teaching experience, Arthur, who was a preservice middle school English teacher and a novice high school English teacher, focused on having students make connections between prior learning and current learning. For example, he had students reflect on their learning about their chosen research topic from the previous day and develop questions based on that knowledge. George, a preservice middle school English teacher who became a novice middle school social studies teacher, had the students develop questions to use when researching their topics which helped them connect learning from his lesson to what they would be doing the following day. Consistently, the TCs incorporated opening activities (i.e., warm-ups) that had students reflect on what they did the previous day and connect it to what they were doing that day. In the middle school science classroom, Hannah had the students complete a warm-up and a closure activity to put the lesson in the context of what happened the previous day and what they would learn the next day. She began the class with a warm-up in which they reflected on their insulator design from the previous day in order to create a better design. She concluded the class with students presenting how they had changed that design and why those changes improved their outcomes.

As novice teachers, the participants incorporated these same beliefs and practices. For example, Melissa, a middle school math teacher who was a preservice middle school science teacher, provided her students with a specific math problem in which they raised ten to the zero power. She related this back to the students' knowledge of exponents from a previous unit and showed that it meant that the decimal would not move. Lucas, a middle school science teacher who taught in a behavioral school as a novice teacher, utilized a similar technique in which he reviewed material the students learned the previous day (that matter cannot be created or destroyed) before beginning a lab that demonstrated this concept. Similarly, George began each

day by conducting “a short review with the students, mostly [by] asking sometimes leading questions about what [they had] covered so far in that unit or at least the past couple days.” He would use the questions “as a jumping off point to new content.” In both preservice and novice teaching, the TCs demonstrated a strong belief in the importance of eliciting prior knowledge, and they enacted those beliefs through daily activities to begin class (i.e., warm-ups), closure activities, or connections within their lessons.

Establishing relevance. During their practicum experience, the TCs believed that one of their most important jobs was to make the content relevant to students’ lives. Every participant discussed the importance of relevance, and because of their focus on the topic I considered relevance as part of eliciting prior knowledge for the purposes of this study. According to Arthur, “Lecture only goes so far. Note taking only goes so far . . . you have to have them get up, you have to have them get hands on. Like, why am I doing this?” George echoed this belief, stating that relevant content was not enough of a focus in schools. He said,

Especially in the environment that we have nowadays, to the degree that is spent learning, I wish there was more time spent on content and relevant content, vocational content almost . . . things that are very applicable, and things that people can use to make themselves valuable in the job market, rather than life skills and things like that.

However, George was realistic about how relevant the content could be within the constraints of the summer program. He said, “It’s nice when [the content] is something you love, but that can’t always be possible. So many people love video games. That’s great, but we can’t all be videogame designers.” While the overall finding revealed that TCs viewed establishing relevance as important, George also realized that it was unrealistic to expect everything to be relevant to students’ lives. Patrick, a middle and high school English teacher, expanded on the desire to

teach content that would be relevant to students' future careers by adding that he wanted to "teach good habits that are going to spread into all arenas of life." He extended relevance to apply to students' dispositions and ambitions.

The TCs' beliefs in the importance of establishing relevance were evident in their practices as well. In the English classroom, George, Arthur, and Patrick were able to incorporate information about the local city environment. The students developed presentations related to environmental concerns, and they used technology to create their presentations. As George pointed out, "the more technology the better, especially since that's where the jobs are at." In the science classroom, Melissa, Lucas, and Hannah utilized hands-on labs and discussed how the concepts taught in the labs were relevant to students' lives. Hannah, for example, explained that constant improvement is necessary in life, especially as an engineer, and she compared the revisions of the students' projects to the everyday utility of constantly updating applications on cell phones. She explained that being an engineer is all about not simply accepting what exists, and she had the students consider, "How can I make it better? How can I make it faster? How can I make it more effective?" The TCs in both content areas viewed establishing relevance as a crucial component of student learning and implemented this belief in practice.

The TCs carried their beliefs and practices regarding establishing relevance into their novice teaching, but they were somewhat altered in light of their curriculum. Patrick stated that his students "have so many questions about purpose and the utility of what they're learning." Although he believed that "all of the things that we are doing in this class work together and layering them in the right order allows you to get more out of a particular lesson to an exponential degree," he questioned the relevance of his content. He said, "I haven't even made up my mind about whether or not they need to be learning what I'm teaching them in every

form.” He believed that establishing relevance can be difficult with this generation of students. He said, “This is a different generation and they have a different sense of purpose and they have a different sense of context and of their really big problems.” Lucas also believed in the utility of establishing relevance as a novice teacher,

I guess that’s why I brought that golf video in today. That’s why I asked the question, “Does anybody play baseball in here?” I figured if they hadn’t played golf, at least they swung a bat, and so I help them think about, “Oh we just learned about kinetic and potential energy, I never thought of that.”

In the area of establishing relevance, the TCs retained the same beliefs, but one difference that resulted from transitioning into novice teaching was that they became more realistic about the relevance of their content. George, who was teaching social studies even though he was trained as an English teacher, stated, “What you learn in the classroom and what you do in the classroom is only as beneficial to the degree that it affects the real world, not this bubble that we create in academia.” This desire to engage the students and promote learning that is relevant to their lives demonstrates that as both TCs and novice teachers, the participants internalized the constructivist belief that learning should be authentic (Crowther, 1999).

The novice teachers carried the belief about the importance of establishing relevance into their practices. Hannah established relevance in each of her lessons by having students share why they thought the content they were learning was important. For example, she asked, “What is the significance of a science journal?” Her students contributed multiple ideas including that it helps them with writing skills, keeps them organized, helps them study for tests, and because it is note-taking, it teaches them how to record data. She praised their answers and explained, “When we’re in this class, we’re scientists and engineers.” Similarly, she tried “to communicate the

purpose of the assignment” at the beginning of each lesson and “tie it back to the real-world application.” In Patrick’s class, this idea was most prevalent in the use of vocabulary. He discussed “why vocab is so important” with his students, and illustrated its importance by discussing a different word each day.

In the domain of eliciting prior knowledge, the TCs overwhelmingly viewed this construct as positive and attempted to incorporate prior learning into each lesson. They established relevance by connecting content to students’ lives and to their future careers.

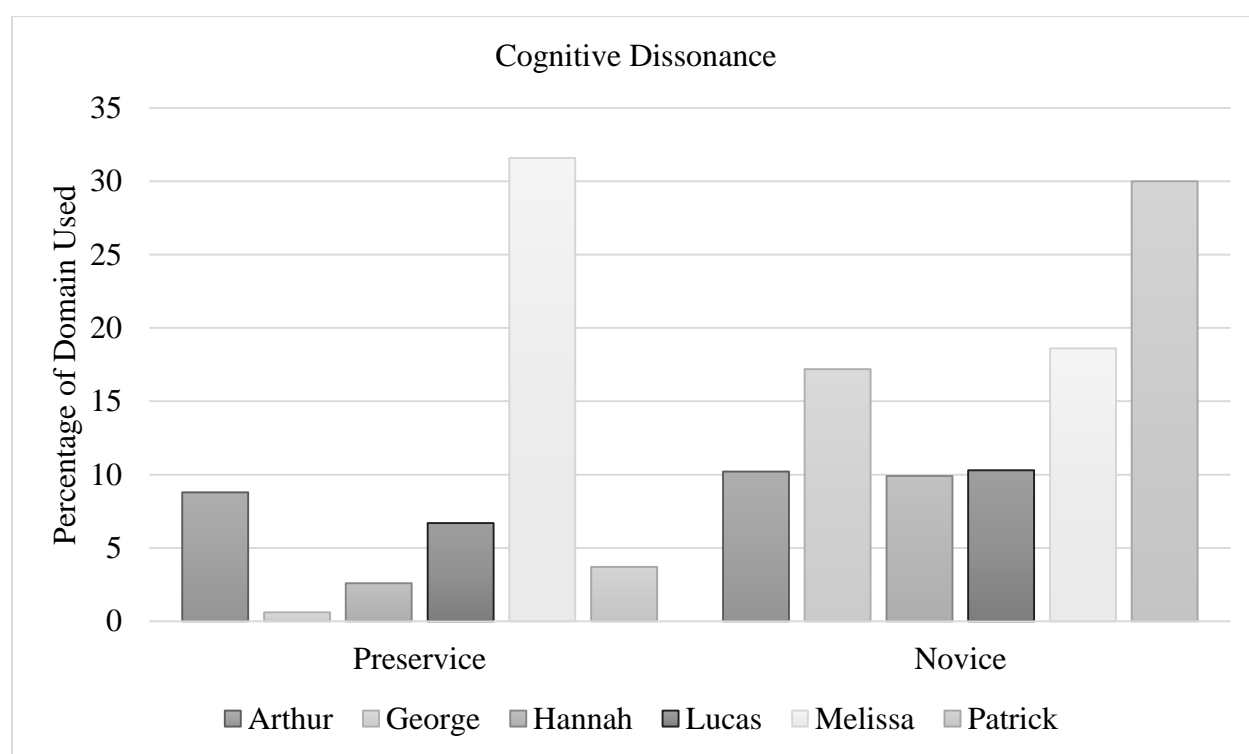


Figure 5. Comparison of generating cognitive dissonance in preservice and novice teaching.

Generating Cognitive Dissonance

The goal of generating cognitive dissonance is to challenge students’ current thinking by creating cognitive disequilibrium (Wheatley, 1991). Two themes emerged in this area: (a) TCs understood “challenge” subjectively; and (b) cognitive dissonance was created through student errors and TCs’ leading questions. In comparing the frequency of implementation of cognitive

dissonance practices between the practicum experience and final novice teaching observation, McNemar's Test indicated there was a statistically significant change ($p < .001$) in the proportion of time in which TCs activated cognitive dissonance during the practicum experience (6.7%) when compared with the proportion during novice teaching (12.7%). Therefore, the alternative hypothesis (H_a) was supported. Figure 5 supports this finding that, on average, the TCs utilized more cognitive dissonance in the novice teaching context. Patrick, for example, showed a marked change from preservice cognitive dissonance (3.7% frequency of the total number of intervals) to novice cognitive dissonance (30% frequency). Melissa was the outlier in this domain because she was the only TC who did not increase the frequency with which she created cognitive dissonance. These findings are supported by the TCs' change in beliefs (based on interviews and qualitative observations) about cognitive dissonance from preservice to novice teaching.

The subjectivity of “challenge.” In the preservice teaching context, the TCs held high expectations about how they would challenge their students. George believed in the importance of holding students to a high standard because “if we hold really low expectations, they’re not going to hold themselves any higher, typically, than we [do].” Similarly, Hannah felt that problem solving was the most successful teaching strategy because “it forces students to think analytically and achieve that whole metacognitive standard, that metacognitive thinking.” This statement shows that she wanted to create discomfort and ask provocative questions of her students. Melissa also believed that “it’s not enough [to] transfer knowledge to my students.” She believed that it is acceptable to “go [a] little bit beyond” what she planned because the students “deserve to gain more knowledge.” Patrick agreed, stating “I need students to be diving in and

getting uncomfortable with the text and exploring different reactions to the text, and that needs to be a very intimate process.”

In spite of these beliefs in the importance of challenging students, the amount of cognitive dissonance that was achieved during preservice teaching varied widely. In Patrick’s observed preservice lesson, for example, the only cognitive dissonance that was created was at the end of the class when groups began to apply the quoting, paraphrasing, and summarizing techniques they learned that day in order to analyze specific articles. Students were struggling in two areas in this lesson. First, they were working in groups and each student had a different job. Some groups were struggling to understand what their specific job entailed. For example, in one group a student who was designated as the writer was not sure what he was supposed to write about. Another area that created cognitive dissonance during the lesson was determining what portions of the readings they should record. Patrick explained that they should focus on what they found interesting and “find the support for it. Find the quotes that make sense.”

In Melissa’s lesson, however, cognitive dissonance was created when students made predictions, recorded data, and reflected on why their predictions were correct or incorrect. This lesson exposed their misunderstandings about insulation and conduction, required comparison of what they knew about these concepts and what they were learning, and required them to understand the evidence that they were missing in order to make proper predictions. The students were fully engaged in the simulation even though, at times, students would say things like “I don’t get it,” which demonstrated that the lesson was creating discomfort or introducing surprising or counterintuitive results. Interestingly, as novice teachers, Patrick and Melissa displayed opposite behaviors. Out of five qualitative novice observations, Patrick clearly created cognitive dissonance five times and vaguely created it once (see Appendix F), while out of five

qualitative observations of Melissa, cognitive dissonance was absent from two observations, was vague in two observations, and was only clear once.

As novice teachers, the TCs' opinions about creating cognitive dissonance changed dramatically in that they became apprehensive about challenging students. Arthur explained, "Maybe it's my demographic of students that I have. Asking them to read and write every day can be really daunting, can be really overwhelming." He continued, "I end up giving them stuff that's probably too hard for them because it's stuff that I thought was really cool when I was a junior in college, and they're not going to understand what *The Myth of Gyges* means." This statement illustrates that, as a novice teacher, Arthur expressed fear of challenging his students too much, which is contrary to what the TCs expressed during their preservice teaching. Lucas experienced similar apprehension, explaining that he had "a set curriculum" that he felt he needed to "drive forward with and try to catch students up that haven't seen it." Because of his school environment, Lucas's students transitioned in and out of the school approximately every six weeks. He realized that some of his students were "not too challenged," but he had "to focus on the majority versus the few." Lucas and Arthur demonstrated frustration with conveying standards to students and teaching rigorous content that was not overly challenging for students.

During novice teaching, Hannah retained her belief that metacognitive questioning was the best way to challenge students. She said, "They ask me a question, they give me the answer. They give me the answer because I ask questions. They don't like it, but I force them to." By creating an uncomfortable situation for her students, Hannah challenged them to expose their own misunderstandings. The TCs who were trained as English teachers tended to utilize whole-class discussion to generate cognitive dissonance. For example, Patrick used a strategy called "Stretch It" (Lemov, 2010) where he required students to "unpack" and "elaborate" on their

ideas during discussion. He also provided students with texts that were above their reading level and encouraged them to struggle through. He told his students, “Don’t worry if you’re struggling with this. That’s the point. It’s the most difficult thing we’ve done all year.” Through questioning and discussion, the novice teachers attempted to create an environment that encouraged cognitive dissonance.

As preservice teachers, the TCs had high expectations for how they would incorporate cognitive dissonance in the classroom, but not all of them implemented it during their practicum experience. As novice teachers, some of the TCs enacted their goals of challenging students while others were apprehensive about providing material that was too difficult. The school context may be one factor impacting that transition. Melissa, for example, taught math rather than science, and she may not have felt as comfortable with the math curriculum. Arthur taught many students with special needs, and he may have been concerned about placing too many expectations on students requiring accommodations. While Arthur did not express this concern explicitly, he did mention that the principal at his school emphasized ensuring that students could “find the answers that are going to be on the test.” His administration’s concern with students passing the proficiency exam may have led in part to his hesitation to alter his curriculum.

The importance of mistakes. During the practicum experience, the TCs demonstrated the belief that students should make mistakes in order to learn. For example, Lucas introduced the students to Newton’s law in order to help them create rockets that they would launch during a subsequent lesson. He helped them understand the concept by using Newton’s Cradle and asking them what they thought would happen if one of the metal spheres hit the other four spheres. This demonstrates the use of provocative questioning. Allowing students to predict and potentially provide an incorrect answer gave them the opportunity to learn from that mistake. Arthur also

realized the importance of mistakes during his preservice observation. His students were struggling to choose proper quotations from their assigned articles. The mentor teacher pointed out at one point that a student had selected part of a sentence that was missing some crucial information. This mistake showed that the students were struggling to understand what constitutes a good quote, and providing their own non-examples exposed their misunderstanding while leaving room to learn from that mistake.

Hannah's preservice lesson exposed misunderstandings explicitly. The students were required to reflect on their insulator designs from the previous day and make judgments about the materials and structure that they used in order to improve on their original design. This activity created discomfort for the students, which was evidenced by students expressing dissatisfaction or frustration. For example, one student said "I don't know *how* to make it better" (original emphasis). Hannah increased that discomfort by responding to student frustrations and questions with questions of her own. When responding to the student, she pointed to specific parts of the student's diagram and said, "Based off of what you already know, based off of what you saw yesterday, are there any improvements that you can make to your original design?" The student explained that he could turn his design so a darker material was closer to the light. In order to help the student learn, she had him look at his work and answer her questions rather than providing him with an answer.

As a novice teacher, George felt that mistakes could be beneficial to student learning. He explained that being taught misinformation can create cognitive dissonance, "You're more likely to remember it if you get taught it wrong the first way, probably, because it's a heightened sense of awareness." He felt that this sense of awareness helps students do everything "with a healthy degree of skepticism." Although this sentiment aligns with the overall finding that TCs viewed

mistakes as important, both a senior researcher and I felt that we should be cautious in interpreting this in the same way as the other TCs' beliefs. It is important to note that the other TCs felt that allowing the students to make mistakes and learn from them was important, which differs from George's belief about teaching erroneous information. The underlying belief about the educational nature of mistakes is the same, but the way in which they are presented is different. Melissa, who only occasionally created cognitive dissonance in her class, also believed in the importance of mistakes. During a lesson on similar figures, she drew an incorrect answer on the board to show students visually why the answer was incorrect. In other words, she provided a non-example of two shapes that were not similar or proportional and described why they were not. Like George, she recognized that providing an incorrect answer might heighten the students' awareness; however, she presented the information as a non-example rather than teaching the information incorrectly.

Many of the other TCs, although they did not explicitly mention the importance of mistakes during novice teaching, utilized leading questions which often exposed students' misunderstandings. For example, when discussing a text with challenging sentence structure, Patrick asked his students to identify a character. Rather than giving them the answer when they were stuck, he had them work together to discover the answer. Similarly, during a lab, Lucas asked students to identify the type of residue left inside of a balloon after an experiment. Rather than giving them the answer, he had them figure it out by discussing the law of conservation of matter.

Creating cognitive dissonance was not easily observable, and because of that, creating challenging lessons was a subjective exercise. Even though the participants in this study did not utilize cognitive dissonance techniques as consistently as they did with prior knowledge, they did

believe in creating the opportunity to make mistakes in order to learn. Also, with the exception of Melissa who changed content areas from preservice to novice teaching, the participants increased their use of cognitive dissonance from preservice to novice teaching. This increase was in spite of apprehension about including content that may be too challenging for students.

Applying Knowledge

In the constructivist literature, application and feedback are presented together because feedback is essential to ensure that the learner is applying knowledge appropriately. However, because of the mixed-methods nature of this study and the use of interval observations, combining application and feedback was not feasible. In order to help understand how often application occurred in conjunction with feedback (even if they were not at the same interval), Figure 6 demonstrates the frequency with which application and feedback were used. Hannah and Lucas both had very high frequencies of incorporating application during preservice teaching (80.1% and 47.4% respectively) when compared with their novice teaching (44.5% and 16.6% respectively). Alternatively, Arthur, George, and Patrick slightly increased their use of application from preservice to novice teaching. The frequency with which Arthur, Hannah, Lucas, and Melissa incorporated feedback decreased from preservice to novice teaching while George and Patrick increased the frequency with which they incorporated feedback.

It is important to note that during the preservice observations in the English classroom, feedback typically occurred more often than application, while in the science classroom application occurred more often than feedback. Feedback was prevalent in both disciplines, possibly because there were substantially more adults in each classroom during the preservice experience. The discrepancy between science and English may be the result of different mentoring styles or different curricula in each discipline. In English, the students were engaged

in writing and researching, which may have required more teacher-provided feedback than the hands-on labs in the science classroom.

During novice teaching, without exception, application occurred much more often than feedback (almost three times as often). One potential reason for this contrast was that there were often no additional teachers in the classroom, so the novice teacher had more students for whom he or she was trying to provide feedback. The importance of combining application and feedback was evident, but there were benefits to studying them separately. As the graph demonstrates, different disciplines may provide more feedback than others, and teachers may provide different amounts of feedback at different stages in their careers. By observing application, which often consists of formative or summative assessments (Baviskar et al., 2009), separate from feedback, the following themes emerged: (a) TCs desired data-driven instruction, and (b) TCs implemented diverse assessments.

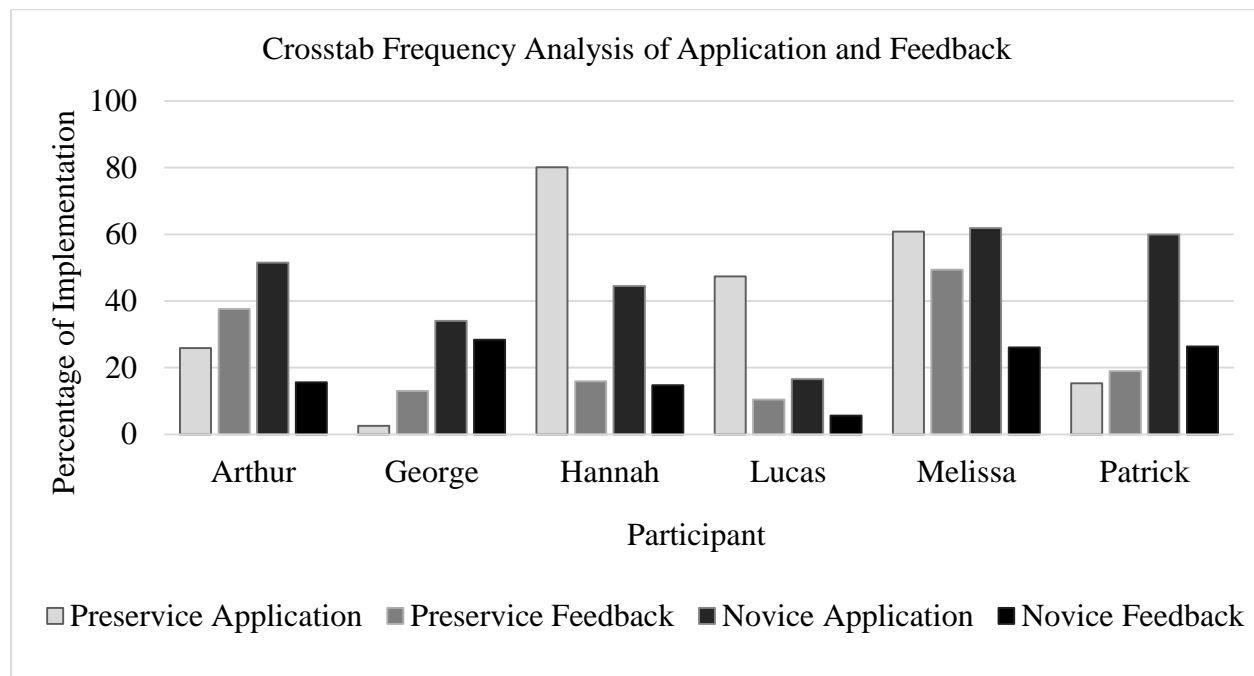


Figure 6. Comparison of application and feedback in preservice and novice teaching by participant.

Data-driven instruction. During their practicum experience, the TCs believed in the importance of continuous assessment in order to understand students' strengths and weaknesses as learners. Hannah believed that formative assessments (such as exit tickets or individual conversations with students) were crucial for checking students' understanding. She felt that they would help her know, "Are students tracking the information?" She believed that these formative assessments would tell her if her students were failing to comprehend the material so she could "put a pause, go back, reteach it, and move on." She also felt that formative assessment consisted of "self-monitoring" in which students could determine whether or not they understood the material. Lucas agreed, stating that formative assessments inform teachers whether or not they should "adjust [their] teaching style based on if the whole class is all [of] the sudden doing worse on a topic." The TCs felt that formative assessment would help them gauge students' learning.

In practice, however, the TCs did not report adjusting their teaching based on information gained through formative assessments. As preservice teachers, they formatively assessed by circulating the room and questioning students. For example, in the science classroom, Melissa circulated during the computer simulation and asked students how they were doing. Arthur did this in the English classroom while students worked in their groups. None of the TCs described altering a lesson based on student feedback. I witnessed one example of altering instruction based on formative assessment data. In the English class, there were two exceptional students who were working at different paces from the rest of the class. The assignment was altered to accommodate the students' differences and capitalize on their strengths. The high-achieving student was encouraged to expand his research beyond the scope of the assignment while the student with a learning disability was given an alternative assignment that allowed for

incorporation of more visuals than the other students used. The accommodations for these two students were the only examples of formative data being used to inform instruction.

In their novice teaching, overwhelmingly the TCs retained their beliefs in the importance of data-driven instruction. Their practices, however, indicated that they continued to view formative assessment as important, and they primarily retrieved their assessment data informally through discussion. Patrick said that he utilized quizzes that measured the effectiveness of his lessons reliably, but he felt that “everything builds up to the discussion.” He viewed the other assignments as “spaces in between” discussions. Lucas also incorporated class discussion with questioning so that “on a test, they might be able to use that same thinking process to get the right answer.” Melissa was the exception to this belief in the importance of discussion. She primarily utilized practice as an application strategy because she wanted students to build up to word problems that were “based on the real-life applications.” During the observations of Melissa’s class, each day began with students applying knowledge in a written warm-up activity. After the warm-up, Melissa would present new material or the students would immediately begin independent practice. As students worked, Melissa circulated the room to answer questions.

In comparing applying knowledge between the practicum and novice teaching, the McNemar’s Test indicated there was no statistically significant change ($p < .001$) in the proportion of application during the practicum experience (35.2%) when compared with the proportion during the last novice teaching observation (34.0%). Thus, the null hypothesis (H_0) could not be rejected. This finding is not surprising because the TCs retained their beliefs about data-driven instruction when they became novice teachers. The difference between the two phases was in how application was implemented, not in the amount of application that was used.

Implementation of diverse assessment. In addition to viewing formative assessment as crucial to their students’ success, the TCs grew to utilize multiple instructional and assessment strategies as novice teachers. During their preservice experience, the TCs focused primarily on formative assessment, partly because summative assessments were not required during the summer program. However, they had beliefs about summative assessment. Hannah believed that formative assessment was more beneficial than summative assessments because the pressure of assessments can cause students to have “mini meltdowns, crying, not wanting to go home.” On the other end of the spectrum, George viewed the utility of summative assessment as demonstrating whether or not students understand “all the many lessons and standards that were touched on in the course of that unit, or in the course of a month or a quarter or school year.” Regardless of which view they held, as preservice teachers the only assessment they utilized was written or verbal student reflections and in-class discussion.

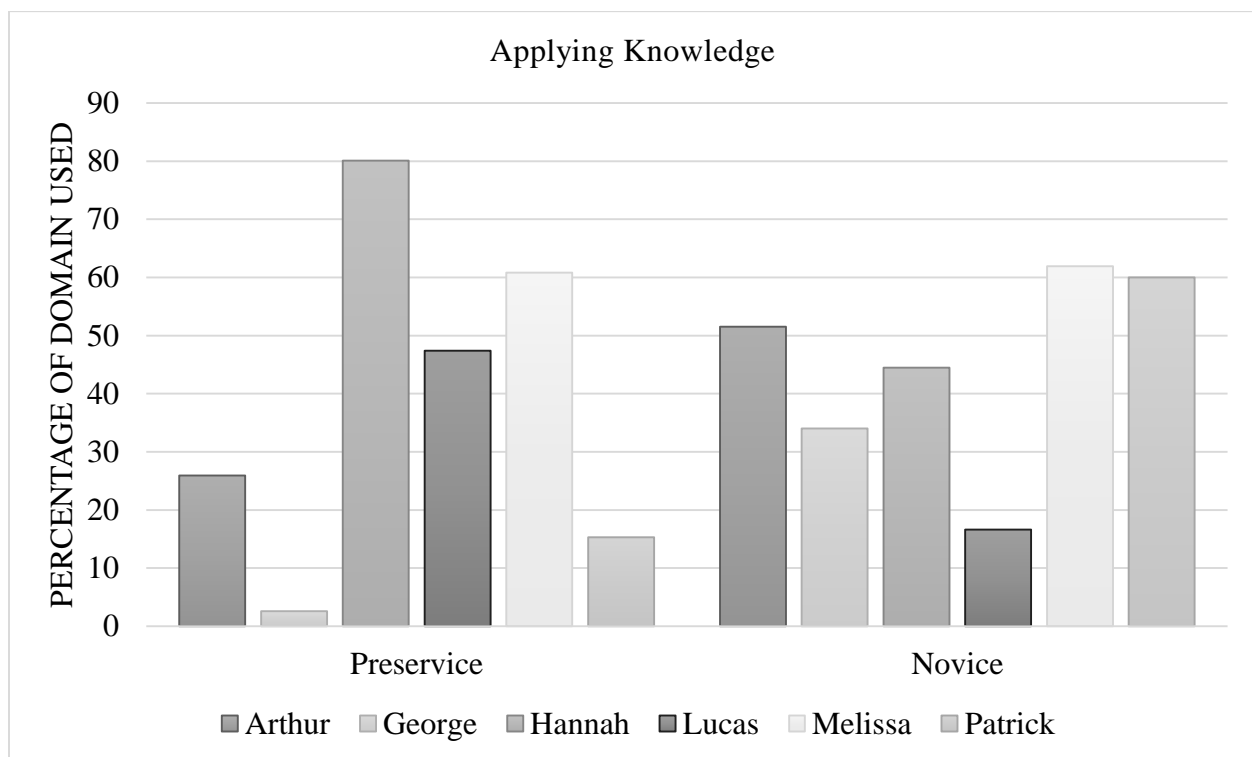


Figure 7. Comparison of application of knowledge in preservice and novice teaching.

As novice teachers, most TCs implemented the same strategies they used as preservice teachers, but they also added multiple assessment strategies over the course of their observations. Figure 7 demonstrates the changes in the frequency with which TCs incorporated application during preservice teaching and novice teaching. Despite findings from McNemar's Test, figure 7 illustrates applying knowledge gains from Arthur, George, and Patrick from preservice to novice teaching while Hannah and Lucas declined in applying knowledge from preservice to novice teaching. These results are inconclusive, since three teachers increased their use of application and two teachers declined. Melissa stayed relatively the same (i.e., a non-statistically significant result from McNemar's Test). The quantitative findings do not demonstrate a consistent change, and several factors could explain why. One would expect the TCs to demonstrate more application during the practicum experience than as novice teachers because of the need for high engagement in the summer environment. However, the English TCs utilized application more often as novice teachers. This finding seems to indicate that mentoring may have been a factor. As will be discussed later, the mentor teachers were partly focused on incorporating reflection for both the middle-grade students and the TCs consistently during the preservice experiences. As novice teachers, TCs' decreases in reflection may have left more time for application in each class period. School context and student demographics may also account for the difference in implementation among the science teachers. Lucas's school is an excellent example of the importance of context in interpreting data. Although he taught middle school science and one would expect consistent application in his class, he also taught in a behavior school. The type of school required that he often focus more on student behavior and less on content. Hannah's fluctuating schedule and large class sizes may have made application more difficult as a novice teacher.

Qualitatively, although the teacher candidates may not have always utilized application more frequently than as novice teachers, they did vary the types of application they implemented. For example, Hannah implemented: (a) peer feedback—students met in groups to discuss a game they were developing and then taught the game to the other half of the class; (b) practice—after Hannah modeled the task, students practiced reading for understanding by working in groups and locating important ideas, creating observations, and writing statements based on the reading; (c) exit tickets—at the end of class, students explained their understanding of how water moves; (d) writing—students answered a warm-up in which they described what water is made of; (e) visuals—students created a physical representation of both water molecules and a hydration sphere in their notebooks; (f) discussion—Hannah conducted a question and answer session as a whole class utilizing questions like, “What is a good example of water being attracted to itself?” and (g) presentations—students met in groups of approximately 10 students to create a tableau to physically demonstrate either hydrogen bonding, a hydrogen sphere, or a hydrogen molecule. Over the course of five observations, each teacher utilized many forms of assessment, with the exception of Melissa who primarily implemented practice.

Patrick explained that varying assessment and instruction was important because if the class was too structured, “that’s where the monotony comes in . . . If you keep hitting the same thing over and over and over again in the same way, I think that it’s like staring at your hand for too long . . . it starts to lose meaning and you lose motivation for it.” Patrick’s practices indicate that formative assessment, particularly writing and discussion, were still important to him, and he expanded on them to incorporate the utility of critical thinking skills. Like Hannah and George, Patrick felt that the ultimate goal of application in the classroom was to get students to apply

lessons in the real world. He felt that certain skills, like close reading, needed to be taught through “inquiry” and had to be “internalized” by the students.

As preservice teachers, the participants discussed the importance of multiple types of assessment in an abstract way, but as novice teachers they were able to implement their beliefs. With the exception of Melissa, they all introduced a variety of instructional strategies to their students, and many of these strategies encouraged collaboration.

Feedback

Feedback is defined in this study as direct and concrete (Strommen & Lincoln, 1992) and it can be implemented in a variety of ways by the teacher, peers, or individual students. From the observation and interview data, two themes emerged related to feedback: (a) Implementation of feedback practices was context-dependent; and (b) Providing feedback could be overwhelming for novice teachers.

The quantitative findings about feedback were equally as sporadic as the application findings (see Figure 8), and because the two domains coincide, this is not a surprising finding. The frequency table indicates that some of the preservice teachers increased their use of feedback from preservice to novice teaching while others decreased their use. McNemar’s Test revealed a statistically significant change ($p < .001$) in the proportion of feedback implemented during the practicum experience (21.8%) when compared with the proportion implemented during the final novice teaching observation (17.0%). This demonstrates that even though the TCs were not consistent in their implementation from preservice to novice teaching, the amount of feedback decreased slightly by the TCs’ final novice lesson. Because there were so many teachers in the preservice classroom, it is logical that the TCs would have more time to provide one-on-one feedback to students.

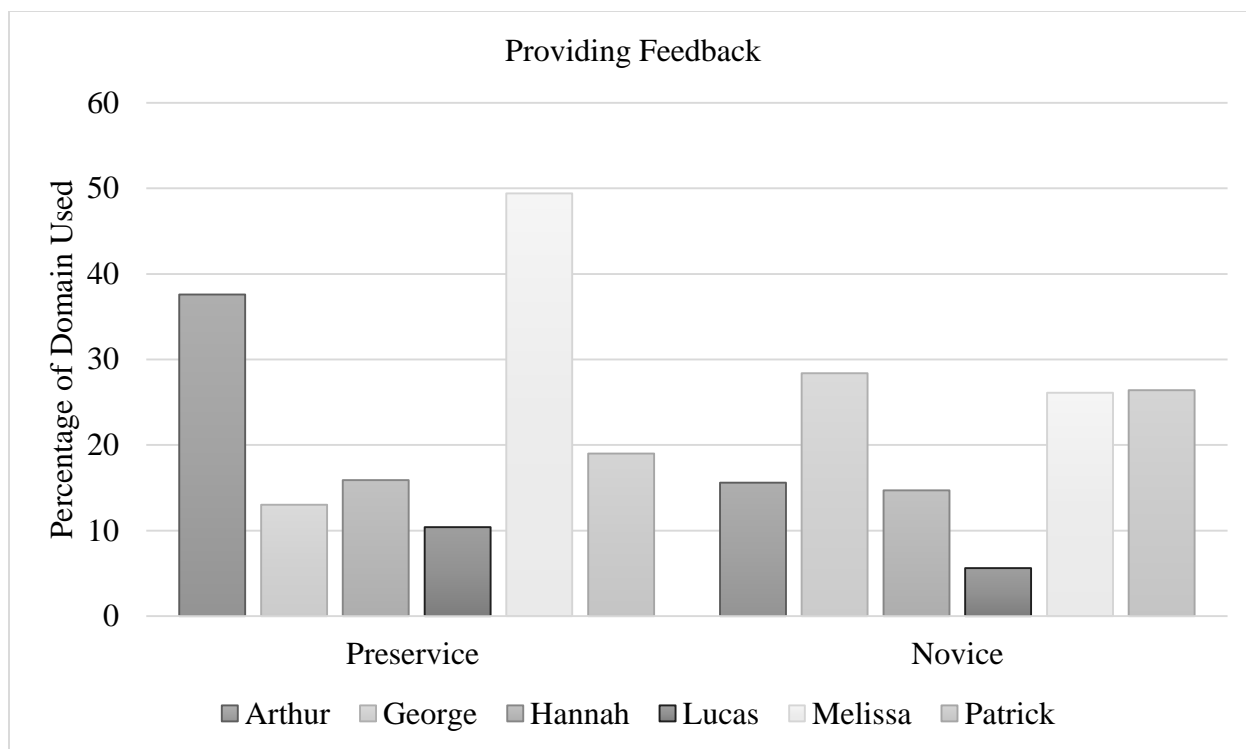


Figure 8. Comparison of feedback in preservice and novice teaching.

Role of context. The unpredictable nature of the statistics regarding application and feedback demonstrate that feedback could be context specific. As preservice teachers, the English TCs had very little to say regarding their beliefs about feedback. Patrick believed that students should be praised for having good insights and correct answers. He stated that he would like to be flexible in his teaching each day but “at the end I want to, obviously, share what they gleaned from their piece of text and tie it in and provide just a reminder, an affirmation of the most correct answer.” Their preservice practices regarding feedback demonstrated an equally undeveloped point of view regarding feedback. George, Arthur, and Patrick expanded on students’ answers during whole-class discussion and provided individual feedback during group work. For example, during discussion Patrick provided examples of movie reviews that were quoted, paraphrased, and summarized. He asked a student for the definition of paraphrasing, and the student said “to put it in your own words.” Patrick explained to the class that the student was

“paraphrasing about paraphrasing.” When a student provided the correct answer during the discussion, Patrick expanded to increase student understanding in this way. This was typical practice among the English TCs, and they did not implement any other feedback strategies.

In science, Hannah, Melissa, and Lucas provided more directed feedback. During their preservice observations, the students were working on hands-on labs. Hannah provided detailed verbal feedback while students were working collaboratively. She circulated the room to answer questions and give students suggestions. She also asked clarifying questions to make sure that they understood their thinking and were not just guessing at the best design for their insulator. One group was having trouble making a decision about their design, so she sat with them and talked through whether it would be preferable to have the tinfoil on the top of their design or on the bottom. She helped a different group determine the best way to present the changes to their design so that the other groups could understand their choices. Melissa’s personality is more reserved than Hannah, but she provided the same type of feedback to her students during their computer simulations. Hannah and Melissa, in particular, utilized leading questions so that students could provide feedback to each other and to themselves. Lucas provided directed feedback as well, but his was less frequent. He allowed groups to work together with fewer interjections. The vast differences between feedback provided in the science and English classrooms indicate that feedback is likely context-dependent.

As novice teachers, the context also heavily influenced the type and frequency of feedback provided. Arthur had a co-teacher in his Grade 9 English classroom because he had several students with special needs. The amount of time he spent giving feedback was lower than the other TCs, potentially because there was someone else in the room to provide feedback as well. Arthur also had classes of over 30 students, so he felt that providing one-on-one feedback

through conferencing was difficult due to time constraints (although he believed it was necessary). Because of these time constraints, Arthur provided a substantial amount of written feedback in the form of detailed comments on assignments. He said, “I always try to find something that I enjoy out of every piece of writing that they give me.” He also provided verbal feedback during whole-class discussions, and he encouraged students to provide feedback to each other through presentations.

The context in which Lucas taught was another example of how circumstances impact the feedback that is provided. Students attended his school because they had behavior concerns that resulted in their expulsion from the local school district. Lucas said, “I try to be positive. If they answer with the right answer, I give them a thumbs up. I try to be excited, which I am.” However, this global, positive, verbal feedback was the only feedback he provided during almost every lesson. Lucas did not provide written feedback, partly due to the fact that his students only attended his school for six to eight weeks, so he did not often provide written assessments. During one observed lesson, Lucas did provide feedback during a discussion about a lab they conducted. These labs were rare, though, because behavior concerns prevented him from bringing in many of the materials needed to perform the experiments.

Patrick’s school context also impacted his ability to provide feedback. Because Patrick taught at a charter school, he had smaller classes and more freedom with developing curriculum than Arthur did. Patrick’s classes were roughly two-thirds the size of Arthur’s classes, so he was able to circulate the classroom more easily and provide one-on-one feedback to each student. Additionally, his school did not place a heavy focus on standardized testing and reading informational texts (as Arthur’s did), so Patrick was able to conduct Socratic-style discussions in which he provided constant feedback to students. This focus on feedback may not be entirely

contextual, though. Patrick stated that students were “burning the most precious currency that we have in this class,” and he wanted students to know that he valued the time and effort that they put into their assignments. In addition to his school context, Patrick’s temperament seemed to lend itself to providing more feedback. He provided feedback on assignments, but he also provided feedback to students on their behavior, stating that he endeavored to be “transparent about how certain things that they’re doing come off” and how their choices impacted him and the students around them. He felt that “communicating that internal feeling gives them a lot of feedback about how their behavior affects other people and how they can adjust it in order to harness a few more positive outcomes.” Patrick’s goal of providing meaningful feedback about students’ behavior seemed to coincide with the culture of the school he worked in as well.

Both the preservice and novice teaching contexts impacted the type and frequency of feedback that TCs provided to their students. In the science classroom, the feedback was more inquiry focused which may indicate that the mentor teachers encouraged that type of environment. In the English classroom, the TCs gave less feedback, but students were often reflecting through blog posts. This finding may indicate that the mentor teachers encouraged peer feedback and self-reflection over teacher feedback.

Overwhelming nature of feedback. During the practicum experience, the TCs did not feel that they were exposed to enough assignments or curriculum development to prepare them for novice teaching. Patrick said, “I just don’t think I had like a super authentic experience with it during the program, unfortunately.” Melissa elaborated on this sentiment, stating, “They weren’t taking any tests. Basically you cannot really force them to do things.” The students attended the summer program voluntarily, and because of that it was often difficult for the TCs to provide meaningful assignments that allowed for meaningful feedback. George explained that

because there were so many TCs in each classroom, “We didn’t have a lot of at-bats, which would have been nice, but impractical.” The number of TCs in the classroom and the small number of students hindered their ability to learn to provide feedback to multiple students.

The inauthentic experience regarding grading and feedback left some of the TCs feeling overwhelmed when they entered novice teaching. Melissa, who expected to be teaching physics but was teaching middle school math, often lamented the amount of grading that she had to do. During several of my observations, her students asked her when she planned to update their grades next. At the beginning of his novice teaching, Arthur explained that he tried to give too much feedback, and he was “looking for everything” in their writing. Realizing that he was spending hours grading each assignment, he changed his grading technique and began grading the assignments for specific skills, such as the ability to incorporate a main idea. Similarly, Patrick explained that he attempted to be thorough with written feedback “to a fault because it takes so long to grade those papers.”

The shortened nature of the practicum experience did not prepare the teacher candidates to deal with the amount of grading they would face as novice teachers. The only person who did not discuss issues related to grading was Lucas because, at the time of the study, he only had about 15 students throughout the day, and they rarely completed written assignments. Unfortunately, neither Lucas’s preservice nor his novice teaching context provided him with the experience he needed to successfully provide feedback. As the behavior school where Lucas taught will most likely close before the next school year, and he will likely need to find a job in a more traditional school, he may face similar issues that the other novice teachers faced during this study.

Reflecting on Learning

Of the six constructivist domains discussed in this paper, reflection exhibited the most dramatic change. In the literature, constructivist reflection refers to reflection-in-action in which learners explore and test hypotheses and think about their actions, and it incorporates metacognition (Schön, 1983). One substantial theme emerged related to reflecting on learning: Mentoring impacted the use of reflection in the classroom. Because the TCs did not have mentors in the classroom with them during novice teaching, there was no mentor data for the novice context. Therefore, the importance of mentors in shaping reflective practices was determined by comparing data from times in which a mentor was present (during preservice teaching) to times in which a mentor was not present in the classroom (during novice teaching).

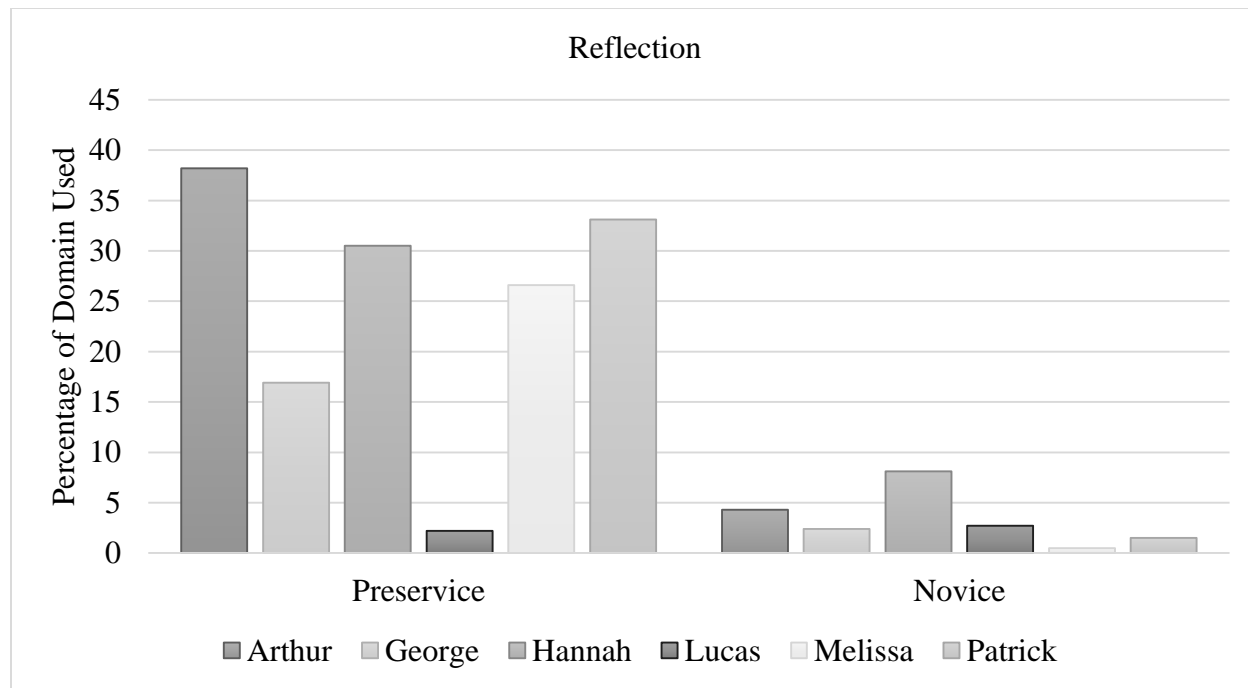


Figure 9. Comparison of reflection in preservice and novice teaching.

Mentors' impact on reflection. McNemar's Test indicated there was a statistically significant change ($p < .001$) in the frequency of reflection during the practicum experience (25.1%) when compared with the frequency during the final novice teaching observation (1.7%).

Figure 9 demonstrates that, with the exception of Lucas, the TCs provided a much larger amount of feedback during their preservice teaching than they did across all of their novice teaching observations. Arthur experienced the greatest change from preservice reflective practices (38.2%) to novice reflective practices (4.3%); however, with the exception of Lucas who had no change in reflective practices, the other TCs demonstrated a large change as well. This change supports the alternative hypothesis (H_a). This decrease in reflection implementation may be due to the influence of a mentor teacher.

One of the English mentors, Edward, explained that he incorporated reflection in both the beginning and end of his classes. He described reflection as an important part of his daily routine,

I would generally open up with some sort of writing prompt related to what we're doing for the day . . . to get them ready for what we're going to be doing . . . At the end of the period, I typically ask them to reflect rather than doing a reflection for them and reviewing what we've done. I ask them to try to tease out from their experience of the day what they did, how it helped shape their understanding of whatever the topic is at hand.

During the practicum experience, Edward modeled using these daily reflective practices with his students for Arthur, George, and Patrick. Additionally, Edward modeled reflection in his interactions as a mentor. He would have conferences with the TCs after each of their lessons, and they would discuss what went right and wrong in the lesson. He said, "I want them to feel like they can talk to me. That if they see something that they don't think I'm doing well, that they feel comfortable giving me the feedback. I want to build that culture of reflection and receptiveness to feedback." Edward created a classroom culture that encouraged feedback, and

the TCs utilized feedback while he was their mentor. While Edward took the lead mentor role in the English classroom, the other mentor teacher, Bridget, explained that as a mentor she believed in “throwing you right out there and you can learn from mistakes.” She did not explicitly describe focusing on reflection with the TCs, but allowing them to learn from their mistakes would seem to require reflection. She did not model her teaching practices like Edward did, though.

As preservice teachers, the English TCs provided daily opportunities for students to reflect on prior knowledge and recent instruction. At the end of the summer program, they even had the students reflect about the program. Arthur explained,

At the end of the whole program, the last day, we had a lot of reflection time for the students and the students wrote a letter . . . and all us teachers we were reading through them all. Overall resoundingly positive, but there’s those couple students that just really made you think about the situation, about how much more I could have done for that student.

Not only did the English mentors encourage daily reflection, but they even built in time for TCs and students to reflect on the effectiveness of the summer program.

During their novice teaching, the English TCs occasionally incorporated reflection, and they utilized multiple strategies, but they did not incorporate it as often as their mentor teachers encouraged them to. Arthur mostly utilized group reflection rather than the individual reflection used with his mentor teacher. He incorporated metacognition during one lesson where he asked students to specify what was and was not helpful about a sample paper he provided them. He also incorporated having students develop conclusions by requiring them to support their opinions with evidence. George utilized the same strategies as Arthur, but he incorporated them

even more rarely. One day, however, he had a group of students reflect on their presentation in front of the class, and the rest of the class reflected on how they would change their own presentation based on that group's reflection. Although Patrick utilized reflection the least frequently out of the English teachers, he utilized multiple strategies when he did have students reflect. Like Arthur and George, he incorporated metacognition by having students discuss the process of learning a new skill. He also had students explore hypotheses by answering other students' posed questions, and he had students reflect on the usefulness of a physics law in their English class.

In the science classroom, one of the mentor teachers, Tony, described the importance of reflection in his classroom. He stated, "As they come in . . . there is an in- and out-question . . . [to] engage students for what are they going to be learning this period. Getting them ready, warm-up, whatever you want to call it and . . . the closure or the reflection would be the out question." Like Edward, Tony incorporated an anticipatory set and a reflection into each lesson. Also like Edward, Tony incorporated reflection in his mentoring. He utilized metacognition with TCs and explained his thinking and reflective process to them. He said that he explains "why I planned it this way" and that "dialogue is one of the most important things . . . and it's more authentic. You don't just do the lesson and afterwards let's talk about it. It's an ongoing thing." Keith, the other science mentor, did not explicitly describe requiring his TCs to reflect, but in explaining his mentoring style, he said that he would help TCs through their lessons, ensuring that they understand what they need to do, that they modified the lesson to suit their needs, and then "at the end of the day I would recap." Tony and Keith's philosophy of reflecting with students and TCs may have encouraged the TCs to utilize reflection in their lessons.

As preservice teachers, Hannah and Melissa used a substantial amount of reflection. In her observed lesson, Hannah asked students if they enjoyed the lesson from the previous day and she had them reflect on their writing from the last lesson. They expanded on their notes by writing ideas and drawing pictures. She also had the students give her a thumbs up or thumbs down if they were ready to move on. During the lesson, students conducted a lab, and while they were waiting for the results of their lab, they wrote “I wonder” statements about the activity. As students were writing their statements and planning to present their findings, Hannah asked individual groups what changes they made and why those changes made their insulators more effective. At the end of the lesson, she asked students to reflect on whether they saw a difference from the previous day and if they thought they met the day’s objective. Throughout the lesson, students utilized metacognition, testing hypotheses, developing conclusions, and explaining procedures. During Melissa’s lesson, students reflected on their thinking during a computer simulation. Students discussed why they considered one material to be the best insulator. After the simulations were complete and the students had recorded the data, Melissa asked them individually to reflect on their findings to determine the best insulator. The students tested their hypotheses and developed conclusions. Lucas was the only TC to demonstrate little reflection during his preservice lesson. He briefly had students hypothesize what they thought might happen when a sphere in Newton’s Cradle hit the other spheres, but this was the only time during the lesson that students are asked to reflect in any way.

As a novice teacher, Hannah retained the most reflective practice. She incorporated metacognition (reflection-in-action) by having the students engage in “metacognition marking” while they were reading articles. She also had them reflect on strengths and weaknesses of a game they created. During a reading activity, Hannah asked students to determine if they

understood the paragraph (thumbs up) or if they were still confused (thumbs down). Then they talked to a partner and summarized the paragraph to their partner. Additionally, Hannah incorporated peer reflections. She had the students discuss positive aspects of group work, and the students discussed that they were able to resolve their feelings, be creative, share ideas, and listen to one another.

Melissa and Lucas did not retain many reflective practices. Melissa would occasionally have students think about whether they thought a lesson was difficult, but that was the extent of the reflection in her classroom. Lucas incorporated reflection during one lesson, which was a lab. He had students make predictions about what they thought would happen, and then they would reflect on whether their predictions were right and determine why.

Both the English and science mentor teachers modeled reflective practices for their TCs, and they provided opportunities for the TCs to enact those practices during their preservice teaching. However, only Hannah retained consistent use of reflective practices.

Student-Centered Practices

Literature on constructivist practices includes several examples of student-centered methods including small-group discussion, peer interaction, use of technology for learning, quickwrites, experimentation, predicting, guided discovery, problem-based learning, group work, and peer reviewing (Olson & Riordan, 2012). In this study, two themes emerged related to student-centered practices: (a) Novice teachers lost confidence in their ability to incorporate certain student-centered methods; and (b) Novice teachers learned to incorporate student-centered methods that were not present in their practicum experience. The TCs were optimistic about their abilities during the practicum experience, but, when they became novice teachers, they lost confidence in implementing most student-centered methods.

Lost confidence. In comparing student-centered practices during the practicum experience and novice teaching, McNemar's Test indicated there was a statistically significant change ($p < .001$) in the proportion of student-centered practices implemented during the practicum experience (44.7%) when compared with the proportion implemented during the final novice teaching observation (20.4%). Student-centered practices were used almost twice as often during the preservice experience. Figure 10 demonstrates the frequency of use of student-centered methods during preservice and novice teaching. George and Patrick were outliers in that their student-centered practices increased from preservice teaching (36.9% and 20.9% respectively) to inservice teaching (46.5% and 54.8% respectively). These findings coincide with McNemar's Test and support the alternative hypothesis (H_a).

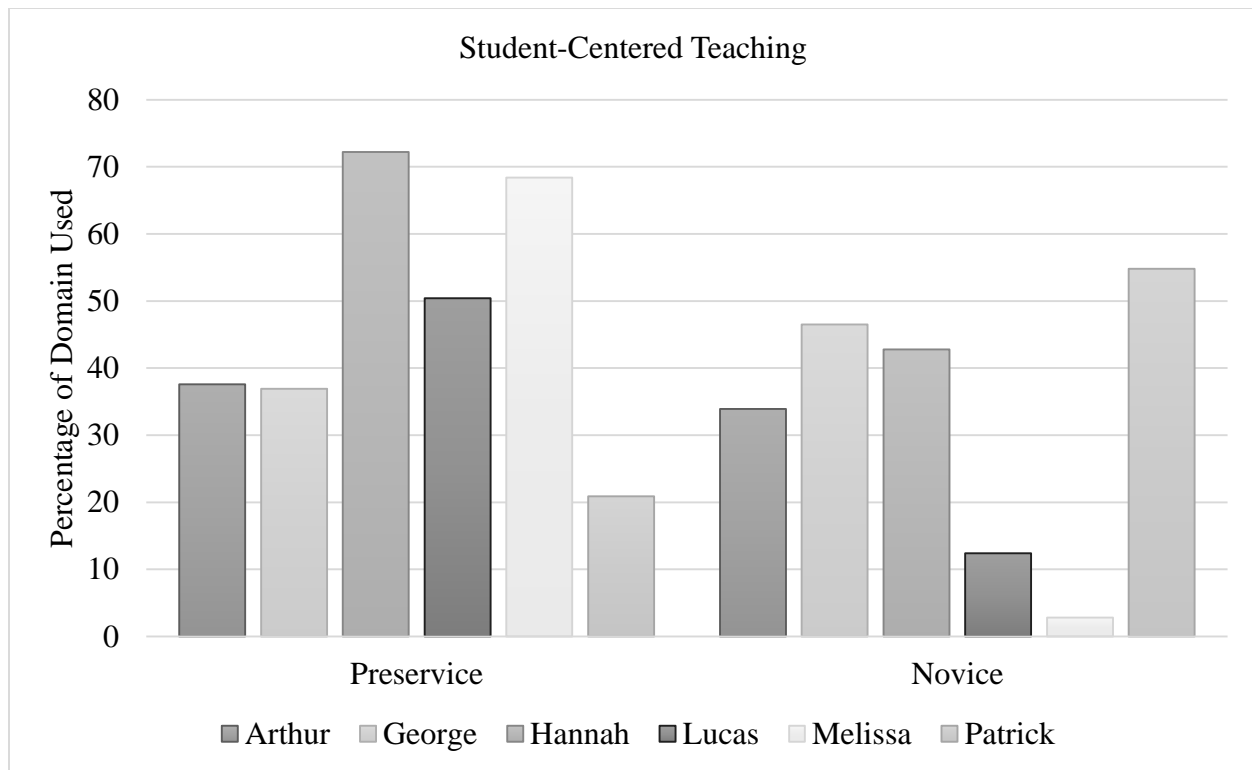


Figure 10. Comparison of student-centered practices in preservice and novice teaching.

As the quantitative data show, TCs were more confident in implementing student-centered lessons during their preservice teaching experience. As preservice teachers, they believed in the utility of collaboration, hands-on instruction, incorporating technology, and inquiry learning. They enacted these beliefs in their practicum experience. As novice teachers, several of the TCs added the belief that student voices are valuable and that they should try to tap into their students' interests.

Collaboration. The TCs were confident in the importance of collaboration during the practicum experience. Arthur said, "I feel that people really learn best by heavy interaction." Melissa believed that students should be encouraged to help each other when they are struggling because "they can learn better from their peers, and they're more comfortable talking." Patrick also hoped to create a collaborative environment in his classroom. He wanted to have students do "in-depth text work with groups" while he supervised and provided scaffolding. The TCs enacted their beliefs about collaboration during their practicum experience. Arthur's students collaborated to find quotes for their presentations and commented virtually to one another via blog posts. George's students brainstormed as a group and worked together to find information in provided articles. Hannah encouraged students to work with the other students at their table during a warm-up, and they worked with those same students throughout the class period. She encouraged them to have a "quick conversation" about their plan to create a more effective insulator, and she explained that part of being an engineer is sharing ideas in order to try to help others. Patrick conducted a whole-class discussion on the previous day's learning, and students collaborated with their research teams at the end of class.

As novice teachers, the TCs' beliefs changed and refined. For Arthur, he specified that pair work was more beneficial than group work, "They seem to be a little better if they can have

1 or 2 people to talk to instead of 5.” Patrick also explained that he had not incorporated cooperative learning much “because I can’t imagine that going well consistently . . . It just creates these little clusters of people looking at each other and so the focus is inside and not on the group or the class as a whole. I don’t really understand the value of that.” However, he said that he thinks collaboration is “an effective skill” even though he did not utilize it often.

The TCs’ practices followed these changes in belief. Because of the challenges with group work, Hannah often utilized partner work so that students could learn “how to crawl before [they] can walk.” She believed that students should share their ideas and “listen, accept, receive information and then be able to vocalize and reciprocate” which was easier for her to accomplish in pairs before trying those skills in a larger group. George continued to believe that collaboration was “certainly necessary,” but he explained that he did not “have confidence” that he would be able to implement group work effectively because students would take advantage of each other. He was also concerned that “when you only put kids in pairs, you run into personality issues, or if you let them pick themselves, then they just pair themselves off according to who they like to socialize with.” As preservice teachers, they had confidence to implement large, collaborative groups, but as novice teachers they were hesitant to implement collaborative groups in practice.

Hands-on instruction. As a preservice teacher, George believed that in order to learn students need “hands-on experience,” but he said that English is not nearly as “fun as science.” Arthur also believed that hands-on instruction using “activities” was most beneficial for students. They enacted these beliefs in the practicum experience by having students construct brainstorming maps on large paper. During the practicum experience, Hannah utilized hands-on instruction. Her students built an insulator and created a poster to present their construction to the

rest of the class. Lucas had students work in pairs to create their own rockets. They cut out pieces of construction paper for the fin, the base, and the cone, and they were able to assemble their rockets any way that they thought would make them most aerodynamic.

Arthur retained his belief in the importance of hands-on instruction as a novice teacher but did not incorporate it often in practice. He discussed the need for it and how he planned to do more in the next semester. Both of the science teachers, Hannah and Lucas, incorporated hands-on labs in their classrooms. Hannah described having students use crayons to represent different types of rocks, and she had one student volunteer to sit inside of a garbage bag during class while she sucked the air out of the bag with a vacuum cleaner in order to demonstrate the concept of air pressure. Lucas used balloons, baking soda, and vinegar to demonstrate the conservation of matter. The English, social studies, and math classes did not incorporate hands-on learning during their novice teaching observations.

Incorporating technology. For George, technology was the best way to provide student-centered instruction. He said that the current generation of students is interested in technology and “the more technology the better, especially since that’s where the jobs are at. And it’s accessible to anyone and everyone.” In spite of the large emphasis that George placed on it, he felt that “education is really slow to adopt technology” and that little consideration has gone into “hiring administrators who place a large emphasis on technology.” George was grateful to have been placed with a mentor teacher who emphasized utilizing technology. He said, “Having his kids do PowerPoints . . . provides a lot of room for creativity and there’s really no ceiling on what the students do with it . . . and I love to see what students step up to the challenge.” He viewed technology as creating an environment in which students could challenge themselves because “there’s no ceiling on how difficult the students make it on themselves.” Lucas also saw

the value of technology in teaching because access to the Internet allows teachers to “show them film clips. It will be easier to show them [for example] the transfer of heat from this gas to this gas . . . I’m sure there will be more videos that I could show, more visual stuff.” Patrick believed that technology would give students the opportunity to access an individualized education. He explained that one benefit of technology is access to vast amounts of information, which allows individuals to “outsource” their learning.

During the practicum experience, Arthur and the other English TCs incorporated technology in practice by allowing students to “go to a computer, type for a little while, [get] back on a computer together, and then have PowerPoints.” The students also used technology to update their blog posts and to reflect on the day’s learning. Melissa was the only science TC who had students use technology for learning during the preservice observations, and she had them work on a computerized simulation. Lucas showed a brief video during his observation, but the students did not use technology themselves.

As novice teachers, technology retained its importance and the TCs incorporated it in multiple ways including Internet research, videos, PowerPoint presentations, and online textbooks. However, some TCs expressed concerns with implementing it in the classroom. For example, Arthur recognized that technology is important to his students, but he was not able to understand their connection to it. Therefore, his beliefs about technology centered on apprehension rather than the utility of technology for education. He “grew up at the tail end of the digital age” and did not feel that he understood “the obsession with it.” At Hannah’s school, each of the students was provided with an iPad, and she created lessons that incorporated students giving online responses and feedback to each other. However, because so many students were misusing the iPads in class, she instituted an iPad-free week in class. George also revoked a

student's computer privileges because he inverted the display on a laptop as a prank. Although the TCs continue to understand the importance of technology in the classroom during their novice teaching, they are more realistic about its weaknesses in practice.

Inquiry learning. Patrick believed that student-centered lessons allow students to have more “immediacy and proximity to the actual practical act” of learning, and he said that “problem solving and inquiry-based learning definitely point students in a certain direction.” Melissa also believed in encouraging inquiry. She wanted to “just post the question on the board and let the students work on it” to determine how much guidance they would need. George stated that while he did not think he would use project-based learning on a daily basis, he “would definitely want at least one or two of those within every unit.”

During novice teaching, student-driven teaching in which the students construct their own learning seemed important to Arthur but was also intimidating. He was conflicted because he knew he wanted to do more truly constructivist teaching but he was afraid that too much independence would cause management issues. He said, “As a teacher, the kids love it. My kids, they love it. They misuse it all the time and that’s the thing that you’re doing, that constant [management].” He realized the benefits of inquiry-based instruction but was apprehensive about the issues it might cause, “I see when they do group work, it’s usually there’s a better end product. . . Sometimes I try to avoid it though because it’s so stressful.” George echoed the same idea, saying that teacher-centered lessons were “more predictable” for his younger students and student-centered lessons “would probably be more effective . . . once they’ve developed more of the skills necessary for a bit more autonomy in the classroom.” While Patrick enjoyed utilizing inquiry in his classroom, all of the other TCs were apprehensive about allowing students to have that much autonomy.

New methods. Although the TCs lost confidence in incorporating student-centered methods that required thorough classroom management and planning, they gained insights into two student-centered methods: valuing student voices and tapping into student interests. Although they may have found these important as preservice teachers, they did not develop practices related to student voices or interests until novice teaching.

Valuing student voices. As a novice teacher, Arthur explained that his students did not value their classmates' opinions,

They don't value each other's voices as much as they should. They would rather just hear it from me and have them be given the right answer rather than construct their own thing that is probably just as good as what I'm going to say. . . I know that's one of the things I need to work on is trying to make them feel like their voice is just as valuable.

Arthur realized as a novice teacher that his students would benefit from valuing each other and their own opinions. He also said that giving them time to speak in class could "create a really cool discussion" that is started by the students. Arthur encouraged this sharing in class by having students snap for each other when they shared their poetry. Patrick also developed an interest in his students' voices. He said that he never wanted to make "their interests seem less valid than what I'm presenting." He also told them that they have brilliant thoughts, but they have been conditioned not to share them because they have been rejected in the past. He explained that learning to be vulnerable with other people has helped him in his life and that sharing emotions is difficult.

Tapping into student interests. As novice teachers, several of the TCs developed the belief that it is important to capitalize on student interest in instruction. Melissa explained that she wanted to assign a project that allowed students to choose their topic, "so if they're

interested, let's say, in physical sciences, they can work on something which is related to physical science or life science. So that way they can actually explore their talent." In English, George believed that the "glorious thing about literature is it's so easy to appeal to someone's interests that they already have." Patrick believed that engagement would be instrumental in student learning. He wanted to "find ways to measure their levels of optimism and senses of engagement, the amount to which they are engaged in flow" in his class. He viewed this engagement as important in creating life-long learners who are involved in the "process of betterment."

Arthur was the only preservice teacher to enact his belief in incorporating student interests into his lessons by having the students share at the end of class. He felt that it "makes them feel like they accomplished something in the day." None of the other TCs incorporated student interest, possibly because the lesson plans were generated by their mentor teachers.

As novice teachers, the TCs' began to incorporate more student interest into their lessons. Hannah allowed her students to take notes from any place in the classroom where they felt comfortable because "if we're comfortable, we learn better." George incorporated student interest by allowing students to choose which Founding Fathers they were interested in researching. Also, in his Career and Finance class, he assigned them an autobiography about their 27-year-old selves. For Patrick, it was important to "navigate the line between appreciating their examples and also showing them that they're structurally not of the same qualities as the stuff that we're trying to get them to work with." He wanted to be able to incorporate "their preferences and their inclinations into the lesson while also connecting them to the style of content that we think is best for them to learn, the most humanistic stuff."

The TCs struggled with maintaining student-centered classrooms due to common concerns that many new teachers face. They were concerned about classroom management and student attention primarily. However, they began to consider the individual application that their lessons would have for students. While they were more confident in student-centered instruction as preservice teachers, they became more innovative as novice teachers.

Within the constructivist domains, student-centered instruction and establishing relevance (part of eliciting prior knowledge) are the only areas in which novice teachers developed new, more constructivist beliefs. Within the domains of application, feedback, cognitive dissonance, and reflection, the TCs either built on existing beliefs and practices or sustained the same beliefs and practices.

Summary of Findings

Through examination of TCs' interviews and quantitative and mixed-methods observations, several findings emerged. The findings can be separated into three categories: (a) Certain domains increased in importance during novice teaching; (b) Certain domains decreased in importance during novice teaching; and (c) Certain domains saw no change between preservice and novice teaching. Tables 10, 11, and 12 summarize these findings and organize them in response to each research question.

First, TCs utilized more cognitive dissonance after becoming novice teachers and used slightly more constructivist practices in this domain. TCs expected to incorporate cognitive dissonance in their classrooms, but not all TCs implemented it during preservice teaching. As novice teachers, some challenged their students while others worried about providing exceedingly difficult material. The context of the school setting may be a factor. Additionally, while assessment was important during preservice teaching, the types of assessment used

increased in variation during novice teaching. Data show that TCs became more comfortable with certain student-centered lessons after utilizing them during preservice teaching. Several TCs valued student input and tried to involve their interests in lessons.

Table 10

Mixed Methods Research Question Findings

Research Question: How do TCs' beliefs and practices differ from preservice to inservice teaching?	
Domain	Findings
Activating Prior Knowledge	Participants supported eliciting prior knowledge and establishing relevance and implemented it with a frequency of 5% or more. As novice teachers, they were realistic about how relevant their content is in the real world.
Generating Cognitive Dissonance	Participants' beliefs changed dramatically; they were optimistic as preservice teachers and hesitant to be too challenging as novice teachers. However, on average, they utilized more cognitive dissonance during novice teaching than during preservice teaching.
Applying Knowledge	As preservice teachers, participants mostly did not alter instruction based on formative assessment. As novice teachers, their data were drawn mostly from discussion. As preservice teachers, participants utilized reflections and in-class discussion. As novice teachers, participants added types of application such as peer feedback, practice, exit tickets and visuals.
Feedback	Feedback was slightly more prevalent during preservice teaching, but during both preservice and novice teaching, feedback was context-based. As preservice teachers, participants did not have opportunities to implement assessment which may have impacted the amount of feedback provided.
Reflecting on Learning	The frequency of reflection decreased dramatically from preservice to novice teaching, potentially because of the lack of mentor teachers' influence.
Student-Centered Practices	Student-centered practices were used almost twice as often during preservice teaching as novice teaching. As preservice teachers, they were confident in collaboration, hands-on instruction, incorporating technology, and inquiry learning. As novice teachers, they lost confidence in these practices but began to implement new strategies that included valuing student voices and tapping into student interests.

Feedback decreased in importance during novice teaching, and the TCs' school context was a mitigating factor in the type and frequency of feedback they provided. Because of the

inauthentic preservice teaching experience, some TCs felt overwhelmed by grading and feedback. Although they implemented some new student-centered practices during novice teaching, TCs lost confidence in allowing students to work in large groups once they became novice teachers. Also, during preservice teaching, TCs championed the use of technology in the classroom, and, while they still believed it was important, as novice teachers they became more aware of the drawbacks of using technology in practicality.

Table 11

Qualitative Research Question Findings

Research Question:	What are the TCs' constructivist beliefs and practices after a semester of novice teaching?
Domain	Findings
Activating Prior Knowledge	Participants strongly believed in and consistently practiced eliciting prior knowledge and establishing relevance although they were realistic about the relevance of their content.
Generating Cognitive Dissonance	Questioning and discussion were viewed as the most beneficial strategies. They created cognitive dissonance by causing students to learn from their mistakes. Some participants were worried about being too challenging. School context may be a factor.
Applying Knowledge	Participants implemented application almost three times more often than feedback during novice teaching. Variation in the frequency of application during novice teaching may be attributed to school context.
Feedback	Context heavily influenced the type and frequency of feedback provided. Some participants felt overwhelmed by feedback when they entered novice teaching.
Reflecting on Learning	In English, the participants used group reflection and metacognition strategies more often than individual reflection, and they used them sparingly. In science, one participant consistently implemented reflection strategies while the others rarely incorporated it.
Student-Centered Practices	The participants focused on pair work rather than group work, and only the science participants utilized hands-on teaching. While they still viewed technology and inquiry learning as important, they had concerns about utilizing them in practice. Participants began to incorporate practices that valued student voices and tapped into student interests.

Two domains saw no change from preservice to novice teaching. The TCs attempted to elicit prior knowledge in both preservice and novice lessons and to establish relevance by connecting the content to students' lives and their future careers. Also, there was no change in application between preservice and novice teaching.

TCs developed more constructivist beliefs in student-centered instruction and establishing relevance. Regarding application, feedback, cognitive dissonance, and reflection, TCs expanded on existing beliefs and practices or maintained the same beliefs and practices.

Table 12

Quantitative Research Question Findings

Research Question: To what extent do TCs differ in their implementation of constructivist practices during their practicum experience and novice teaching?		
Domain	Findings	Odds Ratio (.95 Confidence Interval of Odds Ratio)
Activating Prior Knowledge	No statistically significant change Preservice: 11.6% Novice: 9.1%	1.0664 (0.9625 – 1.1816)
Generating Cognitive Dissonance	Statistically significant change ($p < .001$) Preservice: 6.7% Novice: 12.7%	1.4924 (1.3639 – 1.633)
Applying Knowledge	No statistically significant change Preservice: 35.2% Novice: 34.0%	6.0495 (5.5258 – 6.6228)
Feedback	Statistically significant change ($p < .001$) Preservice: 21.8% Novice: 17.0%	2.1773 (1.9856 – 2.3875)
Reflecting on Learning	Statistically significant change ($p < .001$) Preservice: 25.1% Novice: 1.7%	2.6542 (2.288 – 3.079)
Student Centered Practices	Statistically significant change ($p < .001$) Preservice: 44.7% Novice: 29.4%	5.1199 (4.6366 – 5.6536)

Overall, the findings on the six constructivist domains, activating prior knowledge, generating cognitive dissonance, applying knowledge, feedback, reflecting on learning, and

student-centered instruction, demonstrated that mentorship and teaching context are important factors in developing as novice teachers. They also demonstrate that as teaching identities develop, teachers become more realistic and potentially less confident in their abilities, but they may also develop innovative, student-focused practices. In chapter 5, these findings will be discussed in relationship to reviewed studies and theories, and the limitations of the study as well as implications of the findings will be discussed.

Chapter 5: Discussion

The purpose of this study was to explore the constructivist beliefs and practices of first-year Alternative Route to Licensure (ARL) teachers (referred to as teacher candidates [TCs]) who were enrolled in a summer practicum experience that focused on engaging, student-centered teaching. Through the use of mixed methods, including partial interval recording, observations, and interviews, these experiences were explored in order to determine how constructivist practices were utilized by novice teachers.

Summary of Major Findings

The major findings of this study were categorized according to the six constructivist domains used in the study. In activating prior knowledge, participants consistently elicited prior knowledge across preservice and novice teaching, but they became more realistic their content's relevance as novice teachers. In the domain of generating cognitive dissonance, the participants' beliefs changed dramatically from preservice to novice teaching. As preservice teachers, they believed in challenging students but did not do so frequently until they became novice teachers. As novice teachers, they were hesitant to challenge their students, but they encouraged students to learn from their mistakes. In this domain, the school and classroom contexts were factors.

Novice teachers implemented application approximately three times more often than when they were preservice teachers. Also, preservice teachers did not tend to alter their instruction based on formative assessments. As novice teachers, they used discussion to evaluate students' progress. Like cognitive dissonance, in application, school context may have been a factor. Feedback, which is combined with application throughout teacher education constructivist literature, was also context-dependent, and some participants felt overwhelmed when providing feedback as novice teachers. This feeling may have been partly due to the lack of assessment in

the preservice context. The most dramatic difference between preservice and novice teaching was reflection. As preservice teachers, participants implemented reflection almost 25% more often than they did as novice teachers. The mentor teachers' influence could have contributed to this large decrease. The teaching context also may have been a factor because all of the English participants used group reflection and metacognition strategies as novice teachers (although they used them sparingly) while in science only one participant consistently implemented reflection strategies.

In the final domain, data demonstrated that student-centered practices were used almost twice as often during preservice teaching as they were during novice teaching. As preservice teachers, participants felt confident implementing various student-centered practices including group collaboration, hands-on instruction, technology, and inquiry learning. As novice teachers, participants focused on pair collaboration rather than group collaboration because they lost confidence in implementing certain student-centered practices. They also expressed concerns about utilizing technology and inquiry in practice. However, the participants began to implement two new, student-centered practices: valuing student voices and tapping into student interests.

The following section will discuss these findings based on: (a) their relationship to reviewed studies in teacher education; (b) their contribution to constructivism, social identity development theory, and mentoring theory; (c) the limitations present during data collection and analysis; (d) their implications for practice in teacher education; and (e) their implications for teacher education research.

Relationship to Reviewed Studies

The reviewed literature for this study focused on teachers' beliefs and practices, field experiences and identity development, and the transition from preservice to novice teaching.

Within these bodies of literature, multiple themes were found (see Appendix B). This section will discuss how the findings from this study address the findings in the current teacher education literature.

Teachers' beliefs and practices. The current literature on teachers' beliefs and practices focused on university education, including field experiences, and demonstrated that teacher beliefs are contextual and influence student learning (Levin, 2015). This study aimed to fill the gap in research by incorporating contextual sources and a longitudinal design. The findings from this study demonstrate that preservice teacher beliefs tend to be more idealistic than novice teacher beliefs, and novice teachers enact their beliefs based on their teaching context. For example, even though Arthur believed that teaching literature and creative writing was equally as important as teaching expository writing, he did not enact this belief because his administration did not share his belief. On the other hand, Hannah believed that students should have hands-on learning experiences and was able to enact those beliefs because her administration did not interfere in her teaching. Similarly, George believed in the utility of direct instruction in social studies and implemented that practice daily in his classroom with full support of his administration.

The short-term longitudinal design of the study (Saldaña, 2003; Sztompka, 1993), which incorporated both preservice and novice teaching contexts, contributed to the understanding of how teachers' beliefs and practices changed from preservice to novice teaching. The study is defined as longitudinal in spite of lasting only 7 months as opposed to Saldaña's (2003) suggested 9 months because it used "repeated measurement of the same individuals over time" (Axinn & Pearce, 2006, p. 163). Each participant was measured at a certain time (preservice teaching) and then the measures were repeated at a later time (novice teaching). As novice

teachers, TCs began to question the utility of their curriculum and became apprehensive about the difficulty of their curriculum. They also implemented beliefs about knowledge application and feedback that they were unable to enact during their limited teacher education experience. These findings demonstrate that although studies that incorporated both preservice and inservice teaching were scarce in the literature, the findings were consistent with previous studies about similar topics.

Field experiences and identity development. The idea that field experiences are essential for TCs to develop social identities is supported by current literature. In order to be successful, Haynes (2014) found that field experiences must allow TCs to develop “analytic and flexible thinking” (p. 5) that is engaging and responsive and deepens learners’ abstract thinking. This goal was accomplished through a student-centered practicum experience that focused on student reflection and hands-on learning. These hands-on lessons developed by the mentor teachers allowed for the greatest opportunities for student learning (Baviskar et al., 2009) and incorporated collaboration, scaffolding, and reflection (Bruning, et al., 2011). The lessons allowed TCs to learn the importance of the constructivist domains present in this study.

The field experience, while shorter than teacher education researchers tend to recommend (Haynes, 2014), was designed to achieve the Interstate Teacher Assessment and Support Consortium (InTASC) goals of preparing teachers to meet students’ diverse needs (Council of Chief State School Officers, 2013). The mentor teachers emphasized collaboration, implemented curriculum in diverse ways, planned through integration of multiple strategies, and required professional responsibility in which the TCs collaborated by planning together and sometimes even teaching together. In addition to practices that met InTASC goals, the mentor teachers also emphasized reflection. Teacher education research has demonstrated that field experiences are

necessary for TCs to develop reflective practices (Florian & Linklater, 2010; Harris & Clarke, 2011; Nolan, 2011; Walton & Rusznyak, 2013). This study found, however, that while TCs implemented reflective practices during preservice teaching, they significantly decreased the frequency of reflection as novice teachers. This finding suggests that the literature was incomplete in this area, and that although preservice teachers implement reflective practices with their mentor teachers, they are not likely to do so as novice teachers without mentor support, particularly when they experience shortened field experiences.

Effective field placements and identity development. Current literature suggests that TCs tend to begin their field experiences by focusing on their own practices, but they eventually shift their focus to content and curricular knowledge (Jenkins, 2014). The TCs' development of student-centered practices that encouraged student input and incorporated student interests demonstrates that their focus shifted even further than the current literature suggests. Not only were they focusing on content and curriculum, but they were also focusing on student needs. Wright (2010) found that this shift occurs as teacher identities develop. The participants in this study seem to have developed their identities quickly and began to focus on learners' needs before the end of their first semester of novice teaching.

Walton and Rusznyak (2013) found that diverse practicum experiences would help TCs learn to use multiple strategies to effectively manage behavior and help students develop social skills. The student population during the TCs' practicum experience was extremely diverse and should have allowed them to develop effective behavior management strategies. While Hannah exhibited particularly effective behavior management while conducting student-centered lessons, many of the other TCs struggled with management or, in George's case, were effective at behavior management during teacher-centered instruction. Several TCs even commented on their

hesitancy to incorporate student-centered methods because of behavior concerns. The shortened nature of the practicum experience and the small number of students in each class may account for this discrepancy.

Influence of mentor teachers on identity development. In this study, interviews demonstrated that TCs built on their beliefs about constructivist practices as they became novice teachers. Their identities evolved to incorporate constructivist practices in a way that complemented their teaching contexts and their personalities. For example, Patrick focused on developing students' voices and providing feedback that could benefit his students both inside and outside of school. George, on the other hand, focused on the importance of providing relevant content that incorporated technology for learning. While George's beliefs and practices were different from Patrick's, both TCs identified with constructivism. The literature on mentor teachers' influences on TCs' identity development found that TCs would adopt their mentors' beliefs and practices even when they were at odds with the university training that they received (Moore, 2003). In this study, the mentor teachers and university faculty worked together to create the curriculum, so the traditional battle that TCs face in bridging the gap between theory and practice was not present. Instead, the mentor teachers adopted the same student-centered philosophy as the university faculty, and this common ideology likely led to less conflict for the TCs. The collaborative environment that was created during the summer program could serve as a model for other longitudinal studies on teacher beliefs and practices because the difficulty of navigating between the university and field experience was removed.

When considering the influence of mentoring during preservice teaching on novice teaching beliefs and practices, studies found that mentors were influential in TCs' practices as novice teachers (Bullock, 2004; Huffman et al., 2003). This finding was somewhat supported by

the current study in that the importance of student-centered practices was retained by most of the participants. However, reflective practices significantly decreased. Again, the shortened length of the practicum experience may have impacted the amount of influence that mentor teachers had on TCs as they developed their practices. Lacking a mentor during novice teaching may also have been important because the TCs may have felt more freedom in cultivating their own teaching philosophies.

Experiential learning and identity development. Identity development is linked to opportunities to position theory into specific teaching situations (Moore, 2003). Beeth and Adadan (2006) found that it is impossible to separate theory and practice in teacher education because of the university's simulated nature. The concept behind the summer teaching experience intended to overcome the separation by implementing a lab school. Unfortunately, the lab school was less realistic than intended due to low student enrollment and high TC enrollment. TCs did not have the opportunity to practically implement classroom management strategies or incorporate differentiation in a realistic way. Therefore, these aspects of the TCs' identities did not develop more fully until they became novice teachers, and they will likely continue to develop as they gain experience

Clift and Brady (2005) found that, during university courses, TCs were able to reflect and concentrate on their future students' learning, but when they became novice teachers this reflection was replaced by practical classroom responsibilities such as creating assessments, lesson planning, time management, and classroom management. The current study found that, although practical concerns did become more prevalent, they did not replace reflection on students' learning. In fact, the consistent access to student data and individual control over the curriculum (which they did not have during the practicum experience) seemed to cause TCs to

increase their concern about student learning. The TCs' increased attention to student interests and needs suggests that concentration on students' learning actually increased rather than being replaced by procedural concerns like lesson planning or classroom management.

Transition from preservice to novice teaching. Although teacher education literature has shown that TCs tend to revert to traditional, teacher-centered teaching practices when they become novice teachers (Borg, 2004; Grossman, 1991; Lortie, 1975), the findings for this study indicate that this is not always the case. The participants did decrease their use of reflection dramatically when they became novice teachers, and they were more hesitant to implement group work. This change could be attributed to the realization that time is limited in a school day, and reflection and group work are time-consuming activities. However, the TCs actually incorporated more cognitive dissonance and varied their application techniques when they became novice teachers. They also continued activating prior knowledge and developed new student-centered practices as novice teachers.

Within the literature on transitioning from preservice to novice teaching, two themes were explored that the findings from this study address: (a) tensions during the transition from preservice to novice teaching; and (b) the relationship between novice teachers and their mentors.

Tensions during the transition from preservice to novice teaching. As preservice teachers transition to novice teachers, their practices and beliefs change (Caudle & Moran, 2012), and often these changes result in teacher-centered practices (Brouwer & Korthagen, 2005). While this study found that many of the TCs began to incorporate some teacher-centered practices in their classrooms, they did not completely stop using student-centered practices (with the exception of Melissa). Even Lucas, who expressed behavior concerns about student-centered

teaching, attempted to retain the collaborative, hands-on practices that he learned during his practicum experience. Some studies have found that novice teachers lose confidence in constructivist approaches (Kilbourn & Roberts, 1991), and this study somewhat confirmed that finding (e.g., they lost confidence in cooperative learning). However, even though the TCs lost confidence in collaborative practices and reflective practices, they continued to implement the other constructivist domains, including activating prior knowledge, generating cognitive dissonance, and applying knowledge with feedback.

Beach and Pearson (1998) found that novice teachers struggled with tensions between the school curriculum and their intended curriculum. While Arthur expressed this concern, none of the other participants struggled with the curriculum. This finding could be partly due to the fact that three of the participants were teaching in charter schools which generally allow for more teacher autonomy; one TC was in a long-term substitute position and felt that she had the freedom to implement the curriculum that she wanted; and one TC was in a behavior school where curriculum was not his highest priority due to the focus on student behavior. Beach and Pearson (1998) also found that novice teachers struggled with the school culture and their beliefs and attitudes about it. Hannah struggled with the culture of her school, but this may have been primarily due to the fact that she was not in a secure position and was moved from the school where she had chosen to be. None of the other participants expressed concerns about their roles in their schools or the culture of the school. Therefore, novice teachers in the first semester of teaching may not be as concerned with fitting into the school context as Beach and Pearson suggested.

Mentor and TC relationships. During novice teaching, mentors are necessary to help TCs develop multiple types of knowledge about teaching (Hezlett, 2005). However, in this study,

the participants had little mentorship during their novice teaching. Four of the six TCs had mentors assigned to them at their schools, but none of them reported their practices being influenced by their mentors. Arthur explained that he and his mentor had similar beliefs and practices, and her support was important to him. Melissa and Lucas explained that their mentors had helped them through struggles with classroom management. Although they appreciated the support of their mentors, they did not express changes in beliefs or practices based on their interactions. As preservice teachers, the mentor teachers' influence on the TCs was much greater, and this will be addressed in the Contribution to the Theory section.

The findings in this study contributed to several bodies of teacher education literature. They demonstrated that while certain constructivist beliefs and practices become more challenging as TCs develop their teaching identities, they also confirmed that TCs become more concerned about their individual students. The literature on novice teacher mentorship lent insight into these novice teachers' development, but it was not confirmable due to a lack of novice mentorship.

Contribution to the Theory

Three theoretical areas were examined in order to understand TCs' beliefs and practices regarding constructivism. These areas include: (a) constructivism; (b) social identity development theory; and (c) mentoring theory. The contributions of this study to those theories are described below.

Constructivism. The current study is based on the theory of constructivism which broadly states that knowledge is internally constructed by adding new knowledge to previous knowledge (Koussin, 2003) through struggle and discovery (Loyens et al., 2009; Vygotsky, 1935) and co-constructing this knowledge through cultural and social activities (John-Steiner &

Mahn, 1996) as well as reflection (Moshman, 1982). This co-construction occurs by integrating biological, psychological, sociological, and physical environments (Moshman, 1982). The current study did not add to this understanding of constructivism; rather, it confirmed the previously defined domains and adapted the understanding to the current technology age. Constructivism in today's classroom requires that technology is incorporated and that students are permitted to construct knowledge in relevant ways. As preservice and novice teachers, the TCs incorporated technology, but the students were not always using the technology to construct their own knowledge. Additionally, they helped to place student learning in relevant contexts by relating new knowledge to students' personal lives or future careers.

There are several types of constructivism present in extant literature. Social constructivism focuses on interactions among cultures and groups (Baviskar et al., 2009); personal constructivism incorporates social and interpersonal elements but views individuals as the principal creators of their constructions (Raskin, 2002); and contextual constructivism includes interpretation based on culture and previous experiences (Crowther, 1999). The participants in this study had vastly different previous experiences which may have contributed to their varied teaching beliefs and practices. They also had different mentoring experiences based on their content areas, and they were all hired at different schools. These differences became important in interpreting the study's findings. The findings contribute to the different types of constructivism in the literature in that they demonstrate the importance of contextual constructivism in education. It incorporates social and interpersonal elements while also including the learner's interpretation and internalization of phenomena based on his or her culture and previous experiences (Crowther, 1999; Raskin, 2002).

The literature used to develop the protocols for this study divided constructivist teaching into four domains: activating prior knowledge, generating cognitive dissonance, applying knowledge with feedback, and reflecting on learning. As previously stated, this study deviated from the previous literature in order to study feedback and application separately. Also, in order to get a full picture of constructivist practices, student-centered practices were included for study. The contribution of the study to literature in each of the domains is described below.

Activating prior knowledge. Within the constructivist domains, Hartle et al. (2012) defined activating prior knowledge as “opening activities that emotionally and cognitively engage students in the topic at hand” (p. 33) and Tierney and Cunningham (1980) suggested that prior knowledge impacts a learner’s perception of the purpose for learning. In this study, prior knowledge was evident throughout the lessons, not only during opening activities. Therefore, further research should be conducted to determine if the definition should be altered to include any activity, discussion, or presentation that incorporates previous learning or existing schema. Additionally, Tierney and Cunningham’s (1980) suggestion that prior knowledge is necessary for establishing relevance was confirmed through the TCs’ beliefs and practices regarding establishing the relevance of their content.

Generating cognitive dissonance. In order to create cognitive dissonance, teachers magnify the differences between prior and new knowledge (Rogers, 1995) by exposing misconceptions (Hartle et al., 2012). In this study, the findings expanded on this understanding of cognitive dissonance because, as novice teachers, TCs allowed students to construct understanding by making mistakes and learning from them. This finding exposed a potential omission in the literature: cognitive dissonance appears to be created when students expose their own misconceptions rather than having teachers expose those misconceptions for them.

Applying knowledge with feedback. The reviewed literature described extended practice as necessary for cognitive development (Bruning et al., 2011), and this application should incorporate formative and summative assessment where students are able to compare their understanding with peers or new situations (Baviskar et al., 2009). Feedback during this application should be direct and concrete (Strommen & Lincoln, 1992). By separating application and feedback, the findings in this area were able to add to the theory by demonstrating that in the novice teaching context application was incorporated approximately three times as often as feedback. This indicates that further research must be done to understand preservice and novice teachers' use of and understanding of both domains.

The findings also showed that application and feedback were context-dependent. In the preservice context, the science teachers exhibited more application than feedback, while in the English classroom feedback was more prevalent than application. The mentor teachers and selected curricula could account for this change. During novice teaching, application may have been more prevalent than it was during preservice teaching because of large class sizes and the presence of only one (or at times two) teachers in the classroom. During preservice teaching, TCs were able to provide individual feedback because of the presence of many other teachers in the classroom. These findings suggest, again, the constructivist research should incorporate social context when interpreting findings.

Reflecting on learning. In the literature, reflection requires learners to explore and test hypotheses and think about their actions (Schön, 1983), and ideally these reflections should be interdisciplinary (Roglio & Light, 2009). The findings in this area indicate that most TCs do not continue to implement reflection when they become TCs in spite of having preservice field experiences that emphasize reflection. This finding may indicate that TCs do not believe that

reflection is important, and their only motivation for applying reflective practices as preservice teachers is due to the mentor teachers' influence. This finding suggests that the theory of constructivism regarding reflection may need to be further examined to understand why TCs are less likely to implement reflection than any other constructivist domain.

Student-centered practices. In the literature, student-centered practices are discussed in terms of activities or practices that teachers use in the classroom (Glasgow, 1997; Kain, 2003). These include small-group discussions, peer instruction, the use of technology for learning, experiments, guided discovery, and problem-based learning (Olson & Riordan, 2012). In this study, student-centered practices were implemented differently during preservice and novice teaching. Certain practices, like group work, were used less during novice teaching while others, like validating student voices, were used more often during novice teaching. These findings demonstrate that studies on constructivism may be over-simplifying student-centered practices when they focus primarily on collaboration and hands-on activities. Instead of discussing student-centered practices in terms of specific examples, it may be more beneficial to define the characteristics of student-centered practices. In this study, those characteristics included valuing student voices, tapping into student interests, and providing content and activities that were relevant to students.

Social identity development. Identity development theory posits that identity is formed through a dynamic, on-going process that is influenced by group interactions (Stets & Burke, 2000). In social identity development theory, people classify themselves in relationship to others. Those who fall into the same category are identified as ingroup members, and those who fall into a different category are outgroup members (Hogg & Abrams, 1990). In this study, participants' ingroup originally was ARL TCs, but in the second phase of the study their ingroup shifted to

novice teachers in a specific context. For example, three of the participants identified as charter school teachers and three identified as public school teachers. One participant identified as a behavior school teacher; another shifted from identifying as an English teacher to identifying as a social studies teacher; yet another shifted from identifying as a science teacher to identifying as a math teacher. In their final interviews, the participants were able to articulate beliefs and practices related to their specific contexts, and, although they referenced their preservice training, overwhelmingly they adopted the practices that they felt best fit their current context. The only exception to this shift was Hannah who was unhappy with her school context and was not yet able to identify as a novice teacher (since she had not passed the required exam at the time of the study).

These findings confirm the importance of context in identity development theories. As Beijaard et al. (2000) explained, novice teachers develop their identities in relationship to their content, pedagogy, and methods. For example, Patrick viewed himself as less authoritarian than his peers but as more focused on student interests. George saw his beliefs and practices as in line with those of his administration and peers and believed in the importance of encouraging gifted students. Arthur believed that he was tasked with developing students' writing skills using methods with which he did not always agree, but he felt that his beliefs aligned with his colleagues even if they did not align with his administration. These examples demonstrate that, while all three participants had the same preservice context, their novice teaching identities were vastly different. The findings add to the social identity development theory by demonstrating that teaching context was more influential than preservice experiences in this instance. While Knowles (1992) explained that teacher education courses and experiences as students were as

important as role models and teaching experiences, this study found that the novice teaching context was the most influential factor in social identity development.

Mentoring theory. In this study, mentoring is defined as a sustained, informal process of knowledge transfer and support (Bozeman & Feeney, 2007). Mentoring theory explains that mentors transfer their emotions or feelings to the TC unintentionally (Druckman & Bjork, 1994). Therefore, TCs should view the same practices as important that their mentor teachers find important. The findings in this study demonstrate that mentoring is effective through informal means in some circumstances, but occasionally TCs do not adopt the same beliefs and practices as their mentor teachers through informal, socially-induced transfer. While the TCs internalized many of the practices of their preservice mentors, including using warm-ups and creating relevance in lessons, the one area that was largely discrepant between preservice and novice teaching was the use of reflection strategies. These strategies were never formally discussed between mentors and TCs, but they were used daily in class. Even though the mentors believed in and practiced reflection, the TCs did not adopt these beliefs and practices as novice teachers.

Overall, this study contributes to the body of literature on constructivism, social identity development theory, and mentoring theory in several ways. It adds to the understanding of each of the constructivist domains while also encouraging consideration of the teaching context when studying constructivist practices. Additionally, the study incorporates both preservice and novice teaching contexts, which demonstrate that while preservice experiences are influential, the novice teachers draw heavily on their novice teaching contexts when developing their social identities. Finally, mentoring theory tends to focus on the importance of informal mentoring, but this study suggests that formal, explicit mentoring in certain areas (such as reflection) may be necessary to help TCs understand the importance of less prevalent constructivist domains.

Implications

This study included both preservice and novice teaching experiences, and it incorporated quantitative and qualitative methods. The variety of methods and longitudinal nature of the study allow for several implications for practice in teacher education and for future education research.

Implications for practice. A major decision that I made in order to research the constructivist domains quantitatively was to separate feedback and application. Although this is not common practice in constructivist education research, it led to some interesting findings. Separating feedback and application showed that, during both preservice and novice teaching, application was much more prevalent than feedback. This finding demonstrates that teacher educators must be explicit about what concrete, specific feedback is and how it should be meaningfully conveyed to students. Teacher candidates would often circulate the classroom and ask students how they were doing, but they would rarely provide concrete feedback that allowed students to adjust their behaviors to enhance learning.

The participants in this study demonstrated the variance in teaching practices that can result from one teacher education program, and the variation in their teaching contexts illustrates the need for multiple case study. Some participants retained most of the constructivist practices that they learned as preservice teachers, while other TCs became much more teacher-centered. The differences in novice teaching contexts and provision of mentors may account for many of the differences in practice. Different student demographics, varying class sizes, and school culture can all influence how TCs grow and change as they become novice teachers. Therefore, it is recommended that ARL teacher education programs continue to provide mentorship and professional development for their TCs. Because the TCs in this study were completing their student teaching while they were teachers of record, according to Southwestern University, they

should have had frequent meetings with a mentor and consistent feedback on their teaching practices. The student teaching handbook for the ARL program at the University states, “Continual supervision, feedback, and correction are expected. Therefore, co-teaching will be used as a model for instructional delivery throughout the program.” Unfortunately, the mentoring that they did receive was sporadic in some cases and nonexistent in others. A supportive mentor provided by the school is helpful, but the university must continue to provide support to ensure that novice teachers implement the practices the university promotes.

Although the TCs were supported through their field experiences by like-minded university and school-based mentors, when they entered novice teaching, they lost this cohesive environment. In order to meet the demands of the school district, like many ARL programs, the program at the researched institution revised the student teaching requirement to allow TCs to complete their student teaching as teachers of record. In other words, they no longer had a mentor teacher at their school site during student teaching. This practice may be harmful to burgeoning teachers as they are not afforded the opportunity to make mistakes with another teacher available for support. This study demonstrated that certain concerns, such as time and classroom management, may have hindered TCs in their implementation of student-centered practices. A consistent mentor in the classroom may have been able to address those concerns and help the TCs retain more constructivist beliefs than they were able to experience independently. I suggest that retaining the traditional student teaching model in teacher education or expanding to a yearlong field experience model in spite of teacher shortages may be beneficial to teacher development. Universities should continue to offer the opportunity for student teaching with an experienced mentor teacher in order to help TCs develop skills that cannot always be addressed in a shortened practicum experience.

In the area of generating cognitive dissonance, participants were apprehensive about making their content too challenging for students when they became novice teachers. This finding indicates that more time should be spent during preservice training on scaffolding and standards-based instruction, specifically regarding differentiation for student skill levels. Similarly, although TCs had opinions regarding summative assessment, they were not able to practically implement many assessment strategies as preservice teachers. Providing the opportunity to assess students and alter instruction based on that assessment is necessary to adequately prepare teachers for the data-driven culture of contemporary education; teacher education programs “must recognize that they need to integrate data into course content and practica” (Mandinach, Friedman, & Gummer, 2015, p. 35).

Overall, the findings from this study indicate that an authentic preservice teaching experience is necessary for ARL TCs. They also support the implementation of a lab school that removes the concerns related to bridging the gap between university and school-based learning. Selecting effective mentors and working with them to create the most beneficial practicum experience produced positive outcomes for the TCs in this study.

Implications for research. This study examined both preservice and inservice, novice teaching contexts in order to understand how TCs’ constructivist beliefs and practices changed. This research design allowed for a broad picture of how TCs’ identities develop and how contemporary teachers implement constructivist practices. The finding that TCs are likely to retain constructivist practices, in spite of a shortened field experience, has multiple implications for future research. First, it should not be assumed that ARL TCs will return to the teacher-centered practices that they observed as students. Instead, researchers who focus on this population may want to focus specifically on reflection and feedback, which were the two

domains that saw the most change from preservice to novice teaching. Also, while many of the ARL students in the original sample did not actually become teachers or remain in teaching for long, those who did were vastly different—their teaching contexts strongly influenced their level of constructivism as novice teachers. Therefore, it is important that researchers do not discount the social context of teaching. This finding demonstrates the importance of qualitative and mixed-methods research in teacher education to supplement quantitative findings; knowing what happens in preservice and novice teaching is necessary, but it is equally important to know how and why these beliefs and behaviors occur.

In addition to implications regarding the type of research to be conducted, the importance of accurate definitions in constructivist research is highlighted. I designed the study based on research previously conducted by Baviskar et al. (2009). My research supported many of their findings, but it also determined that their definition of activating prior knowledge may be incomplete. Every participant discussed the importance of establishing relevance in a lesson; therefore, I believe that rather than focusing on activating prior knowledge, future research should incorporate establishing relevance in all forms. Prior knowledge is crucial to creating cognitive dissonance and helping students learn new concepts, but it can be embedded within the idea of establishing relevance. I suggest that future studies should alter observation protocols and surveys to include establishing relevance.

Limitations of the Study

The findings in this study are limited in several ways. First, although the qualitative methods allowed for both teacher self-report and observation data, the amount of preservice data that were collected were much less than the novice data. The short practicum experience hindered my ability to observe multiple classes for each participant, and the small amount of

preservice data limited my ability to understand the changes in constructivist practices. It would have been preferable to conduct multiple preservice observations. However, incorporating two interviews during the preservice experience helped to supplement the limited observational data.

The participants included in the study demonstrated some of the variation in the TCs who enrolled in the ARL program, but it would have been more representative to have more TCs of color in the sample. Also, only six of the original 20 TCs participated in the study, which left questions about how the other participants would have changed their constructivist beliefs. There were also no participants from the math cohort, and their inclusion in the study would have given more depth to the findings. Including six participants for the multi-case study, though, allowed for a rich comparison across novice teaching contexts.

Originally, I intended to include survey data and artifacts (including lesson plans and class activities) among the analyzed data sources. However, the participants had several questions about the survey and, although it was validated, the findings from the survey did not seem to accurately represent the findings from the other quantitative and qualitative sources. One of the participants also never completed the pre-survey, so her data would not have been included in the findings. The artifacts were not included because several of the TCs did not create written lesson plans. Although I was able to acquire some class activities, the TCs did not consistently provide these activities. Because of the sporadic nature of these artifacts, I chose not to include them in the findings. Having both quantitative and qualitative observations and multiple interviews allowed for rich data analysis, but including the lesson plans and artifacts would have added an additional layer of understanding to the TCs' constructivist beliefs and practices.

As this study has demonstrated, analyzing the teaching context is necessary to understand TCs' constructivist beliefs and practices. These contexts varied widely, and their variation created some obstacles regarding data collection. Hannah and Arthur had block schedules at their schools, which meant that their classes were about twice as long as the other TCs. Therefore, in order to gather the same amount of quantitative data on all participants, I conducted fewer observations at their schools. Also, Melissa and George started teaching later than the other TCs, and I encountered some obstacles with Patrick's school, so there was less time in between observations for each of them. It would have been preferable to have equal amounts of time in between all observations, but in order to achieve the same amount of quantitative data for all participants this was not possible. Also, during preservice teaching I was able to video record all of the observations which allowed for more accurate interval data collection. Novice teaching interval data may have been less accurate because it was collected live rather than from video.

Finally, limitations in data analysis resulted from the small number of preservice observations. Because there were fewer preservice observations than inservice observations, non-parametric quantitative analysis was necessary. It would have been more powerful to include a parametric test. In qualitative data analysis, most coding was completed by one researcher. This limitation was mitigated by conducting analyst triangulation during both phases of the study.

Future research can avoid the limitations listed above in several ways. Researchers can ensure that the same numbers of preservice and novice observations are conducted to allow for parametric data analysis. Also, researchers can work in teams to avoid the bias of having one person conduct multiple rounds of coding. Finally, recruiting participants from a larger pool could allow for more variety in participants.

This study demonstrated that preservice teachers grew and changed considerably during their first semester of novice teaching. The mixed methods approach allowed for an analysis of their beliefs and practices in order to determine the frequency with which constructivist practices were utilized, and it provided the opportunity to determine why certain practices were used more often than others. The theoretical framework demonstrated the importance of including the teaching context and mentor teachers' input in evaluating TCs' beliefs and practices. In short, this study found that TCs who went through an abbreviated ARL summer practicum experience struggled in many areas, but they did not lose their belief in the importance of constructivist teaching. Rather, they molded constructivist practices to fit their individual teaching styles and contexts, and they modified the practices modeled by their mentor teachers to fit their personalities.

Appendix A

Practical Application of Constructivist Practices

Criterion	Definition	Practical Example
Activating Prior Knowledge	Stimulates relevant knowledge; opening activity; emotionally and cognitively engaging; access and apply prior knowledge in observable way; prior knowledge related to new knowledge; allows discussion of misconceptions	Demonstrations; concept mapping; solving a problem; explaining a new idea; conducting open-ended discussions; creating lists; conducting informal surveys; discussing current events; applications to the students' lives
Generating Cognitive Dissonance	Elaborate differences between prior knowledge and new knowledge; conflict; psychological imbalance that changes behavior; cognitive disequilibrium; reorganize and reconceptualize	Expose misunderstandings; compare prior and current learning; discuss missing evidence; create discomfort; ask provocative questions; introduce surprising or counterintuitive statements
Applying Knowledge with Feedback	Extended practice; compare understanding with peers/new situations; feedback is direct and concrete	Formative or summative assessment; discussions; quizzes; presentations; detailed comments on assignments; whole-class discussion; presentation; peer discussion; self-correction
Reflecting on Learning	Reflection-in-action: metacognition-learners explore and test hypotheses; interdisciplinary; integrate diverse topics; assessments or metacognitive activities	Students explaining variables or procedures or developing conclusions; compositions; demonstrations; reports; peer teaching

Note. Field guide to constructivist teaching and learning. Adapted from “A Field Guide to

Constructivism in the College Science Classroom: Four Essential Criteria and a Guide to their

Usage” by R. Hartle, S. Baviskar, and R. Smith, 2012, *Bioscience*, 38, p. 32

Appendix B

Literature Review: Themes, Findings, and Gaps in the Literature

	Literature	Findings	Gap in Lit.
Teachers' Beliefs and Practices			
Theme 1: Interdependence of beliefs and practice	<ul style="list-style-type: none">• Borg (2004); Grossman (1991); Lortie (1975)• Ashton (2015)• Levin (2015); Levin, He, & Allen (2013)• Shulman (1986)• Fives & Buehl (2012)	<ul style="list-style-type: none">• Apprenticeship of observation more influential than training• Changing beliefs is complex• Beliefs impact teachers' choices and behaviors• Beliefs influence learning environment• Beliefs are fluid and contextual	Changes in beliefs from preservice to inservice teaching instead of experienced teachers
Theme 2: Independence of beliefs and practices	<ul style="list-style-type: none">• Levin (2015); Levin, He, & Allen (2013)• Buehl & Beck (2015)	<ul style="list-style-type: none">• Enacting beliefs in practice is context-dependent• Personal and contextual factors influence practicing beliefs	
Field Experiences and Identity Development			
Theme 1: Influence of effective field placement on identity development	<ul style="list-style-type: none">• Jenkins (2014); Wright (2010)• Walton & Rusznyak (2013); Morton & Bennett (2010)• Florian & Linklater (2010); Rodriquez (2013); Ong'ondo & Borg (2011); McNaughton (2012)	<ul style="list-style-type: none">• TCs shift focus from their own practices to student learning.• Diverse placements help TCs develop identities as inclusive practitioners.• Reflection is important in identity development.	Changes in beliefs from preservice to inservice instead of university-based to school-based settings Meaningful field experiences ensured
Theme 2: Influence of mentor teachers on identity development	<ul style="list-style-type: none">• Harris & Clark (2011); Lave (1991); Moore (2003); Meister & Melnick (2003)• Huffman, Holifield, & Holifield (2003); Putman (2009); Clift & Brady (2005); Bullock (2004); Kaufman & Moss (2010)	<ul style="list-style-type: none">• TCs implement mentor style/ strategies even if conflict with the university; Theory eclipsed by procedure; Few chances to reflect on theory and pedagogy• TCs retained some policies/ideas from university but mentors more influential	

<i>Theme 3:</i> Experiential learning and identity development	<ul style="list-style-type: none"> • Korthagen & Kessels (1999); Freudenthal (1991); Moore (2003); Beeth and Adadan (2006) • Clift and Brady (2005); Ensor (2001) 	<ul style="list-style-type: none"> • TEPs should address practical concerns during fieldwork • TCs have difficulty dealing with conflicting beliefs in courses, fieldwork, and practices 	
Transition from Preservice to Novice			
<i>Theme 1:</i> Tensions during the transition from preservice to novice teaching	<ul style="list-style-type: none"> • Caudle & Moran (2012); Brouwer & Korthagen (2005) • Bullough (1990); Kilbourn & Roberts (1991) • Beach and Pearson (1998); Clark, Byrnes & Sudweeks (2014) 	<ul style="list-style-type: none"> • Practices and beliefs change based on experiences • Novices struggle to implement goals developed during TEPs • Goals hindered by different teaching styles, curriculum, culture and beliefs/attitudes 	Quantitative data Both field experiences and novice teaching experiences included
<i>Theme 2:</i> Mentor and teacher candidate relationships	<ul style="list-style-type: none"> • Hezlett (2005) • Orland (2001) • Gratch (1998) 	<ul style="list-style-type: none"> • Mentors help improve cognitive, learning, organizational, technical, interpersonal, and time management skills • Mentor teachers face similar struggles as novices • Different instructional styles can be frustrating 	

Appendix C
UNLV Social/Behavioral IRB – Expedited Review

Approval Notice

DATE: October 2, 2015

TO: Jori Beck

FROM: UNLV Social/Behavioral IRB

PROTOCOL TITLE: [784822-3] The Transfer of Teaching Practices from Preservice to Novice Teaching: A Mixed Methods Approach

SUBMISSION TYPE: Revision

ACTION: APPROVED

APPROVAL DATE: October 1, 2015

EXPIRATION DATE: September 30, 2016

REVIEW TYPE: Expedited Review

Thank you for submission of Revision materials for this protocol. The UNLV Social/Behavioral IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a protocol design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

PLEASE NOTE:

Upon approval, the research team is responsible for conducting the research as stated in the protocol most recently reviewed and approved by the IRB, which shall include using the most recently submitted Informed Consent/Assent forms and recruitment materials. The official versions of these forms are indicated by footer which contains approval and expiration dates.

Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through ORI – Human Subjects. No changes may be made to the existing protocol until modifications have been approved.

ALL UNANTICIPATED PROBLEMS involving risk to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed. All NONCOMPLIANCE issues or COMPLAINTS regarding this protocol must be reported promptly to this office.

This protocol has been determined to be a Minimal Risk protocol. Based on the risks, this protocol requires continuing review by this committee on an annual basis. Submission of the **Continuing Review Request Form** must be received with sufficient time for review and continued approval before the expiration date of September 30, 2016.

If you have questions, please contact the Office of Research Integrity – Human Subjects at IRB@unlv.edu or call 702-895-2794. Please include your protocol title and IRBNet ID in all correspondence.

Office of Research Integrity – Human Subjects

4505 Maryland Parkway . Box 451047 . Las Vegas, Nevada 89154-1047

(702) 895-2794 . FAX: (702) 895-0805 . IRB@unlv.edu

Appendix D

Permissions

Informed Consent

Department of Teaching and Learning

TITLE OF STUDY: Changes in Teachers' Beliefs and Practices from Preservice to Inservice Teaching: A Mixed Methods Approach

INVESTIGATOR(S): Dr. Jori Beck, Dr. Chyllis Scott, Christina Santoyo, Derek Riddle

For questions or concerns about the study, you may contact Jori Beck at **702-895-2466**.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794 or via email at IRB@unlv.edu.**

Purpose of the Study

You are invited to participate in a research study. The dual purposes of these study are: (a) to determine your beliefs and practices as a novice teacher; and (b) to examine how you use professional judgment (autonomy) to plan and implement individualized professional development

Participants

You are being asked to participate in the study because you fit these criteria: You are a novice teacher who participated in an alternative route to licensure program at XXXXXXXXXX

Procedures

If you volunteer to participate in this study, you will be asked to do the following: allow the researchers to collect data through audiotaped interviews, observations and videotaping of your lessons, a survey, analysis of your lesson plans and assignments, and observations of professional development sessions. You will also be asked to allow us to use the data from your practicum experience in this study. These data will be used to investigate the changes in your beliefs and practices from preservice to inservice teaching.

Benefits of Participation

There may not be direct benefits to you as a participant in this study. However, you may benefit from the study because you will reflect on your teaching and learning.

Risks of Participation

There are risks involved in all research studies, and this study includes minimal risks. The only risk involved is a potential breach of confidentiality.

Cost /Compensation

There will not be financial cost to you to participate in this study. You will not be compensated for your time. It is estimated that this data collection could take up to two and a half hours of your time.

Confidentiality

All information gathered in this study will be kept as confidential as possible. No reference will be made in written or oral materials that could link you to this study. All hard copies of data, audiotapes, and videotapes will be stored in a locked facility at UNLV for 5 years after completion of the study. After the storage time the information gathered will be destroyed. The principal investigators will not analyze the data until professional development has concluded and the data have been de-identified.

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Consent:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Signature of Participant

Date

Participant Name (Please Print)

Audio Taping:

I agree to be audio taped for the purpose of this research study.

Signature of Participant

Date

Video Taping:

I agree to be videotaped for the purpose of this research study.

Signature of Participant

Date

Consent to use data from Rebel Academy:

I consent to allow the research team to use all data collected during summer 2015 for this study.

Signature of Participant

Date

Consent to use data in future studies:

I agree to allow the research team to use data collected and then deidentified during this study in future studies.

Signature of Participant

Date

Recruiting Script

Hello,

We would like to ask you to participate in research that we hope will be beneficial to you as a growing teacher. This study, *Changes in Teachers' Beliefs and Practices from Preservice to Inservice Teaching: A Mixed Methods Approach*, is about the changes in teacher beliefs and practices from preservice to inservice teaching. You are eligible to be in this study because you participated in the UNLV ARL program and are currently teaching.

If you decide to participate in this study, the research team will conduct in-person and video observations during your regular school day and during professional development sessions. Your lesson plans will also be analyzed. Finally, you will be interviewed and asked to participate in a short survey at the end of your first semester of teaching.

Participation in the study is completely voluntary. If you would like to participate, we are happy to discuss any questions you may have at a time and place that is convenient for you. The informed consent form for this study is attached to the e-mail, and we will discuss the form on the day of our first observation.

If you have any more questions about this process or if you need to contact me about participation, please e-mail jori.beck@unlv.edu or call 702-895-2466.

Thank you,

Dr. Jori Beck
Dr. Chyllis Scott
Christina Santoyo
Derek Riddle

Debriefing Script

Thank you for your willingness to participate in research during the Rebel Academy and during your first year of teaching. We hope that you were able to reflect on your beliefs and practices as a result of participating in the study.

The goal of this study was to understand how your beliefs and practices changed from the practicum experience to novice teaching. As you may know, scientific methods sometimes require that participants in research studies not be given complete information about the research until after the study is completed. Although we cannot always tell you everything before you begin your participation, we do want to tell you everything when the study is completed.

We do not always tell people everything at the beginning of a study because we do not want to influence their responses. If we tell participants what the purpose of the study is and what we predict about how they will react, then their reactions would not be a good indication of how they would react in everyday situations.

One of the purposes of this study was to understand specifically how your constructivist, student-centered beliefs and practices changed from the practicum to your first year of teaching. This information was withheld to avoid influencing you to use more constructivist teaching practices. If you knew the true purpose of the study, it might have affected how you behaved or answered questions.

I hope you enjoyed your experience. If you have any questions later please feel free to contact any member of the research team.

Do you have any other questions or comments about anything you did today or anything we've talked about?

Thank you again for your participation.

Appendix E

Teacher Candidate Interview Protocol³

1. Tell me about your background and why you decided to become a teacher.
2. Why did you decide to go through an alternate route to licensure program?
3. Tell me about your experiences in the Rebel Academy.
 - a. What were the strongest aspects of your preparation?
 - b. What were the weakest aspects of your preparation?
4. Tell me about your beliefs about teaching.
5. Tell me about your beliefs about students.
 - a. How do students learn best?
 - b. What do students need in order to be able to learn?
6. How might you approach working with students who are non-native English speakers?
7. How might you approach working with students from marginalized backgrounds (i.e., low-socioeconomic backgrounds or minority backgrounds)?
 - a. How might you approach working with students with special needs?
8. Tell me about your teaching practices.
 - a. Walk me through a typical lesson in your classroom.
 - b. Describe the methods you use most successfully in your teaching (e.g., presenting and explaining, direct instruction, concept teaching, cooperative learning, problem-based learning, or inquiry learning)? Why do you think it's so successful?

³ Due to the emergent nature of qualitative data collection, these questions may be altered.

- c. Describe the methods you find to be least successful in your teaching? Why are they ineffective?
- 9. What do you know about assessments or tests?

If applicable:

- a. How have you used assessments or tests?

If students seem to understand assessment, possible follow-up questions include:

- b. Formative assessment?
 - c. Summative assessment?
- 10. What are your feelings about assessments or tests?
 - a. Are you thinking about high-stakes tests? Or in-class tests?
- 11. What do you see as the value of assessments or tests? The benefits? The challenges?
- 12. When you hear the word “data” what do you think of?
 - a. How do you think data work in education?
- 13. What do you know about using data to inform instruction?
 - a. Can you give an example of how you have used data/plan to use data to inform instruction?
- 14. How do you collaborate with other teachers?
- 15. What are your goals for your professional development during Rebel Academy?
- 16. What are your goals for working with middle school students during Rebel Academy?

Appendix F

Observation Protocol for Constructivist Practices

Teacher:

Date:

Unit/Lesson:

Start Time:		
Prompt		Notes
Elicits prior knowledge/ helps students establish relevance	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> 3 2 1 </div> <div style="display: flex; justify-content: space-around;"> Clear vague absent </div>	
Creates cognitive dissonance	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> 3 2 1 </div> <div style="display: flex; justify-content: space-around;"> Clear vague absent </div>	
Requires students to apply knowledge	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> 3 2 1 </div> <div style="display: flex; justify-content: space-around;"> >once once not at all </div>	
Provides specific feedback	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> 3 2 1 </div> <div style="display: flex; justify-content: space-around;"> >once once not at all </div>	
Requires students to reflect on learning	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> 2 1 </div> <div style="display: flex; justify-content: space-around;"> Yes no </div>	
Provides students opportunity for collaboration/ discussion	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> 3 2 1 </div> <div style="display: flex; justify-content: space-around;"> >once once not at all </div>	
<div style="text-align: center; margin-bottom: 10px;">Notes</div>		

Appendix G

Interval Protocol

Partial Interval Recording of Constructivist Teacher Practices

Start Time:													
Interval (20 seconds)	Behaviors					Interval (20 seconds)	Behaviors						
	EPK	CD	AK	F	R		EPK	CD	AK	F	R		
	SC						SC						
1						16							
2						17							
3						18							
4						19							
5						20							
6						21							
7						22							
8						23							
9						24							
Interval (20 seconds)	Behaviors					Interval (20 seconds)	Behaviors						
	EPK	CD	AK	F	R		EPK	CD	AK	F	R		
	SC						SC						
10						25							
11						26							
12						27							
13						28							
14						29							
15						30							
Key: EPK=Elicits prior knowledge/establishes relevance; CD=Creates cognitive dissonance AK= Requires students to apply knowledge; F= Provides specific feedback R= Requires reflection; SC= Student centered methods are used (collaboration; discussion)													

Appendix H

Novice Teacher Interview Protocol

1. What, if anything, is different about teaching than what you expected?
2. What do you like most about being a teacher?
3. What do you find most frustrating about being a teacher?
4. How do you like to have your classroom arranged? Is it the same on most days or do you rearrange furniture often?
5. How do you feel about collaboration or group work in class?
6. Describe a typical lesson in your classroom.
7. How do you incorporate students' prior knowledge into your lessons?
8. How do you ensure that your students are challenged on a daily basis?
9. What type of feedback do you provide to students? Do they ever provide feedback to each other?
10. What types of lessons do you use to encourage application of course material?
11. What challenges do you face when teaching student-centered lessons?
12. Think of a successful lesson that you taught recently. What do you think your students learned from this lesson? How did you come to this conclusion?
13. Think of a lesson that was not successful. What do you think caused it to be less successful? Would you try to teach it again? Why or why not?
14. What do you think you could improve on to become a better teacher?
15. Do you have a mentor at your school?
 - a. Does your mentor support you?
 - b. Do you have similar beliefs and practices?

Appendix I

Evaluation Rubric to Assess Presence of Constructivist Principles of Learning

Use the following criteria:

0 = Not Present 1 = Weakly Present 2 = Adequately Present 3 = Strongly Present

Criteria	Score
Prior Knowledge	
a. Students are given opportunities to access prior knowledge.	
b. Students are given opportunities to reorganize/reconstruct prior knowledge.	
c. Students are given opportunities to discuss prior knowledge.	
d. Students have opportunities to elicit and correct misconceptions in prior knowledge.	
e. Students have opportunities to resolve lesson problem based on prior knowledge.	
Learning Environment	
a. Students are given opportunities to discuss learning in groups.	
b. Students are given opportunities to discuss learning as a whole class.	
c. The teacher provides continuous formative assessment.	
d. Students are given choices in process and product.	
e. Students are encouraged to share learning through dialogue.	
f. The teacher provides scaffolding through comments, questions, and activities.	
Learning Activities	
a. Learning is embedded in a problem-, project-, or case-based environment.	
b. The problem or discussion is real-life, relevant, engaging, and motivating.	
c. The overarching problem can have multiple solutions.	
d. The learning activities simulate reality.	
e. Students are expected to obtain, record, and organize information through self-determination and regulation.	
f. Students are provided opportunities for cooperation and collaboration.	
g. Students have access to a variety of resources and perspectives during the learning activity.	
h. Students are expected to develop arguments based on evidence rather than seeking 'right answers.'	
Reflection & Metacognition	
a. Students are given opportunities to compare new knowledge to prior knowledge.	
b. Students are given opportunities to justify problem solutions to others.	
c. Students are given opportunities to analyze learning through individual, group, and whole-class reflection.	
d. Students are given opportunities to assess their own and each other's learning.	
e. Teacher feedback focuses on process and products of student learning.	

This rubric was developed using Baviskar, Hartle, and Whitney (2009), Richardson (2003), and Windschitl (2002).

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in college-and university-based teacher education. *Journal of Teacher Education*, 61(1-2), 89-99. doi: 10.1177/0022487109347671

Curriculum Vitae

Christina J. Santoyo
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Education

- Expected May 2016 **Doctor of Philosophy in Teacher Education**
University of Nevada, Las Vegas, Las Vegas, NV
Dissertation title: *Changes in Teachers' Constructivist Beliefs from Preservice to Inservice Teaching: A Mixed Methods Approach*
Advisors: Dr. Shaoan Zhang and Dr. Jori Beck
- May 2008 **Master of Arts in Teaching**
Western Illinois University, Macomb, IL
Concentration: English
- May 2006 **Bachelor of Arts in English, Cum Laude**
Augustana College, Rock Island, IL
Concentration: Writing

Licensure

Secondary English, 7-12
Nevada Standard Instructional Certificate

Research Experience

- Summer 2015 **University of Nevada, Las Vegas**
Senior Research Assistant
Dr. Jori Beck and Dr. Chyllis Scott, Lab school co-directors
- Spring 2015; Fall 2015;
Spring, 2016 **University of Nevada, Las Vegas**
Research Assistant
Dr. Jori Beck

Publications

Peer-Reviewed Journal Articles

Santoyo, C. & Zhang, S. (in press). Secondary teacher candidates' lesson planning learning. *Teacher Education Quarterly*.

Manuscripts Under Review

Beck, J. S., Scott, C. E., **Santoyo**, C. J., Prieto, J. A., & Taack, M. (under review). PDS as nimble improvisation: Using a summer lab school to respond to a teacher shortage crisis.

Professional Presentations

Beck, J.S., **Santoyo**, C. J., Scott, C. E., & Riddle, D. R. (2016, May). *Alternative route to licensure teacher candidates' perceptions of equitable teaching practices*. Paper to be presented at the 12th annual Congress of Qualitative Inquiry, Urbana-Champaign, IL.

Santoyo, C. J., Riddle, D., Adkins, A., Beck, J. S., & Scott, C. E. (2016, April).

"To help them be successful": The social identities of six mentor teachers.

Roundtable session to be presented at the annual meeting of the American Educational Research Association, Washington, D.C.

Beck, J. S., Scott, C. E., Riddle, D., Adkins, A., **Santoyo**, C. J., Taack, M., Prieto, J., Ewen, S., Gates-Williams, A., White, C., Cusick, W., Vallett, D., & Hayden, S. (2016, March). *Building a lab school through a professional development school partnership*. Concurrent session to be presented at the 2016 National Association of Professional Development Schools Conference, Washington, D.C

Santoyo, C. J., Beck, J. S., & Candel, S. L. (2016, February). *"The hardest career ever": Persisters' reasons for staying in the classroom- A case study*. Paper presented at the 28th annual Ethnographic and Qualitative Research Conference, Las Vegas, NV.

Scott, C. S., **Santoyo**, C. J., Riddle, D. R., & Beck, J. S. (2016, February). *Student preferences for new literacies*. Paper presented at the 28th annual Ethnographic and Qualitative Research Conference, Las Vegas, NV.

Santoyo, C., & Zhang, S. (2015, February) *Secondary teacher candidates' lesson planning in field experiences*. Paper presented at the annual meeting of the Association of Teacher Educators, Phoenix, AZ.

Zhang, S., **Santoyo**, C., & Murphy, D. (2015, January). *A case study of social justice education in a general methods course*. Paper presented at the annual meeting of the Hawaii International Conference on Education, Honolulu, HI.

La Prad, J., Lunsman*, C., Foss, T. Godwin, G., Seal, J., & Zilch, M. (2007, November). *Planting seeds for engaged learning*. Paper presented at The Coalition of Essential Schools' Fall Forum: A Principled Stand, Denver, CO.

*Last name changed from Lunsman to Santoyo in 2012

Invited Talks

Santoyo, C. (2015, November). *Changes in constructivist beliefs from preservice to inservice teaching*. Rebel Grad Slam, University of Nevada, Las Vegas. Las Vegas, NV.

Santoyo, C. (2015, March). *A case study of social justice education in a general methods course*. Graduate & Professional Research Forum, University of Nevada, Las Vegas, Las Vegas, NV.

Scott, C., **Santoyo, C.**, & Espinoza, N. (2105, February). *Roundtable: Setting a dissertation committee*. Spring 2015 Teaching and Learning Doctoral Student Colloquium, University of Nevada, Las Vegas, Las Vegas, NV.

Grant Participation as a Graduate Assistant

Funded

Beck, J. S., Vallett, D., Brown, D. B., & McCreery, M. (2015). *A proposal for the Nevada Educator Performance Framework Online Training System*. Submitted to the Great Teachers and Leaders Fund. (\$218,323.00).

Not Funded

Beck, J. S., Scott, C., & Lin, E. (2015). *Proposal for the exploration of high-leverage field practices in an alternate route to licensure teacher education program*. University of Nevada, Las Vegas Faculty Opportunity Award (Individual Investigator Award). (\$16,105)

University Teaching Experience

Instructor of Record

Fall 2015 – Spring 2016	University of Nevada, Las Vegas, Las Vegas, NV Graduate Assistant- Teacher Education <i>EDSC 323: Teaching and Learning Secondary Education</i> - Partner with practicum experience coordinators - Help teacher candidates learn to lesson plan for the field
Fall 2014 – Spring 2015	University of Nevada, Las Vegas, Las Vegas, NV Graduate Assistant- Teacher Education <i>EDU 202: Foundations of Secondary Education</i> - Facilitate field experiences <i>EDU 408: Foundations of classroom management (online)</i>
Fall 2015	Nevada State College, Henderson, NV College and Career Success (CEP 123) Instructor
Spring 2015	Nevada State College, Henderson, NV English 102 Instructor

Fall 2014 **Nevada State College, Henderson, NV**
English 100 Instructor (Hybrid: face-to-face and online)

Intern

Fall 2015; Spring 2014 **University of Nevada, Las Vegas, Las Vegas, NV**
Secondary Process and Instruction (CIS 603)
- Shadowed a master's level course and taught several lessons
- Concurrent with the students' practicum experience

K-12 Teaching Experience

Summer 2014 **Sierra Vista High School, Las Vegas, NV**
English Instructor (High school- juniors and seniors)

Fall 2013 – Spring 2014 **Silvestri Junior High, Henderson, NV**
English Language Arts Instructor (7th grade)

Fall 2012 – Spring 2013 **O'Callaghan Middle School, Las Vegas, NV**
English Language Arts Instructor (7th grade)
AVID Instructor (7th grade)

Fall 2009 – Spring 2012 **O'Callaghan Middle School, Las Vegas, NV**
English Instructor (7th grade)

Spring 2012 **O'Callaghan Middle School, Las Vegas, NV**
PASS Tutor (Students with IEPS and/or low test scores)

Spring 2008 **V.I.T High School, Table Grove, IL**
English Student Teacher (English II, English III,
Communications, dual credit college English, and Yearbook)

Winter 2004-Spring 2006 **Augustana College, Rock Island, IL**
Reading and Writing Center Tutor

Service

Reviewer

Summer 2015 American Association of Colleges of Teacher Education Annual Meeting

Fall 2014 *Journal of Teaching Effectiveness and Student Achievement*

Spring 2015 Pearson Higher Education: *Building Classroom Discipline, 12/E*

Committees

Spring 2015	Elementary Education Assistant Professor Search Committee (ex-officio)
Spring 2015	Graduate Student Association Colloquium Advisory Committee
Fall 2014 – Summer 2015	University of Nevada Las Vegas Rebel Academy
Summer 2015; Fall, 2015	Mock interviews for teacher candidates

Campus Leadership Experience

Fall 2008 – Summer 2009	The Art Institute of Las Vegas , Henderson, NV Residence Life Coordinator
Fall 2006 – Spring 2008	Western Illinois University , Macomb, IL Graduate Assistant - Department of Curriculum & Instruction
Fall 2003 – Spring 2005	Augustana College , Rock Island, IL Resident Assistant
Fall 2003 – Spring 2004	Augustana College , Rock Island, IL Communication Coordinator for Residence Hall Association

Formal Training

Summer 2012, 2013	AVID Center , San Diego, CA AVID Summer Institute
Fall 2009 – Spring 2010	Clark County School District , Las Vegas, NV New Teacher Induction Program

Professional Affiliations

Spring 2014 – Present	American Educational Research Association Division K
Spring 2014 – Present	Association of Teacher Educators
Spring 2015 – Present	Text and Academic Authors Association
Fall 2006 – Spring 2010	National Council of Teachers of English
Fall 2005 – Spring 2006	Mortar Board Honor Society

Honors and Awards

Fall 2015 – Spring 2016	Patricia Sastaunik Scholarship award (\$2,500)
Fall 2015 – Spring 2016	Edward Pierson Scholarship award (\$1,000)
Spring 2015	Graduate and Professional Student Association Travel grant (\$750)

Spring 2015	Graduate and Professional Student Association Honorable mention
Fall 2002 – Spring 2006	Augustana Dean’s Scholarship
Fall 2003 – Spring 2006	State of Illinois MAP Grant
Fall 2002 – Spring 2003	Augustana Grant

Extracurricular and Volunteer Experience

Summer 2014 – Present	Orphanage, Tijuana Mexico The Refuge Administrative Director
Fall 2013 – Spring 2014	Silvestri Middle School, Henderson, NV AVID Site Team Member
Fall 2009 – Spring 2012	O’Callaghan Middle School, Las Vegas, NV Middle School Soccer Coach

Language

Spanish- limited working proficiency