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Use of the Physical Classroom Environment as a Teaching and Learning Tool Including the Impact of the CCSSI in Kindergarten Through Third Grade Classrooms in Northeast Tennessee

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Use of the Physical Classroom Environment as a Teaching and Learning Tool Including the Impact of the CCSSI in Kindergarten Through Third Grade Classrooms in Northeast Tennessee

A dissertation presented to the faculty of the Department of Teaching & Learning East Tennessee State University

In partial fulfillment of the requirements for the degree Doctor of Philosophy in Early Childhood Education

by Charity G. Hensley-Pipkin August 2015

Dr. Pamela Evanshen, Chair
Dr. Kim Hale
Dr. Amy Malkus

Keywords: Constructivism, Early Childhood, Environmental Rating Scales/Tools, Physical Classroom Environment, Primary Grades, Primary Educator’s Environment Rating Scale (PEERS), Teacher Beliefs Survey (TBS), Common Core State Standards Initiative (CCSSI), 21st Century Skills, The 4 Cs (Collaboration, Cooperation, Creativity, and Communication)
ABSTRACT

Use of the Physical Classroom Environment as a Teaching and Learning Tool Including the Impact of the Common Core State Standards Initiative in Kindergarten Through Third Grade Primary Classrooms in Northeast Tennessee

by

Charity G. Hensley-Pipkin

The specific goal of this study was to determine the use of the physical classroom environment as a teaching and learning tool in an era of the implementation of the Common Core State Standards Initiative (CCSSI). This qualitative multi-case study focused on the learning principles and epistemological beliefs of primary teachers with reference to the physical classroom environment and the teaching process in regard to meeting the expectations set forth by the CCSSI. The researcher sought participation from a city school district in Northeast Tennessee which included a total of 8 participating teachers consisting of 2 each of grades kindergarten, first, second, and third. The Teacher Beliefs Survey (Woolley, Benjamin, & Woolley, 2004) was administered to determine teachers’ philosophical position regarding constructivist and traditional beliefs. Based upon responses, 8 teachers representing the most constructivist and most traditional teachers in each grade were selected for further participation. Teachers’ practices and perceptions of the role of the physical environment in the teaching and learning process including consideration of the CCSSI were further explored through interview. Each physical classroom environment was evaluated using the Primary Educators Environment Rating Scale (PEERS), a rubric designed to assess the use of the physical classroom environment on a continuum from traditional to constructivist practices (Evanshen & Faulk, under review). Observational field notes and photographs were collected in order to document environmental
components of the physical classroom environment of each participant. Data was collected and
triangulated through the use of the aforementioned methods. Through the data analysis process,
the researcher found all participants to demonstrate support for the role of the physical
environment in the teaching and learning process which was determined based on results of the
interview in conjunction with findings of the PEERS and supporting photographic evidence.
Each teacher’s personal experiences and philosophy of education was found to guide the physical
classroom environment design and layout in various ways. While most teachers felt the CCSSI
had little or no impact on their physical classroom environment, all shared in varying degrees the
use of the physical environment as a tool to support students in developing 21st century skills.
DEDICATION

I wish to thank my amazing husband and best friend, Ray, for his loving support, continual encouragement, and thought-provoking conversations throughout the writing of this dissertation. You motivate me and keep me sane. Thank you for being my biggest fan (and for bringing me ice cream after I was too drained to walk to the refrigerator after a long day of reading and writing)!

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CHAPTER 1
INTRODUCTION

Statement of the Problem

America has gone from providing children with what was once considered a world-class education to producing students who score significantly below other developed countries on international assessments (Bidwell, 2013). Of course, the world has changed. Even 25 years ago, 95% of jobs required only low skills; whereas, today’s job requirements consist of only 10% low-level cognitive skills (Calkins, Ehrenworth, & Lehman, 2012). Past education was based on standardization under review for jobs aligned with the industrial revolution. In contrast, today’s jobs require new skills such as critical thinking, cooperation, creativity, collaboration, as well as content knowledge to meet the needs of an increasingly global economy (Partnership, 2013).

With a recent study demonstrating United States’ students ranking an unimpressive 35th out of 64 countries in math and 27th in science performance, it is clear the American education system is not meeting the needs of some students or society (The Huffington Post, 2015). In response to the nation’s low performing students, an effort was made by the U.S. education department, governors, and state commissioners across the United States to form the Common Core State Standards Initiative (Calkins et al., 2012). The goal of the initiative is to develop a set of shared national standards designed to ensure all students are prepared for future success in both the academic and career setting (Kendall, 2011).

Introduction to Common Core State Standards Initiative (CCSSI)

According to the National Education Association (2012), “habits of mind” such as “analysis, interpretation, precision and accuracy, problem-solving, and reasoning” can be as or more important than content knowledge in determining success in college courses and the work
place (p. 8). Today’s children need to build the aforementioned skills to be successful in meeting challenges of an ever-changing world. Further, these skills aid in gaining a deeper understanding of subject matter required to meet learning standards (Ogu & Schmidt, 2013). The Partnership for 21st Century Skills (2013) asserts the educational system of the United States should strive to improve academic rigor to improve critical thinking experiences, well-planned curriculum, writing and reading skills, research projects, debate opportunities, and similar experiences in an attempt to compete with international education. The Common Core State Standards Initiative (CCSSI) is an attempt to enhance the academic rigor in U.S. schools. Introduced in 2009, the CCSSI represents a sweeping reform of the current K-12 standards that drive teaching and learning. The CCSSI strives to provide a rigorous and comprehensive curriculum in reading, literacy, and writing as well as mathematics. This initiative, adopted by 43 states and the District of Columbia at the time of the study, influences what is taught and tested in American classrooms and will likely play a role in the shaping of classroom practices (Calkins et al., 2012; Kendall, 2011).

According to the Partnership for 21st Century Skills (2013), today’s students, who are constantly connected to others through technology, require and anticipate diverse viewpoints and opportunities to share their own knowledge and personal experiences. Students of the 21st century need and expect social experiences in order to be successful learners and future collaborators (Partnership, 2013). Standards set forth by the CCSSI provide support for social learning while ensuring students master the content and skills necessary for success in college and the workforce (Kendall, 2011). Constructivist learning theory can be applied to achieving the Common Core State Standards as it posits individuals create their own understandings based
on interactions between current knowledge, ideas, and beliefs with new information which they encounter (Flynn, Vermette, Mesibov, & Smith, 2007).

**Introduction to Traditionalism**

Traditionalism in education refers to long-established educational customs society has traditionally deemed appropriate. Teachers who use traditional teaching methods oftentimes use direct instruction, a scripted, step-by-step approach to teaching (Barbash, 2012; Dewey, 2007). Traditional practices confine students and teachers to a specific sequence of learning interactions in which the teacher’s role is that of a director of learning (Barbash, 2012). Typically, traditional instruction does not take into account the individual differences and lived experiences of learners. Rather, according to Barbash (2012), traditionalism views “the learning process as the same for all learners” (p. 10). Through carefully planned manipulation of children’s surroundings, Barbash (2012) asserts “the teacher changes the learner only through the manipulation of environmental variables” (p. 18). Traditional teachers often use direct instruction, rote memorization, and repetition as a means of programming an appropriate response from students (Barbash, 2012). Students in a traditional classroom are typically not involved in creative-thinking as the teacher-directed learning process is unilateral (Khalid & Azeem, 2012; Miller, 2003).

Reflective of the traditional belief, learning is considered most effective when the teacher’s primary delivery method of information is lecture and the physical environment design includes rows of desks to ensure individualized learning (Barbash, 2012; Beck, 2009). This seating arrangement faces students toward the teacher to ensure attention during lecturing which often serves as the primary means of instruction. The value of rote memorization, as indicated through worksheets and commercially produced peripherals, is also typical of traditionalism.
(Beck, 2009; Khalid & Azeem, 2012). Environmental indicators of such traditional beliefs and practices may be noted through a lack of student projects, absence of documentation of student learning, and the use of standardized assessments as the main measure of student growth and academic success (Khalid & Azeem, 2012).

**Introduction to Constructivist Approach**

In contrast to traditionalism, constructivism is a theory of knowledge explaining human knowledge acquisition in terms of how new information interacts with existing knowledge generated from previous experiences (Piaget, 1977). Constructivist theory has roots in cognitive psychology as well as biology and is an approach to education which emphasizes knowledge is created through the exploration of one’s environment. According to Piaget, knowledge is meaning we make from experience, “transforming our world from chaos to order” (1977, p. 12).

Although the constructivist learning theory is open to interpretation and no two constructivist classrooms look alike, there are several tenets which are typically associated with constructivist education and the learning environment (LaRochelle et al., 2009; Reese, 2001;).

First, constructivist teachers seek and value students’ points of view. These teachers are interested in knowing what students think about concepts. This information helps teachers formulate classroom lessons and differentiate instruction based on individual student’s needs and interests. Environmental evidence of the value of student learning is oftentimes indicated through student displays and projects (Evanshen & Faulk, 2011). Second, constructivist teachers structure lessons to challenge students' suppositions. All students come to school with personal life experiences that shape their views about the world around them. Constructivist educators are aware of the unique experiences of each individual and, therefore, provide a physical classroom
environment designed to encourage students to construct knowledge relevant to their own lives and experiences (Brooks & Brooks, 1999).

Teachers who fully understand constructivist learning theory understand the value of providing students with opportunities to engage in relevant experiences with real materials (Applefield, Huber, Moallem, 2001; Marlowe & Page, 2005; Wilson, 1996). A classroom which allows for active learning is intended to aid students in internalizing knowledge and skills as they are transferred from external reality to an internal representation once the learner corresponds directly with the outside phenomenon. This process involves the learner in the practice of meaning-making as the learner actively engages in interpreting his or her experiences and corresponding information with either new or pre-existing knowledge (Piaget, 1977).

When classroom practices and the physical environment are designed to cultivate the acquisition of knowledge through active construction, students move through the upward spiral of equilibrium with the confidence and skills needed to become a contributing member of society (Cohen & Younghee, 1999). Current CCSSI learning standards and skills expectations call for experiences aligned with constructivism intended to promote deep understanding of concepts so students can effectively integrate and apply knowledge (Marzano Center, 2013). With this in mind, the greatest impact CCSSI has had to the education system thus far is “not to the content itself, it’s the notion of a level of cognitive demand and critical thinking attached to a content standard. [These standards] demand changes in instructional practice and, frankly, this change is revolutionary. It will cause a big change in how you do your job as a teacher” (Daggett & Gendron, 2010, p. 3).

Researchers suggest increased quality teacher preparation in order to better prepare teachers for effectively engaging students in problem-solving (Buomova, 2008; Schwerdt &
Wupperman, 2010; Wenglinsky 2002). Previously, teacher preparation programs erred in favor of traditional instruction; however, with changes in technology and the resulting neuroscience evidence of how the human brain acquires knowledge, many teacher preparation programs are reexamining their goals and philosophy and aligning content with constructivist principles (Marlowe & Page, 2005; Woolley et al., 2004). The CCSSI will likely influence the teacher preparation process as pre-service teachers will now be expected to not only have appropriate content knowledge but also apply the standards in a way that increases higher-order thinking skills. Further, the CCSSI expects teachers to be adaptable in their practices in order to aid students with a range of abilities in achieving the highest level of mastery. “If the standards are to succeed in changing education, we must prepare our teachers to make them succeed” (SMTI, 2012, p. 3).

Introduction to Teacher Preparation

Personal theories and beliefs of teachers have been viewed as having a substantial influence on nearly all aspects of teachers’ instructional decisions. Teachers’ expectations for learning outcomes as well as plans for organizing and structuring both the physical environment and instruction are directly impacted by one’s beliefs about knowledge acquisition as well as professional development experiences (Applefield et al., 2001). Over the years, the field of education has examined and embraced various theories related to the nature of human learning and the conditions most aligned with knowledge acquisition appropriate to the time period (Avalos, 2011). One of the most influential views of learning over the last few decades is a cognitive development theory known as constructivism (Piaget, 1953). The views and principles set forth by constructivism are considered a philosophical competitor in today’s educational
arena. In reviewing the present major reform efforts Tellez (2007) asserts, “the importance of constructivism in educational theory and research cannot be underestimated” (p. 553).

While interest in constructivism is high, and teachers across the nation are implementing constructivist principles, it is still far from common (Carter, 2008; DeVries, 2012). Engaging teachers in constructivist professional development experiences would likely increase the likelihood of the implementation of constructivist principles and potentially increase positive outcomes for students (MacPhail, Tannehill, & GocKarp, 2013). With the recently introduced CCSSI, teachers must now also support learning by designing a physical classroom space which addresses the tenets of a 21st century curriculum and expected skills (Ogu & Schmidt, 2013). Many teacher education programs are currently providing pre-service teachers with training based on principles of the constructivist learning theory in an attempt to prepare them with foundational knowledge and skills necessary to meet the needs of a diverse population of students (Campion, 2004; Villegas & Lucas, 2002). For many teachers, constructivism resonates with personal beliefs of how young children learn and develop (Jones & Brader-Araje, 2002).

With the recent adoption of the CCSSI, there has been much attention regarding the improvement of teacher preparation programs in the United States (King, 2011). Teacher preparation programs are intended to provide pre-service teachers with the pedagogical knowledge and skills needed to aid students in meeting current learning expectations (NEA, 2012). However, a recent study found only five percent of elementary teachers to be providing students with opportunities to gain skills in analyzing, generating hypotheses, and critical thinking; all skills expected by the CCSSI (Marzano Center, 2013). There has been little research and much debate about what constitutes an effective teacher education program (Avalos, 2011; Lowery, Roberts, & Roberts, 2011). In consideration of the CCSSI, some have
called for a reexamination of the value of providing both prospective and practicing educators with the knowledge and skills to implement principles of the constructivist learning theory (SMTI, 2012).

A recent study found that 85 percent of today’s primary classroom instruction is traditional including lecture, recitation, or seatwork, activities which often require very little critical thought. With this in mind, it is clear the CCSSI expectations will require more intensive training for pre-service teachers as well as some seasoned teachers to shift their philosophical thinking about the nature of teaching and learning (Marzano Center, 2013). The Marzano Center (2013) asserts many of the visible changes will be evidenced through how teachers design their physical classroom environment in an attempt to foster higher-order thinking skills called for by the Common Core. The CCSSI states, “…teachers are thus free to provide students with whatever tools and knowledge their professional judgment and experience identify as most helpful for meeting the goals set out of the Standards” (Calkins et al., 2012, p. 2).

With teachers being given the freedom to engage in practices which they view as most effective, now is a valuable time to reiterate and reexamine the value of constructivist principles and practices in the primary classroom in relation to the physical classroom environment and its use as a teaching and learning tool (SMTI, 2012). Blackburn and Williamson (2013) suggest the establishment of a student-centered environment which encompasses higher-order thinking will engage children at all levels to meet Common Core skills and knowledge expectations. Preparing and educating both prospective and practicing teachers about the application of student-centered practices and the value of a physical environmental design to engage students in
developing 21st century skills may be the best means of ensuring successful implementation of the CCSSI (SMTI, 2012).

Many teacher preparation programs are currently incorporating teaching methods based on constructivist theories of learning in their courses and programs (Dangel, 2013; Melvin, 2011). It is well established that teachers generally teach as they were taught based on years of observing their own teachers (Woolley et al., 2004). Woolley et al. (2004) call for powerful teacher education programs based on constructivist learning theory to guide pre-service teachers’ beliefs away from traditional teacher-centered instruction toward more student-centered instruction. Abbott and Fouts (2003) assert it is critical pre-service and practicing teachers be provided with practical, purposeful knowledge to aid them in engaging in practices and designing a physical environment with constructivist-compatible components which encourages problem-solving, collaboration, exploration, and investigation.

At the core of teacher preparation is the notion that professional development is about teachers gaining understanding of how young children learn and transforming this knowledge into practice with the goal of positively impacting students’ learning and development. When engaged in teacher preparation, prospective teachers begin to examine personal convictions and beliefs and these beliefs in classroom application (Avalos, 2011). Providing prospective teachers with a strong foundation of deep understanding of constructivist learning theory and the application of its principles would likely aid them in designing learning environments to meet 21st century expectations (MacPhail et al., 2013).

There is also value in on-going professional development for both novice and seasoned teachers. For example, although teachers may feel their physical classroom is already designed to meet current skills and learning expectations, it is important to continually examine the
physical classroom environment in view of curriculum as well as on-going teaching and learning practices (Marlowe & Page, 2005). Calkins et al. (2012) suggest conducting school-wide walkthroughs to examine actual classroom practices and physical environmental design in relation to expectations of the CCSSI. In doing so, teachers would likely benefit from reflective observations of their own classrooms to identify opportunities for growth. Identifying underdeveloped areas of the physical classroom environment may be one of the most important things a teacher can do in terms of fully implementing the Common Core State Standards in an attempt to raise student engagement and achievement (Calkins et al., 2012).

One can assume that CCSSI reform will result in many teachers engaging in personal reflection regarding their beliefs and practices in relation to meeting the expectations set forth by the CCSSI and will adjust their teaching practices and physical classroom environment accordingly (Daggett & Gendron, 2010). The Marzano Center (2013) notes the importance of ensuring educators understand the changes brought about by the CCSSI and the importance of personal reflection and evaluation in aligning practices associated with positive student outcomes.

There is evidence that one reason schools remain unchanged is that reforms are oftentimes superficial…teachers went through the motions of adopting new practices, but the changes were neither deep nor long-lasting. The outward manifestations of the changes were present, but the ideas or philosophy behind the changes were either not understood, misunderstood, or rejected” (Marzano Center, 2013, p. 1).

The interplay between teacher preparation and teacher beliefs is an important factor which influences how teachers design the physical classrooms environment. This study will examine how the philosophical beliefs of both constructivist and traditional teachers impact the
physical classroom design and use of the environment as a teaching and learning tool, as well as how or whether teachers have designed the physical classroom environment to meet the skills expectations set forth by the CCSSI.

As society and, therefore, students become more diverse, challenges are presented to teachers in terms of meeting the individual needs of all learners. A more personalized, rigorous and collaborative learning environment which moves away from solely teacher-directed, whole group instruction would likely benefit all learners (Jensen, 2007). Marzano (2003) notes how the critical role of the teacher in developing an environment which is culturally responsive and student-directed leads to increased engagement for large populations of learners. Designing a physical classroom environment aligned with what is known about how young children learn and develop is the foundational step toward fully engaging in appropriate and meaningful learning (Evanshen, 2010). Empowering educators to apply constructivist pedagogical knowledge, instructional strategies, and design physical classroom environments aligned with principles of constructivism would also likely yield teachers who felt greater confidence in the teaching process and students who demonstrated positive outcomes (Wolf, 2002).

**Traditional Versus Constructivist Physical Classroom Environments**

In an attempt to meet both past expectations and the newly adopted Common Core State Standards (CCSS), researchers and educational policymakers have sought to identify the physical and psychological aspects of classrooms which are linked to positive student outcomes (Daggett & Gendron, 2010; Doll, Spies, LeClair, Kurien, & Foley, 2010). Much interest was sparked primarily through the constructivist notion and evidence suggesting student engagement and habits of mind can be attributed, at least in part, to the physical aspects of the learning environment (Doll et al., 2010). A likely explanation for this outcome is the physical classroom
characteristics which promote students’ active participation and engagement in learning, which, in turn, strengthens students’ skill development and overall academic achievement (Doll et al., 2010).

Constructivist learning theory and its principles offers educators universal concepts related to human representations of learning and provides implications for designing a physical classroom environment rich in experiences intended to enhance learning (Applefield et al., 2001). The CCSSI calls for teachers to invoke a repertoire of teaching strategies and to design a physical learning environment to aid all students in developing 21st century skills (Lead & Martindale, 2013). For example, traditional explicit instruction may be needed for high-level comprehension while social learning experience (e.g., small group seating configurations, partner work, debates, etc.) can be used for practicing skills and sharing knowledge (Calkins et al., 2012). While explicit instruction is aligned with more traditional practices, social learning is aligned with principles of constructivism suggesting learning is an interactive, social experience in which children share ideas as they are actively involved in learning (Klem & Connell, 2004). Jensen (2007) suggests the sharing of ideas, asking questions, discussing concepts, and revising theories can encourage knowledge construction needed to build lasting, lifelong learning.

In a constructivist environment, the teacher plans active experiences intended to encourage students to engage in problem-solving, social negotiation, exploration, creativity, communication, and investigation. These experiences are evidenced in the physical environment through both whole and small group seating, flexibility, documentation of student learning, project work, manipulatives, real materials, and thinking maps. The purpose of this setting is to engage learners in actively constructing or creating their own subjective or objective reality. Learners, through social interaction, continuously test their hypotheses and create new
knowledge, correct previous knowledge, or confirm present knowledge (Khalid & Azeem, 2012). While some traditional educators would argue the learner is a “blank slate” (Henson, 2003, p. 2), constructivists would argue learners bring unique past experiences and cultural factors to construct new knowledge in any given situation (Khalid & Azeem, 2012).

Constructivist teachers tend to organize information and learning experiences around conceptual clusters as opposed to traditional education which introduces facts in isolation (Kohn, 2000). Constructivist primary classrooms typically include learning centers or stations as a means of integrating curriculum through active learning. Such activities are considered to be more relevant and authentic than traditional drill-and-practice seatwork. Traditionalists tend to concentrate on knowledge acquisition while constructivist teachers strive to ensure students develop a deeper understanding of knowledge through problem-based, social learning experiences (Sprague & Dede, 1999). In opposition to traditionalism, constructivist instruction and environmental design is flexible and ever-changing. As evidenced through projects, documentation panels, photos, and peripherals, constructivist teachers allow student interests to inform teachers’ decision-making regarding curriculum, to guide instruction, and to influence content. This does not imply that a lack of student interest in a topic will prevent the teacher from introducing it. Rather, constructivist teachers try to relate the concepts and skills surrounding the topic to align with student interests (Spague & Dede, 1999).

While traditional educators instruct primarily through lectures, memorization, and seatwork, teachers who fully understand constructivist learning theory understand the value of providing students with opportunities to engage in relevant experiences with real materials (Applefield et al., 2001; Marlowe & Page, 2005; Von Glasersfeld, 1995; Wilson, 1996). A great deal of research conducted over the last century has found that children need active learning
experiences in order to gain and retain knowledge (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011; Bodrova & Leong, 2003; Carter, 2008; Henson, 2003; Khalid & Azeem, 2012; Marzano Center, 2013; Schilling, Washington, Billingsley, & Deitz, 2003). While traditional education practices of the past may have once been relevant and effective, traditionalism may not meet the needs of all modern learners (Buomova, 2008).

Today’s children require opportunities for investigation, collaboration, and higher-order thinking in order to become capable and contributing citizens. Constructivist education appeals to children’s interests, engages them in experimentation with the physical world, and fosters collaboration among members of the classroom (Marlowe & Page, 2005). Current research asserts a physical classroom environment design based on constructivist teaching practices provides meaningful, activity-based experiences for all learners (Brooks, 1999; Copple & Bredekamp, 2009; Carter, 2008; Cunningham, 2006; DeVries, 2002; Duffy, Lowyck, & Jonassen, 2012).

Although traditional educators value a classroom aligned with independent learning, a physical classroom design intended to promote social interaction among its members will likely lead to increased ability in 21st century skills of collaboration and cooperation (Marzano, 2003). Marzano (2003) outlines the value of including students in classroom management procedures, including beginning the school year with a positive emphasis on organization; arranging the classroom in a way conducive to effective management; and identifying and implementing classroom operating procedures. Addressing the aforementioned components will likely aid in the establishment of a classroom community of learners.

Although no two teachers are exactly alike, many share similar beliefs about teaching and learning which influence their practices. Many teachers adopt an eclectic style as they choose
from a large repertoire of strategies as the situation dictates. However, behind any specific teaching strategies lies a belief about teaching and learning. Two particular approaches focused on in this study include the traditional means of instruction in comparison with practices more aligned with constructivist principles. Practices more aligned with traditional instruction typically include experiences in which students engage in learning facts and concepts through the absorption of information provided by the teachers’ explanations. Further, traditional learning environments typically reflect the belief that students learn best when content is taught in isolation through systematic and prescribed means using a whole group instruction format (Barbash, 2012). Constructivist-aligned practices are based on the constructivist learning theory which suggests students gain understanding through engaging and relevant student-centered learning experiences. In this setting, students participate in procedural knowledge and skill development as they problem-solve through the manipulation of concrete materials with peers (Vygotsky, 1978).

Whether traditional or constructivist-inspired, the physical classroom environment is a reflection of each teacher’s personal beliefs and the environment signals to students the expectations of the teacher. The physical environment design represents teachers’ theories about how young children learn and the skills and knowledge expectations within the environment they have designed. Controversy exists regarding the optimal overall design of teaching and learning spaces; however, research supports various specific physical components directly linked to student outcomes (Berris & Miller, 2011). There is a growing movement toward engaging educators in self-evaluation of their physical classroom environment in an attempt to identify and modify or adapt specific environmental components linked to behaviors and performance in an attempt to guide students toward optimal learning (Campion, 2004). In Tennessee, the Teacher
Educator Acceleration Model (TEAM) evaluation includes a specific component to examine the physical classroom environment designed to engage students in active, problem-based learning (Crosswhite et al., 2013).

**The Role of the Physical Environment in Teaching & Learning**

Research has demonstrated the bi-directional influence of the physical environment on human beings and human beings on the physical environment (Buckley, Schneider, & Shang, 2004; Chan, 1988; Rushton & Larkin, 2001; Taylor, 2008; Veitch & Arkkelin, 1995). Each year, millions of dollars are spent creating environments intended to impact human behavior (Kotler, 2001). In an attempt to psychologically influence people’s behaviors, marketers use atmospherics to stimulate the five senses. Atmospherics are a marketing strategy intended to entice customers into the store and encourage them to remain there in an attempt to increase the odds of a purchase. Atmospherics include the store's layout, sounds, noise level, odor, color, temperature, lighting and décor. For example, the use of quick paced music in gyms affects the brain to influence people hearing the music to become a little more anxious and more tempted to move around. In contrast, slow paced music is intended to affect the brain to calm and relax people in order to enjoy the moment while dining, shopping, etc. (Kotler, 2001). With research suggesting the effectiveness of a well-planned environment in guiding human behavior, why is this research oftentimes unnoticed in respect to the physical classroom environment design?

Hemmeter, Maxwell, Ault, and Schuster (2001) define the physical environment as the room arrangement, materials, equipment, space, display of children’s work, elements of design (e.g., décor, color, etc.), and physical design of the room. Previous findings demonstrate the physical classroom environment and its elements are directly linked to numerous outcomes for students which include social and academic learning and skill development (Copple &
Bredekamp, 2009; DeVries, 2012; Miller & Cunningham, 2009). Neuroscience over the past few decades has provided new information regarding human development which allows for better understanding of the learning process and provides implications for teachers on how to create a more effective and efficient learning environment (Strumwasser, 1994). Designing environments aligned with what is currently known about how the human brain acquires knowledge would likely impact student achievement (Caine & Caine, 1994). Further, brain research provides educators with strategies which can be used to stimulate specific brain regions (e.g., thalamus, amygdala, frontal cortex, etc.) in order to enhance students’ engagement, to foster connections between what is being presented and what has been learned, and to maximize learners’ short- and long-term memory (Rushton & Larkin, 2001).

Constructivism is strongly influenced by cognitive psychology. Cognitive theory concentrates on the conceptualization of knowledge and the way the brain receives, organizes, and retains information (Lefoe, 1998). According to Jean Piaget’s (1977) cognitive development theory, which is the basis of constructivist philosophy, children learn best when given the opportunity to engage with others, to construct meaning from relevant experiences, and to explore with the five senses. To constructivists, a strong physical learning environment is a major goal where the “prime emphasis is placed on the unique interests, styles, motivations, and capabilities of individual learners so that learning environments can be tailored to them” (Lefoe, 1998, p. 455). Through the examination of on-going brain research and the implementation of practices aligned with developmental appropriateness, it is likely educators would design a physical classroom environment to positively impact student outcomes (Epstein, 2001).

To meet the challenges set forth by the CCSSI and current learning expectations, students would likely benefit from as many elements reflective of a good educational experience as
possible (Kendall, 2011). A high quality education encompasses not only quality educators, but also a complex array of both direct and indirect influences on learning (Copple & Bredekamp, 2009). Additionally, the physical classroom environment is oftentimes viewed merely as the context for learning to occur, rather than an actual tool to support learning. A thorough examination of the role of the physical environment in the teaching and learning process in the 21st century would add to the growing body of research focusing on the topic (Doll et al., 2010). This researcher seeks to add to existing research through the examination of the role of the physical environment in the teaching and learning process including the impact of the CCSSI. Although the CCSSI outlines specific learning standards for both English language arts and mathematics, this study will specifically examine how teachers use the physical classroom environment as a tool to engage students in developing 21st century skills necessary for achieving these standards, such as collaboration, communication, creativity, and cooperation, rather than on specific standards instruction.

**Research Questions Introduced**

This study will examine teachers’ use of the physical classroom environment as a tool for teaching and learning through the viewpoint of individual teachers who have been identified to exhibit either constructivist beliefs and practices or traditional beliefs and practices as measured by the Teacher Belief Survey (Woolley et al., 2004). Since the implementation of the CCSSI is underway in Northeast Tennessee, one can assume each participant will be striving to provide experiences for students which aid them in developing the 21st century skills of critical thinking, collaboration, creativity, and communication necessary for meeting current Common Core State Standards. This study seeks to add to the growing body of work exploring the subjective world
of teachers and their conceptions of the physical classroom environment they have created for teaching and learning in an attempt to aid them in meeting current learning standards.

Examining teachers’ perspectives of the learning environment allows researchers to learn more about the intentionality underlying physical classroom design and teacher practices. Additionally, because teachers are oftentimes the final authority in regard to how curriculum and instruction policies are executed, insight into teachers’ beliefs can provide perspective regarding teachers’ philosophies, responses, and environmental design. Further, exploring teachers’ theoretical basis for their teaching philosophy may aid in the improvement of professional development experiences as well as provide teachers with useful information about the impact of their teaching on student engagement and learning (Woolley et al., 2004). Another component of interest for this study is the context in which participating teachers are currently functioning. With the acceptance of the Common Core Standards in nearly all states, many are striving to align their practices to meet the needs of diverse learners while preparing them for both college and the workforce (Kendall, 2011). With this in mind, the following questions served to guide this research:

**Central research question.** What is the role of the physical classroom environment in teaching and learning in 8 primary classrooms in Northeast Tennessee?

**Sub-question 1.** What are the perceptions and experiences of 8 primary teachers related to their use of the physical classroom environment as a teaching and learning tool?

**Sub-question 2.** How does the philosophy of teaching and learning of 8 primary teachers impact the design of the physical classroom environment?

**Sub-question 3.** How has the Common Core State Standards Initiative impacted the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee?
Sub-question 4. How does the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee support the following 21st century skills set forth by the CCSSI: collaboration, creativity, critical thinking, and communication?

Definition of Key Terms

The following terms will be used throughout the study and are defined for the purposes of this research study:

- **Constructivism** can best be viewed in terms of theory of knowledge construction, rather than as a teaching pedagogy. Constructivist teaching is based upon Piaget’s (1977) theory that learning occurs through active involvement with individuals and the materials within one’s environment.

- **Common Core State Standards Initiative (CCSSI)** is a shared set of national standards, accepted by 43 of 50 states and the District of Columbia at the time of the study, designed to ensure students in every state are held to the same level of expectations as students in the world’s highest-performing countries, and that they gain skills and knowledge necessary for success in future educational and work-related endeavors (Kendall, 2011; King, 2011).

- **21st century skills** are skills which have been identified by the Partnership for 21st Century Skills as the skills and dispositions for 21st century readiness for students. These skills are identified by the Partnership for 21st Century Skills (2013) as follows:
  - Innovation
  - Problem-solving
  - Information Literacy
  - Media Literacy
  - Information, Communications, & Technology Literacy
- Flexibility
- Adaptability
- Initiative
- Self-Direction
- Social Skills
- Cross-Cultural Skills
- Productivity
- Accountability
- Leadership
- Responsibility

**The 4 Cs:** Of the necessary basic skills identified by the Partnership for 21st Century Skills (2012), there are four skills which have been labeled as the “super skills” (p. 5) critical for students to successful achieve Common Core learning standards. The 4 Cs include the following “super” skills as defined by the Partnership for 21st Century Skills (2012):

- **Critical thinking** - the ability to use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation; analyzing how parts of a whole interact with each other to produce overall outcomes in complex systems; effectively analyzing and evaluating evidence, arguments, claims, and beliefs; analyzing and evaluating major alternative points of view; synthesizing and making connections between information and arguments; interpreting information and drawing conclusions based on the best analysis; reflecting critically on learning experiences and processes; solving different kinds of unfamiliar problems in both conventional and innovative ways and; identifying and
asking significant questions that clarify various points of view and lead to better solutions.

- **Communication**—articulating thoughts and ideas effectively using oral, written, and nonverbal communication skills in a variety of forms and contexts; listening effectively to decipher meaning, including knowledge, values, attitudes, and intentions; using communication for a range of purposes (e.g. to inform, instruct, motivate, and persuade); using multiple media and technologies, and knowing how to assess impact and their effectiveness a priori and; communicating effectively in diverse environments (including multilingual and multicultural).

- **Collaboration**—demonstrating the ability to work effectively and respectfully with diverse teams; exercising flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal; assuming shared responsibility for collaborative work and; valuing the individual contributions made by each team member.

- **Creativity**—using a wide range of idea creation techniques (such as brainstorming); creating new and worthwhile ideas (both incremental and radical concepts); elaborating, refining, analyzing, and evaluating original ideas to improve and maximize creative efforts; developing, implementing, and communicating new ideas to others effectively; being open and responsive to new and diverse perspectives; incorporating group input and feedback into the work; demonstrating originality and inventiveness in work and understanding the real world limits to adopting new ideas; viewing failure as an opportunity to learn; understanding that creativity and innovation are part of a long-term, cyclical process of small successes and frequent mistakes; acting on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur.
• **21st Century Model for Teaching, Learning, and Educational Change** is based upon early childhood principles and makes provisions for the extension of early childhood beliefs and practices into primary grades. The model focuses on the transformation of the physical environment and the engagement of the learner leading to the academic enhancement of the learner. The overall goal of change is to move from a traditional teacher-directed approach to education to one that is learner-centered and incorporates principles of early childhood best practices. It addresses how teachers can implement classroom changes which will help students reach optimal development. The model outlines specific changes which can be made to the environment in order to engage students in the learning process with the ultimate goal of enhancing the learning process and increasing positive outcomes for students (Evanshen, 2010).

• **Primary Educator’s Environment Rating Scale (PEERS)** is a classroom evaluation tool which aids educators in conducting a self-evaluation of the primary classroom environment to assess the design and use of the classroom environment for supporting student learning. This tool includes multiple descriptors of the physical classroom environment rated along a continuum from traditional to constructivist practices (see p. 128, Evanshen & Faulk, under review).

• **Teacher Beliefs Survey (TBS)** is an instrument to assess teachers’ beliefs regarding constructivist and behaviorist theories of learning (see p. 122, Woolley et al., 2004).

• **Tennessee Educator Acceleration Model (TEAM)** is the teacher evaluation system introduced across the state of Tennessee in 2013. The system is intended to support collaboration among principals and teachers to ensure students receive rigorous instruction. TEAM is intended to provide a holistic view of teacher effectiveness through frequent observation, constructive
feedback, and measures of student learning and aligned development opportunities. The physical classroom environment is also one component evaluated by the tool (Crosswhite et al., 2013).

- **Physical environment** - the room arrangement, materials, equipment, space, display of children’s work, elements of design (e.g., décor, color, etc.), and physical design of the room (Hemmeter et al., 2001).

- **Environmental rating scales/tools** - specialized documents, scales, or rubrics designed to assess the degree of quality of a classroom environment. Classroom quality is assessed through various social interactions among individuals, interactions between children and materials, children’s engagement in activities within the environment, environmental design and layout, and features such as space, daily routine, time, etc. (Whitebook, Howes & Phillips, 1993).

- **Primary grades** - children ages 6 through 8 years. Children of this age are generally enrolled in first through third grades (Copple & Bredekamp, 2009).

**Chapter Summary**

Chapter 1 outlined the current state of U.S. education and the development of the CCSSI in an attempt to increase rigor of education for today’s students. The need to prepare pre-service teachers with the knowledge and skills needed to effectively implement principles and practices linked to constructivist learning theory which coincide with 21st century skills such as collaboration, communication, critical thinking, and creativity was also addressed (Partnership, 2013). An introduction to constructivist and traditional physical classroom environments as well as the role of the environment in the teaching and learning process was provided. Chapter 1 identified the need for in-service teachers to engage in on-going reflection regarding the use of
the physical environment and additional professional development focusing on the environment as a teaching tool as they strive to aid students in gaining 21st century skills set forth by the CCSSI. Research questions were introduced as well as key terms used within the research.

Chapter 2 provides a review of current literature regarding the reform of U.S. education, goals and expectations of the CCSSI, components of both traditional and constructivist-based physical classroom environments, potential outcomes for students engaged in constructivist classrooms, physical environment research, and the 21st Century Model for Teaching and Learning and Educational Change.
CHAPTER 2
REVIEW OF LITERATURE

U.S. Education Today

Currently, American schools are clearly failing to prepare students for a world economy and a highly technical society (Gross, 2000; Johnson & Johnson, 2006). With American College Testing (2013) indicating 76% of American high school graduates “were not adequately prepared academically for first-year college courses” (p. 3) with a graduation rate of just under 70% (Klein, 2011), it is apparent students are not receiving an adequate education. LaRochelle et al. (2009) suggest this phenomenon is due, at least in part, to the failure of the American education system to provide widespread distribution of knowledge in a culturally responsive manner. It is commonly accepted that learning is greatly influenced by one’s developmental level as well as the social and cultural context of one’s background experience and, therefore, it is critical to provide diverse learning experiences and well-planned environments to aid the learning process (Marzano Center, 2013; Vygotsky, 1978).

Jobs today requiring post-secondary education have increased from 28 to 60 percent since the 1970s (Carnevale, Smith, & Strohl, 2010). In order to be adequately prepared to enter college and the workforce, students must graduate high school with a very different set of skills than those of times past. The most frequently cited skills desired by today’s top employers include: interpersonal skills, emotional intelligence, creativity, imagination, technology skills, decision-making, problem-solving, self-directed learning, innovation, communication, and responsibility (Casner-Lotto & Barrington, 2006; Eisen, Jasinowski, & Kleinert, 2005). Clearly, today’s society calls for problem-solvers, collaborators, and lifelong learners; therefore, it is imperative for teachers to consider transitioning to a more constructivist-based approach for
educating young children (Flynn et al., 2007). This may require a shift from a more traditional, teacher-centric culture to one with intense focus on the individual learner (Henson, 2003).

The traditional mode of education, aligned with needs of the past, can produce students inadequately prepared to meet 21st century societal needs (Partnership, 2013). The traditional instruction method includes teachers as transmitters of knowledge with little or no opportunity for initiative and research endeavors for students. A modern learner-centered physical classroom environment includes flexible social and learning groups, activity-based learning opportunities relevant to learners, and opportunities for deep engagement by students. Contemporary instruction should be rigorous and based on learning standards, personalized, collaborative, relevant, applicable, and flexible (Wolf, 2002). The use of constructivist teacher strategies including self-selection of study topics, opportunities for peer collaboration, and authentic, ongoing assessments may help in avoiding insufficient challenge for high performing students while assisting students requiring more support (Cohen & Younghee, 1999).

With a recent study demonstrating only five percent of elementary teachers teaching students skills in analyzing, generating hypotheses, and critical thinking skills, it is a clear the CCSSI will require some teacher education programs to refine their practices for training teachers while current teachers may need to shift their philosophical thinking about the nature of teaching and learning (Marzano Center, 2013). The Marzano Center (2013) asserts many of the visible changes will be evidenced through how teachers design their physical classroom environment in an attempt to foster higher-order thinking skills called for by the Common Core. In alignment with the CCSSI, the National Council for Teachers of Mathematics (2013) asserts the physical environment is demonstrative of teachers’ support for constructivism through “the
forging of a social and intellectual community” (p. 6) designed to encourage collaboration, cooperation, creativity, and communication.

LaRochelle et al. (2009) recommend the implementation of constructivist practices and a physical environment aligned with principles of the theory in order to meet the needs of an increasingly diverse American society.

The roots of constructivism pull up philosophical, economic, political, and educational implications. The application of non-constructivist teaching methods, the assertion of subject knowledge standards, and the use of certain types of testing excludes and allocates who learns…the assumption of normality in education filters in favor of the middle class students who have a greater cultural capital (LaRochelle et al., 2009, p. 159).

Implementing the Common Core State Standards is intended to ensure all students experience evidence-based instruction designed to assist them in achieving success. Using the CCSS as a guide, educators can make important instructional decisions to meet the needs of students from different backgrounds, learning styles, and levels of attainment (Calkins et al., 2012; Kendall, 2011).

**The Common Core State Standards Initiative (CCSSI)**

The recently introduced Common Core State Standards Initiative (CCSSI) is a culmination of an extensive effort to fulfill the responsibility of each state to create a generation of skills and standards to ensure all students are prepared for college and a future career. The Common Core State Standards (CCSS) have been adopted by 43 of the 50 states and the District of Columbia, thus creating groundwork for developing expectations for preparing students for success in their role in the 21st century society (Kendall, 2011). The present CCSSI work builds
on the foundation of each state’s work of developing high-quality education standards. These standards draw on international education models as well as the research from numerous fields. The CCSS represent a synthesis of the best components of standards-related current work and the advancement of previous related research (Kendall, 2013).

Evidence suggests students of today need certain skills as they move toward college and the workforce. According to The Partnership for 21st Century Skills (2013), such skills include academic skills as well as cognitive and behavioral skills such as: creativity, innovation, critical thinking, problem-solving, communication, collaboration, information literacy, media literacy, communications, technology literacy, flexibility, adaptability, initiative, self-direction, social, cross-cultural skills, productivity, accountability, leadership, and responsibility. The development of such skills is supported by constructivist learning theory and its principles (DeVries, 2002). The current standards are research and evidence-based and aligned with expectations for success in a globally competitive 21st century. Further, the CCSS are intended to serve as a living work which is continually revised based on emerging evidence (Daggett & Gendron, 2010).

The Partnership for 21st Century Skills (2005) asserts in order for today’s students to be prepared for college and their future role in the workforce, they require the ability to gather, understand, evaluate, synthesize, and share information and ideas. Additionally, students should be prepared to conduct research, solve problems, answer questions, and creatively analyze an extensive range of print and non-print texts (Kendall, 2011). These skills are aligned with outcomes of constructivism and will likely aid students in meeting current knowledge and skills expectations (Duffy et al., 2012; Heller, Calderon, & Medrich, 2003). In short, students in constructivist-aligned classrooms designed to help meet the standards will likely develop skills in
all domains and become better prepared to meet future expectations as they have established a foundation of creative-thinking and purposeful knowledge through relevant and exciting learning experiences (Phillips & Wong, 2010).

As educators become increasingly more accountable for aiding students in meeting college and work readiness standards, it is valuable for teachers to examine all components of the teaching and learning process which impact student outcomes (Trilling & Fadel, 2009). Many teachers, both traditional and constructivist, cite concern and pressure in meeting expectations of the CCSSI (Partnership, 2013). Further, some may not feel able or willing to change teaching practices. It is important to address the potential impact of the CCSSI on primary teacher practices. The CCSSI now calls for more in-depth investigations of topics by students. In times past, teachers may have presented many topics with only surface information provided to students. Teachers will now be expected to cover fewer topics in more depth through student investigation (Porter, McMaken, Hwang, & Yang, 2011).

The CCSSI suggests classroom experiences which engage students in logical and passionate debates surrounding authentic, relevant topics. Communication skills have been cited by employers as a necessity in the 21st century workforce (Porter et al., 2011). Under the CCSSI, teachers will be expected to engage students in conversation, discussion, active listening, turn-taking, and clarifying questions. In the 21st century, an understanding and ability to use technology is integral (Kendall, 2011). Students and teachers are now expected to appropriately and efficiently use technology to share knowledge. Lastly, the CCSSI is intended to increase rigor and accountability for students and teachers (Kendall, 2011). The CCSS call for a transference of knowledge, evidence of learning, students engaged in risk-taking, authenticity of learning experiences, scaffolding, and differentiated instruction (Porter et al., 2011). When
observing the physical classroom environment, it would be valuable for teachers to ask themselves whether the classroom environment design encourages the development of 21st century skills (Phillips & Wong, 2010).

The CCSSI is intended to aid students in preparing for college and workforce expectations in the 21st century (Kendall, 2011). With the CCSSI explicitly citing the role of teachers in “delivering information to students through integrated instruction” (Daggett & Gendron, 2010, p. 3), it would be valuable for educators to evaluate the physical classroom environment to determine whether subject integration, social collaboration, and investigation are possible in their classroom setting. Designing a classroom environment which provides students with enjoyable, deep, thoughtful, relevant, and engaging learning experiences which broaden their worldviews will likely aid students in gaining the skills associated with the Common Core State Standards (Partnership, 2013). Further, a physical environment designed to encourage collaboration and socialization is supported by evidence suggesting such school experiences lead to essential private and responsible citizenship in a democratic society (Abbott & Fouts, 2003; Fletcher, 2005; McDermott, 1977). The physical classroom design can encourage or discourage such collaboration and socialization (DeVries, 2012; Duffy et al., 2012).

The CCSSI was developed to provide teachers with skills expectations for the 21st century and a framework of standards; however, policymakers assure the CCSS are not intended to dictate how standards are met. Those who authored the CCSSI do, however, encourage educators to engage students in 21st century skill development through project-work, small and whole group activities, and activity-based learning experiences. The CCSSI calls for students to take ownership of their learning as they think more critically about content and engage in inquiry. Today’s teachers must consider whether the physical classroom environment they have
designed provides a learning context in accordance with expectations of the CCSSI (Kendall, 2011). Teachers whose physical classroom environments are closely aligned with principles of learner-centered instruction may be better prepared to meet current learning and skills expectations (Weimer, 2013).

The CCSSI’s mission of improving American education is not a new one and it is important to keep in mind many previous reforms have aimed to improve teaching and learning and, mostly, those attempts have resulted in failure (Aud, Hussar, Kena, Bianco, Frohlich, Kemp, & Tahan, 2011; Daggett & Gendron, 2010). As opposed to past reforms of learning standards determined by individual states, the CCSSI establishes skills necessary for achieving learning standards in an attempt to ensure the quality of the nation’s education system (Daggett & Gendron, 2010). The CCSSI calls for all children to become both college and career ready. The mission is well-intentioned, but if it is to be actualized, policymakers, administrators, and educators must learn from past failures and seek to embrace pedagogy supported by human development and learning theories. Further, constructivist principles must be implemented in consideration of the increasingly complex and diverse student population as well as society’s current and future expectations (Brooks & Brooks, 1999; DeVries, 2012; Kilmer & Hofman, 1995; Richardson, 2003; Windschitl, 1999).

**Teacher Preparation Today**

As primary schools become more complex, educators seek ways to meet the diverse needs of their students. Teachers of primary children make important instructional decisions about the needs of children with varying and significant learning needs. Teachers’ decisions about instruction, assessment, and curriculum can have a long-term impact on children’s lives. It is valuable to examine teachers’ beliefs related to those decisions and practices as findings
suggest teachers’ practices are deeply associated with their beliefs (Stipek & Byler, 1997; Ravitz, Becker, & Wong, 2000; Woolley et al., 2004). Traditional and constructivist teachers are informed by vastly different beliefs and values regarding the purpose of schooling and how students learn. In today’s times, many highly politicized debates surround teacher education reform. Currently, there is a movement to further professionalize the field of teaching and teacher education through linking Common Core State Standards for K-12 and teacher preparation (King, 2011). Increasingly, improvement efforts in teacher education programs are based on principles of constructivism (Woolley et al., 2004).

Teacher preparation and professional development are vital components in terms of ensuring the CCSS expectations are achieved (McKinney, 2013). In many of today’s teacher education programs, there is an emphasis on understanding the learning process as influenced by the cultural and experiential background of diverse learners in relation to the philosophical stance embraced by educators. The philosophical beliefs of educators influence such classroom practices as the design of the physical classroom environment, planned learning experiences, the framing of the curriculum, and the social context in classrooms (Dangel, 2013). The fostering of deep understanding of constructivism, based on research of how human beings acquire knowledge, and its principles in teacher education would likely encourage teacher development to its fullest. Pre-service teachers who have a deep understanding of the implications of constructivist learning theory in relation to current learning expectations would likely be better prepared to teach to the new higher standards (SMTI, 2013).

It is important to note the value of providing pre-service teachers with deep understanding of learning theory and related principles of teaching and learning rather than to prescribe an explicit set of rules or practices exclusive of theoretical support (Richardson, 2003).
An adaptable approach, such as constructivism, is more effective than a strict set of traditional practices for each teacher to follow and implement due to the variety of learning needs for children (Richardson, 2003). Additionally, the CCSSI does not provide implications in terms of how teachers are expected to guide students toward the meeting of standards. Freedom is afforded to teachers to use their judgment and experience in formulating appropriate instruction, curriculum, physical classroom design, and assessments (Kendall, 2011).

Many of today’s educational discussions, scholarly and practitioner journals, and presentations at professional conferences are focused on constructivist information and implications for teaching and learning (Applefield et al., 2001; Jones & Brader-Araje, 2002; Lara & Whittier, 2004, NCTQ, 2013; Shapiro, 2011). Constructivist approaches are also reflected in state and local policies as well as current knowledge and skills expectations as such call for experiences which encourage social interaction and active learning (Marlowe & Page, 2005). Such efforts have been set forth by the National Commission on Teaching and America’s Future (NCTAF), the National Council for the Accreditation of Teacher Education (NCATE), and the Interstate New Teacher Assessment and Support Consortium (INTASC). The recently adopted Common Core State Standards demonstrates a nationwide attempt to develop a consistent approach to teacher education based on high standards for both teachers and students (King, 2011).

Although support for constructivism exists, some teachers may feel overwhelmed and unprepared in implementing its principles. Teacher education reform over the last decade has attempted to prepare teachers in translating constructivist learning theory into practice (Yost, Sentner, & Forlenza-Bailey, 2000). In many traditional teacher education programs, teachers are prepared primarily for the purpose of advancing student academic achievement as measured by
standardized exams rather than focusing on the integration of curriculum and the development of learning experiences aligned with students’ background experience, knowledge, and personal perspectives of the learning process (Barr, 2001; Cochran-Smith & Fries, 2001; Horm-Wingerd & Hyson, 2000). The CCSSI now expects teachers to develop appropriate assessments which include the learner, to model appropriate facilitation of skill development, to differentiate instruction, and to design a classroom environment and culture which encourages innovation and excellence (McKinney, 2013). Providing educators with practical strategies based on principles of constructivism may be the start to reforming current teacher education practices (Dangel, 2013). Engaging pre-service and practicing teachers in learning experiences which allow them to explore the role of the physical environment as well as participating in designing an environment aligned with constructivist principles may provide the groundwork for teaching and learning success (Campion, 2004).

Although both support and opposition exist for constructivism, it is valuable to examine the agenda in terms of preparing teachers with knowledge of current learning standards in view of how young children learn as well as the skills necessary to apply theoretical principles in the classroom (NAEYC, 2012). Further, exploring teacher education and professional development in regard to present and future societal needs, the social and economic future of the nation, and the role of public education in a democratic society would likely aid in developing and/or supporting a nationwide movement toward the improvement of teacher education (Horm-Wingerd & Hyson, 2000; King, 2011; LaRochelle et al., 2009). In regard to teacher preparation in light of the CCSSI, Ewing (2010) asserts:

The CCSSI should influence every part of teacher preparation programs. Teachers must have a deep and appropriate content knowledge to reach that understanding; they must be
adaptable, with enough mastery to teach students with a range of abilities; and they must have the ability to inspire at least some of their students to the highest levels of achievement (p. 2).

Today’s teachers will require intense understanding of the newly adopted CCSSI standards and skills expectations prior to designing learning experiences and a physical classroom environment for students (SMTI, 2013). In alignment with expectations of the CCSSI, the National Council on Teacher Quality (NCTQ) seeks to put forth standards which will aid new teachers in overcoming such challenges to better prepare them for successful teaching (2013). These standards include: classroom management, lesson planning, appropriate assessment of student learning, equity, student teaching, and special education experience (NCTQ, 2013). As previously mentioned, teacher preparation programs should revise and/or align curriculum and learning experiences with CCSSI expectations to ensure prospective teachers gain the pedagogical knowledge and skills necessary for developing challenging yet appropriate curriculum as well as an environment aligned with research-based learning theory (Kendall, 2011).

According to the NCTQ (2013), preparing pre-service teachers with knowledge of CCSSI standards and the skills to “establish a positive learning environment that actively engages students in productive tasks through the organization and management of time and materials” (p. 4) may be the most effective means of ensuring success for both teachers and students. It would be valuable to explore teachers’ conceptions of the teaching and learning process in order to examine how they translate knowledge of current learning expectations in view of constructivism into practice. This would aid in better preparing pre-service teachers in planning and adapting learning experiences to be aligned with principles of constructivism in an attempt to meet the
needs of all learners (Lara & Whittier, 2004, NCTQ, 2013; Shapiro, 2011). A component of this study is to explore the influence of both traditional and constructivist teacher beliefs and perceptions on the way teachers design their physical classroom environments in an attempt to meet expectations set forth by the CCSSI.

Some practicing teachers in the field may already be engaged in designing physical environments to aid students in gaining skills set forth by the CCSSI while others may require more guidance in aligning and/or transitioning (Leal & Martindale, 2013). In order to ensure understanding and appropriate alignment of practices with the CCSSI, teachers should receive on-going feedback from administration and peers as well as engage in professional development activities and personal reflection of their practices (King, 2011). NCTQ (2013) suggests providing all teachers with feedback on their classroom strategies including using self-evaluation instruments when examining the physical classroom environment to ensure effectiveness.

Considering the challenge in aligning teacher preparation expectations with the current learning standards, it would be valuable to examine the application of constructivist principles in the professional development and classroom setting (Flynn et al., 2007).

Although many may already have a classroom environmental design aligned with constructivist principles, it may be increasingly difficult to take time to engage in on-going reflection regarding personal teaching practices (Lubeck, 1998). Both traditional and constructivist educators would benefit from on-going self-evaluation of their classroom environment as well as professional development and trainings focused on applying constructivist learning theory to practice (Brooks, 1999). The understanding and embracing of constructivism, as well as the shift from traditional to more constructivist-based practices, is a process and some teachers may require training and understanding of the principles surrounding
constructivist learning theory before aligning the physical environment accordingly (Lubeck, 1998).

All educators benefit from continual reflection on practices as well as opportunities to refine skills. In Tennessee, the Tennessee Educator Acceleration Model (TEAM) is designed to provide educators with an outline of instructional excellence, a process to guide reflection, and opportunity to discuss strengths and areas for further development. Using the indicators of the TEAM rubric, educators work collaboratively to identify areas of strength within the classroom, areas of improvement, and potential options for professional development to support continued growth. One component of the model is the physical classroom environment designed to engage students in active, problem-based learning (Crosswhite et al., 2013).

Informing prospective and current teachers of constructivist learning theory and its implications may aid in arming them with the knowledge necessary to design challenging, relevant curriculum and a physical environment to meet current skills and knowledge expectations (Khalid & Azeem, 2012; MacPhail et al., 2013). As noted by Richardson (2003), without a clear sense of constructivism, it is likely novice and, oftentimes, seasoned teachers will be engaged in practices which they label as constructivist yet are not actually aligned with the theory. True constructivist teaching relies on the full understanding and commitment of the teacher. It also requires the teacher to be skilled in determining where individual children are in their development and have the knowledge necessary to establish a physical classroom environment which is conducive to learning (Brooks, 1999).

It is important to also note the value of on-going professional development for seasoned educators. According to Daggett and Gendron (2010), the states which have adopted CCSSI are taking various actions to ensure teachers master the new standards and use them to guide
instruction. Many states are developing materials for professional development for teachers regarding the new standards. Much focus of the professional development experiences being offered is on teaching educators to deliver instruction which empowers students to apply their knowledge in real-world situations (NCTQ, 2013). Daggett and Gendron (2010) note “with Common Core, students are expected to apply higher-order thinking…many teachers were not taught this way, which makes it a challenge for them to teach this way” (p. 7). With this in mind, the value of professional development training for teachers can be used to provide traditionally trained teachers with strategies, skills, and knowledge aligned with constructivist perspectives (NCTM, 2013). According to the National Council for Teachers of Mathematics (NCTM, 2015), a constructivist-aligned approach encourages children to forego the traditional rote memorization in favor of children finding their own approach to problem-solving and sharing this approach with others. The primary focus of constructivist teacher preparation programs should be to prepare reflective, student-centered teachers who will plan diverse and challenging lessons, utilize current multiple perspective teaching methods, and use a variety of teaching materials to enhance the learning environment of diverse children (Hollins, 2011; Parker, 2012; Sunal & Haas, 2002).

**Traditionalism**

In the early part of the 20th century, the dominant mode of teaching in America was centered on principles of engineering, behaviorism, and mechanism (Hopkins, 1994). Such traditional education utilizes “the purposeful manipulation of students toward predetermined ends and ignores the experience of the students themselves, viewing it as a contamination of the process” (Hopkins, 1994, p. 3). This assembly-line method of instruction grew out of the American obsession with efficiency. Traditionalists might claim the primary goal of their
method is to secure academic goals by ensuring children perform adequately on standardized exams (Carr, 1998). Traditionalists tend to value uniformity as instruction and assessment are standardized. From this perspective, teaching is viewed primarily as the process of ensuring all students are performing “at grade level” in terms of ability and mastery of the knowledge and skills of the grade (Tollefson & Osborn, 2007, p. 2).

Oftentimes in a typical traditional classroom setting, the teacher controls the physical classroom environment with minimal flexibility. A key component of traditional instruction is the use of whole group instruction and individual work (Barbash, 2012). This learning process is designed for knowledge to be transmitted from the teacher to the students as the teacher controls both the content and pace of learning. Such traditional strategies result in passive learning as the physical environment does not allow for social interaction. In such classrooms, students are not given the opportunity to actively explore concepts; however, they are expected to “draw out the correct answer given by an adult, rather than to try to construct new knowledge for themselves” (Polityka, 2001, p. 2). While some research suggests students can acquire operational understanding of content through traditional instruction, such as listening to a lecture or reading the textbook, deeper understanding may not occur if students are not given the opportunity to analyze and synthesize the information (Polityka, 2001). Traditional classroom artifacts such as the displaying of worksheets, tests, and similar products demonstrate the teacher’s value of direct instruction, standardized assessments, and order (Tollefson & Osborn, 2007).

Many traditionalists arrange students’ desks in rows in order to ensure attention is focused on the teacher or front of the room, to limit social interactions and distractions, and to ensure teachers can guide instruction individually (Barbash, 2012). In some traditional classrooms, the majority of classroom space is consumed by the arrangement of individual desks.
which does not allow for movement opportunities (Tollefson & Osborn, 2007). In traditional classrooms, there is a set schedule and all children work individually on the same task at the scheduled time. Traditional teachers tend to limit the use of materials, using them only for the completion of specific tasks. A lack of opportunity to explore with materials can be observed in traditional classrooms through minimal hands-on manipulatives, limited or no learning centers or stations, and the lack of small group seating configurations. This highlights the belief that the teacher serves to control the pace and extent of learning. Further, the presence of behavior charts and commercially produced rules indicates the teacher’s use of extrinsic motivation to assign value to educational activities for students. Such rewards include grades, class point systems, reward parties, behavior charts, etc. This approach reflects the belief in a top-down style of classroom management in which the teacher may serve as the judge of obedience, uniformity, and appropriateness and indicates the teacher’s belief that it is possible to change behaviors with consequences (Tollefson & Osborn, 2007).

Despite perceived cons associated with traditionalism, such as limited social interaction, minimal opportunities to manipulate and explore concepts, and rote memorization, research demonstrates some pros for traditional education. Schwerdt and Wupperman (2010) found students engaged in traditional lecture-style instruction to obtain higher achievement scores on standardized exams when compared to their own later performance when engaged in problem-solving alone. Researchers note one explanation for such findings is the high degree of comfort many teachers demonstrate for traditionalism and a perceived lack of understanding by teachers on how to appropriately implement and guide constructivist, problem-based learning experiences (Buomova, 2008).
While passive, independent learning may have been valuable to students of the past, research demonstrates traditional education, which focused primarily on factual recall, may not aid students in gaining 21st century skills (Buomova, 2008; Wenglinsky, 2002). Despite changes in societal expectations, some continue to use traditionalism as students are taught primarily through direct instruction rather than strategies such as discovery learning and experiential activities (Hopkins, 1994). Historically, curriculum change tends to be associated with societal evolution in an aim to develop individuals into contributing members of society. The constructivist approach offers new teaching and learning tactics as an alternative to the traditional education paradigm (Brooks, 1999).

**Constructivism**

Before considering the most appropriate means of instruction and environmental design for a diverse population of learners, one should first consider the ultimate purpose of education. According to Gredler (1997), the primary goal of education should be to “support the spontaneous research of the child” (p. 10) while others would argue the role of education is to “prepare students to function effectively in the world, and thereby, to assist society to function effectively as well” (Barzun, 1992, p. 21). It is reasonable to consider the use of constructivist practices in the education process as such an approach to support spontaneous learning while also meeting current skills and learning standards in an attempt to produce productive citizens (DeVries, 2012). This supports the goal of the CCSSI to prepare students for college and a future career (Kendall, 2011). A constructivist approach to teaching is adaptable and flexible; allowing teachers to embrace and utilize principles according to the population of students (Brooks, 1999).
Although the term *constructivism* holds varied definitions within the field of education, many constructivist principles remain consistent regardless of the viewpoint. Principles of constructivist learning theory support a physical environment which engages learners in trial and error, experimentation, interaction with peers with guidance from the teacher, and opportunities for students to build upon their own knowledge, experiences, and interests (Cohen & Younghee, 1999). Further, educators who embrace constructivist principles understand learning to be a process of continually adjusting mental models to accommodate new knowledge. In a constructivist-based classroom, new information is introduced in such a way students are motivated to see the relevance of the materials to their own life and interests. The classroom reflects both academic and social learning as demonstrated through various forms of documentation (e.g., peripherals), respect for others through effective communication, and participation by all in learning experiences (Ravitz et al., 2000).

The goal in this type of environment is to foster learners’ intrinsic motivation to become life-long learners and caring, responsible citizens (Dewey, 1897). Further, learning becomes a personal commitment and is a meaningful, self-motivated endeavor. According to constructivist learning theory, human beings learn more when they are actively engaged in the learning process as they build knowledge through investigation and discovery (Piaget, 1953). In a constructivist classroom, the teacher oftentimes serves as a mentor and guide who fosters the learning process by meeting students’ needs and interests while promoting social interaction. Learning activities are typically designed to stimulate students’ interests and inspire them to problem-solve (Rushton & Larkin, 2001). This type of learning typically leads to the development of critical thinking, communication, collaboration, and creativity; skills aligned with expectations of the CCSSI (Daggett & Gendron, 2010).
It has been suggested constructivism is not intended to serve as a pedagogy but, rather, as a model of knowing. Some educators use the constructivist learning theory to guide their development of pedagogy. Barr (2001) and DeVries (2002) suggest effective constructivist pedagogy incorporates two premises which parallel constructivist learning theory: 1) the focus of learning should be derived from student interests and; 2) learning expectations should be aligned with societal needs. Brooks and Brooks (1999) further recognize constructivist-inspired education as flexible and dependent upon authentic, on-going assessments and curriculum designed according to the evolving needs of the learners. It has been argued this type of instruction cannot occur in a prescriptive, fixed manner. Constructivist education requires a teacher who is autonomous and engaged in on-going reflective practice as an evaluative guide of teaching practices as well as the physical environment (Brooks & Brooks, 1999).

Work done in the field of psychology has revealed details of teacher actions in classrooms which were identified as constructivist by researchers. Work by Barr (2001), Brooks & Brooks (1999), Jones, Jones, & Vermette (2010), White (2001), and Wood, Nelson, and Warfield (2001), presented the upcoming representations typical of educators engaged in the process of constructivist practices. Constructivism, when embraced and implemented as pedagogy, involves the following aspects or characteristics:

1. Attention to individual learners’ backgrounds, understandings, and beliefs (i.e., student-centered approach);

2. Facilitation of group dialogue and project work intended to lead to the understanding of a focus topic;
3. Both planned and unplanned experiences to introduce formal domain knowledge through direct instruction, text references, exploration of various resources (e.g., the Internet, experts on the subject, field experiences, etc.);

4. The provision of opportunities which engage students in challenging previous beliefs and understandings; and

5. Aiding students in development of metawareness of their own learning processes.

It is important to note, however, the aforementioned elements are not intended to serve as specific practices but, rather, as a guide for those aspiring to engage in teaching practices aligned with the constructivist learning theory. Further, the representation of these elements in the physical classroom environment may emerge differently depending upon the content domain, the grade level of students, students’ prior learning experiences, teaching style, and support from school administration. Teachers who embrace constructivism are oftentimes grounded in the constructivist theory of learning with the goal of guiding individual students toward obtaining deep understanding of the presented subject matter as well as the development of the habits and skills needed for future success. As interest in constructivism continues to grow, the field of teacher education continues to explore the value of constructivist teaching practices. These programs oftentimes present teacher education students with information to guide them in establishing constructivist classroom environments (Richardson, 2003). Richardson (2003) asserts the criticality of prospective teachers being knowledgeable regarding the depth and breadth of constructivism as a theory prior to implementation.

Jean Piaget’s (1977) cognitive development theory provides implications for the value of active learning, noting learners’ actions to be a result of impulse encounters with objects within the environment and the context which provides specific significance. To Piaget (1977),
learning should be viewed as an upward spiral in which the achievement of each new level of understanding progresses the learner to a more advanced level of knowing. Constructivist theory supports providing an environment rich with experiences that drive curiosity and invite exploration which will likely enhance student engagement in the learning process (Piaget, 1953). In a constructivist classroom, students are encouraged to propose questions, test hypotheses, and model an Inquiry-based approach to learning. This type of learning is cultivated by open-ended questions, encouraging divergent thinking, and providing time and resources necessary for in-depth investigation of phenomenon of interest to students. Teachers in this type of environment take advantage of naturally occurring learning opportunities while maintaining an emphasis on the importance of meeting current learning standards (DeVries, 2002).

Constructivist educators strive to provide classroom spaces which are responsive to students’ needs and interests with the goal of engaging them in active learning to stimulate skill and knowledge development. Constructivist teachers encourage students to investigate big ideas rather than small units of information. Such educators may expose students to wholes first before providing experiences and materials to aid students in refining their understandings of the parts which make up a whole. Further, constructivist teachers engage in daily assessment in the context of classroom investigations as students demonstrate their knowledge in a variety of ways. Constructivist beliefs place a great deal of relevance on a physical environment design intended to promote activity and problem-based, social learning experiences for young children (Brooks & Brooks, 1999; DeVries, 2002; Gray, 1995; LaRochelle et al., 2009).

There is ample evidence outlining the impact of constructivist learning environments on student outcomes. A study by Johnson (2004) found children in constructivist classrooms to exhibit higher skills in classification, writing, and reading in comparison to peers in traditional
classrooms. McLaughlin and DeVoogd (2004) found children in constructivist settings scored at or above the national average in reading. Children in constructivist classrooms also demonstrated higher levels of socialization, conflict resolution skills, respect for others, motivation, and interpersonal skills (Developmental Studies Center, 1998; Tobias & Duffey, 2009). Kamii (2000) reported higher levels of problem-solving and mathematical operation skills for children engaged in constructivist classrooms when compared to peers in a classroom in which the textbook was used as the primary teaching instrument. DeVries (2012) reported less impulsive and more reciprocal strategies among children in constructivist classrooms.

Higher personal autonomy was identified among children (DeVries, Hildebrandt, & Zan, 2000) in constructivist classrooms as well as complex and divergent thinking (Tobias & Duffey, 2009).

Based on findings from previous research, one can assume there are benefits for students engaged in constructivist classrooms; however, it is important to note the degree to which constructivist principles are embraced and implemented can impact student outcomes (DeVries, 2012). The teacher’s role in a constructivist environment typically includes a great deal of time developing or preparing a physical classroom environment for students. This may also require detailed preparation to ensure students are exposed to relevant authentic tasks. Further, environmental design can also include situated learning experiences and materials that match each student’s background knowledge, zone of proximal development, and interests (Oliver, 2000). It would be valuable to examine teacher practices and a physical environment aligned with constructivist principles as many of the positive outcomes for students are associated with skill and knowledge expectations such as collaboration, cooperation, problem-solving, inquiry, creativity, flexibility, and productivity set forth by the CCSSI (Markham, 2012).
Although both experienced and novice teachers acknowledge a need for differentiated learning spaces, research to guide the process of customizing one’s physical classroom environment is limited (Dangel, Guyton, & McIntyre, 2004). Wilson (1996) defined a constructivist learning environment as “a place where learners may work together and support each other as they use a variety of tools and information resources in the guided pursuit of learning goals and problem-solving activities” (p. 5). Indeed, in the 21st century classroom, spaces for technology, projects, and group work are necessary for meeting expected learning behaviors and skills projected by the CCSSI (Partnership, 2013). With neuroscience coinciding with Piaget’s constructivist learning theory (Epstein, 2001), today’s classroom environments should be designed to accommodate a variety of learning experiences which encourage problem-solving, collaboration, technology use, investigation, and creativity (Caine & Caine, 1994).

Others have asserted a constructivist environment to be a “culture or set of beliefs, norms, and practices that constitute the fabric of school life” (Windschitl, 1999, p. 752). This type of setting is rich with interactions, relationships, and experiences; all components supported by constructivist theory. DeVries (2002) asserts the implementation of constructivism exceeds activities, materials, and classroom organization but, rather, is a “network of interpersonal relations that make up a child’s experience at school” (p. 22). Despite the interplay and overlap surrounding the term constructivism, the underlying goal of constructivist-based education is to provide a physical space which encompasses peer interaction, responsibility, active experimentation, cooperation, teacher facilitation, and moral values (Dangel et al., 2004). Each of these outcomes is aligned with skills expectations set forth by the CCSSI (Kendall, 2011).

Constructivist theory offers educators an alternative to the traditional teaching practices; however, translating constructivist theory into practice may be difficult due to the open
translation of the theory, the complexity of individual classrooms and students, and that no single agreement exists for the identification of constructivism (LaRochelle et al., 2009). As support for constructivist teaching increases, there are also greater demands for teacher educators to raise standards as they become more accountable for the quality of the graduates they produce (Brooks & Brooks, 1999; LaRochelle et al., 2009; Richardson, 2003). Many of today’s early childhood graduate programs are guided by principles of constructivist theory, suggesting knowledge resides in learners who require social activity, reflection, and inquiry (Woolley et al., 2004). Evidence suggesting positive outcomes for constructivist education provides support for engaging pre-service teachers in experiences which enrich their understanding of the constructivist learning theory and the associated principles and practices in order to meet today’s high standards for both teachers and students (Cochran-Smith & Fries, 2001).

Theoretical Support of Physical Classroom Environment’s Role in Teaching & Learning

Understanding teacher beliefs and practices in relation to the role of the physical environment provides a source of information for the improvement of American education (Ravitz et al., 2000; Woolley et al., 2004). While direct observation techniques provide some perspective into how teachers view the role of the physical environment and their use of its components, teachers’ actual perceptions provide a raw and rich measure of the underlying meaning why the physical environment is designed and used in such a way. How educators perceive their classroom spaces, what they do with the space and materials, and how such practices contribute to effective teaching and learning requires further examination (Snow, 2002). It is important to note although teachers and students may function sufficiently in a physical environment with minimally satisfactory conditions (e.g., poor lighting, colors,
furniture, etc.), these conditions require further examination and potentially transformation in order to reduce time and energy demands of teachers (Snow, 2002).

As evidenced through environmental psychology and education research, support exists for a physical classroom design aligned with constructivist principles (Dangel et al., 2004; Ravitz et al., 2000; Woolley et al., 2004). Constructivist beliefs place a great deal of relevance on activity-based, social learning experiences for young children and provide implications for classroom elements which allow for such experiences (Vygotsky, 1978). Today’s learners require diverse viewpoints and opportunities to share their own knowledge and personal experiences (Partnership, 2013). Students of the 21st century also need experiences in order to prepare them for their future role as collaborative, innovative thinkers. Learning approaches and developmental theories specifically related to the role of the physical environment in the teaching and learning process have been outlined by early childhood theorists. The CCSSI calls for research-based teaching practices aligned with what is known today about human development and learning (Kendall, 2011). Research suggests a well-planned environment rich with active, social learning experiences aligned with human knowledge acquisition holds the potential to increase the likelihood of engagement and, thus, achievement (Abbott & Fouts, 2003; Caine & Caine, 1994; Calkins et al., 2012; Diamond, 2006; Kendall, 2011; Krapp, 2005; Victorian Institute, 2012).

In an attempt to meet both past expectations and the newly adopted CCSSI, researchers and educational policymakers have sought to identify the physical and psychological aspects of classrooms which are linked to positive student outcomes (Doll et al., 2010). Much interest was sparked primarily through the constructivist notion and evidence suggesting student engagement and habits of mind can be attributed, at least in part, to the physical aspects of the learning
environment (Doll et al., 2010). A likely explanation for this outcome is the physical classroom characteristics which promote students’ active participation and engagement in learning, which, in turn, strengthens students’ skill development and overall academic achievement (Doll et al., 2010). The strategic use of environmental elements aligned with constructivist principles and skillful classroom design holds the potential to positively impact student outcomes associated with 21st century skill development (Moylan, 2008).

**Developmentally appropriate practice.** Developmentally appropriate practice (DAP) encompasses a set of beliefs and practices which have been identified by experts within the field of early childhood as “best practices” for the teaching of young children (Copple & Bredekamp, 2009; NAEYC, 2012). The National Association for the Education of Young Children (NAEYC, 2012) asserts the goal of DAP is to encourage teachers of young children to make choices based on what is known about how young children learn and develop, taking into account the individual needs and differences of each child in light of the social and cultural context. Copple and Bredekamp (2009) assert teachers should be provided the freedom in educational decision-making based on what is developmentally, individually, and culturally appropriate for young children. Teachers who implement DAP strive to “meet learners where they are” taking into consideration the developmental levels of the whole child (i.e., physically, emotionally, socially, and cognitively). More succinctly, Copple and Bredekamp (2009) state: “Developmentally appropriate practice refers to teaching decisions that vary with and adapt to the age, experience, interests, and abilities of individual children within a given age range” (p. 7). Additionally, there are five integral tenets in which teachers must engage in order to enact the principles set forth by DAP.
Copple & Bredekamp (2009, p. 16-23) outline such tenets as follows:

1. Creating a caring community of learners
2. Teaching to enhance development and learning
3. Planning appropriate curriculum
4. Assessing children’s development and learning
5. Developing reciprocal relationships with families

The physical classroom environment is also addressed by DAP. According to Copple and Bredekamp (2009), developmentally appropriate teaching occurs in a variety of formats. DAP should be inserted into every aspect of the environment from the daily procedures and the physical classroom environment, to the experiences which occur. Copple and Bredekamp (2009) outline four learning formats in which teachers can engage students a variety of teaching strategies; these formats include (pg. 19):

1. Large group areas
2. Small group areas
3. Learning centers
4. Daily routines

Jean Piaget. In the 1930s, Jean Piaget proposed a then radical theory suggesting a learner could not be separated from the environment in the development of logical thought processes (Von Glasersfeld, 1995). Piaget asserted human intelligence develops the cognitive structures needed to adapt to one’s environment and that such constructions occur through the on-going process of manipulating real objects and reorganizing understanding based on such interactions. Piaget’s theory of cognitive development serves as the basis for the constructivist philosophy of teaching and learning. Piaget’s theory of knowledge construction asserts an
organism is the interpreter and organizer of the information received through experiences with the objects and individuals within the environment. Such experiences include objects and events, social interactions with others, and experiences with oneself (Von Glaserfeld, 1995).

Constructing one’s knowledge requires relating new information with previous understanding and continually building one’s repertoire of experiences through assimilation and accommodation. To assimilate new information means to add the knowledge to a previously known concept. Accommodation refers to the process of adapting old knowledge to fit new understanding. Assimilation and accommodation advance one’s understanding of the world while simultaneously enhancing overall competency (Piaget, 1953). According to Piaget (1977), innate curiosity and a biological drive to learn cultivates a continual process of assimilation and accommodation, which eventually results in equilibrium in which the learner has achieved an equal balance between cognitive knowledge and environmental interactions. Through careful, in-depth observations of children in a natural learning environment, Piaget determined activity-based, hands-on experiences are the basis of appropriate development and effective learning. Principles of constructivism support educators in creating a well-planned physical classroom environment which promotes and encourages exploration through activity-based curriculum (Piaget, 1953).

**Lev Vygotsky.** Much like Piaget, Lev Vygostky (1978) examined the value of challenge and readiness in terms of human knowledge acquisition; however, Vygotsky focused his research on how knowledge is constructed through interactions with others within the cultural context. Vygotsky’s social development theory, which focuses on the role of social interactions in the learning process, is a founding principle of constructivism. Vygotsky’s theory suggests cognitive development depends upon quality interactions with both other individuals and the
environment. Learning involves discovery and interaction between children and the people and objects they encounter each day. According to Vygotsky, children learn to construct essential meanings of symbols and signs through social interaction with more knowledgeable others within their cultural context and then associate symbols with language to shape a personal reality. Based on this premise, social learning in the classroom setting can be viewed as a reciprocal process between students, teachers, and peers (Vygotsky, 1978).

Vygotsky (1978) coined the term *zone of proximal development* (ZPD) to refer to the distance between what a child is capable of doing both independently and with assistance. Oftentimes, learning occurs within the ZPD as students collaborate with peers and/or the teacher. The provision of social experiences allows and encourages higher-order thinking skills aligned with the CCSSI (Kendall, 2011). Vygotsky’s learning theory supports the value of creating a democratic learning community within the classroom through the establishment of a sense of safety and security, collaborative experiences, the sharing of ideas, and group project work (Feldman, 2003). Social interaction and learning can be encouraged and supported by the physical classroom design (Carter, 2008).

**John Dewey.** John Dewey’s goal for education was to promote progress and uplift society by appropriately and effectively educating individuals. Dewey (1897) viewed learning as an active process. He asserted children should come to school to participate and live in a classroom community which gave them authentic, guided experiences which would ultimately enhance their ability to contribute to society. Dewey proposed students should be involved in real-life situations relative to their own lives. He viewed the responsibility of the teacher as a guide serving to create and promote a sense of classroom community, to develop higher-order thinking skills in students, and to develop curriculum which addresses the learning needs and
interests of children. In Dewey’s progressive setting, opportunities for quality interaction between students encouraged the development of interpersonal skills as children collaborated, inquired, cooperated, and interacted while hands-on learning encouraged problem-solving (Dewey, 1897).

According to Dewey (1897), the most meaningful learning takes place when students are motivated and interested in the content. An effective educator should assist students in finding connections in the classroom curriculum with their own lives and interests and plan learning experiences accordingly. Children should also be encouraged to share personal experiences, ideas, and beliefs in the classroom. This provides the students with an opportunity to communicate personal learning processes and ideas, which often leads to a collaborative learning effort. When children work together and learn from each other, they begin to respect each other’s differences and to value diversity (Dewey, 1897). Principles of Dewey’s philosophy remain relevant in today’s times and can serve as a guide when designing a physical classroom environment to support a democratic classroom.

**Howard Gardner.** According to Howard Gardner (1999), there are nine intelligences in which children may be particularly gifted or possess exceptional ability. Gardner posits (1999) each child has his/her own unique intelligence and “where individuals differ is in the strength of these intelligences and in the ways in which such intelligences are invoked and combined to carry out different tasks, solve diverse problems, and progress in various domains” (p. 12); therefore, teachers should design a classroom environment equipped with the materials and instruction to best accommodate each child’s intelligence and learning style. A classroom equipped with audio, visual, technological and hands-on materials encourages learning by students with a variety of intelligences and learning styles. During lessons when concepts are
best introduced through direct instruction, teachers should strive to incorporate many techniques for meeting the diverse needs of the learners (Morrison, 2004).

**Maria Montessori.** An early childhood theorist, Maria Montessori (1912), proposed the value of space and appropriate materials and furnishings in the teaching and learning process. She proposed spatial order to be a basic human need and designed experiences for children to engage in mental structuring and reordering. Montessori (1912) viewed play as children’s work. According to Montessori, the role of a teacher is to prepare the environment for learning, to act as a guide who directs student learning toward expected goals and learning outcomes, and to observe students in order to adapt the environment and curriculum. A well-prepared environment rich with materials which can easily be manipulated by the students is crucial in the learning process (Montessori, 1912). To Montessori, child-sized furniture, open-shelves, and high-quality materials are fundamental elements of the early childhood classroom. Educators should also recognize the importance of modeling appropriate use of materials, allowing students to make personal choices, and providing adequate time and space for exploration and use of materials (Wolf, 2002).

According to Montessori (1912), children should be given the freedom to explore the classroom environment and follow personal learning interests. In order for this to occur, children should have a variety of developmentally appropriate, self-correcting learning materials readily available and accessible to them which will promote, support, invite, and enhance learning. The daily schedule should also be constructed to allow adequate time for children to choose and become fully engaged in hands-on activities, permitting children to control both the style and pace of their learning. When children are involved in self-directed learning and focus on a particular topic of study, the responsibility of the teacher is to provide materials which extend
children’s thought process, aiding them in gaining further understanding of the concept. The teacher should also provide materials which will promote the integration of curriculum (Wolf, 2002).

**The Reggio Emilia Approach.** Complementing Montessori’s philosophy, the ideas and practices articulated by the Reggio Emilia Approach set forth the physical classroom as the “third teacher” (Cadwell, 2002, p. 5). According to this view, the classroom environment is not only a space for learning, but a space for living in which students, teachers, families, and community members collaborate in the learning process (Malaguzzi, 1993). Elements of the Reggio Emilia Approach include aesthetically pleasing displays of materials, furniture arrangement which encourages social learning, lighting designed to focus attention on learning opportunities and school, community, and familial collaboration. The approach asserts the space and environmental elements of a classroom should be used as a means of communicating to students a message from the teacher of what is expected in that environment. Children in Reggio Emilia are given the opportunity to express their knowledge and ideas in several forms of symbolic representation or languages (e.g., painting, drawing, sculpting, dramatic play, etc.). The importance of the physical environment is based on the belief children acquire meaning of the world around them through complex and varied experiences with the materials and people within the environment (Strong-Wilson & Ellis, 2007).

**Physical Classroom Environment Design in Relation to Teaching & Learning**

The physical classroom environment design reflects both behavior and learning expectations. Gredler (1997) suggests designing a physical classroom environment based not upon a particular teaching and learning style or theory, but rather in response to and in accordance with individual teacher and student needs. The CCSSI is supportive of research
aligned with best practices to increase students’ likelihood of attaining skills aligned with
children’s learning processes (NEA, 2013). The tremendous diversity among both teachers and
students warrants special consideration in ensuring appropriate CCSSI implementation,
progressive assessment methods, and a physical environment aligned with the needs of teachers
and learners (NAEYC, 2012). Close examination of research associated with effective
environmental components aligned with basic human needs and psychology would likely yield
the most positive outcomes for students and teachers (Akey, 2006; Buckley et al., 2004; Jensen,
2007).

**Traditional.** The traditional physical classroom design has several discernible
characteristics reflective of instructional practices aligned with needs of an early American
industrial society. Such classrooms are typically whole group and teacher-directed with content
taught in isolation with little connection between topics (Brooks, 1999). A traditional classroom
would appear to be the most efficient; one teacher lecturing 25 students using approved
curriculum and testing it at different stages to ensure high quality. While traditional instruction
may be most cost efficient, unfortunately, student performance indicates this factory-like
approach is lacking in effectiveness for meeting today’s learning expectations (Heckman &
LaFontaine, 2010; Prince, 2004).

In traditional classrooms, information is oftentimes introduced through lectures, whole
group direct instruction, rote memorization, and teacher-led activities (Hung, Tan, & Koh, 2006).
The classroom seating configuration offers observable evidence of traditional beliefs and
practices (e.g., rows of desks spaced to ensure limited to no social interaction). This arrangement
indicates that the teacher controls learning and limits movement throughout the day. Students
are typically motivated to stay on-task through extrinsic motivators (e.g., gold stars, prizes, etc.)
which are evidenced through behavior charts and commercially produced rules. The individual differences and needs of each child may go unnoticed as the same content is taught in a prescriptive manner to whole groups of students (Hung et al., 2006).

The traditional belief is that each student must develop knowledge and skills associated with the standards of the time. In this setting, students are expected to blindly accept the information they are given without questioning the teacher (Stofflett, 1999). A traditional teacher seeks to transfer knowledge to students through direct instruction without engaging students in questioning, independent thought, or social interaction. This teacher-centered method of teaching also assumes all students have the same level of background knowledge and are able to absorb the material at the same pace (Barbash, 2012). In today’s increasingly diverse society, one must examine the motives of a physical environment design based on principles of traditionalism and seek guidance from theory linked to current learning expectations (Stofflett, 1999).

In traditional classrooms, the central premise of education is the accumulation of knowledge through content taught in isolation. In order to accomplish this progression, traditional teachers tend to use paper-based tasks and memorization (Lord, 1999). Evidence of traditional instruction can be observed through the presence of an overabundance of textbooks, workbooks, and commercially produced worksheets (Lopata, Wallace, & Finn, 2005). Further, peripherals in traditional classrooms often focus on the end product which consists primarily of worksheets (Evanshen & Faulk, 2011). Teachers in this type of classroom generally utilize standardized testing practices in order to assess knowledge and are less likely to use on-going assessment to drive instruction as evidenced through standardized assessment measures (Hung et al., 2006).
Mastropeiri et al., (2006) found many traditional teachers to be in support of their practices based on the allocation of resources such as time and materials. These teachers favored a traditional physical environment because paper-based learning and assessments do not require buying classroom materials. Further, traditional teachers stated support for their practices because “it [constructivism] is not feasible with increased pressure to cover sufficient content for end of year high-stakes tests” (Mastropeiri et al., 2006, p. 135).

One may ask how the CCSSI will impact the physical classroom environment of those engaged in traditional teaching practices. When analyzing expectations of the CCSSI, considering an environmental design which supports 21st century skill development is valuable. With the CCSSI calling for an understanding of how young children learn and adapting teaching and the environment accordingly, it is valuable to reflect upon the physical classroom environment and learning objectives of traditional teaching practices (Marzano Center, 2012). Previous research asserts the value of a physical classroom environment aligned with what is known about human psychology and knowledge acquisition. Traditional methods of teaching strive to “pour knowledge” (Karp & Bay-Williams, 2012, p. 2) into the learner while theory of child development assert learners must be given the opportunity to actively think and interact with concepts in order to develop understanding (Karp & Bay-Williams, 2012; Van de Walle, 2012). Given the body of research in support of active learning, it is not surprising the CCSSI insists on quality instructional materials, social learning experiences, and a physical environment conducive to learning. Teachers who continue to implement traditional practices may require modifications to both instruction and the physical classroom environment design in order to engage students in the development of 21st century skills (Van de Walle et al., 2012).
Constructivist. Constructivist-inspired physical learning environments may become increasingly more prevalent in the U.S. as teacher preparation programs provide pre-service teachers with knowledge of principles and practices based on constructivist learning theory (Dangel, 2013). With this in mind, it is valuable to review aspects of the physical classroom environment related to constructivism as well as components aligned with more traditional beliefs and practices. According to Gray (1995), a constructivist classroom environment is one which consists of learner-driven instruction in which the teacher provides the experiences and appropriate context for learning. Constructivist teachers strive to encourage inquiry by asking thoughtful, open-ended questions while encouraging social collaboration among students. Learning experiences are designed to challenge students to delve beyond surface information to form deeper understanding (Sprague & Dede, 1999).

A constructivist-inspired environment is designed to encourage collaboration, prediction, hypothesizing, manipulation of objects, asking questions, researching, investigating, and inventing (Dangel, 2013); all principles consistent with the evidenced-based practices which are the foundation of the CCSSI reform (Kendall, 2011). In this setting, the teacher’s role is to create the context for such experiences as evidenced through physical indicators such as seating configurations, displays, overall classroom layout, etc. (Gray, 1995). Current research asserts an environment based on constructivist teaching practices should provide meaningful, activity-based experiences for all learners (Brumbaugh, 2008; Cadwell, 2002; Carter, 2008; Cunningham, 2006; Dangel, 2013; Jones & Brader-Araje, 2002; Hausfather, 2001).

Research has found personal experience to be the most effective way to learn (Jones & Brader-Araje, 2002; Schwartz, Lindgren, & Lewis., 2009; Piaget, 1953). Allowing children the opportunity to engage in activity and problem-based learning experiences in a well-planned
environment rich with manipulatives will provide opportunities for optimal development in all domains. Experiences with a diverse population of individuals allow children to gain knowledge and respect of other cultures. Indoor and outdoor experiences are also critical to the learning process. Children must be allowed to explore the world in which they live in order to gain knowledge and understanding of various concepts (Brumbaugh, 2008).

One important element of a constructivist classroom environment is the utilization of brain-compatible research related to education. Brain-compatible teaching strategies are designed with a basis in neuroscience or, in layman’s terms, what is known about the human brain and nervous system (Epstein, 2001). Brain-compatible teaching is founded on principles based on current understanding of the brain and how it works in relation to knowledge acquisition. For example, educators who implement brain-compatible components must additionally create an environment which is free of threat and stress because research suggests that a positive classroom environment is more conducive to learning (Belvel, 2009; Erlauer, 2003). Some brain-compatible strategies for creating a calm and positive classroom environment include stretching exercises, recess, and movement opportunities (Jensen, 2007). The spatial structure and overall physical classroom design can support brain-compatible strategies through the provision of space and materials to encourage kinesthetics within the classroom (Bos & Vaughn, 2002).

Activity and problem-based learning experiences promote lifelong learning in constructivist environments (Terwell, 1999). Providing ample time for both structured and reflective exploration and hands-on experiences allows optimal learning to occur. Social movement activities provide lessons in turn-taking, development of social skills, and creativity which are not usually provided by traditional classroom activities. The careful selection of
materials and activities promotes and enhances meaningful learning for young children. (Brumbaugh, 2008). The strategic placement of well-organized materials is a powerful tool to set the stage for both independent and cooperative learning to occur as students can manage personal learning behaviors as they investigate a variety of concepts using manipulatives (Bos & Vaughn, 2002).

A key element of an effective learning environment is the provision of an enriched environment. An enriched environment is designed to make students feel welcome and ready for learning (Dyck, 2002; Jensen, 2007). This type of environment encourages learning through the provision of appropriate and meaningful materials and allows for adequate time for students to become engaged in learning. A flexible classroom design and schedule contributes positively to the learning process. Seating choices and various work spaces accommodates a variety of learning styles and intelligences (Jensen, 2007; Olds, 2001). Movement opportunities throughout the day keep the body and mind alert and ready for learning (Evanshen, 2010, Weinstein, 1979). Providing an enriched physical classroom environment linked to developmental theory of how humans acquire knowledge would likely yield positive outcomes for all students (Berris & Miller, 2011; Dorman, 2002; Earthman & Lemasters, 1996).

**Physical Environment Research**

The classroom environment has been a focus of research interest throughout history and is now, more than ever, acknowledged as a critical “partner” in a child’s cognitive, social, and physical development (Berris & Miller, 2011, p. 102). Physical learning environments research has become a well-established and recognized means of assessing and investigating the education process. Physical environments have been found to influence student outcomes while playing an important role in improving the effectiveness of both teaching and learning (Martin,
Learning environments research is rooted in the works of early social psychologists with the earliest American interest beginning in the early part of the 20th century. This early research focused on the psychological and physical needs of learners. Findings demonstrate the individual psychological and physical needs of both students and teachers must be met before optimal learning can occur (Chavez, 1984). Classroom environment research was advanced to include the assessment of the role of psychosocial and physical components in the mid-century as tools were developed to evaluate learning in various classroom settings. Classroom environment research has rapidly advanced with the development of validated instruments (e.g., the CLASS) and research associated with quality learning environments and positive student and teacher outcomes (Dorman, 2002; Pianta, La Paro, & Hamre, 2008). Findings demonstrate a typical environment of young children, such as a school setting, is central to defining the character and skill development of learners. It is reasonable to assert without consideration of the crucial role of the physical environment of classrooms, educational productivity cannot be optimized (Martin, 2006).

As indicated through previous research, empirical evidence suggests a relationship between specific environmental elements (e.g., space, furniture, seating arrangement, light, color, peripherals, acoustics, temperature, and living plants) and human behavior, such as engagement, achievement levels, and overall development (Taylor, 2008; Veitch & Arkkelin, 1995; Voelkl, 1995). Educators would likely benefit from the consideration of these elements in the transformation of existing classrooms as well as in the design of new learning spaces. Khalid & Azeem (2012) assert 21st century learners require flexible physical learning spaces which allow for projects, problem-solving, and teamwork; instructional strategies aligned with knowledge acquisition of the human brain as well as societal needs.
The design of the physical learning space signals to students the teacher’s view of learning. According to Kotler, (2001), humans are active in perceiving their environment. Students in a classroom use their senses to both consciously and unconsciously evaluate both the affective climate of a space as well as the physical cues. In the classroom, many sensory experiences are presented which can oftentimes be controlled by the designer of the environment in order to improve the quality and magnitude of learning. Stimuli such as lighting, sound, colors, furniture, etc. all send messages to learners as to what is considered acceptable and expected behavior as well as the types of learning experiences which will occur in the classroom (Kotler, 2001). According to Campion (2004), human functioning can be heightened or impeded by the physical environment design. Design which is considered ideal poses minimal discomfort and maximum functioning. The extent to which children participate in learning depends largely upon how well certain measureable aspects of the physical environment meet the physical needs, attitude, and interest requirement of individuals (Campion, 2004; Veitch & Arkkelin, 1995).

Teachers can design an environment aligned with expectations of the CCSSI while also encouraging student engagement in the learning process (Jones et al., 2010). The Partnership for 21st Century Skills (2013) calls for physical classroom environments which support the teaching and learning of 21st century skills outcomes. These settings should include collaborative learning configurations, individual learning spaces, projects, quality research tools and materials, and technology. This type of environment is supported by Copple and Bredekamp (2009) who suggest quality environments and authentic, integrated experiences can lead to higher engagement levels and the development of long-term knowledge acquisition and skills. Such an interdisciplinary approach to instruction is presented by the CCSSI with a focus on both content knowledge and the application of skills across subjects (Kendall, 2011). A constructivist-based
The classroom environment can support educators in offering a variety of opportunities for the engagement of all learners (Diamond, 2006; Larochelle et al., 2009; Martin, 2006). If used appropriately, the classroom environment can be viewed as a tool to support teaching and learning in light of the CCSSI (Kendall, 2011). Research outlining the impact of the physical classroom arrangement, grouping strategies, and available materials provides support for the positive impact of the environment in the teaching and learning process (Caine & Caine, 1994; Doll et al., 2010; Hunkins, 1994).

Humans perceive their environment through sensory receptors. The interactive effects of the physical environment have been found to significantly enhance or impede the learning process (Dyck, 2002; Klem & Connell, 2004; Rushton & Larkin, 2001; Taylor, 2008). It has been asserted children’s interests exist primarily for “the purpose of meeting developmental needs” (Dyck, 2002). With this thought in mind, teachers should examine each student in regard to physical, cognitive, emotional, and social needs in relation to individual interests and strive to design an environment and experiences which are best suited for him/her (Campion, 2004).

Several physical classroom components have previously been examined in regard to student outcomes. Dyck (2001) reviewed findings associated with classroom layout, lighting, color, temperature, and noise levels and found these elements to be the critical physical classroom components associated with teaching and learning. The interplay between and among these factors is dynamic as color can increase blood pressure, thus enhancing the overall noise level in the room while the shape of the room can impact one’s perception of personal space leading to feelings of crowding. Crowding frustration can adversely impact the social-emotional climate as well as acoustics in a room. Due to the interconnection among physical environment
components, a quality classroom design is instrumental in supporting student success as one off-balanced dimension can adversely impact other dimensions.

The Primary Educator’s Environment Rating Scale (PEERS) is a new reliable and valid tool designed to assess the physical environment in elementary school settings on a continuum of traditional and constructivist practices and measure the components of the physical environment which are related to developmentally appropriate practices. The PEERS can guide professional development by improving teachers’ understandings of the design and use of the physical classroom environment as a teaching and learning tool (Evanshen & Faulk, under review).

**Spatial environment.** In terms of spatial environment, it is widely accepted the optimal learning environment allows room for movement, smooth transitions, rearrangement and mobility of furniture, and areas for both large and small group activities (Taylor, 2008). Appropriate space allows for a variety of teaching methods to occur; however, it is important to note the value of matching teaching pedagogy with the space of the environment (i.e., a relationship has not been identified between spatial appropriateness alone and student behavior and/or achievement). Well-defined learning spaces have been linked to more exploratory behaviors, social interaction, and cooperation (Taylor, 2008). Taylor (2008) posited, “Just as different learning goals require different teaching strategies, different instructional strategies require different learning spaces” (p. 134).

Instructional practices aligned with a more traditional approach to teaching and learning are typically reflected in a classroom which includes rows of desks, teacher lectures, and passive learning by students. Early childhood researchers who have examined learning environments assert the constructivist pedagogy and classroom design aligned with constructivist principles holds benefits for both students and teachers (Roderick & Engle, 2001; Willingham, Pollack, &
The PEERS assesses the spatial environment design including: flexible work spaces, adaptable materials, furniture which allows flow and access to all areas of the room, designated large group space, and multiple seating options (Evanshen & Faulk, under review). Such spaces are aligned with skills expectations of the CCSSI which encourage collaborative, cooperative, inquiry-based, student-centered learning (Kendall, 2011).

**Aesthetic environment.** According to Taylor (2008), the visual classroom environment holds the potential to impact student outcomes. The overall aesthetic environment consists of the lighting, color, peripherals, and organization. These components in particular have been associated with psychological effects on children in the classroom. Findings by Maslow and Mintz (1956) indicated significant differences in relation to overall room quality when identified by students and teachers as “ugly,” “neutral,” and “beautiful” (p. 247) and student and teacher emotional responses and perceptions. Chan (1988) found aesthetics in school facilities to be directly related to student learning as student achievement was higher in newer, quality school buildings when compared to older, low-quality buildings. The PEERS assesses these dimensions through the examination of student work displays, the inclusion of living plants, home-like elements, photos of children and families, and visually appealing agendas (Evanshen & Faulk, under review). These elements strategically engage children in the learning process and support continuous, reflective learning. Successful implementation of the CCSS will require thoughtful, well-planned environments which encourage student engagement and performance through active learning geared toward student interests and learning standards (Calkins et al., 2012).

**Lighting.** The general consensus from researchers who have explored the effects of lighting is lighting can impact human behaviors and overall performance. Positive psychological and behavioral effects have been linked to full spectrum and natural lighting in comparison to
primarily fluorescent lighting (Dunn, Krimsky, Murray, & Quinn, 1985; Fenton & Penney, 1985; Olds, 2001). Inappropriate lighting was found by Winterbottom and Wilkins (2009) to include fluorescent lighting which caused headaches and impaired visual performance among some study participants. Findings by Buckley et al. (2002) further asserted varied (e.g., overhead fluorescent, natural, etc.) lighting to be associated with improved academic performance, reduced off-task behaviors, and higher achievement. Direct illumination of fluorescent lighting was associated with eye fatigue as students’ eye muscles continually attempted to adjust. Eye fatigue was also associated with lower student performance and poor retention (Sleeman & Rockwell, 1981).

Sleeman & Rockwell (1981) asserted the amount and quality of light necessary is dependent upon the type of task expected for students to perform. With this in mind, teachers can use lamps, natural light, overhead light, etc. to focus students’ attention to various areas of the room. In terms of lighting, it is important for educators to explore options and take into account the value and goals of lighting as an environmental feature. The PEERS examines the use of natural and/or full spectrum tubes as the primary source of light as well as the use of lighting to define learning spaces (Evanshen & Faulk, under review). The CCSSI calls for classroom environments which include defined learning spaces focused for small group work (Marzano Center, 2013). Lighting can be used to focus students’ attention to small group areas as well as work materials (Sleeman & Rockwell, 1981).

**Color.** In addition to lighting, a classroom’s use of color should also be considered when designing the optimal learning environment. Myerburg (2002, p. 11) suggests, “color is not decoration; it is a teaching tool, an alphabet of light.” The psychological effect of color was explored by Burruss (2001) who found color holds the potential to alter mood, judgment, and
behavior, thus validating the importance of considering the impact of colors within the classroom. Sleeman & Rockwell (1981) suggested the colors used within a space hold a variety of subliminal behavioral implications for learners. Warm colors such as reds, oranges, and yellows were found to promote action-oriented activity while cool colors such as greens and blues were associated with quiet, calm learning activities. Plack & Shick (1974) found warm colors to increase the blood pressure and muscular activity while cool colors had the opposite effect. Educators should consider evaluating the classroom space to determine the types of learning they intend to take place and align color choices accordingly (Sleeman & Rockwell, 1981).

Using a neutral background on walls provides a subdued backdrop for displaying students’ work while pops of color can be used to draw attention to various areas of the room or to certain materials. The CCSSI calls for reflective teaching and learning (Kendall, 2011). When color in the classroom is derived from student’s work, it draws attention from both learners in the classroom as well as teachers and guests, providing an opportunity for students to engage in discussion regarding their work and the learning process (Faulk & Evanshen, 2013). The PEERS assesses the use of neutral colors on walls and shelves as a calming backdrop for students’ work, materials, and class projects. Such displays should be used to provide meaningful color to the classroom (Evanshen & Faulk, under review).

**Peripherals.** Another valuable classroom element which aids in the promotion of reflective as well as collaborative teaching and learning is peripherals. Peripherals include documentation of the learning process (e.g., documentation panels, photos, student work samples, projects, etc.). It is not uncommon for classroom peripherals to be comprised primarily of teacher-created or commercially generated displays. While the teacher’s
intention is likely to create an engaging classroom by filling it with color and liveliness, the effect on primary students is often the opposite, making them feel overstimulated and inconsequential. On the other hand, classroom peripherals consisting primarily of the work of children sends a stronger message to students; their work and their learning, rather than the work of the teacher or the work of unknown commercial artists, are most important in this classroom (Clayton & Forton, 2001).

Effective classroom peripherals can serve as a powerful tool for teaching and learning. They can generate enthusiasm for the curriculum, increase children’s investment in learning, assist learners in appreciating their own work as well as the work of peers, and promote a strong sense of individual and group ownership of the classroom. Peripherals communicate to learners their work is valued while demonstrating to classroom visitors the types of learning which occur in the classroom and the knowledge gained. Peripherals which are child-centered document children engaged in on-going learning and allow for reflection on the learning process (Clayton & Forton, 2001). Such displays encourage conversations and reflection on the learning process. The CCSSI calls for “materials and experiences which draw students into discussions” (Daggett & Gendron, 2010, p. 9).

Tomlinson (2003) suggests the value of displaying children’s work as an opportunity for students to reflect on their work and share the learning process with others. Relevant peripherals recognize effort rather than focusing on perfection and encourage children to understand learning as a process of growth, not just a process of mastery. Student work displays can also affirm children’s increasing sense of competency. Peripherals were found to have psychological effects on children who participated in a study by Maxwell and Chmielewski (2008) who found students to have increased self-esteem in
classrooms where personal work was displayed. In observed classrooms, students work displays provided an opportunity to learn from each other and to appreciate the work of others, nurturing empathy, respect, and a strong sense of classroom community (Maxwell & Chmielewski, 2008). The PEERS assesses the use of appropriate peripherals to assess, plan, evaluate, and extend the learning in order to ensure engagement and successful progression for all learners (Evanshen & Faulk, under review). The CCSSI supports the role of student work displays which encourage the reflection process, on-going investigations, collaboration, and social learning experiences (Kendall, 2011).

**Seating arrangement & flexibility.** The seating arrangement of a classroom is an important component in terms of impacting student interactions and social behavior. The traditional seating arrangement consists of desks in rows with the teacher as the central focus of the room and the primary source of knowledge; however, recent studies indicate this design may not be the most effective in terms of empowering students in the learning process (Olds, 1989; Schilling et al., 2003; Taylor, 2008). Providing varied seating (e.g., clusters, circles, etc.) was found to encourage students to engage in collaborative learning experiences (Marx, Further, & Hartig, 1999). Marx et al. (1999) found students seated in semi-circle seating arrangements engaged in questioning strategies more often than peers seated in rows. Ridling (1994) further found students seated in clusters and/or u-shaped arrangements to engage in more social interaction than those in traditional seating.

Engaging in questioning is considered to be a positive outcome as this type of behavior enables learners to gain clarification and receive in-depth information. Based on principles of constructivism, children should be involved in asking questions, probing for answers, conducting investigations, and collecting data. In a constructivist-inspired classroom, engaging with peers
and teachers becomes a mode of investigation and meaning-making. This approach allows children to become engaged in the investigative nature of learning (Kilmer & Hofman, 1995) and to experience the pride of having wonderful ideas (Duckworth, 1987). In a learner-centered classroom, the seating arrangement allows students to interact with one another, engage in project work, and take risks through the open sharing of ideas (Marx et al., 1999); skills aligned with CCSS expectations. Researchers found small group seating arrangements to lend themselves more to active and collaborative teaching and learning (Ridling, 1994).

Research also exists supporting the use of varied seating options for all learners. For example, one study found the use of therapy balls to increase on-task behaviors and work productivity compared to students seated on hardback chairs (Schilling et al., 2003). Evanshen and Faulk (2011) suggest matching seating options to the activity (i.e., group seating options such as couches, small tables, and benches for collaborative learning experiences). Providing seating options which encourage and allow movement increase the likelihood of students remaining on task (Clayton & Forton, 2001). The PEERS assesses teachers’ provision of varied and multiple seating options which provide flexibility and mobility based on students’ learning needs, style, and the activity (Evanshen & Faulk, under review). Previously mentioned findings suggest the value of flexible and varied seating to accommodate a variety of learning styles and the enhancement of student social interaction. Providing an environment rich with flexible and collaborative learning opportunities supports the attainment of the CCSS skills (Kendall, 2011).

**Acoustic environment.** Research has been conducted to investigate the effects of noise on human behavior and performance. Poor classroom acoustics have the potential to negatively impact the learning process (Shield & Dockrell, 2003). Klatte, Lachmann, and Meis (2010) found high levels of noise reverberation in classrooms led to lowered academic performance for
students in comparison to classrooms where noise levels were limited. Some individuals prefer to work under noisy conditions, while others cannot maintain attention with background noise. Classroom noise can be absorbed and controlled through the use of soundboards, rugs, ceiling tiles, and other soft elements (e.g., pillows, curtains, etc.). The potential detrimental effects of noise on children’s academic performance should be considered when planning and designing a classroom environment. Teachers should consider the optimal noise level of a classroom environment and design accordingly (Dyck, 2001).

**Thermal temperature.** A thermal temperature of approximately 69-74°F Fahrenheit has been identified by Martin (2006) as the ideal classroom temperature. At this temperature, students were found to be more engaged and productive than peers in a poorly ventilated, hotter room temperature (Martin, 2006). Cooler temperatures were associated with increased levels of children’s comfort, activity, productivity, and concentration. Dyck (2001) identified a relationship between air temperature and student performance in reading and mathematics. Reading speed and comprehension were lower as the temperature exceeded 73.4 °Fahrenheit. Mathematical skills were reduced as the temperature rose above 77°F Fahrenheit. Researchers found students’ performance to increase in accuracy and speed between the temperature of 68 and 74°F Fahrenheit. In consideration of these findings, it has also been asserted teachers be given control over the heat and air conditioning as the amount of air circulation and humidity varies from classroom to classroom depending upon the amount of students and the activity taking place (Sleeman & Rockwell, 1981). The PEERS examines teachers’ ability to provide air ventilation and to control the room temperature in order to maintain a temperature of approximately 70°F Fahrenheit (Evanshen & Faulk, under review).
Summary of classroom environment research. Environmental psychology research supports principles of constructivist learning theory (Berris & Miller, 2011; Dangel, 2013; Schwartz et al., 2009; Twardosz, 2012; Victorian Institute, 2012; Wolf, 2002). In such active learning environments, the learner-environment relationship is dynamic. Although much past research has supported the value of the environment in a variety of settings, recent findings suggest even more influence of the aforementioned environmental factors in active, learner-centered environments. Interactive physical environmental attributes can both impede or enhance student learning and engagement. Design aligned with environmental psychology research will likely result in a learning environment conducive to student concentration, motivation, and overall engagement (Schwartz et al., 2009; Wolf, 2002).

Appropriate alignment with previous research outlining specific components of the environment linked to learning may aid teachers in preparing students to meet expectations set forth by the CCSSI (Marzano Center, 2013). More research focusing on the impact of environmental elements on the teaching and learning process would add to the existing knowledge. As research on the physical learning environment continues to evolve, it becomes increasingly apparent the built environment influences human behavior and, in the learning setting, student learning behaviors and skills such as creativity, cooperation, engagement, motivation, and interest (Abbott, & Fouts, 2003; Diamond, 2006; Krapp, 2005; Martin, 2006; Reyes, Brackett, Rivers, White, & Salovey, 2012; Schwartz et al., 2009; Voelkl, 1995). Each of the aforementioned environment elements should be evaluated and adapted accordingly with the overall goal of promoting student learning. The development of evaluation tools focusing on the physical environment components aligned with human development and knowledge acquisition
would likely aid educators in designing an optimal learning environment for all students (MacPhail et al., 2013).

21st Century Model of Teaching & Learning and Educational Change

Educators of the 21st century hold the responsibility to provide programs which assist children in becoming effective and productive citizens. Specifically, society requires today’s learners to exhibit creativity, critical thinking, innovation, communication skills, and collaboration in order to be successful (Partnership, 2013). The 21st Century Model for Teaching and Learning and Educational Change (Evanshen, 2010), which is based upon early childhood principles, makes provisions for the extension of early childhood beliefs and practices into primary grades. It addresses how teachers can implement changes to the physical classroom environment in an effort to help students reach optimal development.

It is possible for quality learning environments to extend beyond early childhood and into primary classrooms. The 21st Century Model for Teaching and Learning and Educational Change outlines a process for change which focuses on the transformation of the environment, the engagement of the learner, and the academic enhancement of the learner. The overall goal of this change for elementary classrooms is to move from a traditional approach to education to one that is learner-centered and incorporates principles of early childhood best practices, which are based on the principles of constructivism. The transformation of physical classroom environments from traditional to developmentally appropriate and constructivist-based, may assist students and teachers in developing the skills necessary for success in the 21st century (Evanshen, 2010).

Transform the foundation: Environment. Studies focused on the classroom environment have produced a variety of measurement tools for assessing the physical
components of the classroom (Dorman, 2002). These tools range in format from observational assessments to rubrics and checklists. As theories of learning emerge and evolve, it is valuable to design and validate more measures of the classroom environment with the goal of identifying and outlining physical environmental components which potentially contribute to positive outcomes for students (Dorman, 2002; Miller & Cunningham, 2009). Identifying a relationship between physical classroom environment design and student skill development, engagement, and achievement would help to strengthen the support of the role of the environment in the teaching and learning process (Jones & Brader-Araje, 2002).

The 21st Century Model for Teaching and Learning and Educational Change addresses and encompasses many of the principles set forth by early childhood theory and supports the development of such 21st century skills as problem-solving, inquiry, collaboration, cooperation, creativity, and communication (Evanshen, 2010). This model serves as the basis for the development of the Primary Educator’s Environment Rating Scale (PEERS, see Appendix G), a tool designed to assess the degree to which the physical classroom environment is aligned with best practices for primary (i.e., elementary) students (Evanshen & Faulk, 2011). A classroom aligned with student-centered components exhibits several discernible qualities which are different from the elements found within a more traditional classroom environment designed to provide students with passive learning experiences (Reese, 2001).

The PEERS, an observational tool which identifies physical classroom indicators related to developmentally appropriate, constructivist-centered practices can be used as a guide to encourage educators to design and use the physical classroom environment as a tool for teaching and learning (Evanshen & Faulk, under review). Educators of the 21st century hold the responsibility to provide programs which assist children in becoming effective and productive
citizens. Today’s learners are expected to develop skills such as creativity, critical thinking, communication skills, and collaboration in order to be successful (Partnership, 2013). The first component of the 21st Century Model for Teaching and Learning and Educational Change (Evanshen, 2010), which is based upon early childhood theory and principles, focuses on the transformation of the physical classroom environment. Evanshen (2010) suggests classroom design based on early childhood research would likely assist students in developing the skills necessary for success in the 21st century.

The PEERS indicators are intended to aid in the recognition of environmental components which are linked to collaborative planning, student investigations, types of peripherals, assessment artifacts, and documentation of the learning process. Evanshen (2010) proposes the physical environment can be used as a teaching and learning tool which can aid in meeting the diverse learning needs of all students through positive social interactions which may, ultimately, lead to high levels of student engagement.

In this study, specific indicators of classroom quality were examined in relation to teacher beliefs, attitudes, and perceptions regarding the role of the physical classroom environment in the teaching and learning process in the era of CCSSI implementation. The Primary Educator’s Rating Scale (Evanshen & Faulk, under review), outlines components of the classroom environment connected to principles of constructivism and aligned with best practices was utilized; the PEERS will be discussed in greater detail in the upcoming chapters. The use of such a tool in assessing physical classroom environments holds the potential to aid teachers in aligning classroom practices with developmentally appropriate practices and constructivist principles in an effort to use the environment as a teaching and learning tool to positively impact student outcomes. Using self-evaluation tools to examine one’s environment in regard to what is
known about how young children learn could potentially guide educators in creating a classroom conductive to helping students gain 21st century skills needed to meet the CCSS (Marzano Learning Center, 2013).

**Chapter Summary**

Chapter 2 noted the perceived failure of the United States education system. In response, the CCSSI was developed. Goals and expectations of the initiative were outlined. The perceived value of constructivist-based teacher preparation and professional development was noted. Traditionalism and constructivism were identified and components summarized. Evidence and theory supporting constructivist-inspired physical learning environments was provided. Research related to components of the physical classroom environment was delineated. The Model for 21st Century Teaching and Learning and Educational Change (Evanshen, 2010) was introduced and the PEERS (Evanshen & Faulk, under review), an environmental rating scale based on the 21st Century Model, was also introduced. Lastly, the value of using physical classroom environment rating scales and tools as part of on-going teacher evaluation and self-reflection was addressed. Chapter 3 describes the methods and procedures which were used throughout this study.
CHAPTER 3

METHODOLOGY

This study seeks to examine the use of the environment as a teaching and learning tool in 8 primary classrooms in Northeast Tennessee. A need exists for continuing research outlining the potential interconnectivity between the physical classroom environment and outcomes for both teachers and students. Previous research suggests the physical classroom environment holds the potential to positively impact student skill and engagement levels and, therefore, academic achievement (DeVries, 2002; Heller et al., 2003; Klem & Connell, 2004). At a time when the CCSSI calls for learning experiences which aid students in developing 21st century skills of cooperation, critical thinking, communication, and creativity, a constructivist-inspired environment design can be a valuable tool for meeting the needs of diverse learners and engaging them at the highest levels (Jia, 2010). This research aims to provide a more holistic representation of the design and perceived role of the physical classroom environment in the teaching and learning process in consideration of Common Core State Standards through the triangulation of data focused on teacher perceptions and beliefs, the evaluation of the physical classroom environment, and field notes and photographs of the physical classroom environment.

Rationale for Qualitative Design

The intent of this descriptive multi-case study is to gain understanding of teachers’ perceptions of the role of the physical classroom environment in teaching and learning practices in view of the CCSSI. As such, the researcher chose a qualitative research design as an appropriate means for focusing on the descriptions of participants as interpreted by the researcher. Qualitative design differs in its approach to scholarly inquiry in that the methodology employs philosophical assumptions, inquiry, and interpretation of data. The
qualitative strategies used for data collection in this study are intended to demonstrate diverse viewpoints and ideological perspectives. A qualitative design was chosen to allow for: 1) data collection rich in description of experiences, beliefs, and perceptions of participating primary teachers; 2) contextual elements of each participant’s experience and; 3) in-depth representation of human behavior and perceptions in order to construct meaning. A qualitative approach typically provides a more comprehensive and deep investigation of the human condition than quantitative methods (Creswell, 2009).

Aligned with qualitative characteristics, this study includes multiple sources of data, takes place in a natural setting, uses inductive data analysis, focuses on participants’ meanings, includes interpretative inquiry, and attempts to develop a holistic account of each participant’s experience (Creswell, 2009). According to Bogdan and Biklen (2003), the qualitative method in education generally transpires in a naturalistic setting as the researcher studies events which naturally occur. Such naturalistic inquiry requires observation, discovery, and patience under normal conditions rather than intervention or manipulation of participants in a controlled setting. Qualitative data collection typically includes natural behaviors such as observing, talking, and listening in order to gain an overall picture of participants’ experiences.

**Background of Researcher**

The researcher was the primary data collection tool as well as the interpreter of research. According to Creswell (2009), a researcher serving as the primary data collection tool and primary interpreter of data can be both advantageous and disadvantageous in that the researcher provides a responsive human component. The advantage of the human component is the ability to understand verbal and non-verbal communication, reflective processing, seeking of clarification when needed, and innate curiosity to explore. Disadvantages may include biases
and subjectivities (Creswell, 2009). With this in mind, it is important to address the researcher’s relationship to the focus phenomenon. The researcher brings to this study 11 years of experience as the Family YMCA Child Care Director, experience from previous research endeavors, and a curiosity and interest in teachers’ perceptions of the role of the physical environment in the teaching and learning process. The researcher holds a Bachelor of Science degree from a regional university in East Tennessee with a concentration in Early Childhood Education and is licensed to teach PreK-4th grade in the state of Tennessee. The researcher also holds a Master of Arts degree in Early Childhood Education from a regional university in East Tennessee. This study was conducted as part of the requirements for completion of a Doctorate of Philosophy degree in Early Childhood Education.

The researcher’s interest for this study was piqued from active and observational participation in diverse physical classroom designs and various philosophies of teachers as evidenced in primary classroom designs. Additionally, in doing a review of literature the researcher noted the majority of literature focusing on the classroom environment was primarily focused on research outlining the components of the social-emotional climate versus the use of the physical environment as a tool for teaching and learning. Due to the minimal research available connecting the physical classroom environment to teaching and learning, the researcher identified a need to add to the body of research outlining the physical environment’s role in the teaching and learning process. Further, with the recent adoption of the Common Core State Standards Initiative, the researcher became interested in determining if teachers felt their classroom environment was aligned with current learning expectations or whether teachers identified a need to align the environment with components set forth by constructivist principles in an attempt to aid students in developing CCSSI skills (e.g., collaboration, creativity, etc.).
Research Design

This research uses a descriptive multi-case study design. Based upon a literature review of research methods, the proposed research questions, and the proposed design, a descriptive multi-case study was found to be most appropriate to this research. Such a design enabled the researcher to explore both similarities and differences between cases and classroom settings. Multi-case studies are typically used when the researcher is interested in obtaining a rich description of an event or experience (Saldaña, 2013). The study focuses on the lived experiences of participants sharing a similar experience over which the researcher and participants have no control. Further, case studies typically engage participants in focusing and sharing experiences of real-life events as the researcher seeks a holistic understanding of a situation using inductive methods (Saldaña, 2013).

When a study is intended to focus on a particular shared event, it is considered to be particularistic (Merriam, 2009). This study is particularistic in that the shared experience is primary grade teaching in Northeast Tennessee in an era of the Common Core State Standards Initiative. Because of the descriptive multi-case study design and particularistic nature of the study, it is imperative cases be chosen intentionally and with care; thus, the implementation of the Teacher Belief Survey (Woolley et al., 2004) to identify educators either constructivist-aligned or traditional in beliefs and practices. Some generalizations regarding the constructivist and traditional teachers may be assumed based on study findings; however, any conclusions drawn must be done so with caution. The researcher understands not all teachers identified by the TBS as traditional or constructivist will behave in the same exact manner, considering the fact each person is unique. Selecting a single district ensures all teachers have experienced, or
had the opportunity to experience, the same system-wide trainings on the CCSSI. Doing so allowed the researcher to discuss similarities as well as contrasts among cases (Creswell, 2009).

Merriam (2009) asserts a case study is more compelling when it includes more than 4 and less than 10 cases. Although a larger number of cases tends to be more challenging, the findings are considered stronger as they are more extensive (Merriam, 2009). The participants for this study were chosen purposively with the goal of understanding a particularistic experience better through the investigation of both similar and different cases. This descriptive multi-case study explores the experiences of 8 primary educators in an attempt to examine the interplay of such variables as teacher beliefs and practices and the design of the physical classroom environment in regard to the Common Core State Standards Initiative.

In an attempt to completely represent each participant’s experience while providing additional contextual information, the researcher gathered data using a variety of approaches. While this study also includes a quantifiable data collection measure (e.g., the PEERS), the overall intent of the use of such measures is to support interview data, discover new variables, and develop questions for further research. Although the PEERS allows for a quantitative score to be computed, in this study, rather than assigning a general overall score, the qualitative descriptors associated with each score were used to outline the components of the environment and the degree to which teachers addressed each type of learning as outlined by the PEERS. For example, a score of 3 indicated a physical classroom design with multiple examples of evidence aligned with the components under each category (e.g., Meaningful Learning), while a score of 2 indicated emerging or partial evidence. A score of 1 indicated no or little evidence. In accordance with recommendations by Creswell (2009), the PEERS quantitative measure was used primarily to support and explicate the meanings of qualitative findings.
As are many other districts within the United States, the potentially participating school district was faced with the pressure from the state to meet expectations set forth by the CCSSI “to provide a consistent, clear understanding of what students are expected to learn” (Kendall, 2011, p. 1). In today’s times, some teachers strive to balance appropriate, constructivist-aligned practices with preparing students for standardized testing and readiness (Brooks & Brooks, 1999). Several instruments were used to examine this phenomenon: survey, interview, physical classroom evaluative measures (e.g., the PEERS), observational field notes, and photographs. The initial TBS survey (see Appendix B) was used primarily as a means of participant selection. Interview was used to gain specific information regarding participants’ views, beliefs, feelings, thoughts, and intentions (Creswell, 2009). A set of open-ended questions served to guide the semi-structured interview; however, the researcher engaged in improvisation as needed to follow-up responses, clarify information, and to probe more deeply when necessary.

Participating teachers also shared demographic data with the researcher through the completion of a researcher-developed demographic survey (see Appendix D). The survey information was used to provide context and insight as well as to increase generalizability regarding teachers’ teaching experience, certifications, education, etc. The classroom environment of participating teachers was examined and evaluated using the PEERS (for a summary, see Appendix G). The results of the PEERS provides an indication of each teacher’s implementation of best practices as evidenced through the environmental components and is related to individual’s beliefs about the environment, philosophy of education, etc. as evidenced in interview data. Lastly, observational field notes and photos served to illustrate the physical classroom environment design of each participant.
Goals & Objectives of Study

The specific goal of this study was to determine the use of the environment as a teaching and learning tool for 8 primary educators in Northeast Tennessee in an era of the implementation of the Common Core State Standards Initiative. The objectives included: 1) determining participating teachers’ degree of constructivist or traditional beliefs and practices using the Teacher Beliefs Survey (TBS, see Appendix B); 2) collecting participating teachers’ demographic data through the researcher-developed survey (see Appendix D); 3) eliciting teachers’ beliefs and perceptions of their teaching practices, overall philosophy of education, and views regarding the role of the physical classroom environment in the teaching and learning process in light of the CCSSI through interview (see Appendix E); 4) evaluating components of the physical classroom environment of participating teachers using the Primary Educators Environment Rating Scale (PEERS, see Appendix G) and; 5) observing and documenting the physical classroom environment design.

Restatement of Research Questions

Central research question. What is the role of the physical classroom environment in teaching and learning in 8 primary classrooms in Northeast Tennessee?

Sub-question 1. What are the perceptions and experiences of 8 primary teachers related to their use of the physical classroom environment as a teaching and learning tool?

Sub-question 2. How does the philosophy of teaching and learning of 8 primary teachers impact the design of the physical classroom environment?

Sub-question 3. How has the Common Core State Standards Initiative impacted the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee?
**Sub-question 4.** How does the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee support the following 21st century skills set forth by the CCSSI: collaboration, creativity, critical thinking, and communication?

**Instrumentation**

A total of six data collection procedures were used for this study: 1) the Teacher Beliefs Survey (TBS, see Appendix B); 2) a researcher-developed teacher demographic survey (see Appendix D); 3) a teacher interview (see Appendix E); 4) the Primary Educators Environment Ratings Scale (PEERS, see Appendix G); 5) observational field notes and; 6) photographs of the physical classroom environment. These tools were carefully selected in an attempt to provide the most holistic representation and context of participating primary teachers’ beliefs and practices in relation to the physical classroom environment design in the era of the CCSSI.

**Teacher Beliefs Survey (TBS).** The 21-item version of the Teacher Belief Survey (Appendix B) consisting of 10 items aligned with constructivist practices and 11 items related to traditional practices was administered to a total of 87 K-3 teachers within the participating school district in order to identify teachers’ degree of constructivist or traditional beliefs and practices (Woolley et al., 2004). A total of 47 eligible TBS surveys were returned. Eight teachers were selected for further participation in the study based on responses indicating whether they were considered constructivist or traditional in their teaching beliefs and practices. The use of the TBS served to provide some insight into the design of the physical classroom environment as educators tend to arrange the environment in accordance with their beliefs regarding knowledge acquisition (Fraser, 2011). The survey return date was 1 week after the surveys were distributed. The TBS was used primarily for the purposes of participant selection and categorization of participants.
The Teacher Beliefs Survey is a self-report from teachers regarding their beliefs related to teaching and learning practices. The survey was based on an extensive literature review related to the behaviorist and constructivist theories. To develop the survey, 14 in-service elementary teachers were interviewed for an hour each using open-ended questioning strategies to engage them in discussion regarding their beliefs about teaching. From the interviews, seven main themes emerged: 1) classroom learning environment; 2) behavior management; 3) curriculum; 4) assessment; 5) teaching strategies; 6) student roles and; 7) working with families. Based on these themes and information gathered from a review of literature related to constructivist and traditional approaches to teaching and learning, the TBS was created (Woolley et al., 2004).

**Construct validity & internal reliability.** According to Woolley et al., (2004), construct validity of the survey was determined through an exploratory factor analysis to identify groupings of survey descriptors measuring similar concepts. Construct validity was also evidenced through a correlation analysis between scales. Results from the analysis indicated traditional teaching scales displayed positive correlations with one another while a negative correlation between traditional and constructivist descriptors was found. This evidence suggests the scales of the survey could be interpreted as measuring the concepts it was intended to measure. Reliability analysis of the TBS was also performed to examine the internal consistency among items within latent variables. Cronbach’s α computed from the factor analysis of the survey’s scale items was .78 (Woolley et al., 2004).

**Survey completion.** The survey included three constructs including: 1) Traditional Management (TM); 2) Traditional Teaching (TT) and; 3) Constructivist Teaching (CT). The original version used for this study has a total of 21 items consisting of 11 traditional items and
10 constructivist items. The survey took approximately 10 minutes to complete. Teachers were instructed to “Imagine how you set up your classroom as you read the following survey statements. As you think about your classroom, circle the number indicating how much you disagree or agree with the statement on a scale ranging from 1 (strongly disagree) to 5 (strongly agree)” (Woolley et al., 2004, p. 328). Using a Likert-type scale comprising of “strongly disagree,” “somewhat disagree,” “sometimes,” “somewhat agree,” and “strongly agree” an overall average score was calculated for each participant in order to determine the degree to which participants embraced constructivist or traditional practices. Scores were calculated by adding the sum of the items that made up the TBS then dividing by the number of items considered either traditional or constructivist to achieve a percentage. The survey was administered to teachers in 6 participating schools in grades kindergarten through third in the participating district. A total of 87 teachers were surveyed with 47 returned surveys eligible (i.e., fully completed, not duplicated through Googledocs©, and/or received by submission deadline) to participate. The researcher then identified the highest scoring constructivist teacher in each grade and the highest scoring traditional teacher in each grade. Highest scoring teachers were contacted requesting participation in the study; of the 4 highest scoring constructivist teachers (ranging from 80-100% constructivist), all 4 were willing and able to participate. Of the highest scoring traditional teachers, 2 were willing and able to participate (both were ranked as 54.54% traditional). Two were unable or unwilling to participate (first grade teacher was ranked as 63.63% and the second grade teacher was ranked 90.9% traditional); therefore, the next highest scoring traditional teachers within those grades were contacted for participation (second highest first grade teacher was ranked 54.54% and the second grade teacher was ranked 54.54% traditional). The study included a total of 8 participants.
Teacher demographic survey. Demographic data was collected for participating teachers through a researcher-developed survey (Appendix E). Teacher demographics collected included the following: name, school, level of education, highest degree earned, type of teaching certification, number of years teaching, number of years teaching current grade, specific trainings related to the CCSSI, specific trainings related to environmental design, and any additional information or circumstances which the teacher chooses to disclose to the researcher. The purpose of demographic data collection was to provide the researcher with some insight into the background of teachers’ beliefs and practices as well as to increase generalizability of findings.

Each of the aforementioned components is an indicator of teacher quality and is an important factor to examine when exploring teacher beliefs and practices. It is also valuable to explore such factors as socioeconomics, race, and gender as the student population grows increasingly more diverse. Horm-Wingerd and Hyson (2000) suggest a more diverse American teaching pool would encourage a more culturally sensitive classroom environment for young children and their families. Further, the field of education would likely benefit from individuals who are knowledgeable, empathetic, competent, and representative of multilingual and multicultural populations. Awareness of the impact of teacher demographics is valuable to the study and provides implications for teacher beliefs and practices (Horm-Wingerd & Hyson, 2000).

The teacher demographic survey for this study was developed for the purpose of collecting basic population information (e.g., age, gender, education, etc.) on the participating teachers. In order to ensure accuracy and completion of the surveys, questions were designed to require short and concise responses. Further, the researcher and her committee reviewed the
questions in order to evaluate the appropriateness and necessity of each. Demographic information provided context to participants’ experiences (e.g., years teaching, education background, etc.). Pseudonyms were used to identify participants in an attempt to maintain confidentiality.

**Teacher interview.** A single interview was conducted with individual teachers in order for the researcher to gain insight into the perspectives of participants regarding their beliefs and philosophy of education, guiding theory, knowledge of and training on the CCSSI, arrangement and use of the physical environment and materials in consideration of the CCSSI, types of instruction, and the overall extent to which the teacher feels the classroom physical environment facilitates the development of skills expectations of the CCSSI (e.g., collaboration, cooperation, communication, creativity, etc.). Creswell (2009) suggests using interviews when a particular participant behavior cannot be directly observed or when a historical perspective is needed. Through interview, the researcher attempted to ascertain participants’ thoughts, feelings, perceptions, beliefs, and retrospective accounts of the role of the physical environment in the teaching and learning process.

One interview focusing on the participants’ views of the environment was conducted one-on-one with each participant and lasted approximately one hour. Each interview consisted of the same open-ended questions with probing questions as needed to gain further information. Interviews were audiotaped with the researcher taking notes related to participant body language during the interview. Additionally, a field log was kept in an attempt to debrief regarding any speculations, ideas, impressions, biases, etc. Interview transcription was done by the researcher. Upon transcription of the interviews, the researcher provided each participant with a hardcopy of the transcript asking to member-check the interview transcriptions for accuracy. Participants
were given the opportunity to make corrections or clarify as needed and, if in agreement, sign the member-checking letter (Appendix F). According to Creswell (2009), face-to-face interviews demonstrate to the respondent that the researcher values his/her opinions and is truly interested in his/her thoughts and ideas. Conducting semi-structured, open-ended interviews provides an in-depth understanding of the motives, patterns of reasoning, and emotional reactions associated with a particular phenomenon.

**Interview questions.** The interview questions were developed by the researcher based upon the study’s objectives, expectations set forth by the CCSSI, and the contents of the 21st Century Model for Teaching and Learning and Educational Change (Evanshen, 2010). According to this model, the environment serves as the foundation for student engagement to occur with the ultimate goal of positively impacting student achievement. The 15 interview questions reflected the following topics: teacher beliefs and philosophy of education, guiding theory, knowledge of and training on the CCSSI, arrangement and use of the physical environment and materials in view of the CCSSI, types of instruction, and the overall extent to which the teacher feels the classroom physical environment facilitates the development of skills expectations of the CCSSI (see Appendix E).

Interview questions were intended to elicit responses from participants regarding their views and perceptions of why they engaged in particular teaching practices and how these views impacted their practices, environmental design, and overall developmental of the 21st century skills in light of the CCSSI. In an attempt to ensure validity and relevance of the interview questions, the questions were reviewed by a Nationally Board Certified early childhood teacher, an early childhood professor, and a licensed school psychologist. The interview questions were revised based on the recommendations of the reviewers. The semi-structured format of the
interview allowed the researcher to further probe participants in an attempt to gain an in-depth understanding of each lived experience as well as allowing participants to clarify and further respond to questions. A semi-structured format with pre-determined, yet flexible questions guided the conversational style interviews while ensuring the same general information was obtained from all participants. This interview style also allowed freedom and adaptability for the researcher in soliciting information from participants. For a complete list of interview questions asked, see Appendix E.

During each interview, the researcher took notes regarding body language, facial features, sighing, etc. in order to gather information regarding the overall tone of the interview. Creswell (2009) suggests a participant’s attitude affects his/her actions. For example, a participant who is uncomfortable answering a question may demonstrate discomfort by shifting his/her gaze, changing body positions, etc. It was important for the researcher to pay close attention to physical cues from participants in order to adapt or re-phrase research questions. Interviews were audio recorded and later transcribed.

**Primary Educators Environment Rating Scale (PEERS).** The PEERS (See Appendix G) was used to evaluate the physical classroom environments of the participating teachers. A research assistant completed the PEERS in every third classroom in an attempt to maintain reliability of results; the first reliability coefficient was 88.2% and the second reliability coefficient was 88.4%. The Primary Educators Environment Rating Scale (PEERS) is a reliable and valid rubric which assesses multiple indicators of the physical classroom environment and rates them along a continuum from traditional to constructivist. The scale outlines the components of the environment which are directly related to developmentally effective, constructivist practices. The PEERS can be used to assess and guide professional development
and enhancement of student learning by improved design and use of the physical classroom environment as a teaching and learning tool. It can encourage educators to align their physical environment design through the use of a rubric in an effort to reflect upon and create a physical classroom environment which is based upon developmentally appropriate practices (Evanshen & Faulk, under review).

**PEERS rubric.** Ultimately, the PEERS is a rubric which can be used to guide teachers and principals as they collaborate together to provide a classroom environment for meeting differentiated needs of each learner. In aligning the classroom environment with indicators of the PEERS, educators potentially enhance opportunities for self-directed and self-sustained learning and, thus, engagement and potentially achievement. The PEERS can be used to identify areas of strength and target areas for growth for using the environment as a teaching and learning tool. The results can be used for determining professional development needs or areas of improvement or transformation for the educator in relation to using the environment as a teaching and learning tool (Evanshen & Faulk, under review).

Each of the types of learning as outlined by the PEERS is associated with specific indicators. Each indicator is scored as follows: a score of 3 denotes the indicator is observable with strong physical evidence; a score of 2 denotes the indicator is somewhat observable; and a score of 1 denotes no physical evidence of the indicator is identified. Each score indicates the degree to which the environment is being used as a teaching and learning tool in each domain. The 6 domains are defined by Evanshen & Faulk (under review) in the following ways:

1. **Meaningful Learning**- an environment for meaningful learning occurs in a brain-compatible classroom environment which is safe, healthy and welcoming for the
learner. Developing a sense of community within the classroom lays a foundation for meaningful learning to occur.

2. **Social Learning** - an environment for social learning promotes positive learning interactions through room arrangement and furniture design. The classroom provides a variety of seating choices and work space options for social learning activities.

3. **Purposeful Learning** - an environment for purposeful learning facilitates discovery, active engagement and learning through allocation of defined areas in the classroom, student space, and teacher space.

4. **Responsible Learning** - an environment for responsible learning encourages and sustains engagement in learning through multiple and accessible tools and materials. Materials are organized to promote quick access. Storage of materials contributes to the aesthetics of the classroom.

5. **Continuous Learning** - an environment for continuous learning supports the content and process of learning through visible and authentic peripherals and artifacts which represent and document the current learning topics.

6. **Inquiry-based Learning** - an environment for Inquiry-based learning fosters active student engagement, higher-order thinking, reflection and application where teachers and students plan and collaborate, seek information, and engage in solving problems and representing understanding of learning standards.

Table 1. outlines the specific components of the physical classroom environment in relation to the PEERS’ 6 types of learning (Evanshen & Faulk, 2011):
Table 1. The PEERS Domains

<table>
<thead>
<tr>
<th>Meaningful Learning Environment</th>
<th>Purposeful Learning Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Healthy Classroom</strong></td>
<td><strong>Learning Centers &amp; Stations</strong></td>
</tr>
<tr>
<td>Well-Maintained</td>
<td><strong>Teacher Space</strong></td>
</tr>
<tr>
<td>Hazards</td>
<td>Learning centers and stations</td>
</tr>
<tr>
<td>Ventilation</td>
<td>Separation of learning centers</td>
</tr>
<tr>
<td>Odors</td>
<td>and stations</td>
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<tr>
<td></td>
<td>Placement of learning centers</td>
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<td></td>
<td>and stations</td>
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<tr>
<td></td>
<td>Literacy centers and stations</td>
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<tr>
<td></td>
<td>Math centers and stations</td>
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<tr>
<td></td>
<td>Science centers and stations</td>
</tr>
<tr>
<td><strong>The Welcoming Classroom</strong></td>
<td>**Organization of teacher work</td>
</tr>
<tr>
<td></td>
<td>space**</td>
</tr>
<tr>
<td></td>
<td>Placement of teacher work space</td>
</tr>
<tr>
<td></td>
<td>Amount of teacher work space</td>
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<tr>
<td><strong>Lighting</strong></td>
<td><strong>Personal Space for Children</strong></td>
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<tr>
<td></td>
<td>Storage for personal belongings</td>
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<tr>
<td></td>
<td>Storage for student work</td>
</tr>
<tr>
<td><strong>Sense of Community</strong></td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>Photos</td>
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<tr>
<td></td>
<td>Procedures</td>
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<tr>
<td><strong>Nourishment</strong></td>
<td>Agenda</td>
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<tr>
<td>Water</td>
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<tr>
<td>Snacks</td>
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| Social Learning Environment     |                                 |
| **Room Arrangement**            | **Seating Choices**             |
| Furniture arrangement           | Seating furniture options       |
| Small group areas               | Seating assignments             |
| Large group area                |                                 |

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<thead>
<tr>
<th>Purposeful Learning Environment</th>
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<tbody>
<tr>
<td><strong>Learning Centers &amp; Stations</strong></td>
</tr>
<tr>
<td>Learning centers and stations</td>
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<td>Separation of learning centers</td>
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<td>and stations</td>
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<td>Placement of learning centers</td>
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<td>Science centers and stations</td>
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<table>
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<tr>
<th>Teacher Space</th>
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<tr>
<td>Organization of teacher work</td>
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<tr>
<td>Placement of teacher work space</td>
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<td>Amount of teacher work space</td>
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Table 1. (continued)

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<tr>
<th>Responsible Learning Environment</th>
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<tbody>
<tr>
<td><strong>Materials Available for Learning</strong></td>
<td><strong>Organized Materials</strong></td>
</tr>
<tr>
<td>Tools and materials for learning</td>
<td>Labeling of materials</td>
</tr>
<tr>
<td>Accessing materials</td>
<td>Storage of materials</td>
</tr>
<tr>
<td>Variety of materials</td>
<td>Transportation of materials</td>
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</table>

<table>
<thead>
<tr>
<th>Continuous Learning Environment</th>
<th></th>
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<tbody>
<tr>
<td><strong>Peripherals</strong></td>
<td><strong>Peripherals Representative of Learning</strong></td>
</tr>
<tr>
<td>Types of peripherals</td>
<td>Documentation of learning and learning objectives</td>
</tr>
<tr>
<td>Display of peripherals and student work</td>
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<tr>
<td><strong>Documentation of Learning</strong></td>
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<tr>
<td>Assessment tools</td>
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<thead>
<tr>
<th>Inquiry-based Learning Environment</th>
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</thead>
<tbody>
<tr>
<td><strong>Planning &amp; Collaboration</strong></td>
<td><strong>Use of Research Resources</strong></td>
</tr>
<tr>
<td>Collaborative planning</td>
<td>Internet access for research</td>
</tr>
<tr>
<td>Use of graphic organizers</td>
<td>Research materials</td>
</tr>
<tr>
<td></td>
<td>Additional resources</td>
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According to Evanshen and Faulk (under review), the higher a score in an area, the more child-centered the educational experience and more aligned the teacher’s practices are with developmentally appropriate and constructivist, evidence-based practices. After assessing all of the PEERS components, the overall score was calculated for each type of learning. By holistically looking at percentage scores of the six domains of the PEERS, the rater can evaluate the overall strengths of a physical classroom environment and identify areas to strengthen. Additionally, scores on the specific indicators within each domain can lead to more specificity in identifying areas for growth. Although the PEERS allows for a quantitative score to be computed, in this study, rather than assigning a general overall score, the qualitative descriptors associated with each score were used to outline the components of the environment and the
degree to which each teacher addresses each type of learning in the within-case analyses. For example, a score of 3 indicates a physical classroom design with multiple examples of evidence aligned with meaningful learning, such as well maintained, appropriate lighting, nourishment, etc. A score of 2 indicates emerging or partial evidence of meaningful learning. A score of 1 would indicate no or little evidence of meaningful learning. An evaluative tool such as the PEERS can be used to help quantify the elements of the environment and provide teachers with concrete targets for improving their instructional environment and use of the environment as a teaching and learning tool (Evanshen & Faulk, under review).

**Content validity.** A diverse panel of researchers, practitioners, and experts reviewed the PEERS. Reviewers were asked to evaluate each indicator on the rubric and score it from 1-3 in terms of clarity and sufficiency of the descriptors and provide feedback for each item. Reviewers were also asked to provide feedback regarding the usefulness of the tool for designing and improving classroom environments. Based on feedback from the panel of reviewers, the PEERS was revised with some indicators being refined to eliminate ambiguity and technical flaws; four items were eliminated (Evanshen & Faulk, under review).

**Internal reliability.** Internal reliability for each PEERS domain was determined by both Cronbach’s $\alpha$ and Carmine’s $\Theta$ (Carmines & Zeller, 1979). Both $\alpha$ and $\Theta$ ranged between .60 and .83, which is considered adequate for a newly developed scale. Estimates for reliability in all domains, with the exception of Inquiry-based Learning (.69) exceeded .70 which is considered a desirable internal consistency reliability estimate. This indicates desirable psychometrics for internal consistency in reliability estimates; acceptable internal consistency was established (DeVellis, 1991; Nunnally, 1978; Spector, 1994).
**Item analysis.** Psychometric properties of each indicator in each domain were evaluated by computing the squared multiple correlation (SMC) of each item with all other items in the same domain and by coefficient $\alpha$ with each item removed from the scale evaluation. Four indicators were found to have poor item properties with no variability in scores; these indicators were removed from the factor analyses. Within the Meaningful Learning domain, 3 of 4 indicators were removed related to *Colors, Hazards,* and *Ventilation.* For the purpose of item analyses, the domain of Meaningful Learning was then subdivided into two subscales, The Healthy Classroom and The Welcoming & Inviting Classroom (Evanshen & Faulk, under review). *Internet,* the fourth indicator, was removed from the domain of Inquiry-based Learning due to poor item properties.

**Interrater reliability & pilot study.** A pilot study was conducted in 2013 by the authors of the PEERS using the revised version of the PEERS. Statistical analysis was completed by researchers at Orelena Hawks Puckett Institute of Asheville, North Carolina. Interrater agreement was determined by completing the PEERS in 16 of the study’s 47 participating classrooms. Interrater agreement on the complete scale was determined by determining the percentage of agreement for the 43 indicators on the scale in each of the 16 classrooms. Interrater agreement ranged from 79-95% with the overall interrater reliability percentage of 88%. Additionally, interrater agreement by item was determined in each of the 16 classrooms with agreement ranging from 75-100% with the exception of one indicator; Placement of Centers and Stations, with 69% agreement.

**Construct validity.** The construct validity of the PEERS was evaluated by principle components factor analysis with oblique rotation to determine if the items on each domain formed a single factor solution and to determine the factor loadings of individual items. All of
the factor analyses yield single factor solutions except Meaningful & Purposeful Learning, which produced second-order single factor solutions. A second-order factor analysis was performed on these domains to determine whether a summated score of the individual scale scores was justified. This was affirmed in all analyses that yielded two factor solutions. The internal consistency threshold was set at .50 or higher. Factor loadings of 100% of the indicators in 4 domains (Environment for Social Learning, Environment for Responsible Learning, Environment for Continuous Learning, and Environment for Inquiry-based Learning) met or exceeded the .50 threshold. Ninety percent of the factor loadings with the Environment for Meaningful Learning domain met or exceeded the .50 threshold. Sixty percent of factor loadings for the indicators under the Environment for Purposeful Learning domain exceeded the .50 threshold. Eighty-seven percent of indicators on the PEERS presented factor loadings equal to or greater than .50.

**Observational field notes.** Observational field notes of the physical classroom environment were obtained. Field notes were taken of each individual classroom following the PEERS completion on the same day. Each set of field notes included the teacher’s pseudonym, grade, and the date/time. For the purposes of this study, field notes in which the researcher attempted to accurately capture the physical layout of the classroom were used. Field notes in connection with photos are intended to be used to "broaden the range of vision" (Creswell, 2009, p. 38) and produce data that will be of use in providing context to each participant’s experience in the data analysis process. Observational field notes were used to investigate the physical classroom environment of participants, outline the components of the environment and address the degree to which each type of learning was met as outlined by the PEERS, and to provide contextual information related to findings from both the interview and the PEERS.
Photographs. Lastly, photos of each participant’s physical classroom environment were taken simultaneously with field notes following the completion of the PEERS on the same day. Since it would be nearly impossible to document and recall everything observed in each classroom, the researcher also took photos of components of the physical classroom environment related to the theoretical constructs underpinning the research. Photographic data included the teacher’s pseudonym, grade, and the date/time. The PEERS served to guide the researcher’s decisions about photographs taken (e.g., evidence of each type of learning through indicators).

The photos served as a means of documentation of PEERS components as well as the researcher’s personal reflection during the data analysis process. Knoblauch, Baer, Laurier, Petschke and Schnettler (2008) recommend using photos to “reproduce the reality in front of the viewer’s lens, yielding an unmediated and unbiased visual report” (p. 120). Photos demonstrate concrete details of the physical environment designs of each participant. The researcher operated under the assumption that the photos do not contain inherent meaning and may be viewed differently by other observers (Knoblauch et al., 2008). Photos included in the data analysis are intended to draw attention to the participants’ beliefs in relation to specific physical classroom environment components perceived by the researcher to be aligned with the PEERS.

Research Setting

The setting for this study included 8 classrooms within one city school district in Northeast Tennessee. The participating district was chosen based on the district’s known focus on the implementation of CCSS and the provision of district-wide professional development and trainings on the CCSSSI implementation. Permission for teacher participation was sought from both the school district and principals prior to study implementation. Each teacher, in schools in which permission was granted, in grades kindergarten through third from the city school district
was asked to complete the TBS either in hardcopy or electronically and return it. From these responses, teachers ranking highest in constructivist and traditional views, beliefs, and practices within their grade were asked to participate in the study for a total of 8 participating teachers from the city school district (one constructivist and one traditional teacher per grade K-3).

The participating city school district is located in the Tri-Cities region of Northeast Tennessee with a community population of approximately 44,130 residents. The 2015 census reported the city’s racial composition as 91.9% Caucasian, 4.1% African-American, 2.1% Hispanic and 1.9% as another race. The city district serves approximately 3,275 elementary students with 49% receiving free or reduced lunch. The student-teacher ratio in elementary schools is an average of 15:1.

**Sampling Criterion**

A purposive sampling strategy was used for this study. The reasoning behind purposefully selecting participates in a descriptive multi-case study is to aid the researcher in identifying participants who share a similar lived experience and can provide the most accurate information related to the research questions (Creswell, 2009). The participating teachers were selected based on their beliefs (e.g., constructivist or traditional) as measured by the TBS, as well as the representation of different grade levels (e.g., 2 each of kindergarten; 1 high and 1ow TBS, etc.) within the school district. There is variation in the schools across the districts. In the selected school district, enrollment ranges from 560 at the largest elementary school to 246 at the smallest school. One of the schools implemented a multiage grouping configuration (e.g., K/1st, 2nd/3rd). Of the 8 elementary schools, 5 were Title I schools. Title I provides funding to schools for the purpose of improving the achievement of disadvantaged students. Title I is a provision of the Elementary and Secondary Education Act passed in 1965. The program was created to
distribute funding to schools and school districts with a high percentage of students from low-income families (Farkas & Hall, 2000).

**Participant Selection**

Participants for this study included 8 kindergarten through third grade teachers within 8 total classrooms in various schools within 1 city school district in Northeast Tennessee.

Upon approval from the university’s Institutional Review Board (IRB) and the city school board, the researcher contacted principals in an attempt to gain permission for teachers to participate in the participant selection phase of the study. Of the 8 principals contacted, 6 granted permission for the TBS to be distributed to teachers. Surveys were distributed electronically via an email link as well as through hardcopy with instructions to return completed surveys to principals for pick up by the researcher within 1 week. A total of 87 surveys were distributed to K-3rd grade teachers. Fourteen hardcopy surveys were returned. Thirty-seven teachers responded via the Googledocs© survey link; 4 were eliminated due to duplicate responses (i.e., submitted twice). A total of 47 surveys were received which were eligible for participation consisting of 9 kindergarten teachers, 15 first grade teachers, 9 second grade teachers, and 14 third grade teachers, for a total participation rate of 54%.

Survey responses were entered into an Excel spreadsheet with participants’ names coded according to grade level (i.e., Ka, 1a, 2a, 3a). Constructivist and traditional responses to the TBS were tallied and percentages of traditional and constructivist survey responses were calculated based on recommendations by Woolley et al. (2004). Scatterplots were developed to identify teachers ranking highest in traditional and highest in constructivist responses. Those ranking highest in their grade were selected for participation. In grades and categories where participant response scores were tied, the researcher randomly selected participants from the highest scorers.
If a teacher was unable to participate, s/he was replaced with the next highest scorer and so forth until a replacement teacher was willing to participate. Top scoring teachers who were unable/unwilling to participate are indicated by an X. The next highest scoring teachers are indicated by a circle; an asterisk indicates those selected when the top-scoring participant was unwilling or unable to participate or when the score tied with others (see Figures 1 and 2). Once participants were selected, the researcher contacted them via email to establish contact and plan for data collection in the upcoming school year. Teachers were not required to participate and no penalty was impending should teachers choose to opt out of the study. Participating teachers were ensured of the anonymity of data and that outcomes would be shared with participants; pseudonyms were used in an attempt to protect both schools’ and teachers’ identities.

Figure 1. *Traditional Participant Responses & Selection*
Figure 2. Constructivist Participant Responses & Selection

Table 2. Key for Figures 1 & 2

<table>
<thead>
<tr>
<th>Grade or Participant</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>Kindergarten teachers who submitted the TBS survey are coded as a red dot with a $K$ and adjacent lowercase letter $a$, $b$, $c$, etc.</td>
</tr>
<tr>
<td></td>
<td>Kg</td>
</tr>
<tr>
<td>First Grade</td>
<td>First grade teachers who submitted the TBS survey are coded as a blue dot with a $1$ and adjacent lowercase letter $a$, $b$, $c$, etc.</td>
</tr>
<tr>
<td></td>
<td>1d</td>
</tr>
<tr>
<td>Second Grade</td>
<td>Second grade teachers who submitted the TBS survey are coded as a green dot with a $2$ and adjacent lowercase letter $a$, $b$, $c$, etc.</td>
</tr>
<tr>
<td></td>
<td>2c</td>
</tr>
<tr>
<td>Third Grade</td>
<td>Third grade teachers who submitted the TBS survey are coded as a yellow dot with a $3$ and adjacent lowercase letter $a$, $b$, $c$, etc.</td>
</tr>
<tr>
<td></td>
<td>3d</td>
</tr>
<tr>
<td>Selected to participate; unable to participate</td>
<td>✖️</td>
</tr>
<tr>
<td>Participant</td>
<td></td>
</tr>
</tbody>
</table>

Selected when top-scoring participant was unwilling or unable to participate or when scored tied with others *
Data Collection Procedures

The Teacher Beliefs Survey was used for determining the beliefs and practices of the participating districts’ kindergarten through third grade teachers. Upon approval from the ETSU IRB, the researcher contacted each principal in the city district via email. Through email communication, the researcher explained the participant selection process, distributed electronic surveys to principals and arranged for placement of hardcopies in teachers’ mailboxes, and requested principals collect returned surveys in a labeled folder which the researcher provided for them. Further, the researcher informed principals of the deadline for teachers to complete the survey (one week) upon which the researcher returned to each school to pick up completed hardcopy surveys.

Following contact with principals, an email was sent to all kindergarten through third grade teachers containing a link to the electronic survey. Further, hardcopies of surveys were placed in teachers’ mailboxes with instructions outlining the completion and submission process for teachers. Instructions stated: Hello! I am a doctoral student currently working toward the completion of my degree. If you would be willing to participate in my study, please either complete this hardcopy survey and return to your principal or complete the survey online at [web address] by [date]. If you prefer to complete and submit the survey online, please visit [survey link]. This link has also been emailed to you. For returning the survey within a week, your name will be placed in a drawing for a $50 Walmart® gift card. If you have any questions, please contact me [contact info]. Your participation is appreciated! As indicated in the survey instructions, an electronic version of the survey was also available at GoogleDocs.com©. The goal of using both hardcopy and electronic surveys was to increase convenience in an attempt to increase participation. As an incentive to complete and return the survey, those teachers who
returned the survey within a week had their name placed in a drawing for a $50.00 gift card to Walmart®. A name was drawn for the gift card upon the survey deadline; the gift card was mailed to the winning teacher.

After a week’s time, surveys were gathered and the researcher scored and ranked the teachers along the continuum of traditionalism and constructivism. The researcher then identified the highest ranking (either constructivist or traditional) teachers, indicating each teacher’s alignment with either constructivist or traditionally-based practices. The highest scoring teachers within each grade were considered for participation for a total of 8 study participants.

Once surveys were collected and participants selected, the researcher contacted teachers via email to discuss further participation in the study. If a qualifying teacher refused to participate, s/he was replaced with the next closest willing to participate. Once participants were selected for the study and agreed to participate, they were contacted via email to discuss the scheduling of an optional meeting to outline the research plan and goals. Those not wishing to attend a meeting were provided with a Power Point presentation outlining the study plan and expectations for participants. No participants requested a meeting with the researcher. All participants were contacted via email and encouraged to ask any questions related to the study. The researcher responded to emails within a 24-hour period.

Upon reviewing study information, participants were asked to sign an informed consent document (see Appendix A) as well as to complete the demographic survey (see Appendix D) and leave with front desk staff at his/her school for pick up by the researcher. Participants were considered eligible for data collection to begin when the researcher received the signed informed consent document. A mutually agreeable time for the researcher to conduct the one-on-one
interview was scheduled via email communication with teachers with the goal of conducting each interview as soon as possible. Individual interviews were conducted with each teacher as scheduled. A single interview (see Appendix E) lasting approximately one hour was conducted one-on-one with each participant after school hours in his or her classroom. Meeting in the classroom allowed and encouraged the teachers to reference or cite examples of the physical environment if needed.

Following each interview, the researcher completed the PEERS (see Appendix G) and physical classroom observation in each participant’s classroom. A research assistant completed the PEERS in every third classroom in an attempt to maintain reliability of results. Observational field notes and photos of the physical classroom environment were taken on the same day following the completion of the PEERS in each classroom. The PEERS took approximately one hour to complete and the observational field notes and photos took approximately an additional hour to complete. Participants’ names were replaced with a pseudonym in an attempt to maintain confidentiality. The procedures of the study followed the protocol of the Institutional Review Board (IRB) at the university.
Validity & Reliability

In qualitative research, validity refers to the certainty and accuracy of the findings and is supported by evidence. Triangulation of data is a method used by qualitative researchers to establish and ensure validity in research by analyzing a research question from several perspectives (Creswell, 2009). This researcher attempted to address all possible factors threatening the research's validity in the following ways: using well-validated constructs to build theoretical predications for the study, gathering a representative sample, and outlining the limits and potential generalizations of the study. The researcher also sought to ensure validity through the sharing of information with the participants throughout the data analysis process. For example, once interviews were completed, they were transcribed and coded by the researcher. The researcher provided hardcopy transcriptions for each participant to review. Participants were encouraged to review the transcriptions for accuracy and credibility. Upon review,
participants initialed each page of the transcription and signed a member-checking letter agreeing to the accuracy of the transcriptions.

Upon transcription, the researcher generated a general summary of the interview themes using recommendations of Saldaña (2013). A research assistant then re-coded the transcriptions for comparison with the researcher’s themes to further establish rigor of the study. There were minimal discrepancies which were reviewed with agreement reached between the researcher and research assistant; this indicated the researcher rigorously explicated the data. Finalized themes were e-mailed to the participants, encouraging participants to review the summary of themes and determine if the summary reflected the overall tone of the interview. The goal of this process of member-checking was to enhance the trustworthiness of the study and minimize researcher bias (Creswell, 2009).

Reliability is also an important factor to consider when conducting qualitative research. Reliability refers to the repeatability of a particular group of research findings; that is, how accurately findings would replicate in an additional identical work of research (Creswell, 2009). To maintain reliability, the PI attended and completed training for implementation of the PEERS in spring 2013. A PEERS author, who served as a research assistant for the study, engaged in the process of data collection to achieve and maintain PEERS reliability prior to the study implementation. As a mechanism to ensure reliability, data collectors double-coded every third classroom to confirm interrater reliability for the PEERS. Interrater reliability on rubric items was conducted with a target reliability coefficient of no less than 85%; the first reliability coefficient was 88.2% and the second reliability coefficient was 88.4%.

According to Creswell (2009), methods of data collection and analysis must be derived from comparable studies which yielded success. This study’s data were triangulated through
surveys, the PEERS, interviews, observational field notes, and photos. Each of these methods is implemented frequently and successfully within the field of research. Another important aspect to ensure trustworthiness is the triangulation of data. Triangulation of data involves the implementation of at least three methods of data collection to ensure that an account is rich, comprehensive and well-developed. This procedure validates the data through cross verification from multiple sources (Creswell, 2009). Creswell (2009) recommends the use of debriefing sessions to allow for increased trustworthiness as the researcher shares personal reflections, ideas, and a vision for the research study. Debriefing sessions took place with the researcher’s dissertation chair to discuss alternative approaches, to reflect, and to develop ideas. This opportunity allowed for feedback, questioning, and shared ideas to advance the study.

Data Analysis

Qualitative data analysis includes the building of patterns, categories and themes through the organization of data into increasingly abstract units of information. Qualitative analysis is an inductive process which necessitates theme-building. The process of data analysis included examination of data from multiple sources including: 1) data from the TBS identifying teachers as constructivist and traditional; 2) teacher demographic survey results; 3) data from interviews regarding teacher beliefs and philosophy of education, guiding theory, knowledge of and training on the CCSSI, arrangement and use of the physical environment and materials in light of the CCSSI, types of instruction, and the overall extent to which the teacher felt the classroom physical environment facilitates the development of skills expectations of the CCSSI; 4) PEERS data outlining the components of each participating teacher’s classroom environment and; 5) observational field notes and photos outlining components of the physical classroom environment design.
This descriptive multi-case study was intended to gain a clearer understanding of teachers’ beliefs and perceptions of the role of the physical classroom environment design in the teaching and learning process in the era of implementation of the CCSSI. Qualitative methods were used in an attempt to understand the intricate and multifaceted experiences of teachers’ beliefs and classroom practices. It is important to note the qualitative researcher kept a focus on learning the meaning about a shared issue. Meaning did not emerge from the researcher’s beliefs but rather from the expressions of the participants. During the process of organizing and structuring data gathered through surveys, interviews, the PEERS, observational field notes, and photos several analytic methods were implemented to define conceptual themes. Analysis shifted from general to more specific with a comprehensive analysis required to elicit both descriptive and interpretive results. An interrelated research analysis approach involving interview transcriptions, survey data, observational field notes, photos, and the PEERS data were all be used to build a complex, in-depth sense of each participant’s experience as well as each participant’s context. In this way, qualitative analysis was appropriate as the interview data was interconnected with, and supported by, the additional data collection methods.
This study included a rather vast amount of data, which is typical for qualitative research design. In multi-case studies, this holds especially true because data is gathered from a variety of different sources for each case being studied (Creswell, 2009). It was valuable for the researcher to engage in on-going reflection soon after collecting data. Further, examining and analyzing data soon after collecting it aided in preventing feelings of overload for the researcher. The qualitative research process included reading, reflecting, noticing things, collecting data, and then analyzing data based on recommendations by Seidel and Kelle (1995) as seen in Figure 4.

All case data was organized and stored on password-protected individual electronic folders including participation selection data (i.e., TBS), demographic data (i.e., demographic survey), interview data, classroom environment data (i.e., PEERS), researcher observational field notes, and photos. This served to ensure organization and easy retrieval. Each participant file
had a complete electronic data set. All hardcopies were filed in individual file folders and placed in a locked cabinet.

The initial phase of data collection included the completion of the TBS by all teachers the selected school district. This information was primarily used to identify teachers ranging from traditional to constructivist. This information was also used in the data analysis as a type of identification for teachers (e.g., constructivist or traditional). Demographic survey data was included in the data analysis and used primarily to provide background and contextual information for each participant.

**Analysis of Interview Data**

After participants were selected using the TBS and demographic data were collected, individual interviews took place. Interviews were audiotaped. Following each interview, the researcher transcribed the interviews within 24 hours of the time they were conducted and also began analyzing individual interview data within 48 hours of each transcription. Hycner (1985) states, “unlike other methodologies, interview data cannot be reduced to a ‘cookbook’ set of instructions. It is more an approach, an attitude, an investigative posture with a certain set of goals” (p. 279). With this in mind, the researcher attempted to approach interview data analysis with the understanding meaning must emerge, rather than seeking meaning from the data.

To begin analyzing interview data, the researcher first inserted line numbering into the transcriptions and increased margins to provide space for notetaking as recommended by both Hycner (1985) and Saldaña (2013). The researcher then re-read transcriptions while listening to the audio several times in order to document any sounds not captured within the first transcription. Any necessary additions were made to the transcription (e.g., laughing, deep sighing, pauses, “ummm”, background noises, etc.). This process provided context to the data as
well as nonverbal information not provided by the hard data which aided in the emergence of core concepts and/or themes later in the analysis process (Saldaña, 2013).

The researcher then recorded any personal perceptions regarding the interview data within the large margins of each printed transcription document. This activity was intended to help clear the thoughts and perceptions from the mind in order to truly focus on the words, feelings, and meanings of participants. This process is aligned with Saldaña’s (2013) next step of interview data analysis. One must eliminate personal bias from data analysis in an attempt to elicit the true meaning of the data. In order to do this, one must rid him/herself of presuppositions that may be present (Saldaña, 2013). During this process, the researcher communicated regularly with the committee chair to share personal perceptions of each participant’s answers. Shenton (2004) recommends this debriefing process to help ensure trustworthiness as the researcher shares his or her research experiences in order to gain further guidance. This also provides an opportunity for reflection and the recognition of biases related to the research (Shenton, 2004). Upon completion of this process, the researcher prepared to move to the next step of interview data analysis. Next, the researcher again read through the transcription, this time including contextual factors and personal reflections, in order to gather meaning within the interview data. This must be done without referencing the research questions in an attempt to elicit the true “essence” (Hycner, 1985, p. 284) of the participant’s words.

Following the process of including contextual factors, the researcher re-read interview data, then engaged in open (Holton, 2007) or initial coding Saldaña (2013). MAXqda© qualitative analysis software was used to evaluate and interpret data. Interview data was uploaded to MAXqda© where initial coding took place. MAXqda© is a software program which stores, organizes, and manages data to enable human analytic examination. It is important
to note the software itself did not actually code the data; that task was the responsibility of the researcher. MAXqda© was a great help in storing, organizing, locating, grouping, and assigning codes to the data. Extensive examination to locate emerging categories and themes took place by the researcher.

Upon reading each line, the researcher used open coding to outline content of the participant’s answers for each individual line of the transcriptions. This line-by-line process allowed the research to consider “What is actually happening in the data?; what is the data a study of? and; what category does this information indicate?” (Saldaña, 2013, p. 88). This process supported the researcher in focusing on patterns among individuals and minimized the likelihood of overlooking an important category later on in the data analysis process. The use of initial coding further aided the researcher in avoiding becoming too selective and focused on a particular theme early on, resulting in a richer more holistic representation of data (Holton, 2007). These initial codes of general meaning included words and phrases which provided meaning irrespective of the research questions. These codes were recorded in the transcription margins. Care was taken to include all discrete units of general meaning at this stage of data analysis. During this process, and throughout the remainder of data analysis, the researcher maintained a “codebook” of codes used and their meaning as recommended by Patton (2005).

Following initial coding, the researcher then engaged in descriptive coding based on recommendations for case study analysis by Saldaña (2013). Descriptive coding is the process of identifying information which best describes the cases in a study. This process relates both to the coding of information in each case and the formation of attributes and characteristics to classify them (Holton, 2007). Saldaña (2013) describes this type of coding as the “foundation for qualitative inquiry, and its primary goal is to assist the reader to see what you saw and hear
what you heard in general” (p. 88). Descriptive codes, which summarized the primary topic of each interview excerpt, were applied to data in the right side margin of the lined interviews. Following the descriptive coding of all interview data sets, intercoder reliability was addressed by a peer doctoral fellow within the department. Descriptive codes were recoded by and compared to the codes set forth by the researcher. No discrepancies were found. In order to further validate the research, the dissertation committee chair was asked to review the established codes and then validate or invalidate them accordingly; minor suggested revisions were discussed and finalized prior to the next stage of data analysis.

Descriptive codes were then examined in light of their relevance to the research questions presented and categorized into core concepts. If a coded response appeared to provide information pertinent to the research questions, it was noted as a relevant response. Any statements which were not clearly relevant to the research questions were not coded as relevant. The core concepts which emerged from the interview responses were identified and examined in relation to the research questions. These concepts were a result of the laborious data analysis process. The core concepts, with supporting research methods and resulting data, were used to create a detailed description of each case. The research made sure to support case narratives with “sufficient quotes and field note descriptions to provide evidence for the researcher’s interpretations and conclusions” (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005, p. 201).

The following outline represents the core concepts which emerged during the descriptive analysis process of the interview data. Additionally, emerging themes were identified which were gleaned through noting frequency and patterns while seeing plausability in relation to
research questions. Both the core concepts and emerging themes will be further examined in the next chapter.

1. Teachers’ beliefs/philosophy of teaching and learning
2. Impact of teachers’ beliefs on environmental design
3. Teachers feelings/views toward classroom environment
4. Theory/theorists
5. Daily routine/use of environment
6. Physical environment impacts teaching and learning process
7. Knowledge construction
8. Important classroom features
9. Student work configuration
10. Assessments/test scores
11. Teachers’ views of CCSSSI
12. Impact of CC on physical environment
13. 21st Century Skills
   a. Communication
   b. Critical thinking
   c. Cooperation
   d. Creativity
14. Additional needs/wants for classroom environment to achieve CCSSSI

Emerging Themes & Sub-themes

1. Organized physical classroom environment
2. The population of students impacts the physical environment design
   a. Socioeconomic status of students
b. High turnover rate of students

c. Children with special needs.

3. Accountable Talk®
   a. Peripherals linked to learning
   b. Spaces for students to engage

4. Additional materials are needed to aid teachers in meeting CCSSI expectations

5. CCSSI lacks support from the public due to a perceived lack of understanding or misinformation
   a. CCSSI might be temporary
   b. Misinformed public lacks support for CCSSI

**Evaluating the Physical Classroom Environment: The PEERS**

Following an interview with each teacher, the researcher scheduled a time to complete the PEERs as well as observational field notes and photos. Creswell (2009) suggests describing cases in an understandable way while demonstrating how individual components fit to form a whole. For this study, examining the physical classroom environment using the PEERS provided another individual part to add context to the wholeness of each case. The PEERS aided the researcher in identifying each participant’s placement toward fully embracing the physical classroom environment as a tool for teaching and learning as evidenced through alignment with best practices. The PEERS, which is a rubric, provided an indication of each participant’s implementation of physical environment design aligned with best practices (Evanshen & Faulk, under review). The PEERS data was used to provide a rich description of the physical environment components of participating teachers’ physical classrooms.
Examining Visual Data: Photographs & Field Notes

Observational field notes and photos were used to provide information related to teacher beliefs and perceptions versus actual teacher practices (e.g. physical classroom environment design). According to Saldaña (2013), the use of visual data may be best approached with a holistic, interpretative lens guided by the researcher’s inquiry and intuition while keeping the research questions at the forefront of thought. The researcher’s goal when analyzing visual data was to carefully scrutinize and reflect upon the images gathered during the data collection process in connection to any additionally gathered data. This process resulted in a description to articulate the researchers “take” on the photos (Saldaña, 2013, p. 52). Saldaña further proposes the analysis of visual data to be just as valid and tedious as the process of analyzing written data. The use of rich descriptors are an appropriate approach to qualitative analysis of visual data as this process demonstrates detailed attention to the complexities of visual imagery while providing an additional interpretation of data. The use of a “thick description” (Saldaña, 2013, p. 54) of visual data provides a filter which creates balance between induction, in which data speaks for itself, and deduction, in which theoretical framework serves to interpret the data. For the purposes of this study, photos were examined in regard to the representation of evidence, or lack thereof, of the components outlined by the PEERS.

Narrative accounts are commonly used in qualitative research to “enable the analyst to consider both how participants tell their experiences and why they do what they do” (Shenton, 2004, p. 57). Observational field notes and photos were also used to illustrate and provide context associated with the physical environment components addressed by the PEERS. One important reason for including such contextual information is a typical lack of consistency
between what teachers claim they do in comparison with actual classroom practices (Jones & Gullo, 1999).

**Plan for Presentation of Findings**

For this descriptive multi-case study, data was analyzed in two distinct stages (Merriam, 1998). The triangulation of data resulted in a within-case holistic narrative description of each individual’s data set (e.g., Teacher A’s data, Teacher B’s data, etc.) in relation to research questions. Individual data set analysis outlined the perceptions of both individual constructivist and traditional educators (e.g., TBS) in regard to the role of the physical classroom environment in the teaching and learning process (e.g., interview) in an era of expectations set forth by the CCSSI (e.g., interview). Additionally, components of each teacher’s physical classroom environment design were examined (e.g., PEERS) and each participant’s actual physical classroom environment design were illustrated (e.g., field notes and photos). Within-in case analysis involves the in-depth investigation of a single case; the researcher was intimately familiar with each case and used her knowledge to discern how the data 1) supported or refuted information derived by the researcher during the literature review and 2) how the data gathered aided in answering the pre-determined research questions. Individual cases are of interest due both to their uniqueness as well as connections with other cases (Saldaña, 2013).

Following single case analysis, cases were cross-analyzed and synthesized as findings between and among cases were compared and contrasted (e.g., constructivist teachers compared to traditional teachers). The purpose of the cross-case analysis was to identify recurring beliefs, practices, and themes associated with teachers identified as constructivist or traditional. The emergence of themes further supports cross-case analysis. Data was examined and presented in relation to the study’s proposed research questions.
Validating Findings

Qualitative data analysis is an inductive process. In this type of research, theories are developed rather than tested (Creswell, 2009). Additionally, multiple methods of data collection are oftentimes used to triangulate data. Triangulation of data occurs when multiple methods are used for data collection (Creswell, 2009). Triangulation is oftentimes used in an attempt to substantiate the data collected in order to make it more reliable and valid. Triangulation refers to “whether the findings of a study are true and certain—true in the sense that research findings accurately reflect the situation and certain in the sense that research findings are supported by the evidence” (Merriam, 2009). The triangulation of data is critical for multi-case studies to assure a clear and meaningful picture is obtained for each participant (Creswell, 2009). Further, collecting data using a variety of sources or methods decreases the likelihood of errors or inaccurate conclusions. For this study, data was triangulated through a variety of techniques including surveys, interview, the PEERS, observational field notes, and photos. Table 3. outlines the various data collection methods in connection to the research questions. Additionally, the use of multiple participants served to strengthen the trustworthiness of findings. Although the researcher was the primary interpreter of data, external audits occurred in a conscious effort to reduce bias and misinterpretations. External auditors consisted of early childhood professionals and peers within the field.
### Table 3. Matrix of Sources of Data in Relation to Research Questions

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Teacher Belief Survey (TBS)</th>
<th>Teacher Interview</th>
<th>The PEERS</th>
<th>Field notes &amp; photos</th>
<th>Teacher demographic survey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central research question.</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><em>What is the role of the physical classroom environment in teaching and learning in 8 primary classrooms in Northeast Tennessee?</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Sub-question 1.</strong> <em>What are the perceptions and experiences of 8 primary teachers related to their use of the physical classroom environment as a teaching and learning tool?</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Sub-question 2.</strong> <em>How does the philosophy of teaching and learning of 8 primary teachers impact the design of the physical classroom environment?</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Sub-question 3.</strong> <em>How has the Common Core State Standards Initiative impacted the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee?</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Sub-question 4.</strong> <em>How does the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee support the following 21st century skills set forth by the CCSSI: collaboration, creativity, critical thinking, and communication?</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Findings were described in relation to consistency with teaching and learning principles aligned with constructivist learning theory (Barr, 2001; Dangel et al., 2004; Piaget, 1977; Vygotsky, 1978; White 2001; Wilson & Wineburg, 1993; Wood et al., 2001). Interview data was coded, examined, reexamined, and compared to findings from the other measures. An outside auditor was intended to ensure trustworthiness through double-coding of transcriptions while member-checking served to increase reliability. Core concepts identified during the coding process were used to build the complex analysis process as multifaceted theme.
connections were identified among cases. The detailed discussion of several emerging themes and sub-themes identified from interview data were supported by information obtained through the use of the PEERS, observational field notes, and photos. This triangulation of data sources was used to build a coherent justification for the researcher-identified themes while providing a rich context for each participant’s perception related to the role of the physical environment in the teaching and learning process.

As the researcher formed an interpretation of the overall findings, linking the findings from tools with interview data, an understanding of the culture, history, and experiences of participants emerged. Additionally, findings were presented as a result of researcher interpretation of overall meaning occurred through within and cross-case analyses. Future questions for investigation emerged which were unforeseen during the earlier part of the study which will be discussed in Chapter 5.

**Chapter Summary**

Chapter 3 presented the proposed research methods for this study. The characteristics of qualitative research were outlined as well as the suitability of a descriptive multi-case study to address the proposed research questions. The role and background of the researcher were provided. Data collection methods and instrumentation were discussed. Strategies for maintaining reliability and validity throughout the data analysis process were also provided. Lastly, data analysis procedures outlined the plan for examining data in an effort to address the proposed research questions.
CHAPTER 4

RESULTS

Purpose of the Study

Descriptive case studies such as this can yield a vast amount of information. Data from surveys, interview, observational field notes, and photographs were analyzed in order to develop core concepts and themes to address the research questions. Data collection and intense analysis resulted in a rich understanding of each case both independently and in relation to one another. Chapter 4 provides data analyses and presentation of study findings. The chapter consists of two sections; the first outlines the within-case data analysis and the second section presents cross-case analysis.

Restatement of the Research Questions

The purpose of this qualitative descriptive multi-case study was to examine the learning principles and epistemological beliefs of primary teachers with reference to the physical classroom environment and the teaching and learning process. Additionally, the study examined how the CCSSI impacted the design of the physical classroom environment and how the design of the environment supported the development of 21st century skills set forth by the CCSSI. This chapter presents an extensive analysis of each case in relation to the research questions which are as follows:

Central research question. What is the role of the physical classroom environment in teaching and learning in 8 primary classrooms in Northeast Tennessee?

Sub-question 1. What are the perceptions and experiences of 8 primary teachers related to their use of the physical classroom environment as a teaching and learning tool?

Sub-question 2. How does the philosophy of teaching and learning of 8 primary teachers impact the design of the physical classroom environment?
**Sub-question 3.** How has the Common Core State Standards Initiative impacted the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee?

**Sub-question 4.** How does the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee support the following 21st century skills set forth by the CCSSI: collaboration, creativity, critical thinking, and communication?

Following the within-case analysis, a cross analysis of data for the eight participants of the study will be presented.

**Within-Case Analysis**

One strength of qualitative analysis is the ability to illustrate the elements of a shared human phenomenon (Ayres, Kavanaugh, & Knafl, 2003). Multiple accounts of a common experience make up the narrative data from which the researcher’s generalizations are drawn. While a general context of a focus phenomenon is developed, which is common to all participants, each individual’s account of the experience forms its own context. It is the responsibility of the researcher to develop an interpretation of each individual data set which reflects the unique experiences while equally applying the context across all of the accounts that constitute the entire data set. Some information is relevant to the shared experience while other information sheds light on exclusive individual experiences. These distinctions are sometimes critical in understanding a particular person’s views of the experience. Insights into a single account can sensitize the researcher to similar information as it occurs in other cases (Ayres et al., 2003). Each case presented in this study is of interest to the researcher for their uniqueness as well as commonality. Chapter 4 provides within case and cross-case analysis in an attempt to share both individual and shared key elements of the phenomenon under investigation which was teaching in the era of the implementation of the CCSSSI. Before results of the within-case
analyses are discussed, an overview of the 8 participants of the study is presented in Tables 4 and 5.

Table 4. *Teacher Belief Survey Scores*

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chrissy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elizabeth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- : Constructivist
- : Traditional
Table 5. Teacher Participants’ Demographic Data

<table>
<thead>
<tr>
<th>Grade Taught &amp; TBS Survey Result</th>
<th>Participant Pseudonym</th>
<th>Gender</th>
<th>Highest degree earned</th>
<th>Certification</th>
<th>Level of teaching experience</th>
<th>Years teaching current grade</th>
<th>Grades taught</th>
<th>Training(s) focused on physical learning environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten Constructivist</td>
<td>Amanda</td>
<td>Female</td>
<td>Master’s degree</td>
<td>Pre-k-3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>2-5 years</td>
<td>&lt;2 years</td>
<td>Pre-k, K</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt;, 2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>None listed</td>
</tr>
<tr>
<td>Kindergarten Traditional</td>
<td>Beth</td>
<td>Female</td>
<td>Master’s degree</td>
<td>Pre-k-3&lt;sup&gt;rd&lt;/sup&gt;, K-6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>&gt;10 years</td>
<td>&gt;10 years</td>
<td>Pre-k, K</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt;, 2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>In-service trainings</td>
</tr>
<tr>
<td>First Grade Constructivist</td>
<td>Chrissy</td>
<td>Female</td>
<td>Master’s degree</td>
<td>K-6&lt;sup&gt;th&lt;/sup&gt; National Board Certification</td>
<td>&gt;10 years</td>
<td>Over 2 years</td>
<td>K, 1&lt;sup&gt;st&lt;/sup&gt;, 4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>None listed</td>
</tr>
<tr>
<td>First Grade Traditional</td>
<td>Dana</td>
<td>Female</td>
<td>Master’s degree</td>
<td>K-6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2-5 years</td>
<td>Over 2 years</td>
<td>K, 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Graduate courses</td>
</tr>
<tr>
<td>Second Grade Constructivist</td>
<td>Elizabeth</td>
<td>Female</td>
<td>Master’s degree</td>
<td>Pre-k-3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>2-5 years</td>
<td>&lt;2 years</td>
<td>Pre-k, 2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Graduates courses &amp; Attendance at East Tennessee State University Early Childhood Conference</td>
</tr>
<tr>
<td>Second Grade Traditional</td>
<td>Fae</td>
<td>Female</td>
<td>Master’s degree</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;- 8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>&gt;10 years</td>
<td>Over 6 years</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;, 2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>None listed</td>
</tr>
<tr>
<td>Third Grade Constructivist</td>
<td>Grace</td>
<td>Female</td>
<td>Master’s degree</td>
<td>K-8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>&gt;10 years</td>
<td>Over 6 years</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;, 2&lt;sup&gt;nd&lt;/sup&gt;, 3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In-service; personal research</td>
</tr>
<tr>
<td>Third Grade Traditional</td>
<td>Adam</td>
<td>Male</td>
<td>Master’s degree</td>
<td>K-6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>6-10 years</td>
<td>&lt;2 years</td>
<td>K, 1&lt;sup&gt;st&lt;/sup&gt;, 3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-day training (Metro Nashville)</td>
</tr>
</tbody>
</table>

**Amanda: Constructivist Kindergarten Teacher**

“I believe that it’s my job to create a safe, positive learning environment in which kids construct their own knowledge…that’s how I believe they learn the best.”

**Demographic survey.**

Amanda is a Caucasian female who was between the ages of 25-34 years old at the time of the study. She held a Master’s in Literacy Education and was certified to teach pre-k through
third grade. Amanda had 5 years of teaching experience and had taught first grade for less than 2 years, but also had experience teaching pre-k, first, and second grades. She had attended district-led Common Core State Standards Initiative Trainings. She scored the highest in her grade for constructivist beliefs on the TBS with an overall percentage of 90% constructivist responses.

**Field notes & photo of classroom layout.**

Amanda’s classroom is illustrated in Figures 5 and 6.

![Figure 5. Sketch of Amanda’s Classroom Layout](image)

![Figure 6. Photo of Amanda’s Classroom Layout](image)

**Role of the physical classroom environment in the teaching and learning process.**

**Interview data.** Amanda shared her belief that the classroom environment should be a “home away from home” as she described her attempt to create a “comfortable, friendly, happy environment” which included a neutral color palette. “I try to keep [colors] calm; nothing to loud or too crazy” with peripherals to a minimal to prevent overstimulation of kindergarten students. Amanda also kept safety at the forefront of her classroom design while also maintaining her focus on developmental appropriateness. “Safety is number one, but I also try to
think about where kindergarteners are developmentally… I make sure I have age appropriate everything; games, activities, books, materials.”

**PEERS data: Environment for meaningful learning.**

Table 6. Amanda’s PEERS Scores: Environment for Meaningful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>15.4%</td>
<td>38.5%</td>
<td>46.2%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>0%</td>
<td>16.7%</td>
<td>83.3%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>28.6%</td>
<td>57.1%</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

The **PEERS subscale: The healthy classroom.** The physical classroom environment can reflect a teacher’s personal philosophy of education and beliefs about how young children learn (Fraser, 2011). The impact of Amanda’s philosophy on her physical classroom environment design was examined in light of PEERS indicators associated with Meaningful Learning as Amanda had shared her desire to create a home-like environment for students. Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Amanda’s classroom environment represented the foundation for DAP, constructivist-centered practices. Approximately 46.2% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 38.5% received a score of 2, 15.4% received a score of 1 with the subscale of Healthy Classroom receiving 0% of ones, 16.7% of twos, and 83.3% of threes.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. The classroom was found to be hazard free and well-maintained. The classroom was well-ventilated
with a room temperature of approximately 70 degrees Fahrenheit. A wax melter contained a brain compatible scent (e.g. vanilla) as seen in Figure 7. Figure 8 demonstrates variety in lighting as evidenced by natural light controlled by a partial curtain and a lamp. A sink with cups made water available throughout the day.

Approximately 38.5% of indicators for the Environment for Meaningful Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Only 1 indicator received a score of 2 under the subscale Healthy Classroom. The indicator which received a score of 2, as seen in Figure 9, is evidence of the availability of healthy, limited sugar snacks (e.g., apples, apple juice, and granola bars) at a designated snack time (noted on daily agenda). Amanda would have received a score of 3 had she provided students with access to healthy snacks throughout the day.

Approximately 57.1% of indicators within the subscale Welcoming and Inviting Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. The classroom’s color palette was limited and complimentary. In
order to receive a score of 3, a neutral base on walls, shelves, etc. would have been available to provide a backdrop for students’ work and projects. Further, a score of 2 was given because student photos were contained only in photo binders and a single class photo, shown in Figure 11. Some home-like elements (e.g., window treatments, a rug, and lamps) found throughout the classroom did not serve to enhance centers or to engage the learner. Evidence that some procedures were created with students was noted through a teacher-created document. A score of 3 would have been given had the class expectations or procedures included photos of children demonstrating the procedures. In Figure 12, the daily agenda is teacher-created and posted, yet lacks picture icons needed for emerging readers necessary to receive a score of 3.

Approximately 15.4% of indicators for the Environment for Meaningful Learning domain received a score of 1, indicating novice implementation of developmentally appropriate principles. No living plants were included in Amanda’s classroom. In order to receive a score of 3, 4-6 living plants and evidence that students partook in caring for plants would have to be available. Limited photos of students were found in the room. Had there been multiple photos indicating evidence of family-school connections, a score of 3 would have been given.

Figure 10. Music  Figure 11. Photos of Children  Figure 12. Daily Agenda
**PEERS data: Environment for responsible learning.**

Table 7. *Amanda’s PEERS Scores: Environment for Responsible Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>66.7%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

Amanda further discussed how she designed her classroom environment to allow for responsible learning through the use of labeled materials, small group access to materials, and the organized materials. PEERS indicators supported the role of the physical classroom environment in the teaching and learning process, particularly regarding the degree of organization and accessibility of materials. Approximately 33.3% of the total indicators for the Environment for Responsible Learning domain received a score of 3, 66.7% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 2 follow. Multiple, flexible materials were located in the learning centers and readily available to learners. Additionally, the materials were stored and arranged for responsible access of transportable materials.

The role of the environment in the teaching and learning process was also explored in terms of the provision of resources and authentic materials linked to learning. Approximately 66.7% of indicators for the Environment for Responsible Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. There was a presence of some commercially purchased textbooks and worksheets as well as authentic artifacts. In order to receive a score of 3, multiple tools and materials available to support and
challenge learners would have to be present. One such example is shown in Figure 13 which illustrates an authentic student work sample. Students had access to materials through centrally stored materials as shown in Figure 14, yet no procedures were posted encouraging independent use of the materials. Although most materials were stored in transportable, labeled bins and baskets as seen in Figure 15, they lacked creative or aesthetic display to promote focus and engagement in learning.

Use of the physical classroom environment as a teaching and learning tool.

Interview data. In regard to the environment as a tool for teaching and learning, Amanda spoke primarily about the value of meaningful peripherals in the teaching and learning process. The peripherals found throughout the classroom were all chosen with the specific goal of supporting learning and promoting reflection. “I try to make it very much about the kids’ work; so their work is always going to be out in the hallways, the classroom.” Peripherals in the classroom were kept to a minimum with one of the most important features of Amanda’s classroom being the word wall, which was “constantly referenced” by students throughout the learning process. “I try not to keep a whole lot on the walls…kindergarten is hard to focus. I try to constantly keep them on track and redirected. Everything [peripherals] is here to help them.”
Continuous learning received the lowest amount of indicators receiving a score of 3, resulting in 0%. One hundred percent received a score of 2 and 0% received a score of 1. Indicators which scored a 2 demonstrated proficient implementation of developmentally appropriate principles; indicators which received a score of 2 follow. A mix of teacher-directed work (e.g., worksheets) and authentic work (e.g., student-generated representations) were arranged for accessible review and access by students. Examples are shown in Figures 16, 17, and 18. Authentic student work representing the current topics of study and peripherals created during learning experiences would need to be visible in order for Amanda to receive a score of 3. Figure 19 demonstrates some evidence of assessment artifacts (e.g., work products, performances, etc.) found in student folders, on display in the room, and in journals or portfolios. A score of 3 would have been given had a wider variety of assessment artifacts been accessible. Two examples of student work related to the current topic of study were displayed (one in the classroom and one in the hallway). Had there been documentation of student learning visible through a variety of media which communicated learning objectives, Amanda would have received a score of 3.

### Table 8. Amanda’s PEERS Scores: Environment for Continuous Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

**PEERS data: Environment for continuous learning.**
Impact of philosophy on physical classroom design.

Interview data. Amanda felt she was not guided by any particular theory or theorist; however, she noted the importance of following her personal philosophy and allowing personal teaching experiences to guide the design of the learning environment she created for young children. “I don’t really take into consideration much about the theorists…getting in here and working with kindergarteners and getting to know them; that’s what has impacted me most in how I create my environment and how I teach.” During her interview, Amanda frequently cited the importance of creating a physical classroom environment and providing materials which allowed children to “construct their own knowledge.” She explained she strived to do so through the provision of hands-on, play-based activities which encouraged children to work with manipulatives.

When asked how her philosophy of education impacted her classroom design, Amanda said, “It [philosophy] impacts everything.” The use of learning centers was found to be prevalent in Amanda’s room, a finding likely related to her beliefs about how young children construct their own knowledge through hands-on learning experiences. Amanda stated, “It’s all about the children for me. That’s why I set up my classroom in centers so they’re always
constructing their own knowledge. They’re always playing. It’s not teacher-driven. It’s child-driven.”

**PEERS data: Environment for purposeful learning.**

Table 9. *Amanda’s PEERS Scores: Environment for Purposeful Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>20%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Based on Amanda’s beliefs in the use of centers to engage children in the learning process, the PEERS was used to evaluate the Environment for Purposeful Learning. The role of the physical classroom environment in the teaching and learning process was explored in regard to the provision of center positioning, the number and type of available centers, storage, and teacher work spaces. Eighty percent of the total indicators for the Environment for Purposeful Learning domain received a score of 3, 10% received a score of 2, and 10% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. The classroom offered 5 learning centers which were grouped by noise and activity level with physical separation of centers. One example is shown in Figure 20. One example of the multiple literacy and math centers is shown in Figure 21. Private and accessible storage was available for students through draft books, individual work boxes, and cubbies. The teacher work spaces were uncluttered and organized as evidenced in Figure 22. Figure 23 shows one of the various teaching stations throughout the room, which occupied less than 1/8 of the instructional space in total.
One indicator scored a 2 which demonstrated proficient implementation of developmentally appropriate principles; an example of the indicator which received a score of 2 is shown in Figure 20. Although there was physical separation of learning centers which permitted supervision, dividers did not add learning value to the space. One indicator scored a 1 which demonstrated novice implementation of developmentally appropriate principles; no science centers were available for reinforcing science skills.

**Figure 20. Physical Separation of Centers**

**Figure 21. Literacy Center**

**Figure 22. Minimal Clutter**

**Figure 23. Variety of Teaching Stations**

**Impact of the CCSSI on physical classroom design.**

**Interview data.** Amanda felt the CCSSI had no impact on the physical design of the classroom environment; again, she cited the importance of allowing her personal philosophy of teaching and learning to guide her practices. “Basically, I don’t read the Common Core standards and say ‘oh, my classroom needs to look like this because the Common Core says.’ I need to focus on my kids and focus on what I know is right for them and what I know is developmentally appropriate.” This being said, Amanda had not considered her physical environment design in regard to helping her teach the Common Core standards. “Ultimately, my goal is to teach the kids, and I set up my environment the best way possible to meet learning goals; if that doesn’t align with Common Core, it doesn’t…my main goal is to make sure they are learning, having a good time, and they’re growing as individuals.”
Physical environment design’s support for 21st century skills.

Interview data. When asked how her physical classroom environment aided in meeting the needs of children in the 21st century, Amanda noted the use of technology as a tool for aiding children in gaining 21st century skills. “They have to learn typing skills because by the time they hit third grade, all of their assessments are on the computer…so in kindergarten, they come in and they are on the computer from the beginning.” She further outlined the use of various forms of technology (e.g., iPads™, SMART Board®, documentation camera, computers, etc.) in sharing children’s work with peers. “If someone…has written a story in their draft book and it’s an awesome story, we share it; put it on the documentation camera to share with everyone.” As the interview continued, Amanda noted how her classroom design aids students in developing the 4 C’s of the 21st century skills.

Creativity. When describing how her classroom design aided students in meeting the 21st century skills, Amanda mentioned the value of providing hands-on activities and limiting the use of worksheets to support creative freedom. “I try to give them creative power and not stifle them because I know, especially with the standards and how they are now…we are stifling creativity and I do not want that, especially in kindergarten.” She further noted the value of using authentic assessments to promote creative-thinking and problem-solving.

Critical thinking. To Amanda, an important aspect of promoting critical thinking was limiting the use of commercially-created worksheets and, instead, encouraging students to solve problems manipulating real materials in learning centers, engaging in higher-order thinking strategies, and reflecting on their own learning experiences. “I didn’t set up my centers thinking this will meet a standard. I set them up this way because I know what kids need…they need a variety of teaching for each learning style. You can’t just have them sitting at their desks doing
worksheets all day long.” She further discussed the use of the centers as a tool for engaging students in critical thinking and communication as they “create their own knowledge, come back, and share what they’ve learned…if they haven’t got something, we talk it through as a group always.”

Collaboration. Amanda’s classroom design, learning centers, and small group seating arrangement allowed for what she described as “social freedom” throughout the day. She noted children have choice in regard to work configuration and that students were encouraged to engage in collaborative learning throughout the day. “Most of the time they’re working with partners, but if I see that they’re getting frustrated and they need some alone time…then that’s totally fine. I don’t say ‘you have to stay in a group’.” The provision of time to become fully engaged in learning center activities was also noted as an important aspect of the collaborative learning process. “I think it’s important to give them time to learn from each other; it helps them think through their learning.”

Communication. In Amanda’s classroom, children are engaged in social learning and are expected to share their knowledge with peers. “They’re creating their own knowledge [in centers]…they share what they’ve learned and I keep them accountable at all times. I think communication with everyone is very important. We learn from each other.” In keeping with her beliefs about the value of social learning, Amanda provided small group tables to promote “a family-like environment.” She noted the value of using small group seating to encourage students to work collaboratively, share ideas, and to create a sense of community.
PEERS data: Environment for social learning.

Table 10. Amanda’s PEERS Scores: Environment for Social Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

As previously mentioned, the environment design can be indicative of a teacher’s philosophical beliefs regarding teaching and learning. Amanda had discussed the value of social learning to aid students in achieving 21st century skills in length, with her environment demonstrating support for this belief. The Environment for Social Learning Domain received 100% of indicators scoring a 3 as evidenced through Amanda’s physical classroom design. Figure 24 demonstrates some of the variety in small group seating. Amanda offered a variety of work spaces for students, multiple areas for small group instruction with instructional resources, choices in seating, and evidence that students working individually and in small groups had options for seating (e.g., rug, chairs, pillows, etc.). A designated large group meeting area used as a multipurpose area is shown in Figure 25. Evidence of seating options (e.g., rug and multi-level activities) is demonstrated in Figure 26.

Figure 24. Small Group Seating
Figure 25. Large Group Meeting
Figure 26. Seating Options
**PEERS data: Environment for Inquiry-based learning.**

Table 11. *Amanda’s PEERS Scores: Environment for Inquiry-based Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td><strong>20%</strong></td>
<td><strong>60%</strong></td>
<td><strong>20%</strong></td>
</tr>
</tbody>
</table>

Amanda shared her support for the role of “hands-on” learning to support 21st century skills development in her classroom, with the PEERS indicators demonstrating environmental evidence of this belief. Twenty percent of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 60% received a score of 2, and 20% received a score of 1. One indicator scored a 3 which demonstrated accomplished implementation of developmentally appropriate principles; the indicator which received a score of 3 was the availability of multiple technology centers. One of the multiple technology centers for reinforcing technology skills is shown in Figure 28.

Three indicators received a score of 2, indicating proficient implementation of developmentally appropriate principles. Limited evidence of collaborative planning between the teacher and students was found. Had there been extensive evidence of the use of a variety of graphic organizers to plan student work, monitor their progress, and summarize information, a score of 3 would have been given. One example of the use of graphic organizers was found as shown in Figure 27. Figure 29 demonstrates some student access to research texts (e.g., dictionaries, information texts, encyclopedias, etc.), and some evidence of access to additional resources (e.g., photography, music, artwork, etc.) was found. With the addition of projects,
multiple research texts, and active learning experiences to explore the topic of study, a score of 3 would have been given.

One indicator scored a 1 which demonstrated novice implementation of developmentally appropriate principles; the indicator which received a score of 1 included evidence suggesting the teacher provided a prescriptive series of steps for task completion by students. Extensive evidence of collaborative planning would have increased the score to 3.

*Beth: Traditional Kindergarten Teacher*

“I believe every child can learn…I take them where they are and I move them as fast as I can.”

**Demographic survey.**

Beth is a Caucasian female who was over 55 years old at the time of the study. She held a Master’s in Reading and was certified to teach pre-k through sixth grade. Beth had a total of 28 years of teaching experience and had taught kindergarten for over 10 years, but also had experience teaching grades pre-k through second grade. She had attended multiple in-service trainings offered by the district as well as a 3-day Common Core State Standards Initiative Training during summer 2014. She scored highest in her grade for traditional beliefs on the TBS with an overall percentage of 54.54% traditional responses.
Field notes & photo of classroom layout.

Beth’s classroom is illustrated in Figures 30 and 31.

![Figure 30. Sketch of Beth’s Classroom Layout](image)

![Figure 31. Photo of Beth’s Classroom](image)

Role of the physical classroom environment in the teaching and learning process.

Interview data. Beth shared her goal for creating a welcoming environment for students. “I want it to be homey; that’s why I put lots of pictures around. I want the kids to feel comfortable here and to know the rules from the beginning.” She also noted the importance of maintaining organization and keeping clutter to a minimum. No further information from the interview was coded as being related to the role of the physical environment in the teaching and learning process.
**PEERS Data: Environment for meaningful learning.**

Table 12. Beth’s PEERS Scores: Environment for Meaningful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>23.1%</td>
<td>61.5%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>0%</td>
<td>66.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>42.9%</td>
<td>57.1%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*The PEERS subscale: The healthy classroom.* Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Beth’s classroom environment represented the foundation for DAP, constructivist-centered practices.

Approximately 15.4% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 61.5% received a score of 2, and 23.1% received a score of 1 with the subscale of Healthy Classroom receiving 0% of ones, 66.7% of twos, and 33.3% of threes.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Beth’s classroom was found to be hazard free and well-maintained; however, there was no evidence that students were active participants in the care of the room. The classroom was well-ventilated and maintained a temperature of 70 degrees Fahrenheit. The room was odorless.

Beth’s room received 61.5% of indicators scoring a 2, and 66.7% were related to the Healthy Classroom subscale. Natural and overhead lighting were the primary lighting sources; in order to receive a score of 3, variety in lighting would have to be used to define learning spaces. Figure 32 demonstrates how blinds were used to control natural light. Figure 33 shows healthy, limited sugar snacks (e.g., granola bars and crackers) which were available at a
designated snack time as indicated by the daily agenda. If procedures had been in place for responsible access throughout the day, a score of 3 would have been given. Access to water was available through a water fountain within the classroom as seen in Figure 34; procedures in place for water consumption would have raised Beth’s score to 3.

The PEERS subscale: Welcoming & inviting classroom. The subscale of Welcoming & Inviting Classroom received 28.6% of threes, 28.6% of twos, and 42.9% of ones. The following indicators received a score of 3. A tape player and tapes were noted, indicating regular use of music in the classroom. Figure 34 demonstrates the daily agenda with picture icons to aid emerging readers. Home-like elements such as soft furniture, various types of photography, blinds, and rugs were available and served to enhance centers and areas throughout the room.

Indicators receiving a score of 2 included color in the room and the daily agenda. The classroom walls were a light blue with complimentary accents; a score of three would have been given had color from the room come primarily from students’ work. The daily agenda, featuring picture icons, is seen in Figure 37.

Although there were 2 artificial and 2 real plants in the room, a score of 1 was given because there was no evidence of reinforcing learning about the care of living things. Figure 35
shows evidence of living plants and photos. Additionally, photos of students were limited to one per student as seen in Figure 36. Had there been evidence of family-school connections through photos, a score of 3 would have been given. No rules or procedures were displayed in the classroom. Procedures for student expectations and photos of students demonstrating procedures would have to be evident for a score of 3.

*Figure 35. Living Plants  Figure 36. Student Photo  Figure 37. Daily Agenda with Picture Icons*

**PEERS data: Environment for responsible learning.**

Table 13. *Beth’s PEERS Scores: Environment for Responsible Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>16.7%</td>
<td>83.3%</td>
</tr>
</tbody>
</table>

Beth noted the value of a well-organized, planned environment for young children. A key component of Beth’s room, as indicated by the PEERs, was organization to support responsible learning by students and the value of students understanding the classroom’s use and routine. She further noted the importance of practicing expectations and classroom procedures, which were evidenced by the PEERS. “I have always taught my kids how to rotate and how to
stay in a specific center once you’re there…they know the rules from the beginning. They do what I ask them to do because they know the rules and, basically, they just do them.”

Approximately 83.3% of the total indicators for the Environment for Responsible Learning domain received a score of 3, 16.7% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Multiple materials, including authentic artifacts, linked to learning objectives were available. Figure 38 demonstrates access to leveled readers. Figure 39 demonstrates the availability of multiple materials as well as developmentally appropriate labeling (i.e., words and photos) on the majority of materials. The majority of materials were stored for responsible access and transportation by students and were found to be uncluttered and visually appealing, as seen in Figure 40.

Approximately 16.7% of indicators for the Environment for Responsible Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Only one indicator received a score of 2. Students had access to classroom materials as evidenced in central storage; however, no procedures were posted to encourage independent access and use of materials for learning.

Figure 38. Accessible Materials Linked to Learning

Figure 39. Labels

Figure 40. Easily Transportable Materials
Use of the physical classroom environment as a teaching and learning tool

*Interview data.* Beth outlined the importance of using centers in her classroom as a tool for teaching and learning. She further shared the role of learning centers in the assessment process. “We have lots of paper documentation. At every center they have papers they have to complete to help keep them accountable. In math, there’s always worksheets they have to complete.” Beth felt teacher observation of learning centers was also a valuable form of assessment. “…there are certain checklists that they have that you walk around the room and check (during centers).”

*PEERS data: Environment for continuous learning.*

Table 14. *Beth’s PEERS Scores: Environment for Continuous Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>25%</td>
<td>50%</td>
<td>25%</td>
</tr>
</tbody>
</table>

The physical classroom environment was used as a teaching and learning tool, as indicated through PEERS findings outlining indicators of continuous learning. Twenty-five percent of the total indicators for the Environment for Continuous Learning domain received a score of 3, 50% received a score of 2, and 25% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; the one indicator which received a score of 3 is demonstrated in Figures 42, 43, and 44. A variety of assessments was found, which included writing samples, journals, worksheets, hands-on activities accompanied by teacher observational checklists, and technology as seen in Figures 42, 43, and 44.
Fifty percent of indicators received a score of 2. A mix of teacher-directed work and authentic student work was found, as seen in Figure 41. Displays of student work were limited primarily to paper-pencil tasks displayed on bulletin boards within the classroom. Only 1 indicator received a score of 1; documentation of student learning was primarily represented through paper and pencil tasks while there was a limited display of student work on bulletin boards.

Impact of philosophy on physical classroom design.

Interview data. Beth shared her philosophy that every child can learn. She shared her use of ability groupings to ensure skill development before children move to the next level. She also noted the value of maintaining a framework for taking advantage of every available teaching opportunity. “I’m very structured in here as far as we move through the classroom so that every second of the day is utilized and helps the children learn as much as they can.” In keeping with her belief in the value of a well-organized room in which expectations are known to students, Beth further outlined the importance of maintaining a well-planned environment with organized materials which were readily available to learners. “I think young children need to understand how a room works and buy into that. So, I have little signs posted around the room with the
different names of the groups so I always know where to start them and where they end up. And they know how to rotate, depending on what center it is.”

Beth shared regarding the impact of her professional development and training through the Learning Network®, noting the role of learning centers in her classroom. “When I started teaching, the goal of kindergarten was to teach them their letters. Well, in this world today, that’s not enough…my trainer from the Learning Network® said, when we got rid of our housekeeping center, *Are you training them to be housekeepers or do you want them to learn to read and write and to give them the skills they need to succeed in this world?* And so, that’s basically, you know, my thinking.”

**PEERS data: Environment for purposeful learning.**

Table 15. *Beth’s PEERS Scores: Environment for Purposeful Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>20%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Another notable role of Beth’s physical classroom environment in the teaching and learning process was to support the use of well-planned learning centers to reinforce a variety of skills. Seventy percent of the total indicators for the Environment for Purposeful Learning domain received a score of 3, 20% received a score of 2, and 10% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Several learning centers (e.g., technology, math, reading, writing, and listening) were available and clearly defined as well as grouped by noise and activity.
Figure 45 is indicative of noise grouping; the listening center is in a quiet area of the room and is positioned between two partitions to encourage focus. Three literacy centers were available to reinforce literacy skills, which included vocabulary, listening, and writing. Figure 46 demonstrates the variety of materials available for use in the math center. The teacher work space was free of clutter with a variety of teaching stations located throughout the room; shown in Figure 48. Less than 1/8 of the instructional space was occupied by teacher.

Only 2 indicators received a score of 2 under the Purposeful Learning domain. The centers were also separated by some form of divider, although dividers did not add learning value to the spaces. Community storage was available for personal belongings and student work, which included storage bags as seen in Figure 47. In order to receive a 3, additional privatized individualized storage would have to be available. Only 1 indicator received a score of 1 under the Purposeful Learning domain. There was no evidence of an available science center. Multiple science centers for reinforcing science skills would have increased Beth’s score to 3.
Impact of the CCSSI on physical classroom design.

*Interview data.* Beth expressed her support for the CCSSI. “I think it’s wonderful; I do think children need to be pushed.” Beth felt the CCSSI had no impact on her physical environment design. She felt her physical classroom environment had always been aligned with the expectations set forth by the standards. “I think it [the classroom environment] works fine; if something works and the kids are learning and my kids *are* learning every year, the scores will verify that.”

Physical environment design’s support for 21st century skills.

*Interview data.* When asked how her physical classroom environment aided in meeting the needs of children in the 21st century, Beth spoke regarding the use of assessment to drive instruction. “We assess with DRAs, and then, of course, teacher observation, and then in math there are certain checklists that they have that you walk around the room and check *Can you make a pattern? Can you write your numbers one through ten?* And sometimes it’s individual and sometimes it’s just going around. *Can you count in the counting jar? Can you count the correct number of objects? Did you record it correctly? Did you write the number that matches?* That sort of stuff.” As the interview continued, Beth noted how her classroom design aids students in developing the 4 C’s of the 21st century skills.

*Creativity.* Beth felt the use of reading groups supported the development of creativity as students were engaged in predicting as well as critical thinking using inference to aid them in reading unfamiliar texts. Despite prodding, Beth did not elaborate beyond this explanation regarding how the physical classroom environment supported the 21st century skill of creativity.

*Critical thinking.* She shared regarding the value of allowing children of mixed-ability to share personal findings with the whole group to support critical thinking. “So they’re really
teaching each other all the time…but they know I’m going to expect them to explain stuff.”

Despite further questioning, Beth did not elaborate beyond this explanation regarding how the physical classroom environment supported the 21st century skill of critical thinking.

**Collaboration.** Beth felt opportunities for children to collaborate with one another were available daily through peer interactions and opportunities to share with the whole group. Student choices in terms of work configuration were varied and dependent upon the task. “Sometimes they work back here (back table) if there is a task they need to do together. If they want to work by themselves that’s fine. And then some of them, they need the instruction that’s going on, so they stay in a group.”

**Communication.** Beth outlined the value of using learning centers to encourage open communication throughout the learning process and further noted the use of technology to support the development of language skills. “When they have created something…I say Would you like to share that? And we bring it to the rug and share it with everybody, and they tell them how they got that.” She further noted the development of communication as students engaged in literacy center activities related to new concepts (for example, discussing new words with their partners and using them in a sentence). She also felt communication was addressed as students engaged in writing experiences.

**PEERS data: Environment for social learning.**

Table 16. Beth’s PEERS Scores: Environment for Social Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
The PEERS found evidence within Beth’s classroom to support the development of such 21st century skills as collaboration and communication with 100% of the total indicators for the Environment for Social Learning domain received a score of 3, 0% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Social learning was supported by the provision of tables, chairs, rocking chairs, and a riser. Figure 49 demonstrates small-group student seating. Several small-group instructional areas were available with access to instructional resources; one small-group area was equipped with technology and resources for students. A designated large group space was available and appeared to be multipurpose, as seen in Figure 50. Multiple seating options for meeting diverse learning needs, styles, and activities are demonstrated in Figure 51. Classroom furniture indicated that seating was flexible and students had seating options.
**PEERS data: Environment for Inquiry-based learning.**

Table 17. Beth’s PEERS Scores: Environment for Inquiry-based Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

None of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 100% received a score of 2, and 0% received a score of 1. Indicators which scored a 2 demonstrated proficient implementation of developmentally appropriate principles; indicators which received a score of 2 follow. The use of technology was evidenced through the availability of computers and iPads™; the inclusion of multiple centers would have increased Beth’s score to 3. Figure 52 shows the technology center. Figure 53 provides evidence of some collaborative planning through the use of “I Can” statements. Extensive evidence of collaborative planning would have increased the score to 3. Some evidence that students use graphic organizers was found; extensive evidence would have increased the score to 3. There was some evidence that students had access to information texts and additional resources, as indicated in Figure 54, which shows informational texts organized by topic. A score of 3 would have been given had there been inclusion of additional resources to engage students in active learning experiences to explore the topic of study.
Chrissy: Constructivist First Grade Teacher

“I try to teach on an individual basis and try to work with them as much as I can and… I try to make it as much fun as possible.”

Demographic survey.

Chrissy is a Caucasian female who was between the ages of 35-44 years old at the time of the study. She held a Master’s in Education and was certified to teach kindergarten through sixth grade. Chrissy had over 10 years of teaching experience and had taught first grade for over 2 years, but also had experience teaching kindergarten and fourth grade. She was a National Board Certified Teacher and had attended the Common Core ELA Training (7-month) and multiple in-service trainings offered by the district as well as a 3-day Common Core State Standards Initiative Training during summer 2014. She scored highest in her grade for constructivist beliefs on the TBS with an overall percentage of 90% constructivist responses.
Field notes & photo of classroom layout.

Chrissy’s classroom is illustrated in Figures 55 and 56.

_Figure 55. Sketch of Chrissy’s Classroom Layout_  
_Figure 56. Photo of Chrissy’s Classroom Layout_

**Role of the physical classroom environment in the teaching and learning process.**

*Interview data.* Chrissy noted the valuable role of the physical classroom environment in the teaching and learning process. An important aspect of designing her room included meeting the needs of a unique population of students. Creating a welcoming environment was a priority for Chrissy. “I was talking to another teacher in the school, and she said this may be the only warm and inviting place they have. So I try to let them know that things can look neat and organized and pretty and…welcoming for them.”
PEERS data: Environment for meaningful learning.

Table 18. Chrissy’s PEERS Scores: Environment for Meaningful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>15.4%</td>
<td>23.1%</td>
<td>61.5%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>0%</td>
<td>16.7%</td>
<td>83.3%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>28.6%</td>
<td>28.6%</td>
<td>42.9%</td>
</tr>
</tbody>
</table>

*The PEERS subscale: The healthy classroom.* Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Chrissy’s classroom environment represented the foundation for DAP, constructivist-centered practices.

Approximately 61.5% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 23.1% received a score of 2, and 15.4% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles with the subscale of Healthy Classroom receiving 0% of ones, 16.7% of twos, and 83.3% of threes. Indicators which received a score of 3 follow. The class was found to be hazard free, clean, and well-maintained. Further, the “Respectations” (i.e., Respect your classroom and materials) in Figure 57 indicate the active role of children in caring for the classroom environment. The classroom was well-ventilated and maintained a temperature of 70 degrees Fahrenheit. A diffuser was used to give the classroom an odor of peppermint, which is a brain compatible scent. Figure 58 exhibits variety in lighting with lamps used to define learning space and focus students’ attention. In Figure 59, access to water is shown and cups were available for water to be transported throughout the room.
One indicator received a 2 because snacks were made available at a designated time rather than throughout the day with procedures in place for access. No plants were found in Chrissy’s classroom; therefore, a score of 1 was given. Additionally, photos of students were limited. Had there been evidence of family-school connections through photos, a score of 3 would have been given.

*Figure 57.* Students as Active Participants in Care of the Room

*Figure 58.* Varied Lighting

*Figure 59.* Access to Water

*The PEERS subscale: The welcoming classroom.* “I’m here eight hours a day, and so I want a place that I’m comfortable with… I want it to be nice and welcoming, and I believe the environment has to have things they can refer to when they are learning, but I also feel it needs to be warm and inviting also.” Upon Chrissy’s mention of the value of a warm, inviting classroom, the PEERS was used to examine the degree to which a welcoming atmosphere was achieved within Chrissy’s classroom. The Welcoming and Inviting Classroom subscale received 42.9% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. Walls in Chrissy’s classroom were painted neutral beige, providing a backdrop for displaying children’s work and peripherals. A CD player and CDs indicated the regular use of music. Figures 60 and 61 show some of the home-like elements such as a photo of students, pillows, rugs, curtains, and lamps which enhanced learning centers.
Approximately 28.6% of indicators within the subscale Welcoming and Inviting Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. The procedures for student expectations were teacher-created and posted; however, no photos demonstrating procedures were included which limited the score to 2. A daily agenda was posted and readily available; the inclusion of photos or icons would have increased the score to 3. Figure 62 demonstrates the teacher developed daily agenda.

Approximately 28.6% of indicators for the Environment for Meaningful Learning domain received a score of 1, indicating novice implementation of developmentally appropriate principles. No living plants were in the classroom; had there been 4-6 living plants with evidence of learning about the care of living things, a score of 3 would have been given. Additionally, only one photo of students was displayed; evidence of family-school connections was needed to increase the score to 3.

A unique feature of Chrissy’s classroom was the “Wall of Inspiration” which included positive quotes and graphics about life and learning. Chrissy explained the “Wall of Inspiration” shown in Figure 63, in the following way: “I use it for myself and my students as a pick me up, to let them and me know ‘Hey, everyone goes through rough times, and it's ok. Hang in there and keep your head high and keep on going.’ I think it adds to my classroom environment by giving kids hope and inspiring them to push through rough times because everything is going to be ok.”
PEERS data: Environment for responsible learning.

Table 19. Chrissy’s PEERS Scores: Environment for Responsible Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>66.7%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

As previously mentioned, Chrissy noted the value of designing her classroom environment to support responsible, independent learning by students. “[The classroom environment] makes me come in and want to teach; it just makes me feel good. I like pretty things, and I like things organized…everything has a place.” The PEERS indicators found approximately 33.3% of the total indicators for the Environment for Responsible Learning domain received a score of 3, 83.3% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. The majority of materials were uncluttered, clean, and visually appealing to students. Classroom materials were organized and displayed aesthetically to promote focus and engagement of the learner.
Approximately 66.7% of indicators within the subscale for the Environment for Responsible Learning domain received a score of 2, indicating proficient implementation of those principles associated with the indicator. Some commercially purchased textbooks and worksheets were present; however, additional materials were available which included trade books and real artifacts. The inclusion of multiple tools and materials to support the lesson objectives would have served to increase the score to 3. Figure 64 shows the real artifacts and informational texts found in the science center. Materials were stored for access and availability by students, as indicated in Figures 65 and 66, yet no procedures were posted to encourage independent access and use of materials for learning which would have increased the score to 3. Materials contained in centers were linked to learning objectives. Had the centers contained multiple materials which evolved according to learning objectives, a score of 3 would have been given. Figure 66 demonstrates labeling of materials in transportable storage. No picture icons were included with labels, which would serve to benefit emerging readers. None of indicators for the Environment for Responsible Learning domain received a score of 1, indicating novice implementation of developmentally appropriate principles.
Use of the physical classroom environment as a teaching and learning tool.

Interview data. Chrissy expressed her support for the physical learning environment as a tool for teaching and learning. She noted peripherals to be particularly important in the development of independence and reflective learning. “I think they know where things are and they can refer to them, and they do refer to them…so they know where everything is and where to go to refer to them if they need them without having to come to me.” The use of peripherals which actively engaged students were an important part of Chrissy’s physical classroom environment as well. Peripherals, such as those shown in Figure 64, were positioned at children’s level to encourage independent manipulation and interaction and to allow “them to have a sense of ownership, too, and to interact with the environment also.”

Another important feature of the physical classroom environment was the use of organization and a well-planned layout. Chrissy outlined how she planned the environment to support learners and guide the learning process. Learning materials were organized for easy access, and centers were intentionally positioned to reflect a variety of content areas. “So it’s kind of like I’m helping to guide them to find things but I’m not telling them. So they’re not having to rely on me necessarily.”

PEERS data: Environment for continuous learning.

Table 20. Chrissy’s PEERS Scores: Environment for Continuous Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>25%</td>
<td>75%</td>
</tr>
</tbody>
</table>
Seventy-five percent of the total indicators for the Environment for Continuous Learning domain received a score of 3, 25% received a score of 2, and 0% received a score of 1. The indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; those indicators which received a score of 3 follow. Peripherals were teacher and student-generated, as seen in the Figures 67 through 70. Displays were strategically designed to support continuous learning and reflection. A variety of assessments, such as work samples, performances, journals, and center activities, were found throughout the classroom.

Twenty-five percent of indicators within the Environment for Continuous Learning received a score of 2, indicating proficient implementation of those principles associated with the indicator. Multiple and authentic work representations, such as those seen in Figure 68, were displayed on bulletin boards within the classroom; the inclusion of a variety of media which clearly communicated learning objectives would have served to increase the score to 3. None of the indicators received a score of 1.

![Figure 67. Peripheral to Support Learning](image1)
![Figure 68. Multiple Representations of Learning](image2)
![Figure 69. Interactive Peripheral](image3)
![Figure 70. Variety of Assessments](image4)

**Impact of philosophy on physical classroom design.**

**Interview data.** Although she was unable to identify with any specific theory or theoretical influence, Chrissy shared her physical classroom design was heavily influenced by
her professional development experiences. “I have to admit, in my first years [my classroom] had themes…but I’ve completely changed since I got my master’s and National Board Certification. I’ve learned more about the way a classroom should be set up.” Chrissy’s philosophy of education focused heavily on the importance of teaching on an individual basis and providing developmentally appropriate learning experiences as much as possible to aid students in achieving high expectations and learning standards. “I hold high standards and goals for everybody because whatever your dream or goal may be, you can set your mind to it.” The centers within her classroom were designed to encourage students to practice skills while engaging with each other, the peripherals, and materials.

**PEERS data: Environment for purposeful learning.**

Table 21. Chrissy’s PEERS Scores: Environment for Purposeful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>0%</td>
<td>40%</td>
<td>60%</td>
</tr>
</tbody>
</table>

The Environment for Purposeful Learning showed 60% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. Multiple learning centers or stations were available in Chrissy’s classroom. Centers were intentionally arranged so that all learning centers were grouped by noise and activity level. Accessible, private storage including portfolios, draft book storage (Figure 73), journals, individual work boxes, and cubbies were available for student belongings. Figure 74 illustrates a teacher work space organized and free of clutter. A variety of teaching spaces, occupying less
than 1/8 of the classroom, were found throughout. “I don’t have a desk. Why do I need a desk? I don’t need to be set off from everybody else, and I don’t need a place where I just go sit.”

Forty percent of indicators within the Environment for Purposeful Learning received a score of 2, indicating proficient implementation of those principles associated with the indicator. The physical separation of centers allowed for visibility and supervision, yet lacked educational dividers to add learning value to the space. Several literacy, math, and science centers were offered, but did not exceed 3 of each which would have increased the score to 3. Figure 71 illustrates the literacy center rotation and Figure 72 shows one of the literacy learning centers. None of the indicators for the Environment Purposeful Learning received a score of 1, which would have indicated novice implementation of developmentally appropriate principles.

![Figure 71. Literacy Center Rotation](image1)
![Figure 72. Literacy Center](image2)
![Figure 73. Individualized Storage](image3)
![Figure 74. Teacher Work Space](image4)

**Impact of the CCSSI on physical classroom design.**

*Interview data.* Chrissy shared her support for the Common Core, although she noted the need for “tweaks” to align the CCSSI with individual students’ learning style and needs. “I like [the Common Core]. It gives kids a sense of critical thinking, thinking on their own and deep thinking. These kids can do it, if teachers understand it and understand the correct way to teach it to the kids.” Chrissy explained that her physical classroom environment had been impacted by the Common Core State Standards as evidenced through the increased use of focused peripheral
displays. In light of the Common Core, Chrissy began to increase the use of *I Can Statements* related to learning objectives, Connections® intended to connect students with texts they read, Accountable Talk® (see Theme 3: Accountable Talk for more details) to increase higher-order thinking, and math terms related to each unit of study. “I don’t have random stuff slapped up on the walls; it all has a purpose that goes along with the Common Core.”

**Physical environment design’s support for 21st century skills.**

*Interview data.* When asked how her physical classroom environment aided in meeting the needs of children in the 21st century, Chrissy shared regarding how the CCSSI was used to aid children in gaining 21st century skills. “…it’s easy with the Common Core because they want…the different strategies and the way kids are thinking. They want them to share amongst themselves so we know that there’s no right way to answer a problem; there’s many different ways.” Chrissy shared her physical environment was designed to support the skills set forth by the Common Core in the following ways:

**Creativity.** Chrissy noted the difficulty of addressing creativity in the classroom due to the rigorous standards set forth by the Common Core. “Creativity can be hard because it’s very rigorous now. You don’t have a lot of time for it.” In an attempt to address creativity, Chrissy provided students with opportunities to draw or write to express a response as well as through the use of poetry to address concepts of literacy. She also encouraged students to play games and use creative problem-solving to address concepts within the math center.

**Critical thinking.** Chrissy discussed the high expectations of the Common Core and the expectation that students use different strategies to problem-solve. “They have to prove their point and show their evidence, which is kind of the whole point of Common Core. *Where’s your evidence? Show me. Prove it...*we know that there’s no one right way to answer a problem;
there’s many different ways.” She used open-ended learning centers and Accountable Talk® to promote critical thinking and investigative learning in her classroom.

**Collaboration.** Evidence of the development of social learning skills such as collaboration and cooperation was found through the use of small group tables, a variety of adaptable work spaces for students, and a large group meeting space. Additionally, Chrissy provided multiple, flexible seating options for students with evidence suggesting students had choices of seating options to promote collaboration and cooperation between students of varying levels. Additionally, Chrissy noted that students were encouraged to “flow in and out of centers and to work with different people at different times” to promote scaffolding.

**Communication.** Chrissy felt social learning was an important component of her classroom. Communication was addressed through the use of learning centers, choices in work configurations, and opportunity for students to share learning throughout the day. “We do buddy reading…I let them pick their own partners. After writing time, we usually do partner sharing, and they get to pick their own partner to share with. That way, they have a sense of choice too, and they’re interacting with different people.”

**PEERS data: Environment for social learning.**

Table 22. Chrissy’s PEERS Scores: Environment for Social Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
The PEERS identified support for the development of 21st century skills such as collaboration and communication through the Environment for Social Learning domain. This domain received 100% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. Chrissy’s classroom offered a variety of adaptable work spaces for students. Figure 75 shows the small group seating arrangement. In Figure 76, a large group meeting space is available for multipurpose use. Multiple, flexible seating options were available for students with evidence suggesting students had choices of seating options, as seen in Figure 77.

![Figure 75. Small Group Seating](image1)

![Figure 76. Large Group Meeting Area](image2)

![Figure 77. Seating Options](image3)

**PEERS data: Environment for Inquiry-based learning.**

Table 23. *Chrissy’s PEERS Scores: Environment for Inquiry-based Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Forty percent of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 60% received a score of 2, and 0% received a score of 1.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally
appropriate principles; indicators which received a score of 3 follow. Graphic organizers were found in student work samples. Figure 79 shows one of the multiple technology experiences offered in the classroom.

Sixty percent of indicators within the domain of Environment for Inquiry-based Learning received a score of 2, indicating proficient implementation of those principles associated with the indicator. Figure 78 offers evidence of collaborative planning through “I Can” statements; additional evidence such as KWL charts, essential questions, etc. would have served to increase the score to 3. Research texts (e.g., reference books, dictionaries, and encyclopedias) were available, but there was limited evidence of student projects. There was evidence that students had access to additional resources which included music, graphs, charts, and maps to support the topic of study as seen in Figure 80. None of the indicators received a score of 1.

*Figure 78. I Can Statements*  
*Figure 79. Technology Center*  
*Figure 80. Additional Resources*
Dana: Traditional First Grade Teacher

“I believe that my job, as an educator, is to prepare them as much as possible to be independent, contributing adults through giving them confidence and self-esteem.”

Demographic survey.

Dana is a Caucasian female who was between the ages of 25-34 years old at the time of the study. She held a Master’s in Education and was certified to teach kindergarten through sixth grade. Dana had 3 years of teaching experience and had taught first grade for over 2 years but also had experience teaching kindergarten. She had attended a Common Core Literacy Training and had completed a master’s level course which focused on the role of the physical environment in the teaching and learning process. She scored among the highest in her grade for traditional beliefs on the TBS with an overall percentage of 54.54% traditional responses.

Field notes & photo of classroom layout.

Dana’s classroom is illustrated in Figures 81 and 82.

*Figure 81. Sketch of Dana’s Classroom Layout*  
*Figure 82. Photo of Dana’s Classroom*
Role of the physical classroom environment in the teaching and learning process.

Interview data. Dana’s primary goal for her classroom was to design the environment to be “practical, functional, and efficient” further noting “I know a lot of other teachers’ [classrooms] are probably more pretty, but I like the functionality of it. I know when I go to other teachers’ rooms…I’m going to be distracted if there’s too much going on because you can only listen to someone for so long.” During the interview, Dana spoke little regarding the specific role of the physical classroom environment in the teaching and learning process; however, she did mention her physical classroom environment design being influenced by Maslow’s hierarchy of needs (Maslow, 1954).

PEERS data: Environment for meaningful learning.

Table 24. Dana’s PEERS Scores: Environment for Meaningful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>15.4%</td>
<td>61.5%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>16.7%</td>
<td>50%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>14.3%</td>
<td>71.4%</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

The PEERS subscale: The healthy classroom. Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Dana’s classroom environment represented the foundation for DAP, constructivist-centered practices. Approximately 23.1% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 61.5% received a score of 2, and 15.4% received a score of 1.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow.
Approximately 33.3% of indicators for the Environment for Meaningful Learning subscale Healthy Environment domain received a score of 3, representing accomplished implementation of developmentally appropriate principles. Dana’s classroom was found to be hazard free and clean. The classroom was odorless and maintained a comfortable temperature of 72 degrees Fahrenheit.

Fifty percent of indicators for the Environment for Meaningful Learning subscale Healthy Environment domain received a score of 2, representing proficient implementation of developmentally appropriate principles. The room remained odorless; a score of 3 would have been given had a brain compatible scent been detected. Figure 84, illustrates the availability of water in the classroom through a water fountain. Low sugar snacks were stored, indicating availability during a designated snack time. No procedures for access to water or snacks were posted, which would have increased the score to 3.

Only 1 indicator received a score of 1 under the subscale Healthy Classroom. Natural light was limited and controlled by blinds, as seen in Figure 83, which made overhead fluorescent bulbs the primary source of lighting. Had natural lighting been used as the primary source of light or variety in lighting have been found, a score of 3 would have been provided.

![Figure 83. Limited Access to Natural Light](image1)

![Figure 84. Access to Water](image2)
The PEERS subscale: The welcoming classroom. The Welcoming and Inviting Classroom subscale showed 14.3% of indicators receiving a score of 3, indicating accomplished implementation. Indicators which received a score of 3 included the use of a daily agenda. Figure 87 shows the daily agenda with picture icons for emerging readers.

The Welcoming and Inviting Classroom subscale scored with 71.4% of indicators receiving a score of 2, indicating proficient implementation of those principles associated with the indicator. Walls in Dana’s classroom were painted warm beige; colors in the room came primarily from furniture and rugs. The displaying of student work and projects would have increased the score to 3. CDs located near the teacher’s computer indicated the use of music in the classroom. Evidence suggested expectations were created with students, as seen in Figure 85 although there were no photos of children demonstrating the procedures posted. Further, posted student expectations indicated students were active participants in the care of the room, as seen in Figure 85. Four living plants were placed throughout the classroom to add to aesthetics and oxygenate the air; there was no evidence suggesting plants were used to reinforce learning about the care of living things, which would have provided a score of 3. One of the living plants is seen in Figure 86, along with a class photo. Home-like elements in the classroom included photos, pillows, and rugs; the inclusion of multiple home-like elements throughout the room would have increased the score to 3.

Approximately 14.3% of indicators for the Environment for Meaningful Learning domain received a score of 1, indicating novice implementation of developmentally appropriate principles. Photos in the classroom were limited to a single class photo and individual student photos displayed at the classroom’s entrance. The use of family photos to demonstrate evidence of family-school connections would have served to increase the score to 3.
PEERS data: Environment for responsible learning.

Table 25. Dana’s PEERS Scores: Environment for Responsible Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>66.7%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

Dana noted the importance of creating a classroom environment which served to aid students in developing autonomy and independence, which was examined in relation to the PEERS indicators for the Environment Responsible Learning. “If I had [materials] put away and they were always needing someone else to get them, that might create more of a distraction for them…but if I have it out there, ready to go, they can do it themselves.” Approximately 33.3% of the total indicators for the Environment for Responsible Learning domain received a score of 3, 66.7% received a score of 2, and 0% received a score of 1.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Most materials were labeled appropriately, organized, and visually appealing, as seen in Figures 89
and 90. Most materials were transportable as they were stored in baskets, bins, and pull-out
drawers.

Approximately 66.7% of indicators for the Environment for Responsible Learning
domain received a score of 2, representing proficient implementation of developmentally
appropriate principles. Some worksheets and textbooks were available in Dana’s classroom with
minimal visible authentic materials. A score of 3 would have been provided had multiple tools
and materials been available to support lesson objectives which challenged students’ thinking.
Figure 88 demonstrates the availability of worksheets while Figure 91 illustrates the storage of
center materials linked to learning. Materials were stored for communal access; however, no
procedures were posted to encourage independent access and use of materials, which is
associated with a score of 3. None of the indicators received a score of 1 under the domain of
Environment for Responsible Learning.

![Figure 88. Worksheets](image1)
![Figure 89. Labeled Materials](image2)
![Figure 90. Organized Materials](image3)
![Figure 91. Organized Materials](image4)

**Use of the physical classroom environment as a teaching and learning tool**

*Interview data.* In regard to the use of the physical classroom environment as a teaching
and learning tool, Dana noted the importance of a classroom organization which aided in
focusing student learning. “It’s about having the ability for them to get the materials they need
when they need them, that doesn’t become a stumbling block for them.” No further information
from the interview was coded as being related to the use of the physical environment as a tool for teaching and learning.

**PEERS data: Environment for continuous learning.**

Table 26. *Dana’s PEERS Scores: Environment for Continuous Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>75%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Twenty-five percent of the total indicators for the Environment for Continuous Learning domain received a score of 3, 75% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. A variety of assessment artifacts were available, including worksheets, writing samples, journals, and checklists, some of which were accessible to students.

Seventy-five percent of indicators for the Environment for Continuous Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Peripherals included a mix of teacher-directed, student-created, and commercially produced work, as seen in Figures 92 through 95. A score of 3 would have been given had the majority of peripherals been student and teacher-generated, created during learning experiences, and used to extend the learning process. Peripherals were displayed for accessible review by students, although an aesthetic design to support continuous learning and reflection of the learning process would have served to provide a score of 3. None of the indicators received a score of 1 under the domain of the Environment for Continuous Learning.
Impact of philosophy on physical classroom design.

Interview data. Dana cited Maslow’s (1954) hierarchy of needs as a philosophical influence, stating the value of meeting children’s basic needs and providing them with a “space to learn.” Another important aspect of Dana’s philosophy of education was the fostering of student autonomy and independence. Evidence of Dana’s belief in the value of independent learning and student responsibility was demonstrated throughout the environment. “I try to make it student-friendly, so they can be as independent as possible…just trying to foster that independence, especially at this age, is a big confidence booster.” The use of labeled materials and transportable learning center materials demonstrated this belief as students were expected to use and return materials to the appropriate location.
Table 27. Dana’s PEERS Scores: Environment for Purposeful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>40%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Sixty percent of the total indicators for the Environment for Purposeful Learning domain received a score of 3, 30% received a score of 2, and 10% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Dana used a combination of both permanent centers and pull-out stations, which were displayed for students then stored when not in use. Figure 96 illustrates a pull-out learning center displayed using an easel and pocket chart. The listening station in Figure 97 was considered a permanent center in the classroom. The room was intentionally arranged so that all learning centers and stations were grouped by noise and activity level. A total of 2 literacy centers and 1 station were available. Dana’s work space had minimal clutter, as seen in Figure 98. A variety of teaching stations were noted throughout the room; one such station is illustrated in Figure 99. The total teacher space occupied less than 1/8 of the classroom.

Thirty percent of indicators for the Environment for Purposeful Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. The placement of center dividers allowed for supervision of students, although learning centers were not clearly defined. One math center was available to students. In order to receive a score of 3, three or more centers would need to be available. Community storage was
available in the form of student cubbies; the inclusion of private, individualized storage would have increased the score to 3. Only 1 indicator received a score of 1 under the domain of Environment for Purposeful Learning. One math center was available to students. In order to receive a score of 3, more than 3 centers would need to be available.

**Impact of the CCSSI on physical classroom design.**

*Interview data.* Dana expressed her support for the Common Core but suggested the need for further “tweaking” to increase developmental appropriateness. She felt her physical classroom design had not been impacted by the CCSSI, although she did mention the value of providing and encouraging students to use technology, when possible, to enhance the development of 21st century skills.

*Physical environment design’s support for 21st century skills.*

*Interview data.* When asked how her physical classroom environment aided in meeting the needs of children in the 21st century, Dana noted the use of technology as a tool for aiding children in gaining 21st century skills. “I think the only thing I can really say about that is that we use the laptops and the iPads™ and I’ve made them as easily accessible as possible.” As the
interview continued, Dana shared how her classroom design aids students in developing the 4 C’s of the 21st century skills in the following ways:

Creativity. Dana expressed difficulty in addressing the skill of creativity within her classroom. “There seems to be less room for [creativity] because it is so regimented with the Common Core or how our district is choosing to interpret it. There’s not as much space for it as I would like.” She discussed her attempt to integrate creativity through the use of “free choice” in learning activities, but noted free choice was limited to rainy days.

Critical thinking. To Dana, the large group meeting rug was the area most associated with the development of critical thinking skills. “We come to the carpet and have a lot of discussions and Accountable Talk®, which provides for critical thinking…to discuss a question that I’ve posed to the group.” Despite further questioning, Dana did not elaborate beyond this explanation regarding how the physical classroom environment supported the 21st century skill of critical thinking.

Collaboration. Some evidence of collaboration and cooperation were found in Dana’s classroom, as demonstrated through the small group seating arrangement and the use of learning centers. “The students are always working in a group of some kind.” Dana provided students choices in terms of work configuration, noting they provided the opportunity to work as partners or small groups during math while literacy was primarily an independent activity. She also shared about the varied work configuration of students to promote different skill levels in an attempt to encourage scaffolding and collaborative learning.

Communication. The small group seating arrangement in Dana’s classroom naturally leant itself to promote communication among students. She also shared about the use of communication during whole group learning on the carpet. “It’s about getting them to have
more of that oral development and speaking in complete sentences about their thoughts.”

Despite prodding, Dana did not elaborate beyond this explanation regarding how the physical classroom environment supported the 21st century skill of communication.

**PEERS data: Environment for social learning.**

Table 28. *Dana’s PEERS Scores: Environment for Social Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Eighty percent of the total indicators for the Environment for Social Learning domain received a score of 3, 20% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. A variety of student work spaces were available in Dana’s classroom. Figure 100 illustrates the small group seating arrangement. Several areas were available for small group instruction with access to instructional resources and a small group area equipped with technology. In Figure 101, a designated large group meeting area is available which appears to be used as a multipurpose space. “I tell them, When we’re on the rug, that’s learning time; when you’re at your tables, that’s practice time.”

Only 1 indicator received a score of 2 under the Environment for Social Learning domain. Some variety in seating was available for students, as seen in Figure 102, through the provision of textured inflatable seating pads. Although some variety in seating options was found, the inclusion of multiple seating options suggesting students had choices would have increased the score to 3.
**PEERS data: Environment for Inquiry-based learning.**

Table 29. Dana’s PEERS Scores: Environment for Inquiry-based Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>20%</td>
<td>80%</td>
<td>0%</td>
</tr>
</tbody>
</table>

None of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 80% received a score of 2, and 20% received a score of 1. Indicators which scored a 2 demonstrated proficient implementation of developmentally appropriate principles; indicators which received a score of 2 follow. “I Can” statements such as those seen in Figure 103, demonstrate some evidence of collaborative planning. Figure 104 shows some evidence of the use of graphic organizers for formal instruction. Technology was readily available for student use, such as the iPads™ and the technology center seen in Figures 105 and 106. Digital and print resources were available, indicating some evidence that students had access to additional resources.

Only 1 indicator received a score of 1 under the domain for the Environment for Inquiry-based Learning. There was no evidence that students had access to research texts related to the
topic of study; had there been evidence in projects and work samples that students had access to multiple research texts, a score of 3 would have been given.

Elizabeth: Constructivist Second Grade Teacher

“I believe the students construct their own knowledge, and when they do that, it’s more meaningful and learning is more intrinsic for them.”

Demographic survey.

Elizabeth is a Caucasian female who was between the ages of 25-34 years old at the time of the study. She held a Master’s in Counseling and was certified to teach pre-k through third grade. Elizabeth had 5 years of teaching experience and had taught second grade for less than 2 years, but also had experience teaching pre-k. She had attended the Common Core ELA Training (7-months), the Summer Math Common Core State Standards Training, Common Core Book Study meetings, and the Partnership for Assessment of Readiness for College & Careers Training. She had also attended presentations offered during a regional Early Childhood Conference and had completed a course focusing on the role of the physical environment in the teaching and learning process as part of her master’s coursework. She scored highest in her
grade for constructivist beliefs on the TBS with an overall percentage of 100% constructivist responses.

Field notes & photo of classroom layout.

Elizabeth’s classroom is illustrated in Figures 107 and 108.

![Figure 107. Sketch of Elizabeth’s Classroom Layout](image1.jpg) ![Figure 108. Photo of Elizabeth’s Classroom](image2.jpg)

Role of the physical classroom environment in the teaching and learning process.

Interview data. Elizabeth shared her feelings about the role of the physical environment in the teaching and learning process, noting the importance of creating an environment which encouraged responsible learning by students. “I do pay a lot of attention to the physical environment, making it feel homey and welcoming but also [the students’] responsibility.” Elizabeth also addressed the importance of a well-planned environment to encourage responsible learning and care of the classroom environment. “I think that it’s so important that they learn to respect the physical environment because it’s our shared space.”
**PEERS data: Environment for meaningful learning.**

Table 30. Elizabeth’s PEERS Scores: Environment for Meaningful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>23.1%</td>
<td>23.1%</td>
<td>53.8%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>16.7%</td>
<td>16.7%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>28.6%</td>
<td>28.6%</td>
<td>42.9%</td>
</tr>
</tbody>
</table>

**The PEERS subscale: The healthy classroom.** Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Elizabeth’s classroom environment represented the foundation for DAP, constructivist-centered practices. Approximately 53.8% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 23.1% received a score of 2, and 23.1% received a score of 1. The Healthy Classroom subscale received 66.7% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. Indicators which received a score of 3 follow. Elizabeth’s classroom was free of hazards and list of student jobs indicated students were active participants in the care of the classroom. The room maintained a temperature of 70 degrees Fahrenheit and was well-ventilated. A wax melter diffused the brain compatible scent of vanilla. “I have a scent warmer…and the students like to pick the smell. It really makes a big difference in how they feel while they’re in the room.”

Varied lighting, as seen in Figures 109 and 110, was used to define learning spaces and to focus students’ attention. “I’ve tried to pay attention to the lighting and we vary the lighting throughout the day. When they come in in the mornings and the energy is low, we don’t need [overhead] lights so we use lamp light in the mornings and we get sun in the mornings…when
they come back from lunch and they’re really tired, we use [overhead] lights to help them stay awake; kind of responding to their mood.”

Approximately 16.7% of indicators within the subscale Healthy Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. Figure 111 illustrates water availability in the classroom throughout the day through the inclusion of a water fountain; no procedures were posted outlining independent, responsible access to water throughout the day. Had procedures been in place, a score of 3 would have been given.

Approximately 16.7% of indicators within the subscale Healthy Classroom domain received a score of 1, indicating novice implementation of developmentally appropriate principles. There was no evidence of snacks being available in the classroom. A score of 3 would have been given if students had access to healthy snacks in the classroom throughout the day with procedures in place for responsible access.

*Figure 109. Natural Light*  
*Figure 110. Lamp*  
*Figure 111. Access to Water*

The PEERS subscale: The welcoming classroom. The Welcoming and Inviting Classroom subscale received 42.9% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. The walls in Elizabeth’s room were painted alternately pale purple and beige, which served to highlight students work displays.
on walls. A digital folder on the desktop of the teacher’s computer indicated the regular use of music in the classroom. Multiple home-like elements, such as a class photo, pillows, curtains, rugs, and lamps were used throughout the classroom to enhance learning centers. Figures 112 and 113 show some of the home-like elements.

Approximately 28.6% of indicators within the subscale Welcoming and Inviting Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. Four living plants were found in Elizabeth’s classroom; however, no evidence was found suggesting the plants were used to reinforce learning about the care of living things, which would have provided a score of 3. Figure 114 illustrates the student expectations, which appear to have been created with students as they were written by the teacher and signed by all of the students. The inclusion of photos of children demonstrating procedures would have increased the score to 3.

Approximately 28.6% of indicators for the Environment for Meaningful Learning domain received a score of 1, indicating novice implementation of developmentally appropriate principles. Limited photos, such as the one in Figure 115, were found in the classroom. In order to receive a score of 3, evidence of family-school relations would have to be evidenced in classroom photos. No daily agenda was posted in Elizabeth’s classroom. A daily agenda with photos to reflect and encourage student responsibility would increase the score to 3.
**PEERS data: Environment for responsible learning.**

Table 31. *Elizabeth’s PEERS Scores: Environment for Responsible Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>33.3%</td>
<td>66.7%</td>
</tr>
</tbody>
</table>

In terms of responsible learning, Elizabeth noted the use of the environment to alert students of the expectations (e.g., check-in station, job chart, etc.). “As far as resources, the way things are set up in the classroom, it’s their responsibility to put things where they go.” Approximately 66.7% of the total indicators for the Environment for Responsible Learning domain received a score of 3, 33.3% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Learning centers contained multiple tools and materials to support learning objectives and problem-solving. In addition to authentic materials, Elizabeth offered students leveled readers, information texts, art materials, and technology linked to the topics of study as seen in Figure 116. Figure 117 illustrates one example of creative, aesthetic storage. The majority of classroom materials were arranged for
responsible access and transportation by students. Additionally, all materials were uncluttered and visually appealing.

Approximately 33.3% of indicators for the Environment for Responsible Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Although materials were centrally stored in the classroom, which indicated students had access to classroom materials, no procedures were posted to encourage independent access and use of materials which would have provided a score of 3. Figures 118 and 119 show a variety of accessible materials which were labeled but lacked picture cues for emerging readers.

![Figure 116. Materials to Support Learning](image1)

![Figure 117. Organized Materials](image2)

![Figure 118. Multiple Materials](image3)

![Figure 119. Accessible Storage](image4)

**Use of the physical classroom environment as a teaching and learning tool**

*Interview data.*

Elizabeth noted the value of hands-on, cooperative learning experiences for young children, which she felt were reflected in the physical design of her classroom environment. “It’s designed to encourage them to talk to each other, to work together, and to become responsible in that way.” Elizabeth’s classroom environment was also intentionally designed to promote and encourage movement throughout the day, as evidenced through varied seating, a large group meeting area, and a flexible room arrangement. “If you were here during the school
day, you would see that students are up and moving around the environment; it’s very rare that they are sitting in their chair spot.”

**PEERS data: Environment for continuous learning.**

Table 32. Elizabeth's PEERS Scores: Environment for Continuous Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>25%</td>
<td>75%</td>
</tr>
</tbody>
</table>

Seventy-five percent of the total indicators for the Environment for Continuous Learning domain received a score of 3, 25% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Authentic student work was displayed throughout the room, which reflected the current topic of study while indicating collaborative learning. All peripherals were students and/or teacher-generated, as seen in Figure 120. Figure 121 is demonstrative of aesthetically-designed displays strategically arranged to support continuous learning and reflection. A variety of assessments were available which included portfolios, writing samples, journals, and projects. Figure 122 illustrates a plan for a research project.

Twenty-five percent of indicators for the Environment for Continuous Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Although student learning was visible throughout the room, as evidenced in Figure 123, documentation did not include a variety of media. The inclusion of a variety of media documentation to clearly communicate learning objectives would have served to increase the score to 3.
Impact of philosophy on physical classroom design.

Interview data. Elizabeth cited Jean Piaget’s (1953) constructivist learning theory as having heavily impacted her philosophy of education. Elizabeth discussed the importance of an environment designed to support her “early childhood background” and “constructivist philosophy.” “I believe that students construct their own knowledge…so in the classroom, I foster that by investigative learning, discovery learning, project work, small group work, lots of research and gathering.” As a constructivist, Elizabeth noted the relevance of providing a flexible environment in which students had the opportunity for movement throughout the day, to explore and interact with peers and the environment to promote learning. “That (classroom environment design) really relates back to the whole theory of how students are expected to learn in here. They are taking responsibility to learn, so they have to be seated in small groups because I’m not encouraging them to sit in rows and be quiet. We’re not very quiet in here because they’re talking through their learning.”
**PEERS data: Environment for purposeful learning.**

Table 33. *Elizabeth’s PEERS Scores: Environment for Purposeful Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>20%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Seventy percent of the total indicators for the Environment for Purposeful Learning domain received a score of 3, 20% received a score of 2, and 10% received a score of 1.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Five learning centers were available in Elizabeth’s room; physical separation of learning centers permitted supervision of the entire room. Learning centers were grouped by noise and activity level. Three literacy centers, one of which can be seen in Figure 124, offered opportunities for reinforcing literacy skills. Private individualized storage was available for learners, which included seat sacks (Figure 126), community journal storage, and draft books. There was a variety of teacher work spaces; each of which was free of clutter, as seen in Figure 127. The total of teacher work space occupied less than 1/8 of the instructional space.

Twenty percent of indicators for the Environment for Purposeful Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. One of the two math centers, shown in Figure 125, held a variety of math manipulatives in transportable storage containers. Had there been 3+ math centers to reinforce math centers, a score of 3 would have been given.
Only 1 indicator received a score of 1 under the domain of Environment for Purposeful Learning. No science centers were available to reinforce science skills; 3+ science centers would have increased the score to 3.

Impact of the CCSSI on physical classroom design.

Interview data. Elizabeth expressed her support for the Common Core State Standards Initiative, noting “I’ve seen great improvement in my students because the expectation is higher. No longer is it ok for [teachers] to expect them to memorize three plus three equals six and that be appropriate. Because I don’t think sitting and memorizing is meaningful to [students].”

Elizabeth felt the physical design of her classroom environment had not been impacted by the Common Core but was already aligned with her personal philosophy as well as learning expectations and standards for the grade level. “If I had had desks in rows, it would not have been conducive to the idea that they need to be talking to each other and having conversations and having these analytical discussions, but I feel like I already had the belief that was appropriate for them.”

Physical environment design’s support for 21st century skills.

Interview data. When asked how her physical classroom environment aided in meeting the needs of children in the 21st century, Elizabeth shared regarding how the CCSSI was used to
aid children in gaining 21st century skills. “The idea, within the standards…is that the students are able to model their thinking using tools and to choose the appropriate tool and to model the thinking and to explain and defend the thinking. So within my environment their tools are readily available.” Elizabeth further shared her physical environment was designed to support the skills set forth by the Common Core in the following ways:

Creativity. Elizabeth discussed the use of discovery learning, reflection, and problem-solving to promote the creative thought process. She discussed how the CCSSI now expects students to delve deep into the thought process through modeling, defending reasoning, and explaining their thinking. With this in mind, Elizabeth felt she had prepared the environment with the tools necessary to explore a variety of concepts. “I don’t have things in the closet that I pull out and present when it’s time; they’re all available at any given time. And I’ve thought you know, I haven’t even thought to use those (manipulatives) in that way but that’s how their brain works…they need to be able to determine what they need and get their hands on it and use it.”

Critical thinking. An aspect of addressing critical thinking in Elizabeth’s room was the use of peripherals linked to learning which allowed students to continually evaluate the work of others as well as to reflect and expand upon their own thinking and learning. Elizabeth shared how peripherals are used in her classroom. Student projects are displayed, and it is the responsibility of peers to view and make comments (using sticky notes) on the work of others. “And so, by displaying their work, they understand that they have to ask questions and that goes back to that critical thinking and coming up with new ways to solve problems.”

She also noted the value of the higher-order, critical thinking aspect of the CCCSI and the importance of students being able to fully understand and regenerate concepts. “I am a fan of the idea that every student can come up with their own thinking or strategy and it works…they are
able to apply that elsewhere, and I am seeing that, in their thinking, they can take what they know and reapply it elsewhere. I think that is coming from the deeper expectation coming from the Common Core Standards.”

Collaboration. Elizabeth felt her classroom allowed for collaboration through multiple opportunities for social interaction within the environment. “I try not to do most of the talking. I tell the kids all the time ‘the person who’s talking is the one doing the learning.’ So I may question, prompt, and facilitate but they’re the ones teaching each other.” The use of learning centers, open areas for small group and partner work, and small group table configurations were all designed to increase collaboration and communication among students.

Communication. Elizabeth’s environment design, including small group tables, a whole group meeting area, learning centers, and a variety of open areas for projects, supported the development of communication. Elizabeth discussed the importance of a classroom environment design to support and promote communication between students, peers, and the teacher. “It’s difficult to have that expectation that they’re teaching each other and taking responsibility if the environment doesn’t allow it.” Another important aspect of the classroom was the whole group meeting area, designed to promote a sense of community and to allow for whole class meetings in which “social needs” were addressed during “family meetings.”

PEERS data: Environment for social learning.

Table 34. Elizabeth’s PEERS Scores: Environment for Social Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
One hundred percent of the total indicators for the Environment for Social Learning domain received a score of 3, 0% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Elizabeth’s classroom offered a variety of flexible work spaces for students, most of which were adaptable for a variety of instructional purposes and student needs. Figure 128 demonstrates one of the small group seating areas in the room. Multiple areas for small groups included access to instructional resources, such as the area seen in Figure 129. A large group area appeared to be multipurpose and available throughout the day, which is shown in Figure 130. Multiple seating options were available for students, suggesting students had choices in seating options based on learning need and style. Movable pillows can be seen in Figure 131.

![Figure 128. Small Group Seating](image)

![Figure 129. Access to Instructional Resources](image)

![Figure 130. Large Group Area](image)

![Figure 131. Flexible, Varied Seating](image)
PEERS data: Environment for Inquiry-based learning.

Table 35. Elizabeth’s PEERS Scores: Environment for Inquiry-based Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

One hundred percent of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 0% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Extensive evidence of collaborative planning was found around the room (see Figures 132 and 133). Further, evidence existed which suggested students and the teacher work together to plan learning experiences. Multiple technology centers were available for access by students; one such center is seen in Figure 134. Project and work samples (as seen in Figure 135) indicated students had access to multiple research texts, such as reference books, dictionaries, encyclopedias, informational texts, and atlases.

Figure 132. I Can Statements  
Figure 133. Evidence of Collaborative Planning  
Figure 134. Technology Center  
Figure 135. Work Samples
Fae: Traditional Second Grade Teacher

“I think expectations are a huge amount of teaching and learning; what you expect of someone is what you’ll get.”

Demographic survey.

Fae is a Caucasian female who was between the ages of 45-54 years old at the time of the study. She held a Master’s in Education/Reading and was certified to teach first through eighth grade. Fae had over 26 years of teaching experience and had taught second grade for over 6 years, but also had experience teaching first grade. She had attended multiple in-service trainings offered by the district which focused on the Common Core State Standards Initiative. She scored among the highest in her grade for traditional beliefs on the TBS with an overall percentage of 54.54% traditional responses.

Field notes & photo of classroom layout.

Fae’s classroom is illustrated in Figures 136 and 137.

Figure 136. Sketch of Fae’s Classroom Layout Figure 137. Photo of Fae’s Classroom
Role of the physical classroom environment in the teaching and learning process.

Interview data. Fae shared positive feelings about her physical classroom environment. “I like my room, and I think it’s cheery. I think the children like the room…it needs to look like a classroom. It needs to look like a place where kids can play; it needs to look like a kids’ place because it is a kids’ place.” Although she felt the physical classroom environment played a role in the teaching and learning process, she noted the size and amount of students in relation to the size of her classroom made it difficult to design. “Definitely we are on top of each other…you learn tricks to get around the room.”

PEERS data: Environment for meaningful learning.

Table 36. Fae’s PEERS Scores: Environment for Meaningful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>30.8%</td>
<td>38.5%</td>
<td>30.8%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>33.3%</td>
<td>16.7%</td>
<td>50%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>28.6%</td>
<td>57.1%</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

The PEERS subscale: The healthy classroom. Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Fae’s classroom environment represented the foundation for DAP, constructivist-centered practices. Approximately 30.8% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 38.5% received a score of 2, and 30.8% received a score of 1.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. The
Healthy Classroom subscale received 50% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. Fae’s room was found to be hazard free, clean, and well-maintained. The room was well-ventilated and maintained a temperature of 70 degrees Fahrenheit. The brain compatible scent of peppermint was maintained by a scent diffuser, as seen in Figure 139.

Approximately 16.7% of indicators within the subscale Healthy Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. Uncontrolled natural light Figure 138, was the primary source of light. Had lighting been used to define learning spaces and focus students’ attention, a score of 3 would have been given. Approximately 33.3% of indicators for within the subscale Healthy Classroom received a score of 1, indicating novice implementation of developmentally appropriate principles. Water and snacks were unavailable within the classroom.

The PEERS subscale: The welcoming classroom. The Welcoming and Inviting Classroom subscale received 14.3% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. Figure 143, indicates the regular use of music through the availability of a CD player and nearby CDs.
Approximately 57.1% of the Welcoming and Inviting Classroom subscale received a score of 2, indicating proficient implementation of developmentally appropriate principles. Five living plants in the classroom served to add to the aesthetics and oxygenate the air, as seen in Figure 141. No evidence about learning for the care of living things was found, which would have increased the score to 3. There was evidence that some classroom procedures were created with students, while some posted expectations were commercially produced as in Figure 142. Had all student expectations been created with students and included photos of children demonstrating procedures, the score would have increased to 3. Some home-like elements were present, which included plants and rugs, although the inclusion of additional home-like elements incorporated throughout the room would have served to increase the score to 3. A daily agenda, shown in Figure 144, was teacher-generated and posted for referencing by students although no picture cues were included which were needed for a score of 3 to be given. “We try to keep to the schedule. They know what’s happening always. I’m not one to come in here and say ‘Now we’re going to do this’ because their life is such a chaotic mess for most of them…”

Approximately 28.6% of the Welcoming and Inviting Classroom subscale received a score of 1, indicating novice implementation of developmentally appropriate principles. Fae’s classroom walls were painted white with the majority of accents coming from primary colors found in furniture, rugs, and peripherals. Although the white walls provided a neutral backdrop, minimal displays of student work were included in Fae’s classroom. Limited historical photos were available. To receive a score of 3, there would need to be evidence of family-school connections as evidenced in photos throughout the room.
PEERS data: Environment for responsible learning.

Table 37. Fae’s PEERS Scores: Environment for Responsible Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>16.7%</td>
<td>50%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

Fae shared the importance of an organized environment to encourage independent learning by students. “I think things need to be labeled. That children are able to find where things are and that they’re easily accessible to them. And to be able to set it up where you can get to things quickly and be organized because little children do not have the patience to wait on you to go find something. You have to have everything right where you need it. I think [organization] is very important.” An example of stored and labeled materials is shown in Figure 148.

Fae noted the role of children in responsible learning and actively participating in the care of the classroom. “It’s their place and I tell them that this is their room, and they need to take care of it. And they do in here…it’s just human nature to feel better when things are clean. If
it’s messy, it doesn’t feel good. And someone inspects it every day, and if they say your desk is messy, then you clean it up; I don’t care what you say. They’re the inspector!”

Approximately 33.3% of the total indicators for the Environment for Responsible Learning domain received a score of 3, 50% received a score of 2, and 16.7% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Most materials in Fae’s classroom were labeled appropriately for the developmental level. Most materials were stored for easy access and transportation by students.

Fifty percent of indicators for the Environment for Responsible Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Materials were centrally stored in the classroom, indicating students had some access; stored materials were separated from usable materials through closed storage (Figure 147). In order to receive a score of 3, procedures to encourage independent access of materials would have to be posted. Materials contained with the math centers were linked to learning, yet did not appear to evolve and change according to learning objectives, which would have increased the score to 3. The classroom materials were uncluttered and clean, yet no creative or aesthetic storage materials were used to promote focus and engagement in learning.

Only 1 indicator received a score of 1 under the Environment for Responsible Learning. Commercially purchased textbooks and worksheets, shown in Figures 145 and 146, were primarily present, indicating paper-based work served as the basis for instruction. Had multiple tools and materials to support lesson objectives been evident, a score of 3 would have been provided.
Use of the physical classroom environment as a teaching and learning tool

Interview data. Fae felt an important aspect of teaching and learning was the development of independence, which was reflected in her environment through organized materials, learning centers, and easily accessed peripherals. “I think things need to be labeled; that children are able to find where things are and that they’re easily accessible to them.” Additionally, Fae felt organization was particularly important due to the departmentalization of her classroom; color-coding, labels, and numbering were used to aid multiple groups of children in locating materials.

PEERS data: Environment for continuous learning.

Table 38. Fae’s PEERS Scores: Environment for Continuous Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>25%</td>
<td>75%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

Fae’s classroom was departmentalized for math; the majority of peripherals were math-related. “It still looks like a second grade classroom, but my main focus will be math. You’ll see math posters up; you won’t see a lot of literacy because I [teach] math.” None of the total
indicators for the Environment for Continuous Learning domain received a score of 3, 75% received a score of 2, and 25% received a score of 1. Indicators which scored a 2 demonstrated proficient implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Peripherals included a mix of teacher-directed and authentic work, as seen in Figures 149 and 150. A score of 3 is given when peripherals appear to be created during learning experiences to extend the learning process. Peripherals linked to learning were displayed for accessibility and review by students, as seen in Figures 149 through 152, yet did not appear to serve to support continuous learning and reflection as most were a mix of commercial and teacher-created and posted at either a very high or very low level. Evidence suggested most assessment artifacts were paper-based, including worksheets and writing samples. A score of 3 is given only when a variety of assessment artifacts capture student learning.

Only 1 indicator received a score of 1 under the Environment for Continuous Learning domain. Student work displays were limited to bulletin board areas at the front of the classroom. The provision of displayed documentation of student learning via a variety of media would have ensured a score of 3.

*Figure 149. Mix of Teacher-directed & Student-generated Work*
*Figure 150. Mix of Teacher-made & Commercial Peripherals*
*Figure 151. Peripherals Linked to Learning*
*Figure 152. Commercially Produced Peripherals*
Impact of philosophy on physical classroom design.

*Interview data.* Fae did not feel her philosophy or physical environment design had been impacted by any specific theory or theorist, rather, she felt “on-the-job training learned over 27 years of hard lessons” served to guide her practice. She further outlined the importance of meeting the needs of the “whole child” and guiding children toward developing character. She discussed the importance of teachers serving as role models and demonstrating shared respect. “I think children should be respectful; I’m all about hands-on and things, but it needs to be structured…in a way that children feel safe and not just this free range. They need limits because I feel like it’s a whole lot easier to live in a world with limits than to live without.”

*PEERS data: Environment for purposeful learning.*

Table 39. *Fae’s PEERS Scores: Environment for Purposeful Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

To create an environment to address purposeful learning, centers and manipulatives were provided to meet the needs of a diverse population of students. “I put things out where everybody can get what they need.” Forty percent of the total indicators for the Environment for Purposeful Learning domain received a score of 3, 40% received a score of 2, and 20% received a score of 1.

Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Learning centers were limited to 3 math centers due to departmentalization, two of which can be seen in
Figures 153 and 154. Teacher work spaces were free of clutter (Figure 156) and incorporated throughout the room with accessible teaching materials organized for easy access. The total teacher work spaces occupied less than 1/8 of the classroom. “I’m just over here in the corner; it’s an insignificant place. A lot of teachers have personal stuff; I don’t…it’s supposed to be about the kids.”

Forty percent of indicators for the Environment for Purposeful Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. The physical separation of centers allowed for supervision of the entire room, although dividers did not add learning value to the space. Centers were grouped by noise and activity level. The class library included texts which focused on concepts of mathematics, as seen in Figure 155. Community storage was in the form of cubbies which were available for students’ personal belongings and work. Had the classroom included accessible private individualized storage, a score of 3 would have been given.

Twenty percent of indicators for the Environment for Purposeful Learning domain received a score of 1, indicating novice implementation of developmentally appropriate principles. Only one literacy center was available which included texts focused on concepts of math. No science centers were available; had there been multiple literacy and science centers, a score of 3 would have been given.
Impact of the CCSSI on physical classroom design.

Interview data. Fae expressed her feelings that the Common Core State Standards Initiative had been “sort of thrown” at teachers. Her mixed feelings toward the initiative emerged. “I think the bar has been raised, and it’s hard to get everyone up to that when this child hasn’t had that education from kindergarten up and when you spring it on them, they’re going to suffer…as it goes through and the kids begin with it and move on, it will be ok.” Fae initially felt her physical classroom environment design had not been impacted by the CCSSI. “Basically, good teaching is good teaching; it’s not far from what you’ve done before.” However, as she continued to reflect, she noted the increased use of peripherals linked to learning due to expectations set forth by the CCSSI. Prior to the CCSSI, Fae felt she shared the learning targets with students orally, yet never posted them as she does now.

Physical environment design’s support for 21st century skills.

Interview data. When asked how her physical classroom environment aided in meeting the needs of children in the 21st century, Fae shared regarding how the CCSSI was used to aid children in gaining 21st century skills. “…. I was in first grade for twenty years so I pretty much knew what the curriculum was…it just gets a little harder. It’s not a huge change, you know?” Fae shared her physical environment was designed to support the skills set forth by the Common Core in the following ways:

Creativity. When asked to discuss creativity in the classroom, Fae noted the lack of time available to address creativity and the importance of maintaining fast-paced curriculum to meet standards. “I am math, so I don’t know how creative we are in math. There’s games, there’s extension activities. No one sits here idle. There’s no wasted time…just being able to keep the
pace; you’ve got to keep them busy! Idle hands are works of the devil; we do not have idle hands in here. And that, they will get in trouble; they stay on task.”

*Critical thinking.*

When discussing critical thinking, Fae noted the value of Accountable Talk® to support problem-solving and critical thinking. Despite further questioning, Fae did not elaborate beyond this explanation regarding how the physical classroom environment supported the 21st century skill of critical thinking.

*Collaboration.* Fae’s seating arrangement was designed to promote social learning. Fae shared that collaboration and cooperation are oftentimes difficult skills for young children; she views her role as a facilitator in the process. “[Collaboration] happens every day and basically, the teacher has to observe with little children. You can’t walk off and expect them to collaborate on things…you have to be right there with them at all times.”

*Communication.* Fae’s classroom included groupings of desks to form small groups to promote interaction among students. Communication occurs in Fae’s classroom through “talk friends” and whole-group discussions. “Talking is not a problem for these children…getting them to listen is the problem (laughs).” Despite prodding, Fae did not elaborate beyond this explanation regarding how the physical classroom environment supported the 21st century skill of communication.
**PEERS data: Environment for social learning.**

Table 40. *Fae’s PEERS scores: Environment for Social Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

Forty percent of the total indicators for the Environment for Social Learning domain received a score of 3, 40% received a score of 2, and 20% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. As seen in Figure 158, a large group meeting area which appeared to be used as a multipurpose space was accessible. Several areas with access to instructional resources, such as the one seen in Figure 15, were available for small group instruction.

Approximately 38.5% of indicators for the Environment for Social Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Desks were not in traditional rows but were clustered to form groups of 8 students as seen in Figure 157. The inclusion of adaptable spaces for instructional purposes and student needs would have served to increase the score to 3. Some variety in seating was available but limited to seating on the large group rug. The whole group area was where the majority of Fae’s students spend the day. “I like to have them in front of me, close. Because I’ve found, little children when you spread them out, their attention span drifts. So if they’re right there, I can be in close proximity, and their eyes are on me, and I can keep them focused.” Only one indicator received a score of 1 under the domain of the Environment for Social Learning. Multiple seating
options were unavailable, a necessary component for scoring a 3. There was evidence that students had assigned seats at both desks and the rug area; flexible seating options would have increased the score to 3.

![Figure 157. Desk arrangement](image1)
![Figure 158. Large group meeting area](image2)
![Figure 159. Access to instructional resources](image3)

**PEERS data: Environment for Inquiry-based learning.**

Table 41. *Fae’s PEERS Scores: Environment for Inquiry-based Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

None of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 100% received a score of 2, 0% received a score of 1. Indicators which scored a 2 demonstrated proficient implementation of developmentally appropriate principles; indicators which received a score of 2 follow. Some evidence of collaborative planning was documented through “I Can” lists and Accountable Talk® questions as shown in Figures 160 and 161. Had extensive evidence of collaborative planning been found around the room, a score of 3 would have been given. Graphic organizers for planning were found, although there was no extensive evidence to suggest students and the teacher work together to plan work, monitor
progress, or summarize information, which is necessary for a score of 3. Two technology centers were available, including iPads™ and laptops as shown in Figures 162 and 163. The inclusion of 3+ technology centers would serve to increase the score to 3. Access to research texts such as dictionaries and encyclopedias were available in Fae’s classroom. There was no evidence of projects or work samples to suggest students access and use multiple research texts to complete work, which would have increased the score to 3. There was some evidence that students had additional resources such as books, charts, graphs, and math manipulatives to support topics of study; minimal evidence existed suggesting these resources were used to engage learners in active learning experiences.

Grace: Constructivist Third Grade Teacher

“My philosophy would be to teach every child with a rigorous curriculum.”

**Demographic survey.**

Grace is a Caucasian female who was between the ages of 35-44 years old at the time of the study. She held a Master’s in Education and was certified to teach kindergarten through eighth grade. Grace had 16 years of teaching experience and had taught third grade for over 6 years, but also had experience teaching first and second grades. She had attended 2 summer trainings focused on the Common Core, as well as in-service trainings offered by the district.
focusing on the learning environment. She further cited personal research on the physical environment as a source of her knowledge. She scored among the highest in her grade for constructivist beliefs on the TBS with an overall percentage of 80% constructivist responses.

**Field notes & photo of classroom layout.**

Grace’s classroom is illustrated in Figures 164 and 165.

![Sketch of Grace's classroom layout](image1)

**Figure 164.** Sketch of Graces’ classroom layout

![Photo of Grace's classroom](image2)

**Figure 165.** Photo of Grace’s classroom

**Role of the physical classroom environment in the teaching and learning process.**

**Interview data.** To Grace, the physical classroom environment played a role in the teaching and learning process, and she shared regarding the amount of time and energy taken to design her physical classroom environment. “I spend more time here really than I do at my own house. And the kids really spend more time here than their homes…so I just want it to be inviting and homey and a place where there’s nice things to look at.” She also noted teaching to be a stressful job and the importance of creating a classroom which helped her feel more calm and relaxed.
**PEERS data: Environment for meaningful learning.**

Table 42. *Graces’ PEERS Scores: Environment for Meaningful Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>0%</td>
<td>15.4%</td>
<td>84.6%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>0%</td>
<td>16.7%</td>
<td>83.3%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>0%</td>
<td>14.3%</td>
<td>85.7%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

*The PEERS subscale: The healthy classroom.* Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Grace’s classroom environment represented the foundation for DAP, constructivist-centered practices.

Approximately 84.6% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 15.4% received a score of 2, and 0% received a score of 1. The Healthy Classroom subscale scored with 83.3% of indicators receiving a score of 3, indicating accomplished implementation of those principles associated with the indicator. Indicators which scored a 3 follow. Grace’s room was found to be free of hazards and clean; a job chart indicated students had an active role in the care of the classroom. The room maintained a comfortable temperature of 71 degrees Fahrenheit. An aroma diffuser, shown in Figure 166, was used to disperse essential oils in the classroom. “I don’t use artificial air fresheners; kids have a lot of allergies now and I don’t use those, but I do diffuse very light essential oils…it’s all natural, and I try to use natural cleaners as well.” Variety in lighting was available with natural light and lamp light used to define learning spaces in the classroom, as seen in Figure 168. Water was accessible throughout the day through a water fountain in the classroom, shown in Figure 167.
Approximately 15.4% of indicators within the subscale Healthy Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. The daily agenda noted a scheduled snack time; a score of 3 would have been given if students were offered access to healthy snacks throughout the day with procedures in place for responsible access.

![Figure 166. Brain Compatible Scents](image1)

![Figure 167. Access to Water](image2)

![Figure 168. Varied Lighting & Living Plant](image3)

*The PEERS subscale: The welcoming classroom.* The Welcoming and Inviting Classroom subscale showed 85.7% of indicators with a score of 3, indicating accomplished implementation of those principles associated with the indicator. Grace’s classroom walls were painted pale purple, providing a calming backdrop to displays of students’ work and projects. Color in the room came primarily from the work of children and the teacher. The neutral palette as well as a displayed project can be seen in Figure 169. A space for music with a CD player and nearby CDs indicated the regular use of music in the classroom. Living plants, illustrated in Figure 170, contributed to the aesthetics as well as served to oxygenate the air. “I do grow a lot of flowers so I always…have little flowers out at their tables.” A job chart indicated the role of students in caring for the plants. Multiple home-like elements such as photographs of children, pillows, blinds, curtains, rugs, plants, and lamps were found throughout the room to encourage
engagement of the learner. Evidence of family-school connections were incorporated into learning through displays of students’ family photos on bulletin boards (Figure 171).

Approximately 14.3% of indicators within the subscale Welcoming and Inviting Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. Procedures were posted and appeared to be created with students, while a daily agenda was also posted to encourage student reflection and responsibility, seen in Figure 172. “I always post an agenda; I have everything they’re doing all day posted on that agenda so they’ll know.” Had there been photographs of students demonstrating procedures, Grace’s score would have increased to 3.

**PEERS data:** Environment for responsible learning.

Table 43. *Grace’s PEERS Scores: Environment for Responsible Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.
Fifty percent of the total indicators for the Environment for Responsible Learning domain received a score of 3, 50% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Grace’s physical classroom environment supported responsible learning by students, as measured by the PEERS. Multiple tools and materials to support learning were available, some of which are shown in Figure 173. The majority of materials appeared to be teacher or student developed. In addition to authentic materials, students also had access to informational texts, art materials (Figure 174), and technology.

Fifty percent of the total indicators for the Environment for Responsible Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Materials were centrally stored, indicating communal access. A score of 3 would have been given had procedures been posted to encourage independent access and use of learning materials. Learning materials in centers were linked to learning objectives and were stored in labeled containers aligned with the developmental level of students. Had there been evidence that materials evolved based on learning objectives, projects, and explorations, a score of 3 would have been given. Most materials were stored in transportable containers, as seen in Figure 175, and were uncluttered and visually appealing; stored materials lacked creative displays which would have increased the score to 3.
Use of the physical classroom environment as a teaching and learning tool.

Grace felt she used the physical environment to support teaching and learning. Her small group tables encouraged students to work collaboratively while areas for independent work were also available. Tables were situated to encourage focus on the SMART Board® and document camera, which Grace considered the “center for modeling and sharing ideas.” Her open Number Talks® area with a rug allowed large groups of students to engage in “mental math” discussions. Authentic student work samples were displayed throughout the room to encourage reflection and extension of learning.

**PEERS data: Environment for continuous learning.**

Table 44. *Grace’s PEERS Scores: Environment for Continuous Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

One hundred percent of the total indicators for the Environment for Continuous Learning domain received a score of 3, indicating accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Grace’s classroom was
departmentalized for math; the majority of peripherals were math-related. Grace discussed the limited use of “decorations” and the color in the room coming primarily from displays of students’ work and things they had created as a class, as seen in Figure 176. Authentic student work, as seen in Figure 177, was displayed throughout the classroom. Peripherals appeared to have been created during learning experiences and displayed to promote reflection and extend the learning process. A variety of assessments, including portfolios, journals, student writing, and projects, were available in Grace’s classroom one of which is illustrated in Figure 179. Documentation of student learning clearly communicated the learning objectives, shown in Figure 178. Student and teacher-created peripherals throughout the room served to extend and celebrate the teaching and learning process.

**Figure 176. Displays to Support Learning & Reflection**

**Figure 177. Authentic Student Work**

**Figure 178. Learning Objectives**

**Figure 179. Variety of Assessment**

**Impact of philosophy on physical classroom design.**

**Interview data.**

Grace felt her philosophy of education had been most impacted by her professional development experiences, teaching experiences, and on-going personal research. “I just see what works and what makes them want to come to school and enjoy it here.” Grace shared her belief in the importance of providing each child with individualized instruction using a rigorous curriculum and assessment to drive instruction. “I just really believe in knowing the children and
exactly where they are and what their needs are…and the classroom environment is important. I want them to feel safe in here and I want them to come to a place that looks nice and smells nice where we treat each other in a nice way so they will have the best opportunity to learn.”

Grace felt providing students with multiple opportunities to engage in social learning as well as private areas was reflective of her philosophy. “I definitely think of their individual work space, team work spaces, and small group spaces. And a place where we can all get together as a whole group in a cozy way.” Grace’s environment provided a variety of cooperative learning experiences as well as individual spaces.

**PEERS data: Environment for purposeful learning.**

Table 45. *Grace’s PEERS Scores: Environment for Purposeful Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>30%</td>
<td>60%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

Sixty percent of the total indicators for the Environment for Purposeful Learning domain received a score of 3, 30% received a score of 2, and 10% received a score of 1. Indicators which received a score of 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Grace’s classroom featured 5 learning centers, which included literacy, social studies, technology, and 2 math centers. All were grouped by noise and activity level. It is important to note the classroom is departmentalized for math. Accessible, private storage was available for students’ personal belongings and work. Grace considered the “seat sacks” (shown in Figure 180) to be “an essential component of the environment.” Grace did not have a desk; however, several
uncluttered work spaces were found throughout the room; as seen in Figures 181 and 182. The total work spaces occupied less than 1/8 of the instructional space.

Thirty percent of indicators for the Environment for Purposeful Learning domain received a score of 3, representing proficient implementation of developmentally appropriate principles. Physical separation of each center allowed for supervision of students; however, dividers were not educationally or efficiently used to define or add learning value to the centers. Had dividers done so, a score of 3 would have been given. Some literacy and math centers were available; a score of 3 would have been given had there been multiple literacy and math centers. Only 1 indicator received a score of 1 under the domain of the Environment for Purposeful Learning. No science centers were available to reinforce science skills; the inclusion of 3 or more science centers would have increased the score to 3.

Impact of the CCSS on physical classroom design.

*Interview data.* Grace shared her support for the CCCSSI stating “I don’t disagree with any of the standards. If you read them, I’d want that for my child. I feel like it’s challenging, and they have definitely risen to the challenge.” Although Grace felt the CCSSI had not impacted her physical classroom environment design, she did feel the rigorous standards challenged her to support learners. She felt her classroom was aligned with expectations set
forth by the Common Core prior to implementation through the inclusion of technology in a well-planned environment. She outlined the importance of increasing the presence of math in the classroom as well as providing extra support for learners since the adoption of the CCSSI. “Having them together at tables really, really supported what they’re asked to do with math tasks now.”

**Physical environment design’s support for 21st century skills.**

*Interview data.* When asked how her physical classroom environment aided in meeting the needs of children in the 21st century, Grace shared regarding how the CCSSI was used to aid children in gaining 21st century skills. “…I don’t know if it’s Common Core but the TN-Core site suggests this structure of a lesson when they’re working on a task and that provides the think group work time. And so, just having them together at tables really, really supports what they’re asked to do with math tasks now.” Grace further shared her physical environment was designed to support the skills set forth by the Common Core in the following ways:

**Creativity.** Grace felt her classroom design supported the development of creativity through the provision of a variety of work spaces and the freedom to explore the available manipulatives and art supplies. She further noted the importance of creating an atmosphere where children felt safe to share creative thoughts and ideas. Additionally, allowing students to work collaboratively as small groups and partners encourages them to get ideas from each other, which Grace felt promoted a sense of creativity. Grace incorporated song, movement, and the arts into projects, when possible. She shared the example of the development of creative mnemonic devices to remember various concepts and the similar use of hand movements and chants.
Critical thinking. “Critical thinking kind of runs through everything we do...trying to build those critical thinking skills whether it’s independent work time, private think time, group time, Number Talks®, or whole group time. We’re always working toward that.” Grace also felt the use of Accountable Talk®, an aspect of the Common Core, served to increase critical thinking in her classroom.

Collaboration. Grace shared about the importance of providing flexible work spaces which allowed for various work configurations (e.g., small groups, partners, etc.) to support and promote collaborative learning. She also discussed the value of allowing children time to explore with materials and to become engaged with peers. Grace further discussed her support for creating an atmosphere of safety in which students felt supported in sharing ideas, debating viewpoints, and working together to problem-solve.

Communication. Grace felt communication was addressed through the varied student work configurations and numerous daily activities. Grace’s physical classroom environment also addressed communication through the use of tables for students to work in small groups. Students were also encouraged to compare, share, discuss and debate with one another often and solve learning tasks together. Additionally, a large group rug area was used as a Number Talks® area to practice critical thinking and communication skills.

**PEERS data: Environment for social learning.**

Table 46. Grace’s PEERS Scores: Environment for Social Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.
One hundred percent of the total indicators for the Environment for Social Learning domain received a score of 3, 0% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. A variety of flexible work spaces was found throughout the room; evidence suggested spaces were adaptable for student needs and instructional purposes. One of the small group work spaces can be seen in Figure 183. Multiple areas for small group instruction with access to instructional resources were available with at least one small group area equipped with technology access. Multiple seating options such as rugs, tables, stools, upholstered chairs, and pillows (shown in Figure 184) were available to provide multiple seating options which allowed for student choices based on learning style and need. Grace felt the flexibility of her classroom encouraged students to maintain focus as they engage in the learning process. “I don’t mind if you have to stand up and wiggle your foot. Sit on the bouncy seat over there. As long as you’re doing your work; I’m pretty strict on that…if you’re talking about your work, that’s great.” Pillows and a rug, found in a reading center, are illustrated in Figure 184. A large group area, shown in Figure 185, appeared to be multipurpose and suggested students were engaged in social learning within the space through the accessibility of resources such as manipulatives, technology, etc.
Table 47. Grace’s PEERS Scores: Environment for Inquiry-based Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Learning</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Departmentalized; math.

One hundred percent of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 0% received a score of 2, and 0% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Extensive evidence of collaborative planning was found in Grace’s room, which included journaling, the use of essential questions, questions to spark discussion, written descriptions or work, and graphic organizers. Further, evidence suggested students and the teacher work together to engage in questioning strategies in order to develop hypotheses, as shown in Figure 186. Three technology centers were available to reinforce technology skills; one such center is shown in Figure 187. Projects and work samples suggested student access and use of multiple research resources to explore topics of study as evidenced through dictionaries, encyclopedias, atlases, informational texts, print and digital resources, books, graphs, charts, maps, measuring tools, and web searches. Some of the resources are illustrated in Figure 188.
Adam: Traditional Third Grade Teacher

“I think it is really important to present the same content in multiple ways so kids can learn in their area of strength but also so they’re exposed to the same content in more than one way.”

Demographic survey.

Adam is a Caucasian male who was between the ages of 25-34 years old at the time of the study. He held a Master’s in Teaching English Language Learners and was certified to teach kindergarten through sixth grade. Adam had 8 years of teaching experience and had taught third grade for less than 2 years, but also had experience teaching kindergarten and first grade. He had attended multiple in-service trainings offered by the district as well as a 3-day Common Core State Standards Initiative Training during summer 2014. He scored highest in his grade for traditional beliefs on the TBS with an overall percentage of 54.54% traditional response.
Field notes & photo of classroom layout.

Adam’s classroom is illustrated in Figures 189 and 190.

Figure 189. Sketch of Adam’s Classroom Layout

Figure 190. Photo of Adam’s Classroom

Role of the physical classroom environment in the teaching and learning process.

Interview data. “Now that you’ve made me stop and assess it (classroom environment) again…I think I am pretty happy with it. I don’t think it’s overwhelming; which, again, is my goal.” No further information from the interview was coded as being related to the role of the physical classroom environment in the teaching and learning process.
Table 48. Adam’s PEERS Scores: Environment for Meaningful Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Meaningful Learning</td>
<td>46.2%</td>
<td>38.5%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>33.3%</td>
<td>33.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>57.1%</td>
<td>42.9%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

The PEERS subscale: The healthy classroom. Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which Adam’s classroom environment represented the foundation for DAP, constructivist-centered practices.

Approximately 15.4% of the total indicators for the Environment for Meaningful Learning domain received a score of 3, 38.5% received a score of 2, and 46.2% received a score of 1. Indicators which received a score of 3 follow. Adam’s classroom was found to be free of hazards and clean. The “class helpers” display, shown in Figure 191, suggested students were active participants in the care of the classroom. The room was well-ventilated and maintained a comfortable temperature of 71 degrees Fahrenheit.

Approximately 33.3% of indicators within the subscale Healthy Classroom received a score of 2, indicating proficient implementation of those principles associated with the indicator. The classroom remained odorless; the use of a brain compatible scent would have increased the score to 3. Some variety in lighting was provided through overhead fluorescent fixtures with choices in turning on/off alternating lights (Figure 192) and uncontrolled natural lighting at the rear of the classroom (Figure 193). “That’s (the windows) a blessing and a curse. I mean, I’d
love to be outside, too. Just like them, but it’s just, they’re (the windows) way too big and recess is right there. So I had to cover it somewhat.” A score of 3 would have been given had lighting been used to define learning spaces.

Approximately 33.3% of indicators within the subscale Healthy Classroom received a score of 1, indicating novice implementation of developmentally appropriate principles. Drinking water and snacks were unavailable within the classroom; the availability of water and snacks with procedures for responsible access throughout the day would have increased the score to 3.

![Figure 191. Class Helpers](image1)
![Figure 192. Overhead Lighting](image2)
![Figure 193. Uncontrolled Natural Light](image3)

The PEERS subscale: The welcoming classroom. The Welcoming and Inviting subscale showed 0% of indicators with a score of 3, 42.9% with a score of 2, and 57.1% with a score of 1. Indicators which scored a 2, indicating proficient implementation of principles associated with the indicator, follow. Adam shared his feelings about his physical classroom environment. “This does still feel sanitary and kind of cold…I don’t know what the balance would be to soften it up little bit, but not to overload them with more stimuli. I feel like it’s kind of cold and barren, to be honest. It sort of feels like a hospital.” The color palette was neutral and colors were complimentary; a score of 3 would have been given had color came primarily from students’ work. Some home-like elements including plants and a rug, shown in Figure 195, were found in
the classroom. The inclusion of additional home-like elements would have increased the score to a 3. The daily agenda, shown in Figure 196, was handwritten on the large dry erase board at the front of the classroom for easy reference by students; the inclusion of photos would have increased the score to a 3.

Approximately 57.1% of indicators received a score of 1, indicating novice implementation of principles associated with the indicator. No specific space for music was available in the classroom; evidence of the regular use of music would have increased the score to a 3. Two living plants were found in the classroom, one of which is seen in Figure 194. The inclusion of multiple plants and procedures in place to reinforce the care of living things would have increased the score to a 3. No student photos were found in the classroom. Student expectations were handwritten by the teacher; however, they were based on the commercially produced expectations set forth by The Leader in Me™ (Covey, 2009) as seen in Figure 197. “That’s (The Leader in Me™) something that has kind of fallen off this year because it’s not mandatory…you just throw out one of those terms and most kids are going to know what type of behavior you’re referring to and what the problem is…I did a great job at the beginning of the year, and I’ve kind of slacked off.” Evidence which suggested student expectations were generated collaboratively with students would have increased the score to a 3.
PEERS data: Environment for responsible learning.

Table 49. Adam’s PEERS Scores: Environment for Responsible Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Responsible Learning</td>
<td>16.6%</td>
<td>66.7%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

Adam felt his classroom environment design encouraged responsible learning by students. “It’s (classroom environment) just an easy way to help them be more independent; to find the resources themselves.” Approximately 16.7% of indicators for the Environment for Responsible Learning received a score of 3, 66.7% received a score of 2, and 16.6% received a score of 1. Indicators which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Tools and materials were available to support lesson objectives with the majority of materials being teacher developed. Students had access to leveled readers (Figure 198), art materials, and technology related to topics of study.

Approximately 66.7% of indicators for the Environment for Responsible Learning domain received a score of 2, indicating proficient implementation of developmentally appropriate principles. Materials were centrally stored in the classroom, which indicated student access to materials although no procedures were posted to encourage independent access of materials which would have increased the score to a 3. Learning center materials were linked to learning objectives although no evidence was found to suggest materials evolved or changed in response to projects, explorations, or experiences. Some materials were uncluttered but lacked creative or aesthetic displays needed to promote focus. “These shelves are out of control.”
Materials for use were separated from stored materials but were not stored for easy student access. Figures 198 and 199 illustrate the storage of student journals and leveled readers, which are stored haphazardly while Figure 200 illustrates organized materials in transportable containers.

Only 1 indicator received a score of 1 under the Environment for Responsible Learning domain. Materials in Adam’s room lacked any labeling; developmentally appropriate labeling would have increased the score to a 3.

![Figure 198. Leveled Readers & Informational Texts](image1)

![Figure 199. Storage](image2)

![Figure 200. Transportable Materials](image3)

Use of the physical classroom environment as a teaching and learning tool.

**Interview data.** Adam used his environment as a tool for teaching and learning. “[The physical classroom environment] helps me be efficient.” He felt it was important to keep materials and peripherals at a minimum to aid focus and prevent overwhelming the students. “When I’m asking kids to look at something and it’s taking 30 or more seconds for kids just to turn around and turn back and get refocused…so I try not to put too much stuff behind them.” Adam used “deliberate” small groups to keep students constantly engaged in peer discussions. “I definitely know what kids I’m placing in terms of behavior but also in terms of skill level so it can be a nice, balanced conversation.”
PEERS data: Environment for continuous learning.

Table 50. Adam’s PEERS Scores: Environment for Continuous Learning

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

None of the total indicators for the Environment for Continuous Learning domain received a 3, 100% received a 2, and 0% received a 1. Indicators which received a score of 2 demonstrated proficient implantation of developmentally appropriate principles; indicators which received a score of 2 follow. Adam’s classroom was departmentalized for math; the majority of peripherals were math-related. As previously mentioned, peripherals in Adam’s room were kept to a minimum; however, those which were available represented the current topics of study through a mix of teacher-directed and student work; the inclusion of authentic student work representing the current topic of study would have increased the score to a 3. A collaboratively created peripheral is seen in Figure 201. Peripherals were arranged for access and review by students; however, no evidence was found to suggest continuous reflection of the learning process. Evidence of some assessment artifacts such as student work samples and journals were found in the classroom (Figure 203). The inclusion of projects, portfolios, etc. would have increased the score to 3. Several work representations related to the topic of study, such as the math word wall (Figure 202), were displayed on bulletin boards and easels.
Impact of philosophy on physical classroom design.

*Interview data.* Adam’s philosophy focused on the importance using assessment to drive instruction while providing diverse learners content in multiple ways. “I think that it is really important to present the same content in multiple ways so kids can learn in their area of strength…” In accordance with his belief in providing students content in multiple ways, Adam noted the role of leveled anchor charts displayed in the classroom. “It’s [anchor charts] the same content with different degrees of complexity.” Aligned with his beliefs about multiple intelligences, Adam also noted the various physical aspects of his room designed to meet various learning needs. For example, a large open space in his classroom was intended to meet the needs of kinesthetic learners. Peripherals were intended to aid visual learners. The room arrangement was designed to support linguistic, social learners. He noted he had failed to focus as heavily on the multiple intelligences since moving to third grade.
**PEERS data: Environment for purposeful learning.**

Table 51. *Adam’s PEERS Scores: Environment for Purposeful Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>80%</td>
<td>10%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

Ten percent of indicators for the Environment for Purposeful Learning domain received a score of 3, 80% received a score of 2, and 10% received a score of 1. The indicator which scored a 3, demonstrating accomplished implementation of developmentally appropriate principles, follows. Adam did not have a teacher’s desk but had several uncluttered work spaces throughout the room (Figures 206 and 207). The total teacher work space occupied less than 1/8 of the entire instructional space.

Eighty percent of indicators for the Environment for Purposeful Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. Four learning centers were available which included math (Figure 204), literacy, science, and technology; however, most learning centers lacked physical separation or clear definition. Adam shared about his learning center objectives. “We are good with using manipulatives…they have manipulatives to guide them through their explanation of their thinking.”

He further outlined the value of implementing whole group instruction, allowing private reflection, and then encouraging students to discuss new concepts with each other prior to practicing their skills in the centers. “They’ll throw out their ideas and sometimes that will lead to a debate. If someone disagrees, they’ll have to do a lot of justifying their answer. It also
clears up a lot of misunderstandings early because with a lot of them, the same misunderstanding will happen, and they learn from each other when they talk about it.” Had there been multiple literacy, math, and science centers, a score of 3 would have been given. The room appeared to be intentionally arranged to accommodate for noise and activity level. “My first thought is noise…and what needs to be a quiet, sacred environment away from where the noise will be going on.” Accessible private, individualized storage needed to receive a score of 3 was unavailable in Adam’s classroom. Community storage was available for students through the provision of cubbies located in a closet within the classroom, as seen in Figure 205.

Only one indicator received a score of 1 for the Environment for Purposeful Learning domain, indicating novice implementation of developmentally appropriate principles. The learning centers lacked clear definition with existing dividers adding little or no learning value to the space.

Impact of the CCSSI on physical classroom design.

Interview data. Adam seemed to have mixed emotions regarding the CCSSI, stating “There has to be accountability. You have to keep track in some way but…I think standardized testing at this age is still a little young to truly show understanding for every kid. So to place that kind of importance on scores at this young is not truly accurate.” Adam felt his physical
environment was used to aid in meeting 21st century skills set forth by the Common Core through the use of technology and peripherals linked to learning objectives. Adam felt his focus on the use of peripherals linked to learning had increased since the implementation of the CCSSI. “I knew the importance of [peripherals] beforehand, but I think I’ve taken an even greater interest in it now.”

**Physical environment design’s support for 21st century skills.**

*Interview data.* When asked how his physical classroom environment aided in meeting the needs of children in the 21st century, Adam shared regarding how the CCSSI was used to aid children in gaining 21st century skills. “There is a lot of quiet think time where I'll just give them part of the concept and just a little bit of direction and not even an approach to a problem but they'll just need to explore and that is an important thing before the discussion. We don't just jump right into the discussion. I give the kids time to process.” Adam further shared how his physical environment was designed to support the skills set forth by the Common Core in the following ways:

**Creativity.** Adam felt an important part of creative development was the implementation of projects. He discussed his desire to implement project work in the classroom but felt projects which allowed for creativity were limited since his class had become departmentalized. He did feel, however, that the CCSSI supported creativity as it encourages collaborative learning, talking, and exploring. In an attempt to further support the development of creativity, Adam shared regarding the use of math manipulatives to promote creative and critical thinking. “While students are sometimes required to perform specific functions or answer specific questions using these manipulatives, [the manipulatives center] is also an area where they can go to be inspired to lead a project of their own.”
**Critical thinking.** Adam discussed his desire to increase the use of project work and investigations to address both creativity and critical thinking but noted the lack of time, money, and assistance needed to do so. “I feel like we don’t end up doing as big and exciting projects as I’d hoped for, but it (Common Core) forces us to kind of slow down and give them a chance to explore first-hand.” Despite further questioning, Adam did not elaborate beyond this explanation regarding how the physical classroom environment supported the 21st century skill of critical thinking.

**Collaboration.** Adam said collaboration was typically the focus of the district’s professional development sessions. To address collaborative learning, Adam used small groups to encourage interaction among learners. “I hope everything just leads to the theory that we’re all trying to understand something together and that we’re not 21 kids all competing but that, when you’re in a community, you can learn from each other as much as possible. So I hope that’s the way [the environment] is set up; that is the goal.”

**Communication.** In regard to communication, again Adam shared the value of using a small group configuration and the importance of encouraging students to “turn and talk” every 15 minutes. He stressed the importance of using “thoughtful groupings” to increase communication and providing several larger tables in addition to small group tables to encourage brainstorming and planning group projects. Only one individual desk was found in Adam’s room, which was used when students need time to “cool down.” Adam shared regarding the value of providing students with opportunities to communicate regularly. “I think the group seating has an effect more than anything because they are exposed to, and encouraged to share their ideas. They’re required to talk all the time…it’s not just my way or my explanation; it’s
them getting other viewpoints. Other third grade viewpoints from another third grade brain. They’re exposed to concepts in another way through communication.”

**PEERS data: Environment for social learning.**

Table 52. *Adam’s PEERS Scores: Environment for Social Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

*Departmentalized; math.

Eighty percent of the total indicators for the Environment for Social Learning domain received a score of 3, 20% received a score of 2, and 0% received a score of 1. Indicators which received a score of 3 demonstrated accomplished implementation of developmentally appropriate principles; indicators which received a score of 3 follow. Adam provided for social learning experiences through the provision of multiple flexible small group work spaces as shown in Figure 208. Spaces appeared to be adaptable for various instructional purposes. Multiple areas for small group instruction with access to instructional resources were available throughout the classroom. A large group meeting area, shown in Figure 209, was available and appeared to be a multipurpose area. Evidence suggested student seating was not always assigned and that students had the option to work either individually or in small groups to promote social learning.

Twenty percent of indicators for the Environment for Social Learning domain received a score of 2, representing proficient implementation of developmentally appropriate principles. In addition to traditional seating, some variety in seating options was available for learners, as evidenced in Figure 210, which illustrates beanbags. The provision of multiple seating options
suggesting student choices in seating based on learning need and style would have increased the score to a 3.

*Departmentalized; math.

Twenty percent of the total indicators for the Environment for Inquiry-based Learning domain received a score of 3, 80% received a score of 2, and 0% received a score of 1. The one indicator which scored a 3 demonstrated accomplished implementation of developmentally appropriate principles; the indicator which received a score of 3 follows. Multiple technology centers, including the one shown in Figure 213, were available for reinforcing technology skills.

Eighty percent of the total indicators for the Environment for Inquiry-based Learning domain received a score of 2, suggesting proficient implementation of developmentally appropriate principles. Some evidence of collaborative learning, such as the “I Can” statements

**PEERS data: Environment for Inquiry-based learning.**

Table 53. *Adam’s PEERS Scores: Environment for Inquiry-based Learning*

<table>
<thead>
<tr>
<th>Domain</th>
<th>percent of indicators with score of 1 (novice)</th>
<th>percent of indicators with score of 2 (proficient)</th>
<th>percent of indicators with score of 3 (accomplished)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>80%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Figure 208. Small Group Seating

Figure 209. Large Group Area

Figure 210. Variety of Seating Options

Table 53. *Adam’s PEERS Scores: Environment for Inquiry-based Learning*
seen in Figure 211, were found in Adam’s classroom; extensive evidence of collaborative planning would have increased the score to a 3. Graphic organizers were used by the teacher and students to organize concepts of formal instruction as seen in Figure 212. Extensive evidence needed for a score of 3 was not found. Some evidence suggested students had access to research texts, such as informational texts and reference books as seen in Figure 214. Additional resources included books, graphs, charts, and data to support the topics of study. Minimal evidence was found suggesting students were actively engaged in projects exploring topics of study.

**Cross-Case Analysis**

Ideas about the data cannot be used to interpret the data set until first shown to be important in individual experiences. Insights from one case may sensitize the researcher to similar information as it occurs in other cases (Saldaña, 2013). This section presents findings from cross-case analysis, the second stage of data analysis, intended to capture the essence of a shared experience and cross-case patterns among individuals. The cross-case analysis section demonstrates the overall similarities and differences in relation to the research questions across the 8 cases.
Central Research Question: What is the role of the physical classroom environment in teaching and learning in 8 primary classrooms in Northeast Tennessee?

Throughout the interview process, both constructivist and traditional teachers shared regarding the role of the physical classroom environment in the teaching and learning process. Both constructivist and traditional teachers addressed the importance of creating a welcoming and comfortable physical classroom environment; however, a difference was noted in the language used by constructivist versus traditional teachers when describing their views of the physical environment’s role in the teaching and learning process. Figures 215 and 216 are word clouds constructed from phrases used by participants during the interview in relation to the central research question.

Word clouds are created when cutting and pasting large amounts of text into the online software’s program field. The online software then analyzes the word count frequencies and displays results in a random cloud design with more frequently used words appearing in a larger font size. Saldaña (2013) recommends the use of such unique visual tools for organizing and representing data. Notice those ranked as constructivist by the TBS were found to more often use words associated with the construction of knowledge (e.g., “construct knowledge,” “hands-on,” and “intrinsic”) versus traditional participants who shared in terms of functionality, organization, and meeting students’ basic needs (e.g., “independence,” “safe,” and “expectations”).
Sub-question 1: What are the perceptions and experiences of 8 primary teachers related to their use of the physical classroom environment as a teaching and learning tool?

Constructivist teachers. Based on results of the TBS, Amanda, Chrissy, Elizabeth, and Grace were ranked as constructivist with each agreeing or agreeing strongly to such statements as I believe that expanding on students’ ideas is an effective way to build my curriculum, I prefer to cluster students’ desks or use tables so they can work together, and I involve students in evaluating their own work and setting their own goals. Evidence of such beliefs was identified in the physical classroom environment through the use of the PEERS and photos documenting
such components as collaborative planning tools and graphic organizers, peripherals linked to learning, small group table configurations, and learning centers. Constructivist teachers also shared regarding the intentional use of the physical classroom environment as a tool for teaching and learning in the following ways:

- “Displaying and referring to a word wall” (Amanda)
- “Peripherals are an important part of developing independent and reflective learning” (Chrissy).
- “I try to create an organized, well-planned layout to support learners and guide the learning process” (Chrissy).
- “Environment to guide students to find materials” (Chrissy)
- “I plan the environment for hands-on, cooperative learning to encourage talking and working together” (Elizabeth).
- “To encourage movement” (Elizabeth)
- “Allowing flexibility in the room arrangement” (Elizabeth)
- “Both independent and whole group work areas” (Grace)
- “Open areas” (Grace)
- “Authentic work samples to encourage reflection” (Grace)

**Traditional teachers.** Based on results of the TBS, Beth, Dana, Fae, and Adam were ranked as traditional with each agreeing or agreeing strongly to such statements as *It is important that I establish classroom control before I become too friendly with students* and *I like to make curriculum choices for students because they can’t know what they want and need to learn.* Evidence of such beliefs was identified in the physical classroom environment through the use of the PEERS and photos documenting such components as limited or a lack of collaborative
planning tools and graphic organizers, a mix of student and teacher-generated rules or expectations as well as commercially produced rules, and learning centers. Traditional teachers also shared regarding their use of the physical classroom environment as a tool for teaching and learning in the following ways:

- “We have lots of paper documentation” (Beth).
- “I’m very structured in here…so that every second of the day is utilized…” (Beth).
- “They know the rules and, basically, they just do them” (Beth).
- “It [the physical classroom environment] is organized to aid students in learning and to get materials when they need them” (Dana).
- “Things need to be labeled” (Fae).
- “Organization is important” (Fae).
- “It [the physical classroom environment] helps me be efficient” (Adam).
- “Materials and peripherals are kept to a minimum to promote focus” (Adam).

Both constructivist and traditional teachers agreed or strongly agreed with the following TBS statements: *I prefer to cluster students’ desks or use tables so they can work together* and *For assessment purposes, I am interested in what students can do independently*. Evidence of such beliefs was identified in each participant’s physical classroom environment through the use of the PEERS and photos documenting various seating options such as small group seating, whole group areas, partner work areas, and independent spaces. In the within-case analysis, the PEERS domain of Continuous Learning was used in relation to each teacher’s perceptions of the use of the physical classroom environment as a teaching and learning tool. Table 54 provides a summary of the results of a cross-case analysis of the data related to sub-question 1.
### Table 54. Cross-case Analysis: Sub-question 1

<table>
<thead>
<tr>
<th>Grade</th>
<th>Participant</th>
<th>TBS</th>
<th>PEERS Score: Continuous Learning Domain</th>
<th>Phrase(s) From Interview</th>
</tr>
</thead>
</table>
| Kindergarten | Amanda      | Constructivist | Score of 2; proficient 100%          | • “meaningful peripherals”  
|            | Beth        | Traditional   | Score of 2; proficient 50%           | • “using centers”  
|            | Chrissy     | Constructivist | Score of 3; accomplished 75%         | • “a tool for teaching and learning”  
|            | Dana        | Traditional   | Score of 2; proficient 75%           | • “organized to aid learning”  
| First Grade | Elizabeth   | Constructivist | Score of 3; accomplished 75%         | • “hands-on, cooperative learning”  
|            | Fae         | Traditional   | Score of 2; proficient 75%           | • “develop independence”  
| Second Grade | Grace      | Constructivist | Score of 3; accomplished 100%        | • “environment to support teaching and learning”  
|            | Adam        | Traditional   | Score of 2; proficient 100%          | • “efficient”  
| Third Grade |             |               |                                       | • “peripherals at a minimum”  
|            |             |               |                                       | • “deliberate small groups”  

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Sub-question 2: How does the philosophy of teaching and learning of 8 primary teaching impact the design of the physical classroom environment?

While both constructivist and traditional participants cited personal experience as having impacted their physical classroom design, they differed in how they described the impact of their philosophical beliefs.

**Constructivist teachers.** Amanda felt her physical classroom environment design had not been impacted by any particular learning theory but cited personal experiences as her guide in the decision-making process. She further noted the value of getting to know individual children in order to make informed decisions about the physical classroom environment. She described her physical classroom environment design as “child-driven” citing her belief “knowledge is constructed through hands-on learning experiences.”

Chrissy felt she was most influenced by her professional development experiences and the process she underwent as part of becoming a Nationally Board Certified teacher. She noted the importance of teaching on an “individual basis” and designing the physical classroom environment based on the unique population of students each year. Her knowledge of developmentally appropriate practices served to guide her in terms of designing a classroom environment which she felt aided students in “achieving high expectations.” She also described her belief in the value of designing learning centers in which “students can practice skills while engaging with personals and others.”

Elizabeth felt her physical classroom environment design had been impacted by the constructivist learning theory set forth by Piaget (1953). Her physical classroom environment was designed to “support my early childhood background and constructivist philosophy.” As part of her philosophical beliefs, Elizabeth included investigative and discovery learning
experiences within her classroom with spaces for small group and project work. Elizabeth shared her support for the inclusion of materials which encouraged students to engage in the process of research and gathering of data. Lastly, she felt her philosophical beliefs were demonstrated throughout her classroom through the provision of opportunities to “explore, move, and interact.”

Grace felt her personal philosophy had been heavily influenced by her professional development experiences and on-going personal research related to the field of early childhood. When designing her physical classroom environment, she noted the importance of “knowing children and their needs.” She also shared her belief that children must feel safe before they can learn. The importance of space for “social learning” and areas of “private reflection” were also reflective of Grace’s philosophical beliefs.

**Traditional teachers.** Beth cited no theoretical influence but felt her professional development and training through the Learning Network® had most influenced her physical classroom environment design. Her belief that “every child can learn” guided her in terms of her physical classroom organization, setting expectations, and using learning centers. She also felt it was important “expectations be known to students” as evidenced in her physical classroom environment design through the posting of expectations and practicing “rotating the room” with her students and encouraging them to learn to “understand how a room works and buy into that.”

Dana felt her room was “student-friendly,” citing Maslow’s hierarchy of needs (1954) as having influenced her physical classroom environment design. She further noted the importance of addressing students’ basic needs before implementing learning experiences. She also commented on the value of providing students with “space to learn” and organization which “fosters autonomy and independence.”
Fae felt her philosophy did not impact her physical classroom environment design. It was her belief the needs of the “whole child” should be addressed by the physical classroom environment although she did not elaborate further regarding how she used her physical classroom environment to address such needs. She further noted the importance of children demonstrating respect and following classroom procedures. “I’m all about hands-on and things, but it needs to be structured…”

Adam cited Howard Gardner’s (1999) theory of multiple intelligences as having impacted his physical classroom design and noted the value of presenting the same content in “multiple ways.” He demonstrated this belief through the provision of visual aids (e.g., anchor charts) for visual learners, a large open space for kinesthetic learners, manipulatives for logico-mathematical learners, and small group seating for social learners.

Table 55. Venn diagram: Constructivist Versus Traditional Phrases Related to Sub-question 2.
Sub-question 3: How has the Common Core State Standards Initiative impacted the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee?

The majority of participants shared their support for the CCSSI; however, several noted the importance of “tweaking” the standards to be “aligned with individual student’s needs” (Chrissy) and to “support DAP” (Dana).

**Constructivist teachers.** When asked if the CCSSI had impacted the physical classroom environment, constructivist teachers Amanda, Elizabeth, and Grace all shared support for the standards, yet felt their physical classroom environment had been unaffected since it was “already aligned” with the expectations set forth by the CCSSI. Amanda further noted, “I did not plan my room with the intention of meeting the Common Core Standards. I do not read the standards and think *oh I need to do this to my room to meet a standard.* I do think *I need to have this in my room because it’s going to help this child learn.*” Chrissy mentioned her environment had been influenced by the CCSSI as evidenced through her increased use of peripherals linked to learning.

**Traditional teachers.** Traditional teachers Beth and Dana felt their physical classroom environment had not been impacted by the CCSSI. They both shared their support for the CCSSI with Beth further noting “children need to be pushed” and Dana commenting “the CCSSI needs to be tweaked to support DAP.” Fae expressed “mixed feelings” toward the CCSSI and felt the standards had been “thrown” at teachers in the district. She also stated the “bar has been raised and it’s difficult for some children to reach it.” Fae felt her physical classroom environment had been impacted by the CCSSI through the increased use of peripherals associated with Accountable Talk®. Adam shared regarding his views toward the CCSSI, particularly in regard to testing young children: “Standardized testing at this age may not demonstrate true
understanding.” He also noted a “stronger focus” on the use of peripherals since the implementation of the CCSSI.

**Sub-question 4:** How does the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee support the following 21st century skills: collaboration, creativity, critical thinking, and communication?

When discussing 21st century skills, several teachers mentioned the importance of providing learning experiences rich in technology.

**Collaboration.** All constructivist teachers received 100% of threes, indicating accomplished implementation measured by the PEERS within the domain of the Environment for Social Learning. Constructivist teachers easily articulated how they addressed collaboration through the physical classroom environment. Constructivist teachers shared how collaboration was addressed by the physical classroom environment with most citing such examples as small groups, partner work, projects, and learning centers. The following phrases are a summary of words and phrases used by all constructivist teachers regarding how their physical classroom environment design supported and promoted the 21st century skill of collaboration. Quoted phrases were specific to a particular teacher.

- Small group table configuration
- Projects
- Partner work
- Whole group spaces
- Learning centers
- Choices in work configuration
- Open storage to allow access to materials and/or research tools
- Encouraging comparing, sharing, discussing, and/or debating viewpoints
- Opportunities to work with “different people at different times” (Chrissy)
- “Teachers model collaborative behavior for children” (Amanda)

One traditional teacher scored only 40% of threes with the remaining three teachers scoring high percentages of threes which indicated accomplished implementation on the PEERS within the domain of the Environment for Social Learning. Traditional teachers demonstrated difficulty responding when asked how the physical classroom environment supported the development of the skill of collaboration. When first asked about collaboration, Beth did not cite any specific instances related to collaboration. When prodded further, she shared “opportunities for children to collaborate with one another are available daily through peer interactions and opportunities to share with the whole group.” Dana responded, “Like projects? We don’t do very many projects, unfortunately.” Fae responded, “Well [collaboration] happens every day and basically, the teacher has to observe that with little children. You can’t walk off and expect them to collaborate on things…you have to be right there with them at all times.”

Traditional teachers shared regarding how their physical classroom environment design supported and promoted the 21st century skill of collaboration in the following ways:

- Small group table configuration
- Mixed-ability groupings
- Whole group spaces
- Choices in work configuration
Table 56 provides a summary of the results of a cross-case analysis of the data related to collaboration under sub-question 4.

**Table 56. Cross-case Analysis: Sub-question 4**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Participant</th>
<th>TBS</th>
<th>PEERS Score: Social Learning Domain</th>
<th>Phrases From Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>Amanda</td>
<td>Constructivist</td>
<td>Score of 3; accomplished 100%</td>
<td>• “social freedom”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “small group tables”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “teachers modeling collaborative behavior for children”</td>
</tr>
<tr>
<td></td>
<td>Beth</td>
<td>Traditional</td>
<td>Score of 3; accomplished 100%</td>
<td>• “whole group sharing”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “choices in work”</td>
</tr>
<tr>
<td>First Grade</td>
<td>Chrissy</td>
<td>Constructivist</td>
<td>Score of 3; accomplished 100%</td>
<td>• “partner work”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “choices”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• opportunities to work with “different people at different times”</td>
</tr>
<tr>
<td></td>
<td>Dana</td>
<td>Traditional</td>
<td>Score of 3; accomplished 80%</td>
<td>• “small group seating”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “whole group learning”</td>
</tr>
<tr>
<td>Second Grade</td>
<td>Elizabeth</td>
<td>Constructivist</td>
<td>Score of 3; accomplished 100%</td>
<td>• “learning centers”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “projects”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “sense of community”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• access to research materials</td>
</tr>
<tr>
<td></td>
<td>Fae</td>
<td>Traditional</td>
<td>Score of 2 &amp; 3; proficient &amp; accomplished 40%</td>
<td>• “small groups”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40%</td>
<td>• “talk friends”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “whole group discussions”</td>
</tr>
<tr>
<td>Third Grade</td>
<td>Grace</td>
<td>Constructivist</td>
<td>Score of 3; accomplished 100%</td>
<td>• “debates”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “problem-solving together”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “open storage”</td>
</tr>
<tr>
<td></td>
<td>Adam</td>
<td>Traditional</td>
<td>Score of 3; accomplished 80%</td>
<td>• “thoughtful groupings”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• “small group tables”</td>
</tr>
</tbody>
</table>
**Communication.** Constructivist participants received high percentages of threes on the PEERS domain of Social Learning. Again, 3 out of 4 traditional teachers received high percentages of threes within the domain for the Environment for Social Learning. In regard to communication, it was easy for all participants to share regarding opportunities for students to develop the 21\textsuperscript{st} century skill of communication through the provision of various opportunities throughout the classroom. Adam shared, “I think that’s [communication] definitely what we, me as a teacher and our school and our system, are big on…typically, that’s what our professional development sessions are on.” The following phrases are a summary of words and phrases used by both constructivist and traditional teachers regarding how their physical classroom environment design supported and promoted the 21\textsuperscript{st} century skill of communication. Quoted phrases were specific to a particular teacher.

- Small group table configuration
- Opportunities to share with the whole group
- Whole group spaces
- Learning centers
- Mixed-ability groupings/scaffolding
- Writing experiences
- Accountable Talk®
- Choices in work configuration (e.g., partners, small groups, teams, etc.)
- Communication through technology (e.g., SMART Board®, iPads™, computers, etc.)
- “Family meetings” at the carpet (Elizabeth)
- “Providing time to learn from each other” (Amanda)
Creativity. When asked to share about opportunities for creativity, several teachers had difficulty sharing how their physical classroom environment supported and promoted creativity. Some of the teachers seemed to think of creativity in terms of art projects while others discussed opportunities to develop creative-thinking. Chrissy noted “creativity is hard because it’s very rigorous now; you don’t have a lot of time for it.” Constructivist teachers Amanda, Chrissy, Elizabeth, and Grace felt their physical classroom environment addressed creativity. The following phrases are a summary of words and phrases used by all constructivist teachers regarding how their physical classroom environment design supported and promoted the 21st century skill of creativity. Quoted phrases were specific to a particular teacher.

- hands-on learning
- learning centers
- limiting worksheets
- encouraging problem-solving
- supporting reflective thinking
- peripherals which display creative-thinking and/or support reflective thinking
- choices
- poetry
- game playing
- discovery learning
- providing an environment with tools necessary to explore a variety of concepts
- available materials
- strategizing
- “drawing or writing opportunities to express a response” (Chrissy)
• “delving deep into learning” (Elizabeth)

• “incorporating song, movement and the arts into projects” (Grace)

• giving students “creative power” (Amanda)

Throughout the interviews with traditional teachers, it was difficult for them to share, even when prodded further, regarding how the physical classroom environment aided students in developing the 21st century skill of creativity. Traditional teachers Beth, Dana, Fae, and Adam shared how their physical classroom environment design supported creativity. Dana noted, “That’s probably one thing with the Common Core there seems to be less room for, because the writing is so regimented…there’s not as much space for creative writing as I would like.” Fae noted, “Well, I teach math so I don’t know how creative we are in math.” Adam felt his creative opportunities were limited as he shared, “I feel like we don’t end up doing as big and exciting projects as I’d hoped for.” The following phrases are a summary of words and phrases used by all traditional teachers regarding how their physical classroom environment design supported and promoted the 21st century skill of creativity. Quoted phrases were specific to a particular teacher.

• Experiences with technology/computer games

• Learning centers

• Using manipulatives

• “When it’s raining, free choice time” (Dana)

• “Writing station with free writing opportunities” (Dana)

• “Making predictions and inferences when reading unfamiliar texts” (Beth)
**Critical thinking.** Both constructivist and traditional teachers had difficulty sharing how the physical classroom environment supported the development of critical thinking. All participants shared to some extent how the physical classroom environment supported and promoted critical thinking, particularly since the onset of the CCSSI and the use of Accountable Talk®. The following phrases are a summary of words and phrases used by both constructivist and traditional teachers regarding how their physical classroom environment design supported and promoted the 21st century skill of creativity:

- Debates and/or discussions
- Strategies to problem-solve
- Available materials
- Peripherals
- Whole group area
- Accountable Talk®

**Comparison of Traditional vs. Constructivist Teachers’ Scores on PEERS**

Although the goal of this study was not to make any type of correlation between teacher beliefs and practices, the use of the PEERS provided a unique form of descriptive and numeric data which allowed for an extended interpretation of findings. Having averaged traditional and constructivist teachers scores on the PEERS, it became evident that those teachers scored as constructivist by the TBS scored a higher number of threes (indicating accomplished implementation) in all domains of the PEERS than their traditionally ranked peers.

**The PEERS.** Qualitative descriptors of the PEERS were used to determine a score which reflected the degree to which each teacher’s classroom environment represented the foundation for developmentally appropriate practices. Accomplished implementation of
developmentally appropriate principles associated with an indicator was scored as 3. Proficient implementation of developmentally appropriate principles associated with an indicator was scored as 2. Novice implementation of developmentally appropriate principles associated with an indicator was scored as 1. Comprehensive percentages of each teacher’s implementation of indicators for each PEERS domain is shown in the following tables. Figure 217 provides a comparison of percentages of scores of 3 on the PEERS for both traditional and constructivist teachers. Note the higher amount of percentages of threes by constructivist teachers in all domains of the PEERS.
## Kindergarten

Table 57. *Primary Educators Rating Scale Results: Amanda & Beth*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Amanda (Constructivist)</th>
<th>Beth (Traditional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>percent of indicators with score of 1 (novice)</td>
<td>percent of indicators with score of 2 (proficient)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>percent of indicators with score of 1 (novice)</td>
</tr>
<tr>
<td>Environment for Meaningful Learning</td>
<td>15.4%</td>
<td>38.5%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>0%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>28.6%</td>
<td>57.1%</td>
</tr>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>20%</td>
<td>60%</td>
</tr>
</tbody>
</table>
First Grade

Table 58. Primary Educators Rating Scale Results: Chrissy & Dana

<table>
<thead>
<tr>
<th>Domain</th>
<th>Chrissy (Constructivist)</th>
<th>Dana (Traditional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>percent of indicators with score of 1 (novice)</td>
<td>percent of indicators with score of 2 (proficient)</td>
</tr>
<tr>
<td>Environment for Meaningful Learning</td>
<td>15.4%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>0%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>28.6%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Environment for Purposeful Learning</td>
<td>0%</td>
<td>40%</td>
</tr>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>60%</td>
</tr>
</tbody>
</table>
### Second Grade

Table 59. *Primary Educators Rating Scale Results: Elizabeth & Fae*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Elizabeth (constructivist)</th>
<th>Fae (traditional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>percent of indicators with score of 1 (novice)</td>
<td>percent of indicators with score of 2 (proficient)</td>
</tr>
<tr>
<td>Environment for Meaningful Learning</td>
<td>23.1%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>16.7%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>28.6%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
## Third Grade

### Table 60. Primary Educators Rating Scale Results: Grace & Adam

<table>
<thead>
<tr>
<th>Domain</th>
<th>Grace (constructivist)</th>
<th></th>
<th>Adam (traditional)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>percent of indicators with score of 1</td>
<td>percent of indicators with score of 2</td>
<td>percent of indicators with score of 3</td>
<td>percent of indicators with score of 1</td>
</tr>
<tr>
<td>Environment for Meaningful Learning</td>
<td>0%</td>
<td>15.4%</td>
<td>84.6%</td>
<td>46.2%</td>
</tr>
<tr>
<td>Subscale: Healthy Classroom</td>
<td>0%</td>
<td>16.7%</td>
<td>83.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Subscale: Welcoming &amp; Inviting Classroom</td>
<td>0%</td>
<td>14.3%</td>
<td>85.7%</td>
<td>57.1%</td>
</tr>
<tr>
<td>Environment for Social Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Environment for Purposeful Learning</td>
<td>10%</td>
<td>30%</td>
<td>60%</td>
<td>10%</td>
</tr>
<tr>
<td>Environment for Responsible Learning</td>
<td>0%</td>
<td>50%</td>
<td>50%</td>
<td>16.6%</td>
</tr>
<tr>
<td>Environment for Continuous Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Environment for Inquiry-based Learning</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Emerging Themes

As an experience occurred repeatedly in several contexts, the investigator then developed the idea as a theme. When themes have explanatory influence both in individual cases and across the study sample, they most likely will apply beyond the sample, which is known as generalizability (Ayres et al., 2003). Emerging themes and sub-themes were developed through comparisons and contrasts, clustering, counting, identifying patterns, observing relations between variables, and gathering a chain of evidence among cases. Resulting themes and sub-themes which represent “lessons learned” (Lincoln & Guba, 1985) include: 1) organized physical classroom environment; 2) the population of students impacts the physical environment design: socioeconomic status of students, high turnover rate of students, children with special
needs; 3) Accountable Talk®: peripherals linked to learning, space for students to engage; 4) additional materials are needed to aid teachers in meeting CCSSI and; 5) CCSSI lacks support from the public due to perceived lack of understanding or misinformation: CCSSI could be temporary, misinformed publics lacks support for CCSSI.

**Theme 1: Organized physical classroom environment**

Both constructivist and traditional teachers shared regarding their belief in the value of developing and maintaining a well-organized physical classroom environment. The classroom environment is influenced by the guidelines established for its operation and its physical elements. Effective teachers expertly organize the physical classroom environment and provide expectations to their students which encourage them to contribute in a positive and productive manner (Wang, Haertel, & Walberg, 1993). For the purposes of theme one, *classroom organization* refers to the physical environment. Efficient teachers take time in the beginning of the year to develop and establish classroom organization. Teachers who organize a safe classroom environment which is easily managed by students are likely to engage students in higher levels of learning. They strategically place materials, learning centers, and furniture in order to optimize student learning and reduce distractions (Emmer, Evertson, & Worsham, 2003). The following statements were made in regard to the value of an organized physical classroom environment:

- “It (classroom) needs to be organized. And materials that you need should be close by”
  (Beth, traditional).
- “I like pretty things and I like things organized. I’m very organized. Everything has a place… it helps me to be organized and know where everything is, and it helps the kids, too”
  (Chrissy, constructivist).
“Having the ability for them (students) to get the materials they need when they need them, that doesn’t become a stumbling block for them. If I had them put away and they were always needing someone else to get them that might create more of distraction for them or they might wait because some students are more shy than others, and they might not want to wait to come and ask me for a pencil. But if I have it out there, ready to go, they can do it themselves” (Dana, traditional).

“Students know where things are; they get it out, and they put it away” (Elizabeth, constructivist).

“…and to be able to set it up where you can get to things quickly and be organized because little children do not have the patience to wait on you to go find something. So you have to have everything right where you need it. I think it’s very important” (Fae, traditional).

“But, they have access to everything, but you do have to stay organized. That’s very important; very important” (Fae, traditional).

“I try to be neat and organized. I’ve worked on that a lot through the years and gotten better at that” (Grace, constructivist).

“It’s (classroom) just an easy way to help them be more independent; to find the resource themselves” (Adam, traditional).

**Theme 2: The population of students impacts the physical environment design.**

Several teachers noted the importance of being flexible and allowing the physical classroom environment to change in accordance with the needs and wants of a diverse population of students.
**Socio-economic status of students.** It is important to note nearly 49% of students within the district received free or reduced lunch, indicating nearly half of students are considered low-income. Additionally, of the 8 elementary schools, 5 were Title I schools which means funding to schools was provided for the purpose of improving the achievement of disadvantaged students (Farkas & Hall, 2000).

The majority of teachers discussed the importance of paying special attention to the design and maintenance of a healthy, welcoming environment especially with the vulnerable population of students within the district.

- “I feel like this is the first school I’ve taught at that’s a very needy school and comes from some very needy backgrounds…this may be the only warm and inviting place they (students) have” (Chrissy, constructivist).
- “…their life is such a chaotic mess for most of them that they need some place, like I tell a lot of them, I can control what’s here for you. I cannot control your home, but I can control what’s here so that you have a good day at least. Because a lot of them have hard lives” (Fae, traditional).
- “It’s semi-homey. I tried to get it that way just because they, the home environment…they just don’t have it. In doing home visits, I’ve seen that they don’t have the warmth, and so I’ve tried to pay attention to the lighting” (Elizabeth, constructivist).

Several teachers also either spoke about or demonstrated evidence as outlined by the PEERS (e.g., procedures, student expectations, etc.) regarding the importance of including students in the care of the classroom environment.

I think that it’s so important that they learn to respect the physical environment because it’s all our shared space. And they don’t have that at home because of the environment
that they’re coming from. So by having them take responsibility for that, they’re learning that and they’re not learning that at home, unfortunately. To care for their space and their materials (Elizabeth, constructivist).

**High turnover rate of students.** Additionally, several teachers spoke to the high turnover rate of students and how the student population can sometimes limit access to materials. “It’s hard when you have a constant rotation of children coming. You don’t start or end with the same [students]. It’s constantly rotating in and out, and they come with nothing so you have to give them everything” (Fae, traditional). Some of the teachers discussed the necessity of creating an open environment which allowed for visibility to inhibit stealing and students disturbing the materials of others. “I’ve tried to keep it open so I can see the whole room without a lot of movement; the cubbies are against the wall to inhibit stealing. I’ve had some sticky fingers in the past…” (Dana, traditional). “Up until about two years ago, I left things just sitting out. I can’t do that anymore. They steal a lot of things” (Fae, traditional).

**Children with special needs.** The inclusion of children with special needs also impacted some of the teachers’ decisions in regard to the flexibility of the physical classroom environment design as well as the use of some areas. “Due to students’ needs, it’s nice that we’re able to have two separate areas because we have some students that have some pretty severe needs for their own space” (Elizabeth, constructivist). “Due to the needs of a specific student, who keeps his personal manipulatives in that area (class library)…it’s been different for me this year because, in the past, the library has been a big hub of my classroom” (Elizabeth, constructivist). The provision of a flexible classroom environment and adaptive materials supports inclusion, which is prevalent in many schools across the U.S. The goal is to provide students with disabilities learning opportunities in the least restrictive environment (Huffman, 1990). Findings of this
study suggest participants attempted to provide a flexible, supportive physical classroom environment with a variety of materials to support this population of students.

**Theme 3: Accountable Talk®**

Another theme which emerged was Accountable Talk® discussed by 5 of the 8 participating teachers. Accountable Talk® is one of the Institute for Learning’s (IFL) 9 Principles of Learning which outlines the value of communicating with others about ideas. Accountable Talk® calls for classroom talk based on accurate knowledge and rigorous thinking to promote learning (Institute, 2002). Students are expected to respond to and further develop or extend upon what peers have said during a group discussion. Active listening is required as students are expected to use evidence to support their own thinking as they engage in debate or discussion with peers and the teacher about the focus topic. Various discussion formats are suggested such as pairs, small groups, whole groups, etc. with the teacher acting as facilitator who challenges, redirects, or presses the group for further accuracy (University, 2003). Teachers shared regarding how the physical environment design was used to support Accountable Talk® through the use of such elements as whole group meeting areas (e.g., rugs, large open areas, etc.), small group spaces (e.g., small group tables, learning centers, etc.), and peripherals linked to learning. Figures 218 is an excerpt from the Accountable Talk Sourcebook® (Institute, 2002). Figure 219 is an example of an Accountable Talk® statements poster similar to those found in participating teachers’ classrooms.
<table>
<thead>
<tr>
<th>Teacher Move</th>
<th>Function</th>
<th>An Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To ensure purposeful, coherent, and productive group discussion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Manning</td>
<td>Direct attention to the value and importance of a student’s contribution.</td>
<td>“That’s an important point.”</td>
</tr>
<tr>
<td>2. Challenging students</td>
<td>Redirect a question back to the student or use student’s contributions as a source for a further challenge or inquiry.</td>
<td>“What do you think?”</td>
</tr>
<tr>
<td>3. Modeling</td>
<td>Make one’s thinking public and demonstrate expert forms or reasoning through talk.</td>
<td>“Here’s what good readers do…”</td>
</tr>
<tr>
<td>4. Recapping</td>
<td>Make public in a concise, coherent form, the group’s achievement at creating a shared understanding of the phenomenon under discussion.</td>
<td>“What have we discovered?”</td>
</tr>
<tr>
<td><strong>To support accountability to the learning community</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Keeping the channels open</td>
<td>Ensure that students can hear each other and remind them that they must hear what others have said.</td>
<td>“Did everyone hear that?”</td>
</tr>
<tr>
<td>6. Keeping everyone together</td>
<td>Ensure that everyone not only heard, but also understood what a speaker said.</td>
<td>“Who can repeat…?”</td>
</tr>
<tr>
<td>7. Linking contributions</td>
<td>Make explicit the relationship between a new contribution and what has gone before.</td>
<td>“Who wants to add on…?”</td>
</tr>
<tr>
<td>8. Verifying and clarifying</td>
<td>Revise a student’s contribution, thereby helping both speakers and listeners to engage more profitably in the conversation.</td>
<td>“So, are you saying…?”</td>
</tr>
<tr>
<td><strong>To support accountability to accurate knowledge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Pressing for accuracy</td>
<td>Hold students accountable for the accuracy, credibility, and clarity of their contributions.</td>
<td>“Where can we find that…?”</td>
</tr>
<tr>
<td>10. Building on prior knowledge</td>
<td>Tie a current contribution back to knowledge accumulated by the class at a previous time.</td>
<td>“How does this connect…?”</td>
</tr>
<tr>
<td><strong>To support accountability to rigorous thinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Pressing for reasoning</td>
<td>Elicit evidence and establish what contribution a student’s utterance is intended to make within the group’s larger enterprise.</td>
<td>“Why do you think that…?”</td>
</tr>
<tr>
<td>12. Expanding reasoning</td>
<td>Open up extra time and space in the conversation for student reasoning.</td>
<td>“Take your time… say more.”</td>
</tr>
</tbody>
</table>

**Figure 218. Accountable Talk Moves & Functions Reference Sheet©**

**Figure 219. Example of Accountable Talk® Statements Poster**
The participating district implemented Accountable Talk® as one of the measures for supporting the CCSSI expectations. Dana described her experience with Accountable Talk® in the following way:

Say we’re discussing why two plus one equals three and one plus two equals three *why would that be the case?* And we would be having a discussion about that. So I might say, kind of scaffolding them, *well, I disagree with Johnny because I think this.* Or I would say *can you restate what Sally said?* so it’s sort of getting them to have more of that oral development and speaking in complete sentences about their thoughts. It kind of pulls everybody in so there’s not just one person raising their hand. It’s more of a discussion (Dana, traditional).

**Peripherals linked to learning.** Throughout the interviews, teachers shared regarding how Accountable Talk® had influenced the displaying, and continual use, of peripherals as teaching and learning tools in their physical classroom environment. The following statements were made in relation to Accountable Talk® peripherals during interviews:

- “Meaningful peripherals to support learning and to promote reflection” (Amanda, constructivist)
- “Peripherals which actively engage students are important” (Chrissy, constructivist).
- “We have Accountable Talk® posters. So, like, when we’re sharing during math time or during reading time, one person will give their answer or share what they’re thinking using the Accountable Talk statements …I try to get them to elaborate….and they have to prove their point and show their evidence which is kind of the whole point of Common Core. *Where’s your evidence? Show me. Prove it*” (Chrissy, constructivist).
• “This Accountable Talk® thing…that was big. The learning target; posting that. Making sure the kids could see that; that was big. But I always talked about what we were going to do, but I never wrote it out… I make them read it first thing” (Fae, traditional).

• “All of the leveled anchor charts are up. It's the same content with different degrees of complexity” (Adam, traditional).

• “I leave anchor charts up longer now…I don't know if that's connected to Common Core or not, but it seems like the big push for it was right around the same time. Before I would make an anchor chart so they would have a visual when they were first learning it, but I wouldn't keep it up for them to touch back to for a long time. It would only be like for a couple of days. So I think that is somewhat Common Core related. Just always have resources up which focus on vocabulary” (Adam, traditional).

• “This is by far the most writing we have done and that has been spurred on by Common Core…I give them a good base to start writing. They'll see the same vocabulary over and over again that they can use because I’ll put up the key vocabulary on the word wall” (Adam, traditional).

Spaces for students to engage. The following statements were made in relation to spaces for students to interact in relation to Accountable Talk® during interviews:

• “We have Accountable Talk®, which is over in the corner…” (Chrissy, constructivist).

• “We’re trying to build those critical thinking skills whether it’s independent work time, private think time, group time, number talk whole group time. We’re always working toward that, and I’ve tried to bring in a lot of Accountable Talk® moves where the kids, you know, talk to one another about their learning” (Grace, constructivist).
• “We come to the carpet and have a lot of discussions and Accountable Talk® which provides for critical thinking because we will discuss whole group, and then sometimes I will have them turn and talk to a neighbor to discuss a question that I’ve posed to the group” (Dana, traditional).

• “They'll discuss ideas at their small group table… and they'll throw out their idea and sometimes that will lead to a debate where if someone disagreed, they'll have to do lots of justifying their answers. So that's a great part of this [Accountable Talk®] that they have to explain their answer. And it also clears up a lot of misunderstandings early because with a lot of them, the same misunderstandings happen, and they learn from each other when they talk about it” (Adam, traditional).

**Theme 4: Additional materials are needed to aid teachers in meeting CCSSI expectations**

Each teacher discussed the value of having the appropriate environmental components and materials necessary to achieve expectations set forth by the Common Core State Standards Initiative. According to Strauss (2014), schools across the U.S. have engaged in multiple rounds of budget cuts that have left 34 of the 50 states providing less funding for education than they did five years ago, which may make it difficult for many teachers to provide the materials and learning experiences they feel students need in order to meet the new standards. Several felt additional materials or physical aspects would aid them in creating a classroom environment to support the development of 21st century skills. Although some elements were fixed (such as school configuration, space, etc.) many needs were achievable, as outlined below. This information may serve to guide administrators in regard to appropriation of funds and distribution of materials while providing future implications for those responsible for overall
school design and layout. The upcoming statements were made in relation to additional materials teachers felt were needed to aid them in meeting the CCSSI expectations:

- “If I had the money, the space, and the time…and if it was allowed, I’d have more play-based centers” (Amanda, constructivist).
- “Kids need to get out there and see things and do things. That’s how we learn. A lot of them don’t have those experiences outside of school so if we had the money, I’d like to take more field trips” (Amanda, constructivist).
- “It would definitely be less cumbersome to have more laptops instead of just one computer” (Beth, traditional).
- “If I didn’t have to worry about expense…a better CD player, some better headphones, more laptops. Updating things mostly” (Chrissy, constructivist).
- “More wall space to hang anchor charts and vocabulary words…to support Common Core” (Dana, traditional).
- “Flexible seating options. I really don’t have any; we’ve got chairs and that’s it. They don’t have a lot of decisions in that” (Elizabeth, constructivist).
- “I’d like more computers; it’s hard to share any more” (Fae, traditional).
- “I do wish we had more wall space to put up some of our work together” (Grace, constructivist).
- “More computers; I think that’s another reason I don’t use them quite as much. Because there’s six, but there’s always one that’s out of commission…I think if I could have 12 and always have one for a pair of students, that would be great!” (Adam, traditional).
- “More books for our classroom library” (Adam, traditional).
Theme 5: CCSSI lacks support from the public due to a perceived lack of understanding/misinformation

CCSSI could be temporary. While the majority of teachers voiced their support for the CCSSI, a few shared their belief that it might be temporary, which may impact how they share information about the CCSSI as well as how it is implemented in the classroom. Several teachers expressed feelings that the CCSSI might be a temporary initiative, which may decrease the likelihood of teachers attempted to fully embrace and align their physical environment design with principles associated with the CCSSI. One traditional participant expressed feelings of having the new initiative and its standards “thrown” at teachers.

- “At every training we go to they say, ‘This may not be here in a couple of years’ so it’s really hard to take it all in and implement it when you know you’re going to scratch it all in a couple of years and start fresh again” (Amanda, constructivist).
- “I feel like by the time I’m really familiar with it, we’ll be on to something else” (Amanda, constructivist).
- “It’ll be like everything else…they’ll change their mind and go on to something else. As soon as we have it, they’ll change their mind. Because they’re already trying to give up…which surprises me in education because we usually beat it to death” (Fae, traditional).

1 Shortly after the completion of data analysis, Tennessee Governor Bill Haslam signed a bill calling for the review and replacement of the Common Core State Standards in Tennessee.

The bill, which passed through the Tennessee General Assembly in April 2015, will require the state's board of education to create two committees (composed of representatives from higher education as well as K-12 schools) to focus on the review of the English and math standards set forth by the CCSSI and the development of new standards. The committees will be required to recommend new standards for full implementation for the 2017-18 school year.
This finding is supported by Fouts (2003) who found evidence suggesting one of the reasons for unchanged curriculum, practices, and classroom environments in many schools is the superficial and arbitrary adoption of the new standards. In other words, evidence of the changes was present, yet the ideas or philosophical principles behind the changes were misunderstood, not fully explained, or rejected entirely. “The illusion of change is created through a variety of activities, but the qualitative experience for students in the classroom remains unchanged when the ideas driving daily practice remain unchanged” (Fouts, 2003, p. 12).

Misinformed public lacks support for CCSSI. Several teachers shared regarding the perceived lack of support received from the public and families of students:

- “Parents are saying it’s too hard” (Fae, traditional).
- “It’s got a lot of negative publicity…but after people realize that rigor is important and they can do it, then it’s like a kid falls off their bike a couple times then they learn to ride it and they’re successful at it” (Beth, traditional).
- “I’m on Facebook® all the time, and I’ll see people posting bad things about the Common Core and putting comments like What about this problem? How is Common Core going to help? How will this help my child? But the key is, they don’t understand it, and they don’t understand the thinking behind it. And other people, even some teachers, don’t understand it, and they misconceive it out in the public” (Chrissy, constructivist).

This finding is aligned with a statement set forth by the U.S. Secretary of Education, Arne Duncan, who described opposition to the Common Core as “misguided,” “misinformed,” and “based on false information” (Duncan, 2013). Parents lacking understanding of the overall goals of the CCSSSI seemed to be a problem area described by several teachers as well. “That’s a problem about the Common Core; parents don’t understand it. And so they’re like well, this is
not the way I was taught. We were taught an algorithm. Well, Common Core doesn’t really teach the algorithm anymore. It does, as one strategy, but we also teach different strategies now. So it’s trying to get through to them, yes, I know you did it this way 15 years ago, but there are other ways your child can do it, too. As long as they get the right answer, it’s fine” (Chrissy, constructivist).

Several teachers noted while the school attempts to educate families about the Common Core through a variety of events, it can be difficult “especially in this area because there’s not a lot of parent involvement” (Chrissy, constructivist). Chrissy mentioned although the CCSSI might not be the perfect solution, it is important to educate the public in order to gain support for the CCSSI to be used as a catalyst for changing the American education system. With this in mind, it would also be valuable to share information regarding how a physical classroom environment aligned with CCSSI expectations may look differently than it did in the past (e.g., desks in rows versus small group tables, worksheets versus the provision of manipulatives to problem-solve, etc.).

**Chapter Summary**

Chapter 4 was divided into 2 sections which provided an in-depth within-case and cross-case analysis of the data. After reviewing the findings of the surveys, interviews, the PEERS, photographs, and observational field notes of the current classroom environment, results were analyzed in relation to the researcher’s initial research questions to develop a within-case analysis. In the second section, a cross-case analysis and examination of the themes and sub-themes developed during the data analysis process was provided. Chapter 5 outlines the study findings in relation to current research and associated literature. The final chapter also includes a
summary of the study, findings, conclusions, recommendations for further research, and study limitations.
CHAPTER 5
SUMMARY & CONCLUSIONS

Summary of the Study’s Purpose

The purpose of this qualitative descriptive multi-case study was to examine the learning principles and epistemological beliefs of primary teachers with reference to the physical classroom environment and the teaching and learning process. Additionally, the study examined how the CCSSI impacted the design of the physical classroom environment and how the design of the environment supported the development of 21st century skills set forth by the CCSSI. Qualitative research requires inductive data analysis theories surrounding a certain topic. Such theories are developed throughout the research process rather than initially tested. In other words, the intent of qualitative research is to gain in-depth understanding related to the ideas and behaviors of those involved (Goodwin & Goodwin, 1996). This descriptive multi-case study focused on the description of 8 primary teachers’ experiences regarding the use of the physical classroom environment as a tool for teaching and learning and the perceived effects of the environment in regard to meeting the CCSS. As discussed by Stake (1995), no recommendations are made based on findings; findings are presented for interpretation and application by participants and stakeholders.

Summary of Findings

Within-case analysis explored the attitudes and beliefs of 8 early childhood teachers in Northeast Tennessee in regard to the physical arrangement of the classroom environment in relation to using the environment as a tool for teaching and learning to address expectations set forth by the CCSSI. Cross-case analysis resulted in the comparison of constructivist and traditional teachers in relation to interview data and the PEERS. Themes which emerged from
interviews during the cross-case analysis included: 1) organized physical classroom environment; 2) the population of students impacts the physical environment design; 3) Accountable Talk®; 4) additional materials are needed to aid teachers in meeting CCSSI expectations and; 5) CCSSI lacks support from the public due to perceived lack of understanding or misinformation. The use of departmentalization in 3 (1 second grade and 2 third grade classrooms) of the 8 participants’ classrooms was not known prior to study implementation. Departmentalization refers to a classroom configuration in which students receive daily instruction from several different teachers with each teacher specializing in a single subject (Chan & Jarman, 2004).

Central research question: What is the role of the physical classroom environment in teaching and learning in 8 primary classrooms in Northeast Tennessee? Rigorous data analysis of multiple sources of data included: 1) determining participating teachers’ degree of constructivist or traditional beliefs and practices using the Teacher Beliefs Survey (TBS); 2) collecting participating teachers’ demographic data through the researcher-developed survey; 3) eliciting teachers’ beliefs and perceptions of their teaching practices, overall philosophy of education, and views regarding the role of the physical classroom environment in the teaching and learning process in light of the CCSSI through interview; 4) evaluating components of the physical classroom environment of participating teachers using the Primary Educators Environment Rating Scale (PEERS) and; 5) observing and documenting the physical classroom environment design. Through the data analysis process, the researcher found the participants to demonstrate support for the role of the physical environment in the teaching and learning process which was determined based on the results of the interview in conjunction to findings of the PEERS (Evanshen & Faulk, under review) and supporting photographic evidence.
Sub-question 1: What are the perceptions and experiences of 8 primary teachers related to their use of the physical classroom environment as a teaching and learning tool? Based on a review of the literature, many feel the environment plays an important role in the teaching and learning process (Abbott & Fouts, 2003; Diamond, 2006; Fletcher, 2005; Krapp, 2005; Martin, 2006; Marzano Center, 2013; McDermott, 1977; Reyes et al., 2012; Schwartz et al., 2009; Voelkl, 1995; Vygotsky, 1978). The assumption was the teacher participants would demonstrate understanding of the value of using the physical classroom environment as a tool for teaching and learning and share beliefs regarding how the CCSSI has impacted the design and use of the physical classroom environment as a tool for teaching and learning. This assumption was confirmed as both constructivist and traditional teachers expressed their beliefs that the physical classroom environment is a valuable tool for teaching and learning.

Sub-question 2: How does the philosophy of teaching and learning of 8 primary teachers impact the design of the physical classroom environment? Each teacher’s personal experiences and philosophy of education was found to impact the physical classroom environment design and layout in various ways including: learning centers, peripherals linked to learning, movement opportunities, providing a safe environment, meeting basic needs, and presenting content in multiple ways. While one constructivist teacher cited such theorists as Jean Piaget, two traditional teachers cited Maslow’s (1954) hierarchy of needs and Howard Gardner’s (1999) theory of multiple intelligences as having impacted their personal philosophy and overall physical classroom environment design.

Sub-question 3: How has the Common Core State Standards Initiative impacted the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee? Support for the CCSSI was shared by the majority of participating teachers;
however, the importance of “tweaking” (Chrissy and Dana) the standards was expressed by two teachers while “mixed feelings” (Fae) were communicated by another. Most teachers felt their physical classroom environment design had not been impacted by the CCSSI because their physical environment was already aligned with CCSSI expectations prior to implementation (Amanda, Dana, Elizabeth, Grace, and Beth). Two constructivists and one traditional teacher felt the physical classroom environments had been impacted by the CCSSI through the increased use of peripherals linked to learning.

**Sub-question 4:** How does the design of the physical classroom environment of 8 primary teachers in Northeast Tennessee support the following 21st century skills set forth by the CCSSI: collaboration, creativity, critical thinking, and communication? While most teachers felt the CCSSI had little or no impact on the physical environment design of their classroom, all shared in varying degrees the use of the physical classroom environment as a tool to support students in developing 21st century skills.

**Collaboration.** All constructivist teachers received high percentages of threes, indicating accomplished implementation as measured by the PEERS within the domain of the Environment for Social Learning. Constructivist teachers easily articulated how they addressed collaboration through the physical classroom environment design. Constructivist teachers shared how collaboration was addressed by the physical classroom environment with most citing such examples as small groups, partner work, and learning centers. One traditional teacher scored a lower percentage of threes with the remaining three teachers scoring high percentages of threes which indicated accomplished implementation on the PEERS within the domain of the Environment for Social Learning. However, it was difficult for them to share how the physical
environment supported the development of the skill of collaboration with all citing the following ways: small group tables, mixed-ability groupings, and whole group spaces.

**Communication.** Again, constructivist teachers scored a high percentage of threes on the PEERS domain for the Environment for Social Learning. Again, 3 out of 4 traditional teachers received high percentages of threes within the domain for the Environment for Social Learning. All teachers discussed how the physical classroom environment supported and promoted the development of the skill of communication with most citing such examples as small group tables, whole group spaces, and learning centers.

**Creativity.** Creativity was the most difficult 21st century skill for both constructivist and traditional teachers to discuss in terms of how the physical environment supported the development of this skill. Chrissy noted the difficulty in addressing creativity due to the “rigorous” expectations. A few examples of how constructivist physical classroom environments addressed creativity include: hands-on learning, choices, projects, and poetry. Traditional teachers cited fewer options provided by their physical classroom environments with examples including: technology experiences, learning centers, and using manipulatives.

**Critical thinking.** Both constructivist and traditional teachers discussed how the physical classroom environment supported and promoted critical thinking, particularly since the onset of the CCSSI and the use of Accountable Talk®. Discussing how the physical classroom environment supported and promoted the development of critical thinking was also somewhat difficult for both constructivist and traditional teachers with the following examples provided: debates and/or discussions, available materials, and Accountable Talk®. Although discussing critical thinking was somewhat difficult for both constructivist and traditional teachers, the
traditional teachers required further prodding or questioning in order for the researcher to glean additional information regarding critical thinking.

**Study Limitations**

When conducting research in the public school setting it is possible that difficulties could arise which could impact the research plan. Possible flaws exist within research and this study is no exception. As with any research, certain limitations may affect study outcomes. The following limitations exist within this research:

1. *Human variation*- The perceptions and experiences of each participant are unique. Each participant’s beliefs and attitudes concerning the environment’s role in the teaching and learning process are likely a result of a variety of factors which may include, but are not limited to: age, gender, educational and teaching background, personal and professional experiences, and personal philosophy of education. Additionally, the variation of the student population each year may have also affected teachers’ attitudes toward personal and professional practices.

2. *Size of study group*- Implementing a study with a large test group provides a more accurate representation of the overall population. This study included 8 participants; therefore, study outcomes cannot be used to make generalizations about the role of the physical classroom environment in teaching and learning.

3. *Departmentalization of classrooms* – One limitation of the study was departmentalization within 3 of the classrooms; it was not anticipated that primary classrooms would enlist departmentalization. Three participating teachers taught in departmentalized classrooms (3 math), which impacted outcomes of the PEERS, particularly in terms of the
Environment for Purposeful Learning which focused on the provision of a variety of learning centers (e.g., math, literacy, science, etc.).

4. **Participant selection** - the TBS was used to identify teachers as either traditional or constructivist. Those scoring highest in their grade were asked to participate in the study. One participant scored with 90.9% agreement on traditionally coded questions while also scoring with 90% agreement on constructivist coded questions. Such a scoring situation was not discussed by Woolley et al. (2004). Additionally, several of the highest scoring traditional teachers were unable (i.e., grade change) or unwilling to participate; these participants were replaced with the next highest scorer within the grade. Therefore, those ranked as constructivist scored within the 80-100% constructivist range while participating traditional teachers scored within the 50% traditional range. The participation of the highest scoring traditional teachers would likely have produced different data.

5. **Professional development** - The teachers of the study were influenced by the district’s on-going implementation of professional development focused on the role of social learning and the use of Accountable Talk® and Number Talks®. PEERS scores for the domain the Environment for Social Learning (e.g., furniture arrangement, small group area, large group area, etc.) was likely impacted since professional development experiences provided by the district increased the likelihood of participants providing social and collaborative learning experiences for students.

6. **TEAM evaluation** - It is important to note potential participants for this study were engaged in the TEAM evaluation at the time of the study as part of the on-going teacher evaluation expectations of the district and, therefore, were likely engaged in on-going
discussion and personal reflection regarding the role of the physical environment in the teaching and learning process. Despite personal beliefs, it is likely many teachers in the district were encouraged to design a physical environment which allows for social interaction, explorative learning, and problem-solving in accordance with TEAM expectations (Crosswhite et al., 2013). Further, the district is responsible for the provision of materials (e.g., small group tables) which would impact the student seating configuration for social learning regardless of teachers’ beliefs and preferences.

**Recommendations for Future Research**

Results of the study served to answer the research questions posed; findings also encouraged the researcher to investigate several of the following aspects further. Stenius, Mäkelä, Miovsky, & Gabrhelik, (2008) suggest increased curiosity in topics or aspects related to the research is a common outcome of any research study. Based on findings of the study in relation to current literature and study limitations, several recommendations for future research should be examined:

1. Teachers may feel they are engaged in developmentally appropriate, constructivist-based practice when, in fact, their physical classroom design may not be aligned. Engaging teachers in professional development experiences to broaden their understanding of developmentally appropriate practices aligned with constructivist learning theory and engaging them in applying such principles to practice would likely yield a more accurate representation of developmentally appropriate, constructivist-based learning environments.

2. Teachers engaging in the process of reflection and self-evaluation of the physical classroom environment using the PEERS may aid in developing a physical classroom
environment aligned with DAP principles which are more aligned with constructivist learning theory.

3. In conducting a review of literature, it was obvious a need exists for further investigation into overall school architectural design (e.g., large windows can take up valuable wall space). Several teachers also mentioned the importance of wall space (which was limited by the large amount of windows in each room), the general “awkward” layout of each room, and the size of each room. It is oftentimes difficult to fund the interdisciplinary partnerships needed to design the optimal school environment. Architects and knowledgeable professionals trained in pedagogy should be elicited for consultation with educators prior to embarking on the development of educational settings. Using this interdisciplinary approach would aid in ensuring the curriculum requirements, teaching styles, and individual needs of students are all met (Martin, 2006). Martin (2006) suggests an approach which outlines changes in school organization and the use of space in existing school structures. Additional research is needed outlining the relationship between overall school structure and student and teacher performance.

4. If schools want to move from a traditional to constructivist environment to engage a diverse population of learners, teachers who have been identified as low scoring on the PEERS would likely benefit from transforming their classroom from traditional to include more components of constructivism. Many teachers and schools are limited in resources and would not be willing to undergo such an endeavor (i.e., transformation of classroom environments). However, transformational work on classroom environments and the use of the environment as a teaching tool could be accomplished through the ongoing use of a self-evaluation tool such as the PEERS. A study of the transformation of
numerous classroom environments and the impact of this change on teaching and learning has the potential to drastically affect the field of early childhood, especially in the primary grades.

5. The researcher holds interest in the degree to which a developmentally appropriate aligned classroom, as measured by the PEERS, increases student academic performance and engagement in the learning process. Designing a study which includes quantifiable academic achievement scores with positive results would provide additional support for the role of the classroom environment in the teaching and learning process and the extent to which a constructivist-aligned environment impacts achievement.

6. It would be beneficial to implement a study which gathers student achievement data to support the use of the PEERS as a tool for examining the physical classroom environment in relation to 21st century skill development.

**Recommendations for Administrators and Teachers**

1. The PEERS can be used as a guide to support professional development experiences by increasing teachers’ and administrators’ interest and understanding in the role of the physical classroom environment design in the teaching and learning process.

2. Teachers would likely benefit from engaging in professional development focusing on the use of the environment as a tool for teaching and learning in relation to expectations set forth by the CCSSI.

3. Another area of interest would be the role of administrative and peer support in the development of a developmentally appropriate physical classroom environment. According to Dorman (2002), educators are more likely to engage in developmentally appropriate practices when they feel supported by both administration and other teachers.
Recommendations for Teacher Educators

Findings of the study have relevance to the field of early childhood teacher preparation. Institutions for teacher educators may consider results of the study when designing curriculum and field experiences for pre-service teachers. Both pre- and in-service teachers’ knowledge of the impact of the physical classroom environment design on the teaching and learning process should be evaluated. Information gleaned from this study could serve to benefit both teacher preparation programs and professional development experiences for teachers in the field.

1. This study served to highlight the learning principles and epistemological beliefs of primary teaching with reference to the physical classroom environment and the teaching and learning process. Several teachers were unable to cite a particular philosophy or theory which guided their practices. Programs which engage pre-service teachers in developing understanding of various theories of learning in relation to the implementation of developmentally appropriate practices in physical classroom environments would likely be beneficial. In such programs, pre-service teachers would then better understand how children construct knowledge and would likely be better prepared to plan the physical classroom environment to optimize learning opportunities for young children.

2. A physical environment design aligned with theories of learning and expectations set for the CCSSI would likely aid a diverse population of learners in developing 21st century skills. Teacher preparation programs could be strengthened to include courses which inform pre-service teachers of the value of the physical environment as a tool for teaching and learning in light of the Common Core State Standards Initiative.
3. Further, a need exists for informing both pre- and in-service educators of the principles and expectations of the CCSSI and how the physical environment design could be used to support this initiative. With 43 states and the District of Columbia implementing the CCSSI, it is considered one of the largest educational reforms in recent history. Expectations for the CCSSI for English language arts and math represent a shift from the traditional rote, fact-based style of direct instruction toward teaching that fosters critical thinking and problem-solving among students. In order to address and achieve this expectation, the physical classroom environment could be aligned to promote active and social learning experiences to address the development of 21st century skills.

4. While many teachers may not experience difficulty providing a physical classroom environment which supports the development of such skills as collaboration and communication, many may find it difficult to address more abstract skills such as creativity and critical thinking. In fact, recent research shows that teaching creative and critical thought is not widespread in American classrooms (Kane & Staiger, 2012; Nystrand, 2006; Nystrand & Gamoran, 1991). Zepke and Leach (2010) suggest a physical classroom environment design which includes a variety of readily accessible manipulatives and authentic materials that are challenging and flexible in an attempt to increase student engagement and creativity. Additionally, engaging students in reflecting, questioning, conjecturing, evaluating, and making connections between ideas may further support the development of critical thinking. “Teachers need to create rich educational experiences that challenge students’ ideas and stretch them as far as they can go” (Zepke & Leach, 2010, p. 171).
5. Meeting the demands of the CCSSI may mean providing teachers with new approaches to instruction; in other words, effective reform demands effective teacher preparation for pre-service teachers and on-going professional development for in-service teachers. While participants noted their district provides professional development experiences related to addressing collaboration and communication in the classroom, none mentioned whether the district provides information related to the development of creativity and critical thinking. Perhaps professional development in an era of CCSSI accountability requires a fundamental change in teaching strategies for both pre- and in-service teachers that will lead to increases in student learning in the classroom.

**Recommendations for Policymakers**

1. It would be helpful for the public to understand how more traditional physical classroom environments of the past may differ from a modern constructivist-aligned environment designed to support the development of 21st century skills set forth by the CCSSI. A need exists for informing the public, families, and even teachers about the goals and expectations of the CCSSI. According to a Gallup poll in August 2014, 81 percent of those polled said they had heard of the Common Core State Standards and 6 in 10 said they oppose them. If the standards are to be continually implemented in the U.S., there is a clear need for appropriately educating the public. Improved communication with families of students is needed to make sure they understand the true goal of Common Core and the need for implementation. A partnership between states and school districts is necessary to develop and disseminate public-friendly informative material.
Concluding Statements

This descriptive multi-case study is significant to the field of education in several ways. First, the study examined the role of the physical classroom environment from the perspective of individual participating primary teachers who were identified as holding either constructivist or traditional beliefs about teaching and learning. Additionally, this study focused on the impact of individual viewpoints of 8 primary teachers on the use of the physical classroom environment as a teaching and learning tool. The study also examined how teachers designed the classroom environment and the degree to which this design was aligned with both the participant’s personal philosophy as well as principles of developmental appropriateness as measured by the PEERS. Lastly, the study examined teachers’ perspectives of the design of the physical classroom environment as a result of the Common Core State Standards Initiative.

The researcher made every effort to provide a complete and accurate representation of participants’ diverse experiences of the teaching and learning process in the era of the Common Core State Standards Initiative. Detailed data were examined and presented. Findings shed light on teachers’ beliefs and practices regarding the role of the physical classroom environment in the teaching and learning process. Study limitations were outlined, and recommendations for future research were shared based on the researcher’s evaluation of gaps in the research and personal areas of interest. This data, although unique to the study population, may be used to aid others in better understanding their own teaching and learning environments. While data here may not be generalizable, perhaps it may elicit reflection on the current state of education in the United States. “Schools need spaces that will facilitate the creation of meaning, places where knowledge can be constructed, experiments conducted, investigation carried out, and results of
inquiry shared and shaped. We need spaces where the curriculum can serve as the raw materials for the knowledge-work process” (Hunkins, 1994).


Evanshen, P., & Faulk, J. (under review). *Primary Educator’s Environment Rating Scale (PEERS)*.


Snow, S. E. (2002). Teachers’ perceptions of the use of classroom space (Doctoral dissertation). The University of Georgia, Athens, GA.


APPENDICES

APPENDIX A

INFORMED CONSENT DOCUMENT FOR TEACHERS

DATE

Dear Participant:

Based on your responses to the Teacher Belief Survey (TBS), you have been selected for participation in Phase 2 of the study entitled: Use of the Physical Classroom Environment as a Teaching and Learning Tool Including the Impact of the Common Core State Standards Initiative in Kindergarten Through Third Grade Primary Classrooms in Northeast Tennessee. This Informed Consent will explain about being a participant in a research study. It is important that you read this material carefully and then decide if you wish to be a volunteer.

PURPOSE:

The purpose(s) of this research study is/are as follows: This is a descriptive multi-case study of the perceptions, beliefs, and practices of primary classroom teachers. The objectives of this study are: 1) collecting participating teachers’ demographic data through the researcher-developed survey; 2) eliciting teachers’ beliefs and perceptions of their teaching practices, overall philosophy of education, and views regarding the role of the physical classroom environment in the teaching and learning process in light of the CCSSI through interview; 3) evaluating components of the physical classroom environment of participating teachers using the Primary Educators Environment Rating Scale (PEERS) and; 4) observing and documenting the physical classroom environment design. There is no intervention with the teacher and students. No individually and identifiable information on teachers or students will be shared and no investigational and/or marketed drug of device will be used during the study.

DURATION:

Your responses to the Teacher Belief Survey (TBS) have resulted in the researcher inviting you to participate further in the research study. Prior to initiation of the study, the Principal Investigator (PI) will schedule an optional meeting with you (study participant) to describe the study, answer questions, and agree to a schedule of activities that do not disrupt or alter instruction at any time. If you opt out of the meeting, communication will occur via email encouraging you to ask any questions regarding your participation. Emails will be answered by the researcher within 24 hours. If you agree to participate, you will be asked to complete a brief demographic survey which should take no longer than 10 minutes to complete. Following survey completion, the PI will meet with you to schedule an interview lasting approximately one hour at your convenience. The PI will also schedule a time to complete the Primary Educators Environment Rating Scale at your convenience. This observation will take place after school
hours at your convenience. Lastly, a time will be scheduled with you for the PI to observe your physical classroom environment after school to take field notes and photos.

**PROCEDURES:**

Teacher demographics to be collected via survey include: name, school, level of education, highest degree earned, number of years teaching, number of years teaching third grade, number of students at time of study, number of students with special needs, and any additional information or circumstances which the teacher chooses to disclose. An interview will follow the completion of the survey. Interview questions will reflect the following areas: beliefs and philosophy of education, guiding theory, knowledge of and training on the CCSSI, arrangement and use of the physical environment and materials in consideration of the CCSSI, types of instruction, and the overall extent to which the teacher feels the classroom physical environment facilitates the development of skills expectations of the CCSSI (e.g., collaboration, cooperation, communication, creativity, etc.). The PEERS will be used to assess the following components of the classroom environment: meaningful learning, social learning, purposeful learning, responsible learning, continuous learning, and Inquiry-based learning. Lastly, observational field notes and photos will be taken to document elements of your physical classroom environment.

**ALTERNATIVE PROCEDURES/TREATMENTS.** The alternative procedures/treatments available to you if you elect not to participate in this study are: There are no alternative procedures/treatments.

**POSSIBLE RISKS/DISCOMFORTS.** The possible risks and/or discomforts of your involvement include: This study poses minimal risk to you. This is a multi-case study that incorporates qualitative components. There is no intervention with students or the teacher. The only potential risks are minor inconveniences in scheduling activities. During observations, the PI and research assistant will NOT be interacting with the teacher or students in any way that would possibly cause interference or interruptions. The teacher interviews and observations will be scheduled after school hours at a mutually convenient time to avoid disrupting planning or instruction throughout the school day.

**POSSIBLE BENEFITS:** The possible benefits of your participation are: Findings will be communicated to you in writing. Should you have any questions, a meeting will be scheduled to address them. Additionally, you may learn the extent to which the classroom's physical and learning environment reflects best practices for serving primary age children.

**FINANCIAL COSTS**

There are no additional costs to you that may result from participation in the research study.

**COMPENSATION IN THE FORM OF PAYMENTS TO RESEARCH PARTICIPANTS**

There is no compensation of payments to research participants; however, individuals who returned the TBS survey had their name placed in a drawing for a $50.00 gift card to Walmart.
VOLUNTARY PARTICIPATION

Participation in this research is voluntary. You may refuse to participate. You can quit at any time. If you quit or refuse to participate, the benefits or treatment to which you are otherwise entitled will not be affected. You may quit by calling Charity Hensley-Pipkin whose phone number is 423.388.5729 or via email at zcgh2@goldmail.etsu.edu. You will be told immediately if any of the results of the study should reasonably be expected to make you change your mind about staying in the study.

CONTACT FOR QUESTIONS

If you have any questions or research-related problems at any time, you may call Charity Hensley-Pipkin, PI at 423.388.5729 or Dr. Pam Evanshen, research supervisor, at 423.439.7694. You may call the Chairman of the Institutional Review Board at 423.439.6054 for any questions you may have about your rights as a research subject. If you have any questions or concerns about the research and want to talk to someone independent of the research team or you can’t reach the study staff, you may call an IRB Coordinator at 423.439.6055 or 423.439.6002.

CONFIDENTIALITY

Every attempt will be made to see your study results are kept confidential. Only the PI and research assistant will record, maintain, and analyze study data. All electronic data will be password protected while hard copy information will be stored in a locked cabinet on the East Tennessee State University campus within Warf-Pickel Hall. No individually identifiable information will be collected on you or children in the classroom; a pseudonym will be used. The results of this study may be published and/or presented at meetings without naming you as a subject. Although your rights and privacy will be maintained, the Secretary of the Department of Health and Human Services, ETSU IRB, and personnel particular to this research have access to study records. Your records will be kept completely confidential according to current legal requirements. They will not be revealed unless required by law, or as noted above. By signing below, you confirm you have read or had this document read to you. You will be given a signed copy of this informed consent document. You have been given the chance to ask questions and discuss your participation with the investigator. You freely & voluntarily choose to be in this study.

__________________________
SIGNATURE OF PARTICIPANT

__________________________
DATE

__________________________
PRINTED NAME OF PARTICIPANT

__________________________
DATE

__________________________
SIGNATURE OF INVESTIGATOR

__________________________
DATE
APPENDIX B

TEACHER BELIEFS SURVEY

Name: ___________________________ Email (please write clearly): ___________________________

School: ___________________________ Current Teaching Grade: _______________

Imagine how you set up your classroom as you read each of the following survey statements. As you think about your own classroom, circle the number beside each statement to indicate how much you disagree or agree with each statement on a scale ranging from 5 (strongly agree) to 1 (strongly disagree)

5 = Strongly Agree (SA); 4 = Agree; 3 = Sometimes; 2 = Disagree; 1 = Strongly Disagree (SD)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>SA</th>
<th>Agree</th>
<th>Sometimes</th>
<th>Disagree</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is important that I establish classroom control before I become too friendly with students.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2. I believe that expanding on students’ ideas is an effective way to build my curriculum.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3. I prefer to cluster students’ desks or use tables so they can work together.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4. I invite students to create many of my bulletin boards and display areas.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5. I like to make curriculum choices for students because they can’t know what they want and need to learn.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6. I base student grades primarily on homework, quizzes, and tests.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7. An essential part of my teacher role is supporting a student’s family when problems are interfering with a student’s learning.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8. To be sure that I teach students all necessary content and skills, I follow a textbook or workbook.</td>
<td></td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
9. I teach subjects separately, although I am aware of the overlap of content and skills. 5 4 3 2 1

10. I involve students in evaluating their own work and setting their own goals. 5 4 3 2 1

11. When there is a dispute between students in my classroom, I try to intervene immediately to resolve the problem. 5 4 3 2 1

12. I believe students learn best when there is a fixed schedule. 5 4 3 2 1

13. I make it a priority in my classroom to give students time to work together when I am not directing them. 5 4 3 2 1

14. I make it easy for parents to contact me at school or home. 5 4 3 2 1

15. For assessment purposes, I am interested in what students can do independently. 5 4 3 2 1

16. I invite family members of students to volunteer in or visit my classroom almost any time. 5 4 3 2 1

17. I generally use the teacher’s guide to lead class discussions of a story or text. 5 4 3 2 1

18. I prefer to assess students informally through observations and conferences. 5 4 3 2 1

19. I find that textbooks and other published materials are the best sources for creating my curriculum. 5 4 3 2 1

20. It is more important for students to learn to obey rules than to make their own decisions. 5 4 3 2 1

21. I often create thematic units based on the students’ interests and ideas. 5 4 3 2 1

(Woolley et al., 2004)
APPENDIX C
CODED TEACHER BELIEFS SURVEY STATEMENTS

Traditional Management (TM)

1-It is important that I establish classroom control before I become too friendly with students (behavior management).
11-When there is a dispute between students in my classroom, I try to intervene immediately to resolve the problem (behavior management).
12-I believe students learn best when there is a fixed schedule (classroom learning environment).
20-It is more important for students to learn to obey rules than to make their own decisions (behavior management).

Constructivist Teaching (CT)

2-I believe that expanding on students’ ideas is an effective way to build my curriculum (curriculum).
3-I prefer to cluster students’ desks or use tables so they can work together (classroom environment).
4-I invite students to create many of my bulletin boards (classroom learning environment).
7-An essential part of my teacher role is supporting a student’s family when problems are interfering with a student’s learning (working with parents).
10-I involve students in evaluating their own work and setting their own goals (assessment).
13-I make it a priority in my classroom to give students time to work together when I am not directing them (teaching strategies).
14-I make it easy for families of students to contact me at school or home (working with parents).
16-I invite family members of students to volunteer in or visit my classroom almost any time (working with parents).
18-I prefer to assess students informally through observations and conferences (assessment).
21-I often create thematic units based on the students’ interests and ideas (curriculum).

Traditional Teaching (TT)

5-I like to make curriculum choices for students because they can’t know what they need to learn (curriculum).
6-I base student grades primarily on homework, quizzes, and tests (assessment).
8-To be sure that I teach students all necessary content and skills, I follow a textbook or workbook (curriculum).
9-I teach subjects separately, although I am aware of the overlap of content and skills (curriculum).
15-For assessment purposes, I am interested in what students can do independently (assessment).
17-I generally use the teacher’s guide to lead class discussions of a story or text (teaching strategies).
19-I find that textbooks and other published materials are the best sources for creating my curriculum (curriculum).

(Woolley et al., 2004)
Please complete the following by writing a response or marking choices that apply.

Name: ______________________________  Phone #: ________________________

E-mail: ____________________________ Grade you currently teach (circle): K 1st 2nd 3rd

<table>
<thead>
<tr>
<th>Gender</th>
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<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African-American</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age Range</th>
<th>≤ 24 years old</th>
<th>25-34 years old</th>
<th>35-44 years old</th>
<th>45-54 years old</th>
<th>≥ 55 years old</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Associate’s degree</th>
<th>Bachelor’s degree</th>
<th>Master’s degree</th>
<th>Professional degree (please indicate)</th>
<th>Doctorate degree</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Certification</th>
<th>Pre-K-K</th>
<th>Pre-K-3rd</th>
<th>K-6th</th>
<th>1st-8th</th>
<th>Other</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Level of Teaching Experience</th>
<th>&lt; 2 years</th>
<th>2-5 years</th>
<th>6-10 years</th>
<th>&gt;10 years</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Years Teaching Current Grade</th>
<th>&lt; 2 years</th>
<th>Over 2 years</th>
<th>Over 6 years</th>
<th>&gt;10 years</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Grade(s) taught</th>
<th>Pre-K or K</th>
<th>Elementary</th>
<th>Middle School</th>
<th>High School</th>
</tr>
</thead>
<tbody>
<tr>
<td>(please check/circle all that apply)</td>
<td>1st 2nd 3rd 4th 5th</td>
<td>6th 7th 8th</td>
<td>9th 10th 11th 12th</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training(s) on the Common Core State Standards Initiative (please list):</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Experience/Training focused on the physical learning environment (please list):</th>
</tr>
</thead>
</table>
APPENDIX E

TEACHER INTERVIEW QUESTIONS

1. What is your philosophy of education?

2. How has it impacted the physical design of your classroom?

3. What theories or theorists have inspired the physical design of your classroom?

4. Please describe your classroom and tell me how you feel about your current classroom environment.

5. Please explain why you set up the classroom environment the way it is currently arranged.

6. How do you feel the environment affects learning?

7. Have you been trained on the Common Core? If so, what trainings have you attended?

8. Have the Common Core Standards impacted the arrangement of your classroom environment? If so, how?

9. Are there ways you have changed your physical environment to better aid students in gaining 21st century skills such as: creativity, communication, critical thinking, and critical thinking?

10. Have you thought about how your physical classroom environment can help you teach the CC standards? If so, in what ways?

11. How does your environmental design meet the needs of students in developing 21st century skills such as: creativity, cooperation, communication, and collaboration?

12. Do students have choices in regard to working in small groups, independently, etc.?

13. Tell me about the most important features of the physical design of your classroom.

14. If space, time, and money were not an issue, would you change your environment to help you implement the Common Core Standards?
APPENDIX F

MEMBER-CHECKING LETTER

Date

Dear Participant:

Thank you for taking time to complete an interview with me. Please review the attached transcription. This process is known as member-checking, in which a research participant is asked to check for accuracy of data obtained through the interview process. This will ensure credibility by preventing mistakes and bias. If you feel that the transcription is accurate, based on your interview answers, please sign on the line below. If you feel it is inaccurate, please contact me so that we may discuss the transcription to ensure accuracy. Thank you for your participation and time. Your contribution toward the completion of my dissertation is appreciated. Thank you!

Sincerely,

Charity Hensley-Pipkin

☐ I agree with the accuracy of this transcription.

________________________________________________________________________________________

(please sign if you agree)

☐ I do not agree with the accuracy and wish to schedule an appointment to meet with the researcher to clarify.

________________________________________________________________________________________

(please sign if you do not agree)
### APPENDIX G

**SUMMARY OF THE PRIMARY EDUCATORS ENVIRONMENT RATING SCALE**

#### Meaningful Learning Environment

<table>
<thead>
<tr>
<th>The Healthy Classroom</th>
<th>The Welcoming Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well-Maintained</strong></td>
<td><strong>Color</strong></td>
</tr>
<tr>
<td>Safe</td>
<td>Neutral paint color</td>
</tr>
<tr>
<td>Well-maintained furniture</td>
<td>Welcoming &amp; Inviting</td>
</tr>
<tr>
<td>Well-ventilated</td>
<td>Music</td>
</tr>
<tr>
<td>Healthy temperature (70°F)</td>
<td>Living plants</td>
</tr>
<tr>
<td>Pleasant-smelling</td>
<td>Home-like elements (pictures, softness, etc.)</td>
</tr>
</tbody>
</table>

**Lighting**

| Natural light | Photos of learners |
| Varied lighting | Procedures created together and posted |

**Nourishment**

| Water available | Planning boards/agenda |
| Healthy snacks | Artifacts representing learning together |

#### Social Learning Environment

<table>
<thead>
<tr>
<th>Room Arrangement</th>
<th>Seating Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual spaces</td>
<td>Tables space</td>
</tr>
<tr>
<td>Small group spaces</td>
<td>Floor space</td>
</tr>
<tr>
<td>Large group work space</td>
<td>Dyad and triad spaces</td>
</tr>
<tr>
<td>Large group meeting space</td>
<td>Variety of seating choices</td>
</tr>
<tr>
<td>Child work space is the focus of the room arrangement</td>
<td>Flexible placements for seating</td>
</tr>
</tbody>
</table>

#### Purposeful Learning Environment

<table>
<thead>
<tr>
<th>Learning Centers &amp; Stations</th>
<th>Teacher Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearly defined areas for learning</td>
<td>Organized</td>
</tr>
<tr>
<td>Literacy centers</td>
<td>Flexible space</td>
</tr>
<tr>
<td>Shelving divides space and allows for visibility</td>
<td>Occupies limited amount of physical space</td>
</tr>
<tr>
<td>Content exploratory areas visible</td>
<td></td>
</tr>
<tr>
<td>Centers arranged loud/quiet</td>
<td></td>
</tr>
</tbody>
</table>

**Personal Space for Children**

<table>
<thead>
<tr>
<th>Storage for personal belongings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage for child work (portfolios, learning artifacts)</td>
</tr>
<tr>
<td>Display space for projects in process and finished work</td>
</tr>
</tbody>
</table>
## Responsible Learning Environment

<table>
<thead>
<tr>
<th>Clutter</th>
<th>Organized Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncluttered and clean</td>
<td></td>
</tr>
<tr>
<td>Materials appropriate for learning centers/stations</td>
<td></td>
</tr>
<tr>
<td>Materials focused on current learning objectives</td>
<td></td>
</tr>
<tr>
<td>Clearly arranged for quick access</td>
<td></td>
</tr>
<tr>
<td>Easily identifiable by children</td>
<td></td>
</tr>
<tr>
<td>Organized in containers for easy transport</td>
<td></td>
</tr>
<tr>
<td>Materials safely arranged</td>
<td></td>
</tr>
<tr>
<td>Visibility of materials is not over-stimulating</td>
<td></td>
</tr>
</tbody>
</table>

### Materials Available for Learning

| Limited number of commercially purchased materials |
| Limited number of worksheets utilized for learning |
| Textbooks utilized as resources, not main tool for driving instruction |

## Continuous Learning Environment

<table>
<thead>
<tr>
<th>Commercial Peripherals</th>
<th>Peripherals Representative of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited commercial materials on the walls</td>
<td></td>
</tr>
<tr>
<td>Nothing hanging from the ceiling</td>
<td></td>
</tr>
<tr>
<td>Skills for living and learning represented</td>
<td></td>
</tr>
<tr>
<td>Authentic work displayed</td>
<td></td>
</tr>
<tr>
<td>Learning documentation displayed for use as a resource or learning tool</td>
<td></td>
</tr>
</tbody>
</table>

### Documentation of Learning

| Variety of assessment utilized to drive instruction |
| Artifacts represent current study |
| Photos of learning in process |

## Inquiry-based Learning Environment

### Planning & Collaboration

| Evidence of conversations |
| Evidence of planning |
| Evidence of graphic organizer use |
| Evidence of sharing ideas and findings |
| Evidence of Inquiry-based Learning |

### Evidence of Inquiry-based Learning

| Seeking information |
| In-depth exploration |
| Asking questions/sharing knowledge |
| Utilization and application of knowledge |

### Research Resources

| Multiple computer available |
| Multiple research book available |
| Multiple resources available on topic of study |

(Evanshen & Faulk, under review)
VITA

CHARITY G. HENSLEY-PIPKIN

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Date of Birth:  September 9, 1985
Place of Birth:  Johnson City, Tennessee
Marital Status:  Married

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PhD Early Childhood Education, East Tennessee State University, Johnson City, Tennessee, 2015
MA Early Childhood Education, East Tennessee State University, Johnson City, Tennessee, 2010
BS Early Childhood Education, East Tennessee State University, Johnson City, Tennessee, 2007

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Child Care Director, Unicoi County Family YMCA; Erwin, Tennessee, March 2008-2013
Graduate Assistant, East Tennessee State University, Johnson City, Tennessee, January 2008-2010
Child Care Counselor, Unicoi County Family YMCA, Erwin, Tennessee, May 2002-March 2008
Student Teacher:  Mountain View Elementary School, Johnson City, Tennessee, October 2007-December 2007
Honors and Awards:

Outstanding Graduate Student, East Tennessee State University, Johnson City, Tennessee, Spring 2013

Quillen Scholarship, East Tennessee State University, Johnson City, Tennessee, Fall 2011-Spring 2012

Dean’s List every semester, East Tennessee State University, Johnson City, Tennessee, 2003-2007