Flexible, Physical Learning Environment Design Elements: How Do They Impact K-12 Stakeholders?

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Flexible, Physical Learning Environment Design Elements: How Do They Impact K-12 Stakeholders?

Abstract
The purpose of this qualitative study, using a phenomenological design, was to examine the perspectives of seven K-12 stakeholders and to examine their understanding and experience with flexible learning environmental designs and how the stakeholders helped to support students’ sense of place. Data were collected using semi-structured one-on-one interviews. Three key findings emerged from this study. First, fluidity and connectedness allow teachers and students to transition from big more easily to medium to small spaces within a flexible instructional model. Second, flexible learning space does a better job inclusively engaging multiple student learning preferences, and third, teachers need to become champions for a change to flexible, physical learning environments. This study provided the following recommendations for research, K-12 school district and building leaders, teachers, boards of education, and state policy makers: First, K-12 school district and building leaders must provide a district-wide mission of fluidity and connectedness for inclusivity that is grounded in a sense of place to address multiple student learning preferences. Next, by using student-centered learning approaches in flexible, physical learning environments that do a better a job of reaching more students, teachers can be change agents for greater inclusivity. Lastly, boards of education need to act on administrator recommendations for physical space that promotes equitable opportunities for greater engagement, and state policy makers must welcome design solutions from architects that safely break down barriers, preventing collaboration by increasing a variety of space adjacency, fluidity, and connectedness.

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Flexible, Physical Learning Environment Design Elements:
How Do They Impact K-12 Stakeholders?

By

Joseph C. Kosiorek

Submitted in partial fulfillment
of the requirements for the degree
Ed.D. in Executive Leadership

Supervised by
Dr. Marie Cianca

Committee Member
Dr. Shirley JA Green

Ralph C. Wilson, Jr. School of Education
St. John Fisher College

August 2020
Dedication

SWBR Architecture, Engineering & Landscape Architecture, D.P.C. is an amazing organizational culture that prides itself on innovation and sustainability. Steadfastly supported by our President, Tom Gears and SWBR leadership, the SWBR mission: positively impacting lives through meaningful design, is authentically carried within us all and the clients we serve. Thank you for supporting my desire to uniquely dive deeper into the impact physical learning environments have on student engagement. Phil Wise, my mentor, thank you for providing a safe environment that allowed this opportunity to come to fruition.

The dissertation journey came with hills and valleys, sprints, and marathon sessions. Dr. Marie Cianca and Dr. Shirley Green, thank you for guiding me through the terrain with patience and trusting me as I trusted you and the process. I was honored to be a part of Team MJCJ originally DJCJ. Jenn, Carl, and Mike (our welcomed late addition), thank you for your support throughout the journey. Thank you for changing my worldview; I look forward to your successes in life.

Background knowledge and abilities, the learning preferences that were fostered by my parents, Ed, and Lesley, created the foundation upon which this dissertation was built. Thank you for your love, compassion, wisdom, and perseverance. Without you and your undivided support, none of this would have been possible. My brother, Casey has always been there blazing a trail in life and scholarship, thank you for being a role model like no other.
My wife, Samantha, your patience throughout this process has been unwavering and selfless. Thank you for your support and encouragement. From every setback to every milestone accomplished, you have been there. It is your stability that allowed me to focus and complete this journey. Our daughters, Ella Wills and Abigail Emily, you are my sunshine. Thank you for understanding the time away from family had purpose for potential meaningful change for others. It is my hope that you both find happiness in a complex world through the love of education and connectedness with others that share your dreams.
Biographical Sketch

Joseph C. Kosiorek is currently a Senior Associate at SWBR Architecture, Engineering & Landscape Architecture, D.P.C. Mr. Kosiorek attended the State University of New York at Buffalo from 1996 to 2000 and graduated with a Bachelor of Professional Studies, Architecture degree in 2000. He attended the State University of New York at Buffalo from 2000 to 2002 and graduated with a Master of Architecture degree in 2002. He came to St. John Fisher College in the summer of 2018 and began doctoral studies in the Ed.D. Program in Executive Leadership. Mr. Kosiorek pursued his research in Flexible, Physical Learning Environment Design Elements: How Do They Impact K-12 Stakeholders? under the direction of Dr. Marie Cianca and Dr. Shirley JA Green and received the Ed.D. degree in 2020.
Abstract

The purpose of this qualitative study, using a phenomenological design, was to examine the perspectives of seven K-12 stakeholders and to examine their understanding and experience with flexible learning environmental designs and how the stakeholders helped to support students’ sense of place. Data were collected using semi-structured one-on-one interviews. Three key findings emerged from this study. First, fluidity and connectedness allow teachers and students to transition from big more easily to medium to small spaces within a flexible instructional model. Second, flexible learning space does a better job inclusively engaging multiple student learning preferences, and third, teachers need to become champions for a change to flexible, physical learning environments. This study provided the following recommendations for research, K-12 school district and building leaders, teachers, boards of education, and state policy makers: First, K-12 school district and building leaders must provide a district-wide mission of fluidity and connectedness for inclusivity that is grounded in a sense of place to address multiple student learning preferences. Next, by using student-centered learning approaches in flexible, physical learning environments that do a better a job of reaching more students, teachers can be change agents for greater inclusivity. Lastly, boards of education need to act on administrator recommendations for physical space that promotes equitable opportunities for greater engagement, and state policy makers must welcome design solutions from architects that safely break down barriers, preventing collaboration by increasing a variety of space adjacency, fluidity, and connectedness.
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Chapter 1: Introduction

Physical Learning Environment Design

When thinking of one’s most memorable grade school or high school learning experiences, most likely, these experiences were shared with a teacher or with fellow students in the context of a physical environment. The athletic field, the band room, the auditorium, the shop class, cafeteria, or classroom, these spaces—indoor and out—have an impact on one’s memory. Phenomenological perception or perceived experience influences the subconscious and makes lasting impressions (Remmers et al., 2014). Perceived experiences are the building blocks of learning that provide children with the tools to thrive and lead within multiple culture types (Remmers et al., 2014). Cultures are grounded in their artifacts or physical environments (Schein, 2017).

In part, these physical environments create a sense of place, an awareness by its occupants that they are part of a culture, a community, something greater than themselves (Falahat, Kamali, & Shahidi, 2017; Jalili & Azar, 2016; Lin & Lockwood, 2014; Lindahl, 2004; Schittich, 2011). Lengen and Kistemann (2012) referred to this awareness as personal identity. Lin and Lockwood (2014) referred to emotional attachment to a physical space as place identity. Emotional bonds are created and recreated by individuals during engagement and reengagement of physical spaces and places (Lengen & Kistemann, 2012). Awareness of emotional bonds, and the ability to regulate or adapt emotion to a space and fellow space users, is defined as emotional intelligence (Uzzaman & Karim, 2018). Emotional intelligence and sense of place are, therefore, closely linked
and may be impacted by the spatial elements of flexible, physical learning environments (Uzzaman & Karim, 2018).

Neill and Etheridge (2008) defined flexible, physical learning environments as a variety of sizes and shapes of physical architectural spaces or room configurations as well as flexible furniture, finishes, and technology. However, there is limited empirical research on flexible, physical learning environments (Blackmore, Bateman, Loughlin, O’Mara, & Aranda, 2011; Brooks, 2011; Chapman, Randell-Moon, Campbell, & Drew, 2014; Cleveland & Fisher, 2014; Parsons, 2017). A significant amount of the empirical, peer-reviewed literature on this topic from high-quality journals was conducted on flexible, physical learning environments in higher education (Blackmore et al., 2011). There is very little empirical research on K-12 flexible, physical learning environments and the ability to create a sense of place for its stakeholders. In addition, the empirical research that is available is almost always authored by expert educators—not by registered architects (Byers et al., 2018; Jankowska & Atlay, 2008; King, Joy, Foss, Sinclair, & Sitthiworachart, 2014). The architect/design professional’s perspective is vital to more comprehensive and collaborative research regarding physical learning environments. This study explored the relationship between the ability to create a sense of place with flexible, physical learning environment designs in K-12 schools and the impact that such environments had on their stakeholders.

By design, classrooms have been separated from other spaces in a school (Baker, 2012). The most impactful learning experiences happen in a variety of physical environments; yet the classroom has traditionally been regarded as the most identifiable place for basic formal learning (Bekerman, Burbules, & Silberman-Keller, 2006, p. 15).
Traditionally, classrooms have been the physical learning environments where reading, writing, science, and mathematics are taught as the skills most desired for successful careers (Baker, 2012). For more than a century, educators have defined the physical learning environment in a school building as a series of classrooms connected by a corridor. This type of floor plan is also commonly referred to as cells and bells, indicating that the school bell rings, and students exit a classroom (cell) into a corridor. The next bell rings, and the students vacate the corridor to enter their next classroom (Nair, 2014). Kindergarten through Grade 12 (K-12), or primary and secondary school design, has consistently followed this industrial or factory model since it was created more than 150 years ago (Baker, 2012; Leland & Kasten, 2002; Rose, 2012). Jankowska and Atlay (2008) referred to the traditional physical learning environment as formal space or F-space. For the purpose of this study, the term traditional physical learning environment will be used for F-space.

Jankowska and Atlay (2008) proposed two complementary space types to the traditional physical learning environment. Their study indicated that a variety of three space types, working together: one traditional and two flexible, physical learning environments, is a successful model. Jankowska and Atlay’s (2008) research is unique because most of the empirical research regarding flexible, physical learning environments only addresses modifications of floor, ceiling, and wall finishes in existing traditional classrooms (Blackmore et al., 2011; Brooks, 2011; Chapman et al., 2014; Parsons, 2017). Also, flexible, physical learning environment research is almost always limited by introducing mobile furniture and technology into existing traditional classroom spaces (Brooks, 2011; Neill & Etheridge, 2008; Parsons, 2017; Rands & Gansemer-Topf, 2017;
Scott-Webber, Strickland, & Kapitula, 2014). Modifications of furniture, finishes, and technology are only part of a comprehensive flexible, physical learning environment (Jankowska & Atlay, 2008). Jankowska and Atlay’s (2008) social learning space and creative space types were central to the purpose of this study, and they are discussed in detail later in this chapter as part of the theoretical rationale.

In contrast to traditional physical learning environments, flexible, physical learning environments promote creativity, autonomy, and self-regulation (Parsons, 2017), which are skills that are increasingly required by employers today (Jerald, 2009). Such skills include creativity/innovation, ethics/social responsibility, critical thinking/problem solving, and collaboration (Jerald, 2009). These skills combine a variety of areas of study, and they are in sharp contrast to what was required by employers prior to the introduction of personal computing in the 1980s (Jerald, 2009; Worthington, 2006). In-demand skills, prior to the introduction of the personal computer, included the singularly taught subjects: the humanities/arts, history/geography, government/economics, foreign languages, the sciences, and mathematics (Jerald, 2009). Singularly taught subjects and cognitive skills are supported by traditional classroom design (Baker, 2012) because of their ability to promote compliance and assimilation (Parsons, 2017).

Employer-valued skills of creativity/innovation, ethics/social responsibility, critical thinking/problem solving, and collaboration require emotional intelligence. Emotional intelligence skills are fostered by participatory learning environments (Landau & Meirovich, 2011). In addition, emotional intelligence skills are positively affected by project-based learning (PBL) instruction methods (Ahlfeldt, Mehta, & Sellnow, 2005). Figure 1.1 shows that average student retention rates are higher using participatory
learning environment methods that encourage teamwork, peer-to-peer, and student-to-educator interaction.

**Figure 1.1.** Average Student Retention Rates. Adapted from “Learning Pyramid,” (2018) National Training Laboratories Institute.

Successful participatory learning and PBL environments require that students perceive their educational environments to be supportive and safe (Landau & Meirovich, 2011). It is a challenge within traditional learning environments to address and support multiple student-learning styles. Student learning styles have been defined by the VARK model: visual, aural, reading, and kinesthetic (Othman & Amiruddin, 2010). Othman and Amiruddin (2010) claimed that individuals who are visual learners are most comfortable when taught with graphics and illustration. Aural learners thrive when given verbal
instruction. Reading learners excel by reading the written word, and kinesthetic learners prefer experiential or hands-on learning and physical movement (Othman & Amiruddin, 2010).

Although student-learning-style theory has mainstream appeal, Riener and Willingham (2010) argued that there is no evidence to support that so-called visual learners perform better or are more engaged if they are presented with information in graphic form. The same holds true for so-called aural, reading, and kinesthetic learners. Rather, Riener and Willingham (2010) defined a variety of individual student-learning preferences based on genetic differences, ability and interests, background knowledge, and learning disabilities. For the purpose of this study, understanding how to engage individual student-learning preferences, using sense of place, was the objective. Research about providing a variety of traditional and flexible, physical learning environment space types may provide answers regarding potential benefits for students.

In traditional learning environments, some students choose not to participate because of the fear of rejection. Other students dominate conversations, reducing others’ ability to participate (Landau & Meirovich, 2011). In some cases, students are separated into smaller groups outside of the traditional classroom to create a participatory learning environment that meets individual student-learning preferences based on abilities, interests, and background knowledge (Riener & Willingham, 2010).

Traditional learning environments also have been found to have an adverse impact on gender with respect to student learning preferences and emotional intelligence. Landau and Meirovich (2011) provided significant evidence that female students speak more briefly than male students, and they participate less than male students, when the
learning environment is not perceived to be supportive and safe. The traditional classroom lacks physical space variety, preventing engagement and equity for individual student learning preferences (Landau & Meirovich, 2011). Addressing a variety of student learning preferences can potentially create learning environments that stimulate students’ senses (Othman & Amiruddin, 2010, Riener & Willingham, 2010). Stimulating a variety of individual student learning preferences and students’ senses through activities, meanings, individual features, and physical features is the basis of the sense-of-place model (Falahat et al., 2017; Jalili & Azar, 2016).

The 2015 Gallup Student Poll Survey (Gallup, Inc., 2016), consisting of approximately one million students in the United States, concluded that students’ perceived engagement level dropped off significantly from Grade 5 to Grade 11 (Figure 1.2).

![Figure 1.2. Engagement by Grade. Adapted from “Gallup Student Poll Engaged Today – Ready for Tomorrow” by Gallup, Inc., 2016, U.S. Overall: 2015 Score Card.](image)

The most significant drop, 67% for Grade 5 to 37% for Grade 11, was in response to agree or disagree with the following statement, “The adults at my school care about me”
This perceived lack of belonging, personal identity, and sense of place is partly due to increased class sizes from elementary school to high school (Meece, 2003).

The National Association of Independent Schools (NAIS, 2017) surveyed more than 10,500 high school students. The study determined that engaged students are more creative and have a higher retention rate than disengaged students. “Engaged students are less likely to drop out and are more satisfied with their coursework” (NAIS, 2017, p. 11). The negative effects on underserved students were decreased by student engagement (NAIS, 2017). Engagement and a sense of belonging, or a sense of place, was therefore an important factor for increased emotional-, gender-, and minority-student equity.

Unlike schools, employers are creating equity in the workplace by offering a variety of activities and space types that work together (Schittich, 2011). These spaces are engaging and cognizant of employee needs for a sense of place. Employers have done this by decreasing cellular or office spaces and increasing communal spaces for collaborative tasks. Cellular or office space design, shown in Figure 1.3, was popular up until the 1980s. This cost-effective design maximizes building square footage by double loading a corridor with individually functioning rooms. Flexibility for multipurpose space use is limited (Schittich, 2011).

Flexible workplace design (Figure 1.4) provides a variety of space use types. This design meets the needs of business and cultural models that require a high level of collaboration and engagement (Schittich, 2011). Although, flexible workplace design is less cost effective than cellular office design, it is required to support increased space users’ sense of place (Schittich, 2011).
Figure 1.3. Cellular Workplace Floor Plan. Adapted from “Work environments: Spatial concepts, usage strategies, communications,” by C. Schittich, 2011, In DETAIL.
Problem Statement

Jerald (2009) posited that flexible, physical learning environments support a stronger sense of place than traditional physical learning environments. Sense of place fosters skills that employers are seeking in today’s workforce (Jerald, 2009). The physical learning environment’s fundamental role is providing successful workforce development opportunities (Chapman et al., 2014). When traditional skills are coupled with real-world, problem-solving skills, required by careers and employers, the impact on student success is much greater (Jerald, 2009). Adedokun, Henke, Parker, and Burgess (2017) indicated that 88 to 96% of students perceived their classroom engagement experience in flexible, physical learning environments as better than classroom engagement experiences in traditional physical learning environments.
Jankowska and Atlay (2008) believed that a new model needs to be developed to complement traditional physical learning environments. Physical workplace environments have changed to meet the needs of employees’ sense of place. Between 1990 and 2019, the average physical workplace environment increased communal space from 15 to 40% (Schittich, 2011). Communal workplace spaces are equivalent to the flexible, physical learning environments that Jankowska and Atlay (2008) referred to as social learning space and creative space. Since the early 1980s, and with the advent of the personal computer, workplace design has shifted to meet the evolving needs of most professional environments (Schittich, 2011). The need for a shift existed because workplace designs needed to provide environments that supported fewer routine processes that were increasingly adaptable and flexible to change (Schittich, 2011). The organizations, buildings, and information technology, or ORBIT, studies model (Figure 1.5) was created in response to these workforce environment needs (Worthington, 2006). The ORBIT studies model indicates that most types of workforce environments, with the exception of high-tech firms in a growth phase, are evolving in a similar pattern (Worthington, 2006). In terms of the nature of the work, most workforce environment types are becoming less routine, indicated by the downward pointing arrow (Worthington, 2006). Routine daily employee tasks can be described as short, repetitive cognitive procedures. Cognitive procedures are learned and supported by a traditional workplace or traditional physical learning environment. In terms of the nature of change, workforce environment types are experiencing a higher rate of change, indicated by the arrow pointing to the right (Worthington, 2006). Workforce environments, which are demanding less routine employee tasks, must adapt their physical space at a more rapid
pace to allow for this evolution to take place (Schittich, 2011). Less routine or creative and social-emotional skills are learned and supported by flexible workplace and flexible, physical learning environments (Jankowska & Atlay, 2008).

According to the U.S. Department of Education’s (USDOE) “Condition of America’s Public School Facilities: 2012-13” report (Alexander, Lewis, & Ralph, 2014), school districts in the United States spent $14 billion on construction projects. According to the report, “53% of public schools needed modernization to be considered in good overall condition” (Alexander, Lewis, & Ralph, 2014, p. 3). Despite the need and the means to modernize the national school system, school environment design has not evolved in pace with workplace environment design (Schittich, 2011). Learning environment design continues to follow the traditional learning environment model (Baker, 2012). In addition, learning environment design innovation has seen limited support from state and national governments in the United States (Washor & Mojkowski, 2003).
According to a 2015 study by the Education Week Research Center, K-12 schools in the United States of America have not made the financial commitment to social and creative pedagogies that support social and emotional learning. As of 2015, only 34% of educators had implemented these pedagogies, yet approximately 99% of educators interviewed believed in the perceived benefits of social and emotional learning supported by flexible, physical educational environments (Education Week Research Center, 2015).

The desire to create student sense of place is present, yet many K-12 stakeholders are reluctant to make the change and implement flexible, physical learning environments.
in their school districts (Kennedy, 2015). Kennedy (2015) proposed many reasons for this reluctance including educator allegiance to the traditional classroom model and educator territoriality. Kennedy (2015) also proposed that administrators are fearful of creating inequity between schools within a district when limited resources narrow the number of schools scheduled for a physical learning environment design change. Additional research may therefore be required to determine if flexible, physical educational environment designs can potentially benefit stakeholder experiences. If the benefits are demonstrable, government and school district administrations may be more inclined to support flexible, physical learning environments.

Research on flexible, physical learning environments is primarily limited to higher education (Blackmore et al., 2011). K-12 stakeholder and architect collaborative empirical research is needed. This type of research may help to uncover why there is a disconnect between design for K-12 schools and workplace environments (Falahat et al., 2017). Workplace physical environments have evolved to meet a sense of place for employees with a variety of space and flexible, physical space, K-12 school physical learning environments have not (Baker, 2012). To avoid a potentially unprepared workforce, research is needed to address and respond to the lack of K-12 alignment with sense-of-place benefits for students (Falahat et al., 2017).

**Theoretical Rationale**

Sense of place was the basis for this study’s theoretical framework. Sense of place is an expansion of Barker’s (1968) behavior-setting theory and its connection to the environment, to ecology, to the community, and to sociology by including activities and meaning categories from psychology (Georgiou, Carspecken, & Willems, 1996; Popov &
Chompalov, 2012; Proshansky, Ittelson, & Rivlin, 1976; Scott, 2005). Barker’s (1968) behavior-setting theory has two parts: place and behavior patterns. Place is defined as the surroundings inhabited by a person, whether they be physical and/or cultural. Behavior patterns are defined as the physical act of doing something, of completing a task (Barker, 1968). The sense-of-place model’s inclusion of activities and meanings provides a comprehensive and effective framework for this study (Falahat, 2006).

Linking academic and workplace physical environments via sense of place is important to the lifelong learning and workforce development processes (Schittich, 2011). Sense of place and student engagement are connected. Student engagement can be defined in terms of attendance, learning, and motivation (Adedokun et al., 2017). Sense of place should not be confused with student achievement or outcomes. The “2015 Brown Center Report on American Education” (Loveless, 2015) and the Program for International Student Assessment (National Center for Education Statistics [NCES], 2015) indicates that measuring students’ sense of place and engagement differs from state to state in the United States and from country to country, worldwide (NCES, 2015). It is also important that creating positive sense of place, not student outcomes, is the barometer for measuring successful K-12 flexible, physical learning environments to address a variety of student learning preferences (Riener & Willingham, 2010).

Adedokun et al. (2017), Chapman et al. (2014), Lippman (2015), Neill and Etheridge (2008), and Rands and Gansemer-Topf (2017) stated that flexible, physical learning environments have a positive impact on student engagement. Student engagement is increased by greater sense of place (Jalili & Azar, 2016). Sense of place architectural design elements of the learning environment and their impact on K-12
stakeholders’ perceptions further define the theoretical framework. Perceived experience of a place can be defined as sense of place (Jalili & Azar, 2016). Sense of place is an awareness that a person is part of a culture, something greater than him- or herself, a sense of belonging (Falahat et al., 2017). Sense of place is experienced through all five senses and is impacted by: (a) activities, (b) meanings, (c) individual features, and (d) physical features, as shown by Figure 1.6 (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014).

![Figure 1.6. Sense of Place Model. Adapted from “The Sense of Place and Its Factors,” by M. A. Falahat, 2006, HONAR-HA-YE-ZIBA, 26, 57-66.](image)

Activities are described as social interactions, satisfaction, and sense of community (Falahat, 2006). The activity of social interactions between peer students, mentors, educators, and staff have direct influence on sense of place. Activities, understood through traditions and formality, or being foreign as a first-time experience, impact the comfort of an environment. An individual’s or group’s satisfaction with these activities and pedagogies elicit either positive or negative responses. The freedom to communicate through verbal and body language determines connectivity or separation (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014). Traditional
teaching practices of a teacher-centered model cannot be successful in a flexible, physical learning environment, which was demonstrated in the failed open classroom model of the 1970s in the United States (Drummond, 2017). The student-centered model allows for the expansion of pedagogy.

Meanings are described as identity, aesthesia, and symbols (Falahat, 2006). Meanings are the symbolic gestures that make up an organizational culture through mission, vision, and goals. A group identifies with a common understanding of what they stand for and what they are trying to accomplish as a group. Aesthesia, or the ability to perceive sensations via physical or metaphoric symbology, also determines physical and/or emotional connectivity or separation (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014).

Individual features are closely linked to physical features and can be described through relations, expectation, and attachments (Falahat, 2006). Scale and its relationship to the human proportion, as a child or adult, influence an environment’s impact on sense of place via the individual features through individual perception. That perception is different between children and adults (Jalili & Azar, 2016). The expectation or lack of expectation determines behavior and the recovery of desired behavior. There is a level of attachment to expectation and, conversely, to change (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014).

Sense of place physical features can be defined as learning environment architectural design elements (Falahat, 2006). The impact that learning environment architectural design elements have on K-12 stakeholders’ perceptions was central to this study’s purpose. Collaborative learning, physical comfort, instructor-student interactions,
and student-student interactions are four criteria to gauge sense of place (Adedokun et al., 2017). These four criteria are impacted by physical features described as form and size, texture and decoration, and connection and arrangement (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014). The sense-of-place component described as physical features was the focus of this study.


The traditional physical learning environment (formal space or F-space) is the academic equivalent of the boardroom (Jankowska & Atlay, 2008). The traditional physical learning environment dominated K-12 design for 150 years, and they are teacher-centered (Baker, 2012; Leland & Kasten, 2002). In academia, these spaces are for seminars and lectures (Jankowska & Atlay, 2008). In the workplace, these spaces are designed for concentration with limited distraction, and they take the form of individual offices and meeting rooms (Schittich, 2011). Traditional physical learning environments are cellular or modularly designed, and they fulfill personal and territorial behavioral needs (Schittich, 2011).

Social learning spaces or S-spaces are the informal spaces that connect traditional learning environments (Jankowska & Atlay, 2008). They are the transition spaces, or the spaces between the spaces where informal conversations happen, such as the conversation between a teacher and student in the corridor or courtyard (Barrett, 2014).
In the workplace, these spaces are designed for movement and communication, and they take the form of the kitchenette, lounge, printer station, touch down workstations for visiting staff from other offices, and filing or archive areas (Schittich, 2011).

Creative spaces or C-spaces encourage creativity. Unlike F-space, C-space is designed for exploration and reconfiguration, using movable or flexible partitions, furniture and technology, variations of patterns and textures, and writable surfaces (Jankowska & Atlay, 2008). C-space encourages critical-thinking and problem-solving skills (Jankowska & Atlay, 2008). These academic spaces are student-centered where the educator acts as a facilitator in lieu of an instructor. In the workplace, these spaces are for collaboration and the exchange of ideas. C-spaces include think-tank space, project areas, and medium-to-small group meeting places (Schittich, 2011).

The greatest opportunity to maximize positive sense of place can be realized when a variety of physical space architectural design types are interconnected (Jankowski & Atlay, 2008). Academic physical learning environments and workplace physical environments are connected in this way (Adedokun et al., 2017; Falahat et al., 2017; Jalili & Azar, 2016; Jankowska & Atlay, 2008; Kamali, & Shahidi, 2017; Lindahl, 2004; Neill & Etheridge, 2008; Schittich, 2011; Van der Voordt, 2004; Vali & Nasekhiyan, 2014; Worthington; 2006). F-space, S-space, and C-space elements define flexible, physical learning environments (Baker, 2012; Barrett, 2014; Jankowski & Atlay, 2008; Leland & Kasten, 2002; Schittich, 2011).

**Statement of Purpose**

Empirical research on flexible learning space is limited to the higher education educator perspective (Blackmore et al., 2011). Workplace physical environments have
been adapted to meet the variety and flexible, physical space needs of employees, but K-12 school environments have not been so adapted. Research regarding the impact K-12 flexible, physical learning environment design elements have on stakeholders is all but nonexistent. The purpose of this study was to examine the perspectives of K-12 stakeholders and to examine their understanding of flexible learning environment designs and support for students’ sense of place.

Research Questions

The following research questions were asked of K-12 educators, building administrators, and district administrators who are employed within a K-12 school district and who have recently experienced flexible, physical learning environment renovations:

1. What impact, if any, does a flexible, physical learning environment have in K-12 settings, and how is this impact different in any way from the impact of a traditional physical learning environment?

2. What information and processes contributed to the school district’s decision to proceed to a flexible, physical learning environment model?

Potential Significance of the Study

Additional research is important because the K-12 traditional physical learning environment does not support a pedagogy of lifelong learning skills that better accommodate the changing landscape for college readiness and employment (Baker, 2012; Jerald, 2009). The traditional physical learning environment model does not easily provide emotional, gender, and minority equity nor does it provide a variety of the skills desired by workforce employers (Jerald, 2009). Sustainable, next-generation, leadership
and workforce development research is critical and supportive to both educators and employers (Jerald, 2009).

Educators’ desire to create students’ sense of place is present, yet many K-12 stakeholders are reluctant to make the change from traditional physical learning environments to flexible, physical learning environments in their school districts (Kennedy, 2015). Additional research may help determine if flexible, physical educational environment designs provide a fiscally responsible direction for school district administrations and boards of education (Kennedy, 2015).

This study was the first qualitative research specific to K-12 physical learning environment design types, using sense of place and its impact on stakeholders. The goal of this study was to provide physical learning environment guidance to school district superintendents, district business administrators, and building principals. District superintendents are school districts’ chief executive officers, and they are responsible for providing the board of education with district-wide operating and educational direction. District superintendents may benefit from this study’s research by supplying information that is critical for determining spatial influences on the desired culture and future of the district. District business administrators, the equivalent of chief financial officers, are responsible for all district financial decisions. District business administrators may benefit from this study’s research by determining if the district superintendent’s vision is attainable within the financial capacity of the district. School principals are responsible for managing educators and directly informing district superintendents how students receive education in their individual buildings. School principals may benefit from this
study’s research by gathering information to recommend more effective teaching and learning environments for educators and students, respectively.

**Definition of Terms**

*Adjacency* – In the physical environment, refers to the connectedness of physical settings, and behavior settings, specifically, a number of different types of settings separated or connected by boundaries (Smith et al., 2016).

*Behavior-Setting Theory* – based in ecological or environmental psychology, behavior-setting theory is the study of physical and social environments’ impact on human behavior. Behavior-setting theory has two parts: place, which are the surroundings inhabited by a person that are physical and/or cultural; and behavior patterns, which are the physical acts of doing something, such as completing a task (Barker, 1968).

*Emotional Intelligence* – includes five skills: (a) self-awareness, the understanding that an individual’s action impacts others and how; (b) self-regulation or self-control; (c) motivation, the desire for achievement; (d) empathy or an individual’s understanding of others’ needs and emotional state, even if the individual has not experienced another’s emotional or physical event by him- or herself; (e) social skills, the ability to build common interest to advance the desired outcomes with others (Katsekera, 2011).

*Flexible, physical Learning Environments (Education)* – a variety of sizes and shaped physical architectural spaces or room configurations, as well as flexible furniture, finishes, and technology. Physical features include three interconnected, or networked (Neill & Etheridge, 2008), physical learning environment space types: F-space (formal
space); S-space (social learning space), and C-space (creative space) (Jankowska & Atlay, 2008).

*Formal/Traditional Physical Learning Environments* – a series of classrooms connected by a corridor, commonly referred to as cells and bells (Nair, 2014). Also known as the industrial (factory) model, traditional physical learning environments have been in existence for more than 150 years. Traditional physical learning environments promote compliance and assimilation (Parsons, 2017).

*Post-Occupancy Evaluation (POE)* – the physical building evaluation process by a professional architect, engineer, or educator of a building after that building has been occupied by its users (Leung & Fung, 2005).

*Sense of Place* – a perceived experience of a physical or cultural environment. An awareness that a person is part of a culture or community that is something greater than him- or herself. Sense of belonging, sense of community, sense of identity, and sense of self-worth are a few derivatives of the term. Sense of place is experienced through all five senses of sight, smell, hearing, taste, and touch (Falahat et al., 2017; Jalili & Azar, 2016).

*Student-Centered Learning* – also known as *learner-centered education*, student-centered learning is a teaching method that shifts the focus of instruction away from the instructor to the student. The educator acts as a facilitator, encouraging student autonomy and independent problem solving (King et al., 2014).

*Student Learning Preferences* – a concept that defines the four learner types or senses that influence student engagement and capacity to learn different areas of content based on: (a) genetic differences or individual innate qualities; (b) ability and interests or
the activities that pique individual curiosities; (c) background knowledge or fundamental skills that promote learning secondary skills within similar content; and (f) learning disabilities, including visual, auditory, cognitive, and physical (Riener & Willingham, 2010).

Chapter Summary

There is limited empirical research on flexible, physical learning environments (Blackmore et al., 2011; Brooks, 2011; Chapman et al., 2014; Cleveland & Fisher, 2014; Parsons, 2017). A significant extent of empirical, peer-reviewed literature is conducted in a higher education setting for research on physical learning environments (Blackmore et al., 2011). There is very little empirical research on K-12 flexible, physical learning environments and the ability to create a sense of place for its stakeholders. Furthermore, current empirical research is almost always authored by expert educators without the voice of registered architects. The architect/researcher’s perspective is vital to this topic (Minero, 2018). Almost all flexible, physical learning environments research is based on modifications of floor, ceiling, and wall finishes only within existing traditional classrooms (Blackmore et al., 2011; Brooks, 2011; Chapman et al., 2014; Parsons, 2017). Also, flexible, physical learning environment research is typically limited to introducing mobile furniture and technology to existing traditional classroom spaces (Brooks, 2011; Neill & Etheridge, 2008; Parsons, 2017; Rands & Gansemer-Topf, 2017; Scott-Webber et al., 2014). Modifying furniture, finishes, and technology is only part of what can be a comprehensive flexible, physical learning environment (Jankowska & Atlay, 2008).

Physical environments play a part in creating a sense of place, an awareness by its occupants that they are part of a culture, a community, and something greater than
themselves (Falahat et al., 2017; Lin & Lockwood, 2014; Lindahl, 2004; Jalili & Azar, 2016; Schittich, 2011). The traditional physical learning environment model promotes compliance and assimilation (Parsons, 2017). In contrast, nontraditional physical learning environments, also known as flexible, physical learning environments, promote creativity, autonomy, and self-regulation, all which are emotional intelligence skills (Parsons, 2017). Emotional intelligence skills gained through participatory student learning are increasingly sought after by employers (Jerald, 2009). Individual student learning preferences play a significant role in how emotional and cognitive intelligence skills are acquired (Riener & Willingham, 2010). Understanding how to engage and encourage individual student learning preferences, using sense of place, with a variety of flexible, physical learning environment architectural space types, was the purpose of this study. Additional K-12 flexible, physical learning environment research using the sense-of-place model, an expansion of Barker’s (1968) behavior-setting theory, is an important factor for increased emotional, gender, and minority student equity. Additional K-12 flexible, physical learning environment research from the architectural profession’s perspective, using sense of place, is also important because K-12 flexible, physical learning environments have not kept pace with workplace physical environments (Minero, 2018). The answers to the research questions for this study add to the limited, existing K-12 flexible, physical learning environment empirical research, and they aid in future collaborative school district school renovation and construction decision-making processes. Chapter 2 provides an overview of the literature, regarding physical learning environments, that supports student sense of place, the role of sense of place, student emotional intelligence, and student engagement in learning, as well as workplace
physical environment evolution that addresses employees’ sense of place. Chapter 3 describes the methodology and protocol used to collect data. Chapter 4 presents the analysis of each research question, introducing emerging themes and subthemes. Chapter 5 discussed the research implication based on the results in Chapter 4 as well as recommendations for research for application.
Chapter 2: Review of the Literature

Introduction and Purpose

For more than a century, educators have defined the physical learning environment in K-12 school buildings as a series of repetitive classrooms connected by a corridor. The traditional K-12 physical learning environment, alone, no longer supports the teaching of the skills that are most sought after by employers. The purpose of this study was to examine the perspectives of K-12 stakeholders and their understanding of flexible learning environment designs and support for sense of place. Research about the impact that K-12 flexible, physical learning environment design types have on stakeholders is all but nonexistent.

The following research questions were asked of K-12 educators, building administrators, and district administrators of a single K-12 school district that has recently experienced flexible, physical learning environments renovations:

1. What impact, if any, does a flexible, physical learning environment have in K-12 settings, and how is this impact different in any way from the impact of a traditional physical learning environment?

2. What information and processes contributed to the school district’s decision to proceed to a flexible, physical learning environment model?

The literature review is organized into three sections. The first section focuses on physical learning environments that support student sense of place. Physical learning environments, in part, create a sense of place, which is an awareness by its occupants that
they are part of a culture, a community, and they are part of something greater than themselves (Falahat et al., 2017; Lin & Lockwood, 2014; Lindahl, 2004; Jalili & Azar, 2016; Schittich, 2011).

The second section identifies the role sense of place, emotional intelligence, and student engagement play in student learning. Emotional bonds are created by individuals during their engagement of physical space (Lengen & Kistemann, 2012). Awareness of these bonds and the ability to regulate or adapt emotion to one’s own space and fellow space users is defined as emotional intelligence (Uzzaman & Karim, 2018). The 2016 NAIS Report (2017) determined that engaged students are more creative and have a higher retention rate than disengaged students. “Engaged students are less likely to drop out and are more satisfied with their coursework” (NAIS, 2017, p. 11).

The third section explores how workplace physical environments have evolved to address employees’ sense of place. Workplace physical environments have adapted to meet space variety and flexible, physical space that employees need. K-12 school physical learning environments have not (Schittich, 2011). Colleges and universities have begun to study and implement flexible, physical learning environments as a result of student demand and expectations for collaborative spaces which has come about over the past 25 years (McLaughlin & Faulkner, 2012).

**Physical Learning Environments Supporting Students’ Sense of Place**

The first part of physical learning environments supporting students’ sense of place introduces higher education flexible, physical learning environment studies. These studies focus on the use of complementary physical features and space types. Next, there is a focus on primary- and secondary-age complementary physical features and space
types. Last, the section introduces higher education studies that attempt to isolate specific flexible, physical learning environment features within traditional classroom spaces, using a combination of flexible furniture and technology only. Research that focuses on flexible furniture and technology is important because it reduces the number of variables in determining sense of place (Brooks, 2011). When other space-related variables are removed from a study, greater validity is directed toward a concentrated impact of flexible furniture and technology on flexible, physical learning environments’ sense of place.

Higher education, flexible, physical learning environments using complementary physical features and space types. Employers value emotional intelligence skill development including creative higher order problem solving (Jankowski & Atlay, 2008). Understanding that, Jankowska and Atlay (2008) conducted a qualitative study focused on creative space. The study was conducted on a creative space at one of 74 Centres for Excellence in Teaching and Learning (CETL) at the University of Bedfordshire, United Kingdom. Open-ended questions were used for the Jankowska and Atlay (2008) study. The researchers also offered participants the opportunity to provide additional responses that were unique to their experience of the space type used.

Creative space, or C-space, impacts student engagement differently than formal space (F-space) and social learning space (S-space). F-space is defined as the traditional physical learning environment space for seminars and lectures. S-space is defined as the space between spaces, and it is used for relaxed and spontaneous communications (Jankowska & Atlay, 2008).
Jankowska and Atlay (2008) identified two key findings in the use of C-space: increased creativity and inclusivity. Flexible layouts of the physical learning environment increased the opportunity for students to practice professional conduct. Greater perceived student autonomy and problem-solving skills were a product of the less formal and strengthened teacher-learner relationship. In this case, the teacher took on the role of facilitator. C-space increased students’ enthusiasm and excitement, and it had a positive impact on learning experiences and engagement. Most intriguing is the impact C-space had on inclusivity. Students felt that they could express themselves safely and more authentically. C-space allowed for a variety of student preferences, commonly referred to as learning styles, to be the norm (Jankowska & Atlay, 2008).

A variation of Jankowska and Atlay’s (2008) space-type research that supported student sense of place was conducted in a mixed-methods study by Neill and Etheridge (2008). Neill and Etheridge analyzed four flexible learning space types: linear, horizontal, cluster, and network, using flexible furniture configurations and decentralized technology within an existing classroom. Linear is defined as a lecture and presentation space type; horizontal is defined as a class discussion space type; cluster is defined as a small group discussion space type; and a network space type is defined as an environment of decentralized instruction (Neill & Etheridge, 2008). Linear configurations can be equated to Jankowska and Atlay’s (2008) reference to formal space, a traditional configuration. Horizontal, cluster, and network configurations are similar variations of both the creative and social learning spaces.

Neill and Etheridge (2008) indicated that the variety of flexible learning environments that included flexible furniture reconfigurations and decentralized
technology within an existing classroom contributed positively to student engagement. Students were empowered to explore different approaches to learning, be actively involved in learning, and they were likely to recommend the room to others based on increased levels of collaboration. Faculty and students experienced two basic negative results (Neill & Etheridge, 2008). One, technology used by faculty was not as decentralized as originally thought, and by not having a wireless connection to the video display, faculty mobility around the room was adversely affected. Two, regular reconfiguration of the space was uncomfortable. This was a perceived barrier because time spent rearranging furniture limited instructional time. Neill and Etheridge stressed that faculty professional development regarding how to use instructional space is vital. With effective professional development, educator and student frustration using the flexible, physical learning environment may have been reduced (Neill & Etheridge, 2008).

Frustration with the lack of professional development for decision makers and educators using flexible learning environments is not a new problem. Higher education professional development for flexible learning environments was the focus of the King et al. (2014) university-wide case study. Drummond (2017) posited that traditional pedagogy and the teacher-centered model cannot be successful in a flexible, physical learning environment, as too often has been the case since the failed open-classroom model of the 1970s in the United States.

The King et al. (2014) case study was unique by providing flexible learning environments for educators with the university’s research aim of progressing toward a more personalized student-centered model. The physical features of the Teaching Grid, a
flexible, physical learning environment for educators, were studied to determine future use of the same physical features for student learning environments. The Teaching Grid was a mock space for professional development to simulate the future of student-occupied flexible, physical learning environments. The Teaching Grid provided a chance for the educators to work in a flexible and customizable physical space that provided a variety of peer-to-peer collaborative and technology-rich environment options (King et al., 2014).

The physical features of the Teaching Grid included a variety of mobile furniture types: round tables, square tables, and rectangular tables, with the capacity to seat two, four, six, or eight in different configurations. Individual couch seating and sectional seating were also provided. Technology was mobile. The most important physical features that link the King et al. (2014) Teaching Grid to Jankowska and Atlay’s (2008) three space types and Neill and Etheridge’s (2008) four flexible learning space types are the multiple variations of space types provided by flexible glass panels and curtains on tracks. Movable glass panel partitions and translucent curtains provided multiple sized and shaped space types for a variety of group-sized activities with visibility to other complementing spaces.

Ultimately, the study findings of the Teaching Grid reinforced flexibility in allowing educators a variety of pedagogies that were not feasible in traditional teaching/learning environments. The option to use a variety of pedagogies allowed educators the opportunity to address an array of student learning preferences. The ability to address numerous student learning preferences can create learning environments that stimulate students’ senses (Othman & Amiruddin, 2010, Riener & Willingham, 2010).
Understanding the impact that a variety of complementary spaces had on the educator teaching and learning preferences made the findings of the King et al. (2014) research important for K-12 educators.

**Primary- and secondary-age flexible, physical learning environment studies using complementary physical features and space types.** While Jankowska and Atlay (2008), Neill and Etheridge (2008), and King et al. (2014) focused on higher education physical learning environments’ impact on supporting student sense of place, the next three studies, Byers, Imms, and Hartnell-Young (2018); Leung and Fung (2005); and White and Lorenzi (2016) focused on secondary- and primary-school learning environments. Kindergarten through Grade 12 physical learning environment empirical research is limited because the topic is still in its infancy (Blackmore et al., 2011; Brooks, 2011). The study by Byers et al. (2018) was conducted in a secondary school in Melbourne, Australia. The study is unique because it focused on educator perception and the impact the physical learning environment had on their ability to teach. Like Jankowska and Atlay’s (2008) study, a variety of connected physical space types were researched. This community of connected spaces or flexible, physical learning environments was referred to as an innovative learning environment (ILE) by Byers et al. (2018). The ILE types included a large communal space with a variety of flexible furniture types surrounded by small-group and medium-sized rooms. The ILE spaces were connected, in some areas, with glass walls, and some were separated from other spaces by opaque walls. The ILE was also connected to an older section of the building that housed traditional learning environments. The purpose of the Byers et al. (2018)
study was to understand how teachers and students transitioned from the older traditional physical learning environment to the newer flexible, physical learning environments.

Byers et al. (2018) used the linking pedagogy, technology, and space (LPTS) observational metric via a single-subject research design. LPTS includes five domains: pedagogy, learning experiences, communities of learning, student use of technology, and teacher use of technology. By collecting three traditional learning environment observations and three ILE observations of nine teachers ($N = 9$), the behaviors of each teacher in each environment were addressed.

All five domains were impacted by using the ILE (Byers et al., 2018). Teacher didactic pedagogies observed in traditional physical learning environments declined in the ILE, while student feedback and engagement increased. Student learning experiences shifted from receiving content to engaging in appraisal and refinement of teacher-provided information. Observations also revealed that the teachers changed their practices to facilitate greater differentiation of activities. The most interesting aspect of this finding was that teacher mobility around the room reduced student distractions and increased student engagement. The community of learning domain revealed that students gravitated away from whole classes and individual arrangements toward mixed-sized groups. Byers et al. (2018) aligned with Parsons (2017) and Jankowska and Atlay’s (2008) variety of physical space type recommendations. Student and teacher use of technology domains also support a variety of space types as students move between teacher-centered, student-centered, and informal/communal space types within the ILE (Byers et al., 2018).
Barriers and challenges were limited but notable. Transparency from space to space via glass walls was distracting at first, but the students overcame this challenge within weeks of using the ILE. Open spaces were intimidating to some students yet enabling to others. Traditionally taught subjects and standardized testing were difficult to provide in the ILE. Most importantly, the Byers et al. (2018) secondary-school observations are aligned with Jankowska and Atlay’s (2008) higher education research that both flexible and traditional space types are necessary for providing a variety of physical learning environments. Leung and Fung (2005) investigated variety of space types at the primary-school level.

Leung and Fung (2005) uniquely focused on primary schools in Hong Kong after a countrywide school redesign program was completed. The purpose of Leung and Fung’s (2005) study was to investigate the effectiveness of enhanced school facilities and their impact on student behaviors. Physical learning environments of both the old schoolhouse and new millennium schoolhouses (Leung & Fung, 2005) were experienced by 750 students ($N = 750$) who were given a questionnaire approximately 4 months after moving into the new physical learning environment. The POE questionnaire focused on three areas: (a) student background information, (b) student satisfaction level, and (c) student learning behaviors (Leung & Fung, 2005).

Decoration and space management were identified as the two most prominent physical features of the learning environment (Leung & Fung, 2005). Decoration can be defined as the use of space, finish material color, walls, ceiling and floors, and flexible and comfortable furniture (Leung & Fung, 2005). Space management can be defined in two ways: more space and better utilization of the existing space (Leung & Fung, 2005).
The latter, a more effective method, can be achieved by using action zones or a variety of teaching/learning areas created by the configuration of furniture and space appropriate to the pedagogy (Leung & Fung, 2005).

Leung and Fung (2005) identified two action zone types, chalk and talk, and multimedia. Chalk and talk is the traditional lecture style, learning environment configuration, and multimedia is participatory, interactive, and flexible. When placed in the appropriate action zone, students had an 80% information retention rate (Leung & Fung, 2005). Leung and Fung (2005) determined that appropriate space management improved students’ coordination, attention, classroom preference, and goal achievement. Where Neill and Etheridge (2008) identified four space types, and Jankowska and Atlay (2008) identified three, Leung and Fung (2005) identified two. Regardless, each study identified both traditional and flexible, physical environments complementing each other.

White and Lorenzi’s (2016) study was an extension of Jankowska and Atlay’s (2008) three space types consisting of creative, formal, and social learning spaces. White and Lorenzi’s (2016) focus was on the merits of creative space with primary- and secondary-aged students that provides a link to Byers et al. (2018) and Leung and Fung’s (2005) research. White and Lorenzi were also interested in opportunities that allowed creative space infusion into formal education. During a 12-month period, open-ended and closed questionnaires, and semi-structured interviews were conducted. The study’s initial research method included 256 students, seven teachers, and 41 tutors (I = 304), who used the creative writing center, Fighting Words. The Fighting Words’ CEO and principal of schools who participated in the program were interviewed to provide secondary research. Three themes emerged from White and Lorenzi’s (2016) study:
(a) creative space is multidimensional, (b) creative space has three characterizations, and (c) challenges that face creative space implementation into formal physical learning environments.

White and Lorenzi’s (2016) first theme identified three dimensions of creativity: physical, social-emotional, and critical. Physical can be defined as physical space; social-emotional can be defined as a safe and supportive environment, valuing student voices; and critical can be defined as encouraging self-motivation and experimentation with ideas (White & Lorenzi, 2016). The creative-space physical learning environment was characterized in the second theme by the findings in three ways: open and light, stimulating and cozy, and unexpected and dynamic. Open and light was defined as minimal physical barriers. Like the King et al. (2014) Teaching Grid, strategically located curtains instead of doors, flexible furniture, and relaxed colors and textures were used to decrease physical and perceived barriers, creating a sense of openness. White and Lorenzi (2016) concluded that physical alterations to the learning environment are not enough. Sense of place supports this statement by stimulating a variety of individual student learning preferences. Students’ senses are therefore stimulated by physical features complementing characteristics: activities, meanings, and individual features (Falahat et al., 2017; Jalili & Azar, 2016).

Higher education studies using a combination of flexible furniture and technology in traditional classrooms spaces. The Byers et al. (2018), Jankowska and Atlay (2008), King et al. (2014), Leung and Fung (2005), Neill and Etheridge (2008), and White and Lorenzi (2016) studies focus on the use of complementary physical features and space types. Adedokun et al. (2017) and each of the following studies sought to
isolate specific flexible, physical learning environment physical features within traditional classroom spaces using a combination of flexible furniture and technology only. Research isolating flexible furniture and technology from providing complementary space types is important when taking an additional step to reduce the number of physical features, sense-of-place variables. In alignment with Leung and Fung’s (2005) use of primary school action zones providing better utilization of space, Adedokun et al. (2017) described 21st century learning spaces, also known as flexible, physical learning environments, as better utilization of the existing physical space not adding more space to the environment.

More space was the historic and traditional answer to increased-learning environment needs (Adedokun et al., 2017). Adedokun et al. (2017) conducted a study to gather student perceptions of flexible, physical learning environments. The Adedokun et al. (2017) study included 25 Purdue Polytechnic Institute students (N = 25) who used a flexible learning space in the recently built Purdue University’s Hall for Discovery Learning and Research (HDLR) to attend five different courses: math, technology, integrated English, communications, and a seminar course (Adedokun et al., 2017). Adedokun et al. (2017) measured how flexible furniture impacted student engagement as defined by the 2000 National Survey of Student Engagement (NSSE) Report.

Adedokun et al.’s (2017) findings provided a clear distinction between the necessity for a greater variety of space. Students’ perceptions of the flexible space were surveyed on classroom climate and learning and motivation (Adedokun et al., 2017). Focus groups were used to determine how students compared their experience of engagement in the HDLR flexible, physical learning space to traditional physical learning
environments. Students were asked to rate classroom climate by how flexible furniture impacted the level of engagement they experienced. Flexible furniture had the greatest impact on student physical comfort and collaborative and interactive learning. (Adedokun et al., 2017).

Flexible, physical learning space was successful in terms of student comfort and collaborative and interactive learning. Just as important, the Adedokun et al. (2017) study determined that personal or individual learning requires introspective opportunities that are not afforded by flexible, physical learning space. Personal or individual learning aligns with singularly taught subjects and cognitive skills that are supported by traditional classroom design (Baker, 2012) because of their ability to promote compliance and assimilation (Parsons, 2017).

Much like Adedokun et al. (2017) made the four walls of the learning environment a constant, Brooks (2011) compared the use of two traditional, four-walled classrooms as a constant by providing one classroom with flexible furniture and enhanced technology, and the other classroom was a placebo in terms of traditional physical learning environments because it included neither flexible furniture nor enhanced technology. Brooks (2011) took the research one step further by controlling the two physical learning environments with identical pedagogy. By making both pedagogy and physical space a constant, Brooks’ (2011) study isolated the impact of flexible furniture and enhanced technology on student outcomes, but Brooks did not study student engagement. Student outcomes are not the focus of this study, but Brooks’ (2011) study is important because it attempted to diagnose a flexible, physical learning environment
using highly controlled variables. To control variables, Brooks’ (2011) study moved only incrementally away from studying the traditional physical learning environments.

By controlling all elements of pedagogy provided in two distinct types of physical learning environments, a traditional/formal classroom, and a technologically advanced active learning classroom (ALC), Brooks (2011) focused on determining the impact the ALC had on student learning. Most students in the sample were first-semester, first-year students. Without college performance data, the students’ high school ACT scores were used to determine preexisting academic ability. Brooks (2011) defined ALC as having a greater level of flexibility compared to the traditional classroom by using flexible furniture and decentralized technology. Flexible furniture is defined as mobile desk surfaces, chairs, and storage in a variety of types that can be easily reconfigured into multiple orientations. Multiple orientations include traditional row seating, face-to-face seating, small group seating, large group seating, and U-shaped or circular configurations. For the purpose of Brooks’ (2011) study, round tables accommodating up to nine students were used. Decentralized technology is defined as individual laptops, tablets, and multiple computer screens for small group use for students and for mobile access to technology by the instructor.

Brooks’ (2011) study at the University of Minnesota selected half the student sample to use the traditional physical learning environment and half to use the ALC. Brooks (2011) defined the traditional physical learning environment as a whiteboard and instructor being at the front of the room and students at tables, in rows, facing the front of the room. Brooks (2011) defined the ALC as a similarly sized room where students sat at round tables and the instructor moved about the room. Both classes were additionally
controlled by being taught at the same time with the same course material, assignments, and scheduled exams (Brooks, 2011).

Two noteworthy findings emerged. Students who used the ALC both exceeded grade expectations based on their preexisting high school ACT scores, and they outperformed the students who used the traditional learning environment. Brooks’ (2011) research is unique because it successfully demonstrated, in a highly controlled manner, that flexible, physical learning environments, as defined by Brooks (2011), have a positive impact on student learning outcomes. Empirical research demonstrating that flexible, physical learning environments have a positive impact on student learning outcomes is important (White & Lorenzi, 2016). White and Lorenzi (2016) defined the greatest challenge that faces creative space implementation within formal physical learning environments is that providing creative pedagogy is in direct conflict with a performance-driven culture that dominates formal education.

Where Brooks (2011) compared two classrooms, Wilson and Randall (2012) used only one classroom to study how a blended classroom student experience differed from previous traditional learning environment student experiences. For the purpose of Wilson and Randall’s (2012) study, a blended classroom was defined by its flexible furniture and adaptive use of technology. The purpose of the Wilson and Randall (2012) study was to determine the next generation learning space (NGLS) impact on pedagogy. NGLS, also referred to as the Pod Room is a flexible learning environment located at a university in Australia. The Pod Room has four components: student pods, master pod, informal breakout area, and whiteboards. Student pods were stationary, kidney-shaped tables with six chairs for students that were equipped with two computer monitors. One informal
breakout area had an ottoman and three soft, kidney-shaped couches. Five student pods surrounded the informal breakout area, allowing room for approximately 30 students per class. The master pod, the traditional learning environment equivalent of the lectern, was used by the teacher to control lighting and technology, and it was situated at the front of the room. Whiteboards were affixed to the front room wall.

Wilson and Randall (2012) surveyed seven staff and 56 students ($N = 63$). Both groups were asked questions about how the space impacted pedagogy, space, and technology, compared to traditional learning environments. Positive responses outnumbered negative responses. Staff positive response themes included: flexible seating allowed for a more academic and social environment, technology encouraged independent learning and peer support, student autonomy was encouraged, and problem-based learning scenarios were more effectively introduced. Student positive response themes included: classroom design encourages expression of ideas, informal breakout space increased relaxed communications, and technology allowed everyone to share ideas at the same time. Staff and student negative responses were similar and consistent: the technology sound system made it hard to hear as a group, stationary monitors at student pods blocked views to the master pod, and whiteboards were difficult to view from all pods. Wilson and Randall’s (2012) study provided basic technology and furniture modifications to a traditional learning environment and it left ample room for future research. This study is informative because of its simplicity. Much like Brooks’ (2011) quantitative approach to maintaining the classroom four walls as constant, only manipulating technology and furniture, Wilson and Randall (2012) attempted to study the same constants qualitatively.
Like Brooks (2011), Park and Choi (2014) compared the use of two traditional four walled classrooms as a constant by providing one classroom with flexible furniture and enhanced technology, an ALC; the other, a traditional physical learning environment, included neither. Park and Choi’s (2014) study was uniquely different in three ways: determining how student experience and equity are impacted by the ALC is the purpose of the study, not student outcomes; student experience and equity in the traditional learning environment was diagnosed as rigorously as the ALC; and this study is the first attempt to introduce the non-traditional ALC classroom design in Korea. Park and Choi (2014) first conducted research with 95 students in two sections using the same traditional learning environment, and then a 30 student \( n = 125 \) ALC at SoongSil University. Students were in their second, third, and fourth year studies in the humanities, social science, natural science, and engineering majors; 57% of were male, 43% female. GPAs ranged from 2.9 to 4.5 out of a 5-point grading scale.

Traditional learning environment research was provided using two questionnaire surveys to determine students’ satisfaction. In the traditional learning environment, the teacher was situated front and center in the room with a table, whiteboard, and computer display screen. Students were seated facing the front of the room in 10 rows, row 1 at the front of the room, row 10 at the back of the room, and in six columns A-F, C and D being the middle columns in the room.

The first traditional learning environment survey determined that student experience was impacted by seating position. Four seating zones were created: golden zone, seats located in the front four rows, center two columns; shadow zone, seats in the back of the room, rows 9 and 10 across all six columns; semi-golden zone, the two rows
and columns behind and to either side of golden zone seating; and other zone, all other seats in the room. The golden zone, seating preferred by approximately 75% of students, was defined by students in three ways: (a) golden opportunity for eye contact and teacher interaction, (b) best environment for maintaining concentration and motivation, and (c) best view of the whiteboard at the front of the room without distraction from others in the room. Conversely, shadow zone, seating disliked by approximately 84% of students, was defined in four ways: (a) remote distance from whiteboard, (b) lack of eye contact with instructor, (c) obstruction of views, and (d) distraction from neighboring students.

The second traditional learning environment survey also determined that student experience was impacted by seating position. Students were divided into four parallel zones from the front of the traditional learning environment to the back, A zone the front of the room, D zone the back of the room. Students were asked to rate their experience on a scale of one to five, one being the worst and five being the best experience, in terms of eight categories; communication, interested, understanding, participating, concentrating, motivating, asking questions, and not bothered by others. Differences in experience from the A zone to the D zone were substantial in three areas: communicating, 4.62 versus. 1.61; participating, 4.34 versus. 1.77; and, concentration, 4.29 versus. 1.79. Both surveys point out the discriminatory effects of space, making Park and Choi’s (2014) study the most rigorous empirical research on the negative impact traditional learning environments have on student experience.

Park and Choi’s (2014) study then undertook the challenge of researching the impact of the ALC on Korean student experiences. Korean students are known to prefer lecture style traditional learning environments and can be more passive learners than
Western learners (Park & Choi’s, 2014). Like Brooks’ (2011) study, pedagogy was consistent between both the traditional learning environment and the flexible learning environment, the ALC. The ALC included five round tables, six students at each table and each table had a computer docking station. Three of four walls had display screens and the teacher station was mobile. After using both the traditional learning environment and the ALC for one semester each, student perceptions were analyzed using five-personal characteristics: interaction and participation; sharing and creating ideas; views and learning attitudes; learning attitudes based on GPA; and classroom suitability on instructive style. The first four areas scored higher for the ALC while the ALC was found to be less effective for instruction that required student memorization. The last finding of Park and Choi’s (2014) study, like the Brooks (2011) and Adedokun et al. (2017) studies indicate that personal or individual learning cognitive skills thrive in traditional classroom settings.

Park and Choi’s (2014) study is important because it points out the inequities that are created by traditional learning environments using a demographic that was previously untested, Korean college students. The most important finding was that the strongest traditional learners got stronger in the traditional learning environment, often at the expense of less confident students. While less confident students desired golden zone seating, they were forced to sit in less desirable seats if they did not arrive early (Park & Choi, 2014). Conversely, the flexible learning environment, the ALC created equity for all students regarding; interaction, participation, sharing, creating, and learning attitudes. The ALC not being effective for memorization aligns with Parsons’ (2017) and
Jankowska and Atlay’s (2018) studies that variety of space types is required if equity for all students is desired.

Brooks (2011), Park and Choi (2014), and Parsons (2017) used round tables to differentiate flexible, physical learning environments from traditional physical learning environments. Parsons’ (2017) and Park and Choi’s (2014) studies differ from Brooks’ (2011) because their research focused on student engagement, not student outcomes, being impacted by flexible, physical learning environments. Parsons’ (2017) research was also different because a singular round table was used to accommodate the entire classroom.

Parsons’ (2017) study included 18 freshman and seniors (N = 18) at a public southern university in the United States, who participated in interviews, classroom observations, focus groups, and provided journals. Two-thirds of the students were female and only one student was not White. Prior to data collection, the unoccupied classroom spaces were documented using observation, photographs, sketches, and notes. Interview questions sought to better understand how spatial orientation of desks and technology influenced the space users’ enjoyability (Parsons, 2017).

Three important themes emerged from Parsons’ (2017) study. First, interactive learning through consistent face-to-face interaction is promoted by the roundtable classroom. Nonverbal communication, including eye contact and hand gestures, facilitated immediate feedback from other classmates. Open discussions built confidence and promoted the growth process. Second, a system of accountability was promoted by the roundtable classroom (Parsons, 2017). Participation from all students was expected and encouraged by the, “You can’t fade into the background here . . . everyone is looking
at you” (Parsons, 2017, p. 27), comment by one student. Last, the roundtable classroom encouraged interactive learning that allowed students to manage participation in the discussion (Parsons, 2017). The roundtable classroom allowed the professor to act as a facilitator during class discussions. Student-led conversations would often continue outside the classroom. Extended conversations were evidence that student-centered dialogue was important and practically associated to the students’ everyday life, building sense of community, and sense of place. Parsons (2017) concluded that round tables promote face-to-face interaction. Sense of place is promoted by face-to-face interactions (Falahat et al., 2017; Jalili & Azar, 2016). Face-to-face interactions provide immediate feedback and support the use of nonverbal communication (Parsons, 2017).

Based on the findings, Parsons (2017) also made many policy and practice recommendations, impacting future flexible, physical learning environment designs. Two of Parsons’ recommendations align with other empirical research. The first, flexible, physical learning environments require professional development regarding how to appropriately use the space pedagogically as well as using its physical features, aligns with the King et al. (2014) demand for comprehensive professional development. The second and most substantial recommendation is that a variety of informal and formal spaces should be located close to each other, such as classrooms, lobbies, offices, and study rooms (Parsons, 2017). The recommendation for variety of space types aligns Parsons (2017) with Jankowska and Atlay’s (2018) recommendation for three space types: creative space, formal space, and social learning space.

The Brooks (2011) study on ALCs focused on student achievement; Rands and Gansemer-Topf (2017) studied the ALC model at Iowa State University, focusing on how
classroom design impacts student engagement. While Brooks focused on flexible furniture in two controlled environments, the traditional physical learning environment, and the flexible, physical learning environment, Rands and Gansemer-Topf (2017) focused on flexible furniture in a single, flexible, physical learning environment. Tables had writable surfaces, were square, and seated up to four students. Both chairs and tables had casters that allowed easy movement around the room. Mobile whiteboards and multiple interactive monitor displays surrounded the ALC (Rands & Gansemer-Topf, 2017).

Focus groups in the Rands and Gansemer-Topf (2017) study included nine students and four instructors in varying disciplines except for one instructor who elected to participate via personal interview (N = 14). Instructor data about their perception of student engagement were collected by semi-structured interview questions. Student data about their perceptions of motivation and engagement were collected using three focus groups. Data were coded in two cycles.

Three overarching themes emerged: (a) classroom design encourages a community of learners, (b) classroom design helps students achieve their optimal level of performance, and (c) classroom design encourages students to learn holistically (Rands & Gansemer-Topf, 2017). First, movement, interaction, and removing the student-instructor barrier were the most substantial results of the ALC in creating a community of learners. The students felt valued as learning process co-constructors. Faculty reflected that movable furniture allowed students to hear each other more effectively. Second, optimal level of student performance was achieved when students could monitor their own performance using multiple mobile whiteboards, video displays, and writable
desktop surfaces. Technology was used in aiding performance when students provided answers using the word cloud on video displays. Portable whiteboards allowed student with peer-to-peer interactions when demonstrating work processes. Last, students were encouraged to learn holistically by using both their mind and body to participate in active learning. Engaged active learning stimulated the students’ senses.

In partial alignment with White and Lorenzi’s (2016) theme of the unexpected and cozy, Rands and Gansemer-Topf (2017) realized the unexpected was noteworthy when a student suggested there was always something new to discover every time they walked into the room. The power was in the unexpectedly encouraged students, as co-creators of their physical learning environment, to envision opportunities that stimulated collaboration and interactivity within the group. This holistic learning approach created a sense of community or sense of place, consciously and unconsciously, using multiple bodily senses and by having the students retain more information (Rands & Gansemer-Topf, 2017).

One critique of the ALC was that it was messy, unorganized, and distracting. Distracting is an important critical characterization of the ALC because findings of the Adedokun et al. (2017) study provided a clear necessity for a greater variety of space, more than the ALC provides, in the search for student learning preference equity. Collaborative and interactive learning in the ALC flexible, physical learning space was very successful. Conversely, personal, or individual learning requires introspective opportunities that are not afforded by the ALC flexible, physical learning space. Another critique was that professional development would have made the space more productive and conducive to learning. This critique is in line with other empirical research. The
Neill & Etheridge (2008) study suggested professional development to overcome the barrier of rearranging furniture. The Parsons (2017) study suggested professional development for creating active learning strategies to make more effective use of the flexible, physical learning environments.

Overall, the 12 empirical studies (Adedokun et al., 2017; Brooks, 2011; Byers et al., 2018; Jankowska & Atlay, 2008; King et al., 2014; Leung & Fung, 2005; Neill & Etheridge, 2008; Park & Choi, 2014; Parsons, 2017; Rands & Gansemer-Topf, 2017; White & Lorenzi, 2016; Wilson & Randall, 2012) presented data and findings around the impact physical learning environments have on supporting student sense of place. Of these empirical studies, only three studied K-12 physical learning environments: Leung and Fung (2005) studied primary-aged children, Byers et al. (2018) studied secondary-aged children, and White & Lorenzi (2016) studied both primary and secondary flexible, physical learning environments. All other empirical studies focused on higher education flexible, physical learning environments. Two common themes emerged from the analysis of these 12 empirical studies. One, creative and innovative use of technology, pedagogy, and physical space elements are all required; one cannot function without the other when providing successful flexible, physical learning environments that support students’ sense of place. Two, successful innovative and creative flexible, physical learning environments require educator professional development.

The next section will introduce empirical research on how sense of place, emotional intelligence, and student engagement impact student development. Learner-centered practices, PBL instruction methods, and participatory learning methods are
studied. These three pedagogical approaches have shown significant success in the development of student emotional intelligence, engagement, and sense of place.

**Sense of Place Impact on Emotional Intelligence and Student Engagement**

Although multiple student-learning-style theory has mainstream appeal, Riener and Willingham (2010) argued that there is no empirical evidence that supports so-called visual learners as performing better or being more engaged if they are presented with information in graphic form. The same holds true for so-called aural, reading, and kinesthetic learners. Rather, Riener and Willingham (2010) defined a variety of individual student learning preferences based on genetic differences, ability and interests, background knowledge, and learning disabilities. For the purpose of this study, the objective is to understand how to engage individual student learning preferences, abilities, interests, and background knowledge, by using sense of place, specifically, with a variety of flexible, physical learning environment space types.

In traditional learning environments, some students choose not to participate because of their fear of rejection (Landau & Meirovich, 2011). Other students dominate the conversation, reducing others’ ability to participate. In some cases, in the Landau and Meirovich (2011) study, students were separated into smaller groups outside the traditional classroom to create a participatory learning environment that met individual student learning preferences based on abilities, interests, and background knowledge.

In the Landau and Meirovich (2011) study, traditional learning environments also had an adverse impact on gender with respect to student learning preferences and emotional intelligence. Landau and Meirovich (2011) provided strong evidence that female students speak more briefly than male students, and they participate less than male
students when the learning environment is not perceived to be supportive and safe. The factory model, the traditional classroom, with a lack of a variety through flexible, physical spaces, prevented student engagement for some and equity for individual student learning preferences in these cases. Addressing a variety of student learning preferences can create learning environments that stimulate students’ senses (Othman & Amiruddin, 2010, Riener & Willingham, 2011). Stimulating a variety of individual student learning preferences and students’ senses through activities, meanings, individual features, and physical features is the basis of the sense-of-place model (Falahat et al., 2017; Jalili & Azar, 2016). Sense of place, student engagement, and emotional intelligence are therefore all associated.

Meece (2003) defined the learner-centered practices (LCP) education model by five characteristics. One, learners are unique and must take responsibility for engaging in their learning. Two, learners have unique learning rates, emotional states of mind, abilities, and talents. (Riener and Willingham (2010) similarly described some of these characteristics as learning preferences.) Three, learning happens best when the subject is meaningful to the learner. Four, learning occurs best in a safe, supportive, and comfortable environment. Adedokun et al. (2017) and White and Lorenzi (2016) described successful physical learning environments with similar descriptions aligned with sense of place. Five, learners are interested in mastering their own world.

Meece (2003) administered the Assessment of Learner-Centered Practices (ALCP) survey to 109 teachers and 2,200 middle school students \( (N = 2,309) \) from urban, suburban, and rural schools across the United States. Approximately 80% of the teachers surveyed were White; the number of male and female teachers surveyed were
approximately even; and 40% of the teachers had a minimum of 16 years of experience (Meece, 2003). The purpose of the survey was to assess learner-centered teaching practices with three goals: mastery, performance, and work avoidance. Physical learning environments were not addressed.

In the Meece (2003) results, learner-centered practices had the strongest positive association with student motivation, achievement, and mastery. Learner-centered teaching practices had a greater impact on mastery than did class size or teacher experience. Positive impact on performance was also realized. Work avoidance was negatively correlated to learner-centered teaching practices. Students became less focused on avoiding work when learner-centered teaching practices included adaptive and personalized instruction, caring, respecting the student voice, and instilling higher ordered thinking (Meece, 2003). White and Lorenzi (2016) referred to these qualities as being emotionally supportive environments to succeed. The most interesting result of the Meece (2003) study was that students rated educators as more effective when using learner-centered practices. Meece (2003) also defined the educator’s role in learner-centered classrooms by providing the students with opportunities to choose, opportunities for collaboration, a variety of instructional strategies, activities that were relevant, facilitation, and a sense of belonging or sense of place. Learner-centered practices empower students, and at the same time, they increase teacher perceived classroom performance (Meece, 2003). Similarly, Park and Son (2010) used the term, transdisciplinary learning to describe the use of collaborative learner-centered practices that increase student engagement opportunities. “The key characteristic of transdisciplinary learning is participatory collaboration in which various levels of
participation can control the overall quality of a conceptual framework and learning outcomes” (Park & Son, 2010, p. 84).

Ahlfeldt et al. (2005) discussed how student engagement is affected by project-based learning (PBL) instruction methods. Ahlfeldt et al. surveyed 56 classes at an upper Midwestern university in the United States, using the Student Engagement (SE) Survey. The SE survey is based on the 2000 NSSE Report. The 2000 NSSE surveyed 62,000 college students about learning environments, and it focused on collegiate thinking methods. The Ahlfeldt et al. (2005) study hypotheses included: (a) as course level increases, engagement increases; (b) as class enrollment decreases, engagement increases; and (c) as PBL increases, engagement increases. The study’s first step was training 28 faculty members in engaging teaching methods. Then, 42 additional faculty participated after the first 28 shared their experience with the larger group ($N = 70$). In the last step, approximately 50 trained faculty members provided the SE survey to 2,603 students; 1,831 surveys were completed ($n = 1831$).

The Ahlfeldt et al. (2005) study established distribution across seven university disciplines. Students were asked to rate their classroom, using 14 items, and ratings of between 1 and 4, 1 indicated the least PBL being taught in their classroom and 4 indicated the greatest amount of PBL being taught in their classroom. The SE survey achieved a high alpha reliability of 0.84. The SE survey results were compared to the NSSE survey results. The student’s average engagement score (ES) was 37 while the NSSE’s ES was 38. The Ahlfeldt et al. (2005) study revealed that classes with higher PBL levels had an average ES equal or higher than the NSSE national average. Classes with a PBL of 3 had a mean of 38, and classes with a PBL level of 4 had a mean of 41.
All three hypotheses held up: as course level increased, engagement increased; as class enrollment decreased, engagement increased; and as PBL increased, engagement increased (Ahlfeldt et al., 2005). Most interestingly, PBL teaching methods provided in large classrooms also had a substantial positive impact on student engagement. This finding has important implications for educators’ perceiving that a smaller number of students is required to provide successful PBL methods.

PBL methods and participatory classroom environments are both nontraditional teaching and learning methods. How do higher education participatory classroom environments impact emotional intelligence development, and is emotional intelligence connected to academic achievement? Landau and Meirovich’s (2011) study discussed both. Employers are increasingly seeking strong soft skills or emotional intelligence (Jerald, 2009), yet they continue to be dissatisfied with recent graduates’ competence in this area (Landau & Meirovich, 2011). Landau and Meirovich (2011) described emotional intelligence as measured by the 141-item online Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), which has four categories: (a) accurate perception of emotions, self, and others; (b) facilitate through using emotions; (c) understanding connections between emotions that differ; and (d) managing emotions, self, and others.

At a state college in the Northeast, Landau and Meirovich (2011) provided 265 undergraduate students with the MSCEIT survey. Of those 265 students, 137 students completed the survey \((n = 137)\). Of the 137 students, 59% were women, and 71% were upperclassman. The average student worked 22 hours a week and had an average 2.5 years of full-time work experience (Landau & Meirovich, 2011). Regression analysis
was performed to test the participatory classroom environments’ impact on emotional intelligence development and emotional intelligence connections to academic achievement.

The Landau and Meirovich (2011) results support that there is a positive correlation between participatory classroom environments and emotional intelligence. There was no link between emotional intelligence and academic achievement in terms of grade point average (GPA). Most interesting, Landau and Meirovich (2011) found that the women and students with more full-time work experience had higher emotional intelligence. This finding makes two important connections: one, gender plays a role in providing learning environment equity; and, two, greater levels of emotional intelligence are required by the workplace than are generally provided by higher education learning environments.

Together, the three empirical studies (Ahlfeldt et al., 2005; Landau & Meirovich, 2011; Meece, 2003) presented data and findings that support student engagement and emotional intelligence’s role in creating a sense of place. Student engagement and emotional intelligence stimulating a variety of individual student learning preferences and students’ sense of place (Jalili & Azar, 2016) has shown to be successful in educational environments that provide LCP (Meece, 2003), PBL instruction methods (Ahlfeldt et al., 2005), and participatory learning methods (Landau & Meirovich, 2011).

The common theme that emerged from these studies was that innovative and creative, student-centered pedagogies need to be as diverse as the students that the pedagogy serves. There is no one-size-fits-all solution to creating a learning environment that supports the development of student emotional intelligence, engagement, and sense
of place. Employer-valued skills of creativity/innovation, ethics/social responsibility, critical thinking/problem solving, and collaboration require emotional intelligence. How employer-valued emotional intelligence skills and a sense-of-place impact workplace physical space elements and design are discussed in the next section.

**Workplace Physical Environments**

Physical workplace environments have developed to meet the needs of employees’ sense of place. Since the early 1980s and the advent of the personal computer, workplace design has shifted to meet the evolving needs of most professional environments (Schittich, 2011). Worthington (2006) found that workplace designs were needed to provide environments that supported fewer routine processes and were increasingly adaptable and flexible to change. Flexible workplace spaces are engaging and cognizant to employees’ sense-of-place needs (Schittich, 2011). Flexible and creative workplace environments meet the needs of business and cultural models that require collaboration, engagement, and creativity (Schittich, 2011). Personal or individual workspaces requiring reflection and introspective opportunities are included in flexible workplace design, but they are limited, compared to the traditional office design model (Schittich, 2011).

Creative workplace environments are a balance between social-organizational work elements and physical workplace elements (Dul & Ceylan, 2011). Traditional workplace environments maximize output at minimum cost. Creative and innovative workplace environments require employee and organization productivity while stimulating problem solving, new product development, services, products, work methods, and systems (Dul & Ceylan, 2011). Developing creative workplaces has
traditionally relied on recruitment of creative talent. Dul and Ceylan’s (2011) study attempted to determine how creative work environments impact employee creativity.

The Creativity Development Quick Scan (CDQS), a survey instrument of nine social-organizational workplace environment-element key words and 12 physical workplace environment-element key words, was provided to 409 Dutch employees in 55 companies (Dul & Ceylan, 2011). Employees were selected from a variety of workplace types and professions. Participants were asked to rate each element key word from 1 to 7, as very little to very much on the presence of the element occurring in their workplace. Social-organizational workplace environment element key words included: challenging job, teamwork, task rotation, autonomy in job, coaching supervisor, time for thinking, creative goals, recognition of creative ideas, and incentives for creative results. Physical workplace environment element key words included: furniture, indoor plants/flowers, calming colors, inspiring colors, privacy, window view to nature, any window view, quality of light, daylight, indoor physical climate, sound, and smell (Dul & Ceylan, 2011). Many of these elements, social-organizational and physical, align with the sense-of-place model’s four elements: activities, meanings, individual features, and physical features (Falahat et al., 2017; Jalili & Azar, 2016).

The Dul and Ceylan (2011) study’s Step 1 was aggregating CDQS’ data from a randomly selected 22-employee case company. The case company’s social-organizational workplace environment element highest fit score was challenging job. The case company’s physical workplace environment highest fit score was indoor plants/flowers. Step 2 was creating a benchmark for all 55 companies that were surveyed. The benchmark social-organizational workplace environment element highest
The highest fit score was autonomy on the job, and the benchmark physical workplace environment. This allowed Dul and Ceylan (2011) to gauge any one company based on the benchmark average. If any one of the company’s element fit scores fell below the benchmark average, there was room for improvement. This information was shared with the company managers in Step 3. Step 4 was to implement change based on managerial alignment with the data (Dul & Ceylan, 2011).

Dul and Ceylan’s (2011) study confirmed that creatively supported work environments are directly related to individual creative performance. There were two significant findings in this study. First, the need for creative workplaces that promote creativity, from finance and sales to factory workers, is not limited and is appropriate for all workplace types and employees. This is significant in terms of what student preferences need exposure to regarding flexible, physical learning environments that promote creativity (Riener & Willingham, 2010). The answer is that all student preferences need this opportunity. Second, increased creativity and innovation that promote competitiveness are directly linked to increased health and safety. This finding aligns with Adedokun et al. (2017), Landau and Meirovich (2011), and White and Lorenzi’s (2016) studies that physical learning environments are only successful if they are safe and supportive.

**Chapter Summary**

Workplace physical environments have adapted to meet space variety and flexible, physical space employee needs. K-12 school physical learning environments have not been adapted to meet the space variety and the flexible, physical space students need (Schittich, 2011). The K-12 physical learning environment’s role is creating
student/future employees’ sense of place, thus its role in workforce development is not evolving with workplace physical environments. The lack of K-12 stakeholder evolutionary alignment with workplace stakeholder response to employee needs creates an unprepared workforce (Jerald, 2009), generating a significant negative impact for both K-12 school and workplace stakeholders. A review of the empirical studies revealed substantial relationships linking three topics. One, physical learning environments have a significant impact on supporting student sense of place (Adedokun et al., 2017; Jankowska & Atlay, 2008; King et al., 2014). Two, the link between student sense of place, student emotional intelligence, and student engagement play an important role in student learning (Ahlfeldt et al., 2005; Landau & Meirovich, 2011; Meece, 2003). Three, workplace environments benefit from employees who have strong emotional intelligence skills, and workplace physical environments have adapted to address these employee sense-of-place needs (Dul & Ceylan, 2011).

Two significant gaps were identified in the review of the literature on the impact physical learning environments have on supporting students’ sense of place. First, there is limited empirical research on flexible, physical learning environments (Blackmore et al., 2011; Brooks, 2011; Chapman et al., 2014; Cleveland & Fisher, 2014; Parsons, 2017). While empirical peer-reviewed studies on physical learning environments exist, most are based in higher education environments. Empirical peer-reviewed studies on K-12 flexible, physical learning environments are almost nonexistent. Research using the methodologies that exist for higher education physical learning environments for K-12 flexible learning environments would be a valuable addition to the literature and useful to K-12 stakeholders seeking creative and innovative methods for meeting their students’
sense-of-place needs. Research on how flexible learning environments impact students based on demographics would provide valuable student equity data (Brooks, 2011).

Second, no empirical peer-reviewed articles were authored by registered architects. The architectural profession’s perspective is vital to physical learning environments’ research. Understanding the impact of learning environment design from the architectural profession’s perspective is as important as the teacher and student’s perspective of educating. Teachers may not be thinking about the benefits of design. A more comprehensive level of research and collaboration with K-12 educators and building and district administrators is required to define successful future physical learning environments. Future research of the flexible properties of space is required (Rands & Gansemer-Topf, 2017). Architect/K-12 stakeholder collaboration is important because architects can help bridge the gap that is created by the lack of K-12 stakeholder evolutionary alignment with the workplace stakeholder response to employees’ physical environmental needs. A comprehensive collaborative architect/K-12 stakeholder research and decision-making process will provide school districts with information that is required to make the best decisions for all K-12 stakeholders, students, staff, and community members. This study was an opportunity to narrow these two gaps.
Chapter 3: Research Design Methodology

Introduction

For more than a century, educators have defined the physical learning environment in K-12 school buildings as a series of repetitive classrooms connected by a corridor. The traditional K-12 physical learning environment, alone, no longer supports the teaching of skills that are most sought after by employers (Jerald, 2009). The purpose of this study was to examine the perspectives of K-12 stakeholders and their understanding of flexible learning environment designs and support for sense of place. Research regarding the impact K-12 flexible, physical learning environment design types have on stakeholders is all but nonexistent.

The following research questions were asked of K-12 educators, building administrators, and district administrators of a single K-12 school district that has recently experienced flexible, physical learning environment renovations:

1. What impact, if any, does a flexible, physical learning environment have in K-12 settings, and how is this impact different in any way from the impact of a traditional physical learning environment?

2. What information and processes contributed to the school district’s decision to proceed to a flexible, physical learning environment model?

Methodology

A qualitative study was used to gather data to answer the research questions. A phenomenological research design (Creswell & Creswell, 2018) approach was used to get
to the, “essence of the experiences for several individuals who have experienced the phenomenon” (p. 13). This study used individual interviews to gather data on stakeholders’ perceptions of flexible, physical learning environments and the impact in schools.

Given the nonexistence of qualitative empirical research regarding the impact K-12 flexible, physical learning environment design types have on stakeholders’ perspectives, a phenomenological design was justified and was an innovative opportunity in an emerging field of research. With no existing instruments to effectively measure flexible, physical learning environments, a quantitative study was not considered. The hope is that this qualitative research will provide the opportunity for quantitative research in the future. The research questions provided the basis for the research context, participants, research procedures, and data analysis.

Individual, one-on-one interviews were chosen as the most appropriate research method to maintain phenomenological triangulation within the selected population. Individual interviews were also chosen over potential teacher focus groups to, “respect potential power imbalances” (Creswell & Creswell, 2018, p. 94) among junior and veteran teachers as well as other conflicting teacher dynamics. Another reason individual, one-on-one interviews were selected was to provide more individualized information. The research interview questions were open-ended to allow the interviewees to participate in the semi-structured process (Creswell & Creswell, 2018). Semi-structured individual research interviews were also chosen to provide a safe and equitable environment to encourage the interviewees’ depth and authenticity of their responses (Brinkmann & Kvale, 2015).
Research Context

The study took place within a single school district in the Central New York State region. The district was located within the vicinity of 15 colleges. The greater metropolitan area population was approximately 662,000. The area’s median household income was approximately $39,000. Local industry included Bristol-Myers Squibb, Carrier Corporation, Lockheed Martin, and Wegmans.

The school district researched was a suburban school district with a student enrollment of approximately 3,500 (University of the State of New York, 2019). The district had seven educational buildings: five elementary schools, one middle school, and one high school. The middle school had recently experienced a flexible, physical learning environment renovation project, and was the focus of this study. The middle school is referred in this text to as the CNY Middle School.

Research Participants

The study’s participants were from a single K-12 school district in New York State. To provide an appropriate level of phenomenological triangulation, the participants included: (a) district administrators, (b) school building administrators, and (c) teachers from the school building. One-on-one interviews were conducted on site at the CNY Middle School building, and they were semi-structured (Creswell & Poth, 2018).

Teacher selection was based on the following criteria and they were selected by the researcher based on the same criteria: (a) worked in a school building within the district prior to the flexible, physical learning environment renovation project, and (b) worked in that same school building within the district for at least 1 year after the
flexible, physical learning environment renovation project. In total, there were seven interview research participants. Creswell and Poth (2018) stated that seven interview participants in a qualitative phenomenological study is an acceptable sample size.

**Instruments Used in Data Collection**

The instruments used in data collection included interview protocols, interview memos, and the researcher. Semi-structured individual interviews were based on the study’s two research questions: (a) What impact, if any, does a flexible, physical learning environment have in K-12 settings, and how is this impact different in any way from the impact of a traditional physical learning environment?, and (b) What information and processes contributed to the school district’s decision to proceed to a flexible, physical learning environment model? The researcher also can be considered an instrument (Creswell & Creswell, 2018).

**Interview protocol.** The interview protocol was organized as semi-structured, one-on-one individual interviews, based on the study’s two research questions, and the protocol was conducted with school administrators and teachers. Probing questions were used to facilitate deeper discussion (Brinkmann & Kvale, 2015) or to bridge the interview to get back on topic (Heath & Heath, 2008). Prior to beginning each interview, the protocol briefly described the study, the selection process, and how the interview data were collected and used while protecting the privacy of participants in coding responses. The interview protocol included a hard copy, signed, consent form listing the research questions and the focus of the study (Appendix A). A hard copy handout describing the term, sense of place, was also provided to all individual interviewees (Appendix B).
Interview memos. Each individual interview lasted approximately 40 minutes. Individual interviews were digitally recorded using an audio recording device, and the interview recordings were transcribed for accuracy and authenticity. The researcher also used handwritten notes throughout the interview to document the nonverbal observations made by the interviewee. When appropriate, the time on the recording device was noted to correspond with the handwritten observations with the audio recording.

Researcher connection. Epoché is a required part of the phenomenological research method. Epoché is the ability of the researcher to set aside prejudgments or biases (Moustakas, 1994). Prior to and during individual interviews, researcher biases were clarified by stating and reiterating the researcher’s background and professional history (Creswell & Creswell, 2018). Qualitative data, filtered by the researcher as an instrument, brought validity to the findings when the researcher clarifies his biases (Kirk & Miller, 1986). The study’s researcher has been a registered architect in New York State for 13 years and has focused on K-12 educational design for the last 20 years of his career. The researcher therefore frequently engaged in reflection throughout the study to manage awareness of his connection and minimize potential bias.

Data analysis. Individual interviews were conducted over a 1-week period. Audio recordings of each individual interview were replayed to ensure an understanding of participants’ responses. A transcription of each individual interview session was done separately. The transcription process took approximately 2 weeks.

Three cycles of coding were used. Predetermined or a priori codes were applied first. Next, emerging, emotion, and in vivo coding were used. Finally, pattern coding was applied. The a priori codes for analysis were developed by the researcher using the
study’s theoretical framework, sense of place (Falahat et al., 2017). Examples of the a priori codes are flexibility and connectivity.

Following a priori coding, two additional cycles of coding were used to increase the validity of the findings (Saldaña, 2016). First, affective method, or emotion coding, and in vivo coding were used simultaneously. Emotion coding was used to capture the focal aspect of the study that ontologically explores how stakeholders perceive sense of place in a flexible, physical learning environment (Saldaña, 2016). Emotion coding allows a researcher to empathize with the interviewee by capturing nonverbal cues. As part of coding the transcript, the researcher took handwritten notes that were timed with the audio recording to document the emotions witnessed during the interview (Saldaña, 2016). In vivo coding was used to capture the actual words and phrases used by the interview participants (Saldaña, 2016). The purpose of in vivo coding was to capture the story being told by those who had experienced the phenomenon regarding how stakeholders perceive sense of place as impacted by flexible, physical learning environments.

Last, summarized segments of the data provided by emotion and in vivo coding were coded using pattern coding (Saldaña, 2016). Pattern coding was used to take the coded segments and place them into a smaller number of categories and concepts that resulted in the larger meta codes or emergent themes (Saldaña, 2016).

**Validation strategies.** This research study included three validation strategies within the research design to provide a high level of credibility (Creswell & Creswell, 2018). First, there was triangulation of the sources. Perspectives of the district educational administrators, building educational administrators, and the teachers
increased the study’s validity (Creswell & Creswell, 2018). Second, prior to individual interviews, a pilot test interview took place with another school district that had recently experienced a flexible, physical learning environment renovation project. Last, while completing the first and second cycle coding, interrater reliability was used to validate the codes and potential themes (Creswell & Creswell, 2018).

**Ethical Guidelines and Confidentiality**

Prior to implementation, this study’s procedures were presented to the St. John Fisher College Institutional Review Board (IRB) for approval. All individual interviews were structured in the same format, beginning with a review of the research’s purpose. The interview protocol included a verbal overview of the study to all individual interview participants. Prior to the beginning of each interview, the study was briefly described by the researcher to each consenting interviewee, including the selection process, and how the interview data were collected and used while protecting the privacy of the participants when coding their responses. All individual interview participants were informed that they could end their participation at any time during the interview research process with no penalty. Finally, each individual interview participant signed the informed consent form before participation in the interview.

Pseudonyms were created for all individual interview participants to guarantee confidentially and by informing them that their name and school would not be linked to any specific comments or conclusions that were expressed in this study. Each individual interview participant was reminded that other administrators and teachers were being interviewed for the purpose of this study. Each individual interviewee was also asked to keep conversations confidential. Individual interview participants were told that the
interview content, audio recordings, transcripts, and other research material would only be used by the researcher.

Confidentiality of the data collected, all digital audio recordings, and transcriptions of interviews are maintained using a private, locked, and password-protected laptop computer, stored securely at the researcher’s residence. Electronic files include assigned identity codes, and pseudonyms do not include actual names or any information that could personally identify or link the participants to this study. Other materials, including notes or paper files relating to data collection and analysis are stored securely at the researcher’s residence. Electronic and paper records are only accessible to the researcher. Digitally recorded audio data will be kept by the researcher for a period of 3 years following publication of this study. Signed informed consent documents will be kept for 3 years after publication, and all hard copy records will be professionally shredded, and electronic records will be removed from the researcher’s laptop computer and destroyed.

Procedures

The researcher adhered to the following procedures to complete the study:

1. Submitted the required information and paperwork for approval to the IRB at St. John Fisher College.

2. Used meaningful criteria to determine an appropriate New York State public school district. The criteria included a school district that: (a) recently experienced a flexible, physical learning environment renovation project, (b) had educators and administrators who worked in a school building within the district prior to the flexible, physical learning environment renovation
project, and (c) had the same educators and administrators who worked in the school building within the district for at least 1 year after the flexible, physical learning environment renovation project.

3. Sent introductory email and correspondence to the superintendent of the desired district (Appendix C).

4. Had phone conversations with the superintendent to discuss the participation of district administrators, CNY Middle School administrators, and teachers that fit the study’s criteria: (a) worked in the district prior to the middle school building flexible, physical learning environment renovation project, and (b) worked in the district for at least 1 year after the middle school building flexible, physical learning environment renovation project.

5. After the researcher selected the teacher participants from the list provided by the superintendent, an introductory email was sent to the teachers by the researcher.

6. Communication was made with administrators, and teachers via email to schedule interviews (Appendix D).

7. Pilot tested interview protocol with another school district that recently experienced a flexible, physical learning environment renovation project.

8. Interviews were facilitated using the interview protocol (Appendix E).

9. District administrators, building administrators, and teachers’ individual interviews were conducted at the CNY Middle School main office conference room as directed by the district for the convenience of all participants. This allowed for more authentic interview responses. Physical location was
selected carefully to engender responses that aligned with individual sense of place.

10. Interview sessions were transcribed using www.rev.com.

11. Interview data were coded, using established a priori codes.

12. Data analysis was completed to identify themes and subthemes.

Chapter Summary

Research about the impact K-12 flexible, physical learning environment design types have on stakeholders is all but nonexistent. A qualitative study was used to gather data to answer the two research questions. A phenomenological research design approach was used to get to the “essence of the experiences for several individuals who have experienced the phenomenon” (Creswell & Creswell, 2018, p. 13) of flexible, physical learning environments. The study participants were from a K-12 school district in the Central New York State Region. The study participants included: (a) district administrators, (b) CNY Middle School building administrators, and (c) teachers from the CNY Middle School building.

The study participants were selected by the researcher based on the following criteria: (a) they were working in a school building within the district prior to a flexible, physical learning environment renovation project, and (b) they were working in that same school building within the district for at least 1 year after the flexible, physical learning environment renovation project. The study participants were provided with a rationale for the phenomenological study, and semi-structured, one-on-one, individual interview open-ended research questions were asked of each study participant. Individual interview
research procedures were followed. Interview data were collected, transcribed, and analyzed using empirical research methods.

Chapter 4 describes the demographic profile of the individual interview participants. Following the demographic profile, the interview data analysis process is described. Next, the chapter presents the analysis of each research question, introducing emerging themes and subthemes. Finally, Chapter 4 concludes with the research findings summary.
Chapter 4: Results

Introduction

For more than a century, educators have defined the physical learning environment in K-12 school buildings as a series of repetitive classrooms connected by a corridor. The traditional K-12 physical learning environment, alone, no longer supports the teaching of skills that are most sought after by employers (Jerald, 2009). Research regarding the impact of K-12 flexible, physical learning environment design types on stakeholders is all but nonexistent. For that reason, the purpose of this study was to examine the perspectives of K-12 stakeholders, their understanding of flexible learning environment designs, and their support for sense of place.

Sense of place is an expansion of Barker’s (1968) behavior-setting theory and its connection to the environment, to ecology, to the community, and to sociology by including activities and meaning categories from psychology (Georgiou et al., 1996; Popov & Chompalov, 2012; Proshansky et al., 1976; Scott, 2005). Barker’s behavior-setting theory has two parts: place and behavior patterns. Place is defined as the surroundings inhabited by a person, whether they be physical and/or cultural. Behavior patterns are defined as the physical act of doing something, of completing a task (Barker, 1968). The sense-of-place model’s inclusion of activities and meanings provides a comprehensive and effective framework for this study (Falahat, 2006). Sense of place is experienced through all five senses, and it is impacted by (a) activities, (b) meanings, (c) individual features, and (d) physical features.
Sense of place physical features can be defined as learning environment architectural design elements (Falahat, 2006). The impact that learning environment architectural design elements have on K-12 stakeholders’ perceptions was central to this study’s purpose. Physical features are described as form and size, texture and decoration, and connection and arrangement (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014). The sense-of-place component described as physical features is the focus of this study.

The following research questions were asked of K-12 educators, building administrators, and district administrators of a single K-12 school district who had, recently, before the time of this study, experienced flexible, physical learning environment renovations within their school buildings:

1. What impact, if any, does a flexible, physical learning environment have in K-12 settings, and how is this impact different in any way from the impact of a traditional physical learning environment?

2. What information and processes contributed to the school district’s decision to proceed to a flexible, physical learning environment model?

Data Analysis and Findings

Chapter 4 begins with an overview of the demographic profile of the seven individual interview participants. Individual, one-on-one interviews were chosen as the most appropriate research method to maintain phenomenological triangulation within the selected school district. Individual interviews were also chosen over potential teacher focus groups to, “respect potential power imbalances” (Creswell & Creswell, 2018, p. 94) among junior and veteran teachers as well as other conflicting teacher dynamics.
Another reason individual, one-on-one interviews were selected was to provide more specific information for this study. Following the demographic profile, the interview data analysis process is described. Next, the chapter presents the analysis of each research question, introducing the emerging themes and subthemes. Finally, Chapter 4 concludes with the research findings summary.

**Demographic profile of the interview participants.** Study data were collected using seven separate individual, one-on-one interviews ($N = 7$) conducted over a 1-week period. All seven interviews occurred in the CNY Middle School main office conference room. The interviews were held in this location at the district’s request for convenience and equity of all the participants. The interview participants included (a) district administrators, (b) school building administrators, and (c) teachers from the district’s middle school. A pool of five teachers were selected by administrators based on the following criteria: (a) they worked in a school building within the district prior to the flexible, physical learning environment renovation project, and (b) they worked in that same school building within the district for at least one year after the flexible, physical learning environment renovation project. Three teachers were selected from the five by the researcher based on the same criteria. Table 4.1 shows the gender profile of the interview participants including one female and one male district administrator, one female and one male school building administrator, and two female teachers and one male teacher. The administrator participants were asked to volunteer by the district superintendent using the researcher’s criteria.
Table 4.1

*Interview Participants and Pseudonyms*

<table>
<thead>
<tr>
<th>Position</th>
<th>Pseudonym</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Administrator</td>
<td>Mrs. DeBottis</td>
</tr>
<tr>
<td>District Administrator</td>
<td>Mr. Shedd</td>
</tr>
<tr>
<td>CNY Middle School Administrator</td>
<td>Mrs. Antonini</td>
</tr>
<tr>
<td>CNY Middle School Administrator</td>
<td>Mr. Morse</td>
</tr>
<tr>
<td>CNY Middle School Teacher</td>
<td>Mr. Johnson</td>
</tr>
<tr>
<td>CNY Middle School Teacher</td>
<td>Mrs. Niziol</td>
</tr>
<tr>
<td>CNY Middle School Teacher</td>
<td>Mrs. Todd</td>
</tr>
</tbody>
</table>

**Analysis procedures.** All seven individual, one-on-one administrator and teacher interviews were conducted using the protocol in Appendix E to guide the interview. The participant responses to the interview protocol questions were transcribed and coded individually. In total, 78 codes were used across the seven transcripts. Prior to interviews, a pilot test interview was conducted with another school district that had recently experienced a flexible, physical learning environment renovation project. The participant interviews were transcribed and coded to determine the validity of the research questions and the coding process. Interrater reliability was established by having an outside person, who was experienced in both K-12 education and the coding process, code a section of a transcript that the researcher had also coded (Saldaña, 2016). Emerging themes and subthemes across the interviews arose from the code analysis. While there was a wide breadth of interview participant differences: age, gender, and position, there were many similarities in their shared experiences throughout the interviews while discussing the impact flexible, physical learning environments had on
Research Question 1

What impact, if any, does a flexible, physical learning environment have in K-12 settings, and how is this impact different in any way from the impact of a traditional physical learning environment?

The protocol questions were developed to gather interview data on the first research question. Traditional physical learning environments have been in existence for more than 150 years and are defined as a series of classrooms connected by a corridor. Conversely, flexible, physical learning environments are an emerging paradigm defined as a variety of size-and-shape physical architectural spaces or room configurations including flexible furniture, finishes, and technology.

Along with the initial protocol questions, probing questions were designed to initiate deeper discussion about the differences in the impact between flexible, physical learning environments and traditional physical learning environments. Within the analysis of the participant responses, four predominant themes emerged. The first theme, fluidity is important to build and support a positive culture, highlighted that a variety of space types are required for flexible, physical learning environments to successfully meet multiple student learning preferences. This theme included three subthemes because of the complexity of fluidity as it relates to a variety of spaces. The second theme was transdisciplinary learning, which focuses on the flexibility required to accommodate many teaching and learning models. This theme included two subthemes. The third theme was physical space design promotes the feeling of a more professional setting,
supporting evidence that physical features, appropriately and collectively designed, can create a positive and desired behavior. The fourth theme, students feel empowered when they are aware that they are connected and collaborating, revealed the power that a strong sense of place and sense of belonging has within the context of positive culture and an engaging community. Table 4.2 presents the four themes for this research question, along with the key concept for each theme. Key concepts were established using a priori coding analysis of the interview data, developed by the researcher, using the study’s theoretical framework, sense of place (Falahat et al., 2017). In addition, subthemes are indicated for the first and second theme.

Table 4.2

Research Question 1 – Themes, Key Concepts, and Subthemes

<table>
<thead>
<tr>
<th>Theme</th>
<th>Key Concept</th>
<th>Subtheme</th>
</tr>
</thead>
</table>
| 1. Fluidity is important to build and support a positive culture | Variety of space | a. Multiple student learning preferences  
| | | b. Small, medium, and large group spaces  
| | | c. Exciting options allow greater utilization of space |
| 2. Transdisciplinary learning | Flexibility accommodates many models | a. Teacher and student mobility  
| | | b. Grouping within localized adjacencies allows inclusivity |
| 3. Physical space design promotes the feeling of a more professional setting | Physical features can create positive and desired behavior |
| 4. Students feel empowered when connected and collaborating | Connectivity and collaboration |

RQ1, Theme 1: Fluidity is important to build and support a positive culture.

Variety of space is at the core of the sense of place (Falahat et al., 2017) model. The term, space, in all its varied forms and characteristics, was used during all seven
individual interviews. Mrs. Antonini, a reading teacher for 14 years prior to becoming a CNY Middle School administrator, described how a variety of spaces enables the fluidity of teacher and student movement throughout the physical learning environment when she stated:

   Being able to have the ability to have a larger space to come together, and then break out into smaller groups, to open the room up and have a large space, and then put the wall in or things like that obviously promotes that collaboration for the students, allows for that to be a lot more fluid and flexible without work. (T1, 224-227)

   When describing the fluidity that a variety of space creates, Mr. Shedd, a district administrator who has been with the district for more than 20 years, discussed the opportunities for increased inclusivity when he said:

   Shifting into the ability to have smaller groups to focus on, if it’s their own developmental and their own skill levels, to even then being able to, for intervention purposes or for just in general, being able to have groups even smaller. (T6, 125-127)

   While Mr. Shedd described the importance of small group instruction areas, Mrs. Antonini got excited when she described how larger team spaces were part of a variety of spaces types that created a physical learning environment, enabling a collaborative culture:

   The way the building is designed allows for that grade-level team collaboration. Each team has a large breakout space. So, for example, all teams have the ability that every student and all the teachers on that team can gather together in one
large space. So, a lot of times, if they’re kicking off a project, or they’re doing their class meeting, they’re all coming together as a team. And that’s also pretty important for building that positive culture on the team and a lot of those. (T1, 235-240)

While the previous three quotes holistically address a variety of space types working together to enable physical transitions between spaces, three subthemes help to explain how variety of space creates fluid, physical learning environments supporting a positive culture. First, flexible, physical learning environments address and promote multiple student learning preference opportunities. Second, the inclusion of small, medium, and large group spaces is critical to meet students’ sense-of-place needs. Third, exciting options allow greater utilization of space.

**RQ1, Subtheme 1A: Multiple student learning preferences.** A variety of student learning preferences requires a variety of space types, working together, to form physical learning environments that meet the sense-of-place needs of the students. The need for a variety of space types was echoed by all seven interview participants. Mr. Johnson, a veteran teacher of 26 years, expressed the importance of space types supporting student learning preferences when he stated:

If I have a group of three that might be wanting to work collaboratively and other groups want to work silently, I can tag those kids and say, “Hey, why don’t you go to the breakout space?” And there’s a bench that is built right into the wall. Three students, even four, students can sit next to each other with Chromebooks on their laps and then there’s another one [built-in bench] kind of kitty corner to that. (T4, 133-137)
Mrs. Todd, a teacher at CNY Middle School since 2002, expressed the need for students to feel comfortable. While collaboration is central to the desired culture, there is always a need to, “have a place that we can have kids come if they need a quiet place” (T7, 206-209). Mrs. Todd smiled and went on to say:

There’s just lots of options for different types of learners, and I also feel more comfortable leaving the door open and having that space kind of extended into the hallway or into other rooms, also allowing for other teacher contact as well as just physical space that you have. (T7, 32-35)

Mrs. Niziol, also a CNY Middle School teacher for many years, expressed the same need to provide a comfortable physical learning environment for a variety of students’ learning preferences. Comfort equated to student autonomy when she stated:

I collaborate with some teachers that the kids are able to pick where they learn, and you know, when they walk into the room, they have a choice. I can sit at the counter, I can sit in the front of the room, I can sit in the back of the room. Maybe there’s a grouping of tables over here. (T5, 451-455)

Students transition fluidly from space to space within a variety of space types. This ability was described, during most interviews, as learning zones, allowing a variety of student preferences and allowed them to feel comfortable, “taking risks” and “testing things out.” Mrs. Antonini described the importance of student and teacher autonomy fostered by learning zones when she said:

If you look at different zones of the building, what might be like a corridor, you can actually close off those walls and there’s actually built-in benches, and across from those benches are whiteboards. So, what might appear if you’re not paying
attention, is, just like a little transition hallway or corridor can actually be two
other small instructional spaces where students in small groups are doing project-
based learning, or group work could go out there and [they can] start to develop
their ideas on the whiteboard, work on projects, test out things, be on the floor, be
on the benches. (T1, 101-107)

Overall, this subtheme identified the importance fluidity or transitioning through a
range of space types plays when trying to meet the needs of multiple student learning
preferences. Variety of space types and features create a culture of autonomy, creativity,
and risk taking, for students and teachers alike. Space size also plays an important role
for supporting a positive culture.

**RQ1, Subtheme 1B: Small, medium, and large group spaces.** A variety of space
sizes is also critical to meet the sense-of-place needs of multiple student learning
preferences. Mr. Shedd supported the ability to easily maneuver or transition between
space sizes necessary to address the comfort of multiple student learning preferences by
discussing the need for both large group and small group spaces. “How can you get
whole groups, large groups, to hear a common message, a common learning goal, then be
able to break into different pieces, and it can be layered” (T6, 98-101). Then Mr. Shedd
described the necessity of small spaces:

If it’s just smaller groups being able to have more of a quieter area to learn,
because every kid learns differently and needs different ways to either have
intentional distractions or just to have that comfort level of being able to have the
ability to talk to a partner or it could be a teaching assistant or whatever that may
be. (T6, 129-132)
Medium-sized group spaces that are transparent and connected by design effectively act as large group spaces and allow fluid communication between educators.

Mrs. Todd reflected on the ability to communicate ad hoc, when necessary, by stating:

Having that large group space and also having the teachers close to each other, we can talk, we can interact. I mean, we oftentimes will fly into each other’s room because we’re door to door and just be, like, “can we just switch this in the schedule or hold the kids for five more minutes” and by having that, we can do it, which would never have happened in a traditional setting. (T7, 423-427)

All three size variations working simultaneously together was most directly and arithmetically described by Mr. Johnson. He discussed the grouping of four learning areas that created one learning community. That learning community started with 96 students and was then collaboratively divided in half according to the lesson plan or exercise:

Space needs to be flexible enough to allow for, if you’re talking about 96 students, a group of 96, or a couple of groups of 48 or 24, and I think that flexibility in size allows the breakdown between subject areas and the flexibility for student grouping. (T4, 50-52)

Mr. Johnson went further by breaking that number down in half, and then again in half, to achieve all three groups of large, medium, and small. Large group instruction had 96 and 48 students, medium or traditional group instruction had 24 students, and small group instruction was for 12 down to six students when Mr. Johnson said:

Being able to create a class of 48 happening concurrently with 24s then allows additional partitions of classes down into groups of 12. You can have a class of
24 taking place with a certain permutation of teachers at the same time that you’re having two classes of 12 and then further break down, giving staffing groups of six by breaking out into small breakout spaces. (T4, 67-71.

With flexible, physical learning environments, variety of size does matter. Connectivity of varying-sized learning areas also gives teachers the tools they need to communicate fluidly allowing multiple student learning preferences to thrive. When students are given space that feels comfortable to them, where autonomy and risk taking are celebrated, exciting opportunities emerge, and space of all sizes becomes more highly utilized.

**RQ1, Subtheme 1C: Exciting options allow greater utilization of space.** Variety is the spice of life. When physical learning environment options are provided, sense of place is supported, and a variety of space becomes more utilized. Greater utilization of individual spaces means less physical space is required to address the needs of a school’s occupants. Mrs. Antonini expressed this by saying, “The space within the building is very conducive, again, to breaking out into small groups, large group presentations, and activities, it’s really utilized all year long” (T1, 347-348). When spaces are not only comfortable to one or multiple student learning preferences, but they are also exciting, it becomes a privilege and an incentive for students and sense of place increases. Mrs. Niziol described her experience as a young teacher many years ago. She challenged the status quo and described a space underutilization as an untapped resource that existed in the traditional physical learning environment, the corridor or hallway, as an educational space. “When I first started teaching, going and working out in the hall was a privilege. Like, ‘Can I go work out in the hall?’ It's like, ‘yeah.’ But now it’s just like . . . it’s a
classroom space” (T5, 144-147). Autonomy and providing different options in a variety of physical learning environment spaces makes students more interested and engaged. That is how Mrs. Todd described her space, which allows a variety of student groupings:

We have actually been flexible with our student grouping as well, we now have the space and the autonomy within that space to do what we want; we’ll switch kids at different times of the day that they’re with different groups of kids. I think that it just changes and makes kids seeing a different thing, it just makes them more interested in, “oh, now I’m with this group, what’s going to happen?” As opposed to the same old kids, they did the same old thing every day. (T7, 436-440)

Mrs. Todd went on to say that she had expanded the different ways she engaged with students in ways she was unable to in traditional physical learning environments because of the ability to meet fluidly in a variety of group sizes.

In summary, this subsection provided evidence that when educators offer physical learning environment options that are unique and exciting, students’ sense of place grows, and they will use the variety of spaces more often. A conveniently located variety of spaces is more effectively utilized.

**RQ1, Theme 2: Transdisciplinary learning.** Physical learning environments that accommodate a variety of educational models was the definition of flexibility for most of the interview participants. Flexible, physical learning environments were further defined through student and teacher ease of movement or mobility. Mobility, enabled by a variety of space types, adjacently located, allowed transdisciplinary student groupings of varying sizes; learning preferences and sense of place thrive. When multiple student
learning preferences collectively thrive, inclusivity is a natural byproduct. Mr. Morse, a school administrator for the last 15 years, best described how flexibility created by the CNY Middle School renovation project supported transdisciplinary learning when he stated:

Our kids were able to embrace transdisciplinary learning, but [they] have the space to meet as one group of students in morning meeting because we have the flexibility of opening up one of the interior rooms with all of our students and utilizing responsive classroom techniques as an instructional methodology or strategies for meeting with the kids all at once. (T3, 84-87)

Mr. Morse continued to describe flexibility as space that they can adapt to the needs of the class, the lesson plan, and the students. He also equated the adjacency of flexible space to efficiency by saying:

It’s more efficient, and there’s more gain out of it now because it’s so efficient and so conducive to the large group. The large group, we would have to go to another place because we couldn’t get all kids in one classroom. It just doesn’t work. So, the large group really didn’t happen like it does now or could now. It’s more intentional now, and it’s become part of the pedagogy. (T3, 117-121)

Like Mr. Morse, Mr. Shedd shared his thoughts about how flexible space allowed them to actively manage space efficiently for different student group or team sizes.

“Teamed areas can be manipulated quickly and seamlessly, for the most part, to provide an environment for a whole group” (T6, 119-120). Mr. Johnson described the flexible learning environment’s ability to support a transdisciplinary model by reconfiguring space through the movement of walls to create transparency. “The ability to open or
close off spaces to allow for a team teaching between two subject areas and also allow for
the flexibility of the grouping of students” (T4, 42-44).

While the previous four quotes give a general description of how flexible, physical learning environments support transdisciplinary learning and a variety of educational models, two subthemes further detailed the space’s relationship to its users. First, it afforded teacher and student mobility. Second, the grouping spaces within localized adjacencies promoted and allowed inclusivity.

**RQ.1, Subtheme 2A: Teacher and student mobility.** When students and teachers can move freely within a space and from space to space, a transdisciplinary learning model and sense of place can flourish. Flexible space, allowing student and teacher mobility, comes in three interconnected forms that support each other: (a) furniture, (b) technology, and (c) variety of physical space types. When a variety of space is provided, furniture and technology can be used to their fullest, innovative potential. Mr. Johnson described flexibility’s impact on active learning and student mobility through the ability to move furniture within a room and from room to room when he said,

Students actually break down the room to prepare for a meeting. It takes two or three minutes. So, that ability [allows them] to change that floor space from traditional to nontraditional so quickly, then it allows those tables to be moved not just within that space but too other spaces. (T4, 96-99)

Mr. Johnson continued to describe how flexible furniture most effectively works in a transdisciplinary learning model when combined with an adjacent variety of space and created mobility by saying,
We have large alcoves in the hall where we can move one of those tables, and the chairs roll, so we can really set it up on the fly. Which I think is important because sometimes you have to react immediately for instruction to work well. (T4, 102-104)

Mrs. Antonini similarly described the exciting and collaborative power that flexible furniture had on student mobility:

Losing very little instructional time, how they [students] can transition from maybe just having desks in pairs, going from groups and changing over to collaborative teams and things like that, which allows a lot of flexibility. And the learning allows for a lot of exciting things to be happening in the classroom. (T1, 53-56)

Mrs. Niziol described student mobility as a powerful tool for active learning as part of the physical space working within a transdisciplinary educational model. “A lot of the rooms have whiteboards and multiple areas so kids can get up and can get moving” (T5, 358-360). Technology also played an important role for these educators in a flexible, physical learning environment using a transdisciplinary education model. Later in our discussion, Mr. Johnson described the ability to communicate with students even when they were not in the same room that he was in but most likely in an adjacent breakout alcove space in the hall:

Having a student working on a Chromebook also allows indirect instruction to be taking place and if the kids are not immediately in my classroom. I could still be looking at their screens, I can provide them feedback while they’re working, even though they’re not in my space and I can call them back. (T4, 143-146)
Mr. Morse also described how flexible, physical space features work in tandem with technology to the benefit of the transdisciplinary learning model. Grades are broken down into color-coded teams, a physical feature used to create a sense of place:

Team eight [grade] orange [team color], when they worked on the Mars Rovers project, they’d open up their entire lab, the double doors. They’d have their Promethean. We also had some other communication devices, and they were actually communicating as if they were the control center. (T3, 242-243)

While furniture, technology, and variety of space had an impact on students, Mr. Morse stressed that teacher mobility is just as important as student mobility when providing a transdisciplinary educational model. “In our physical environment, now, we are seeing growth in our staff in methodologies, in teaching strategies, willingness to try different things, because, one, people around them are doing it with kids” (T3, 309-311). Mr. Shedd described his space as mobility allowing the teacher to act as a facilitator, “It could be a couple of adults within a classroom that are shifting and moving and facilitating learning” (T6, 178-179).

Overall, this subsection provides evidence that furniture, technology, and a variety of physical space types played a fundamental role in the success of flexible, physical learning environments. Working together, these three elements supported a transdisciplinary educational model, yet it was the adjacency of these space types that was critical to the student groupings.

*RQ1, Subtheme 2B: Grouping within localized adjacencies allows inclusivity.* Student grouping is essential for addressing multiple student learning preferences, for sense of place, and to create more inclusive physical learning environments. Mr. Morse
described how the flexible, physical learning environment renovation project at CNY Middle School allowed teachers to create multiple student grouping configurations. Adjacency as defined by Smith et. al (2016) refers to the connectedness of physical settings, and behavior settings, specifically, a number of different types of settings separated or connected by boundaries. He also described how a variety of adjacent space types within the vicinity of their primary learning environment had a substantial impact:

Because we have a flexible space to do it, we don’t need to set up an auditorium. They open up their large group space and have a large group presentation in their content literacy period, because they’re going to write about that now. (T3, 187-190)

When Mr. Morse described not needing to transition to an auditorium, a space that is typically distanced from the classrooms in a traditional departmental learning environment model, Mrs. Todd described the positive impact adjacency or proximity of flexible space had on student and teacher interaction:

Before, we were set up as departments, I was always with the math teachers. My classroom was close to the other math teachers. Now I’m close to my team and we have ownership over those kids, and we can interact with the kids all day long, because they’re always close to us, and we can interact as teachers, discussing kids more frequently, and I just think that proximity has allowed us to do that. (T7, 275-279)

Mrs. Todd further elaborated on the opportunities that space adjacency afforded teacher interaction and planning to the benefit of the students:
Now we [teachers] discuss our plans, what we’re going to do, what we’re going to do as a large group, as a team, how are we actually going to team teach because we are able to, with the space that we have and the proximity that we have. (T7, 405-407)

Like Mr. Morse, Mrs. Todd described small group and large grouping opportunities and their ability to create a sense of community, a sense of place, and a culture by being in one general area that afforded them a variety of adjacent space types.

This morning we did short classes, and this afternoon we’re doing large group stuff. We have that all in one day. We don’t have to go make sure the library’s available for a large group activity. We have that right within our own space that we can do that, and it really sets culture for the kids. (T7, 444-447)

Mr. Johnson described a variety of space adjacencies with an ease of oversight over his students:

I can see both of my breakout spaces from my room if I shift my position just a little bit just for that accountability. I can tell if a kid left because I can see their head get up and walk away and those types of things. For the breakout space, that’s a little further away [from] where my desk is; I can kind of lean out the door to make sure that those students are fine and safe and working well. (T4, 167-172)

Mr. Johnson continued to describe a community of spaces that were connected in a way that multiple teachers had visibility to all the student groupings within that team of up to 96 by saying,
When we open up our doors, with where my desk is situated, if I’m sitting in my room, I can actually see my entire class, and I can see most of that in the ELA class going on, including the teacher giving instruction and most of the social studies teachers from one vantage point. So, I actually can see all of our students. (T4, 178-181)

Mrs. Todd, early in her interview, described the ability of a variety of space types, which were designed to be adjacent to each other, supporting student grouping. Later in the discussion, she explained how this impacted inclusivity of student learning preferences and abilities:

This setup actually allows a little more flexibility for our special ed students. If they need a separate location, or they need another place that’s more secluded. A lot of times, if we’re doing a large group activity, and we have kids that maybe need to finish taking a test or do something, my room actually works as a great space to pull them out, because it is kind of a way from the rest of the group, and allows them a quiet spot. (T7, 199-203)

Mr. Shedd echoed Mrs. Todd’s description of inclusivity that provided a personalized learning opportunity for the students:

The environment that it’s created by going out into a corridor, being able to break off into smaller groups, allows [us] to provide a level of instruction that’s appropriate, for if it’s a student with a disability, enrichment and extensions just as well, as they might need an intervention .(T6, 160-163)

Mr. Shedd continued by further describing the impact on inclusivity that a closely located variety of space type options had:
I think it allows for the idea of having students be in that least restrictive environment and allowing students who may have specific disabilities that typically, what one would say, they would be either distracted or cause a distraction in the classroom, to be part of that learning with their peers. (T6, 166-169)

Overall, this subsection provides evidence that student grouping via localized flexible, physical learning environment options supports transdisciplinary learning. Transdisciplinary learning, therefore, allows inclusivity of multiple student learning preferences. Physical learning environments have an impact on the ability to provide personalized learning, creating student autonomy and a culture supported by the individual and a group’s sense of place. Educators and administrators sometimes describe this as the feeling of a more professional environment.

RQ1, Theme 3: Physical space design promotes the feeling of a more professional setting. Physical features can create positive and desired behavior. Sense of place physical features, this study’s framework, can be defined as learning environment architectural elements. Physical features can further be defined as form and size, texture and decoration, and connection and arrangement (Falahat, 2006). The interview data in this study reinforce the impact physical features had on the stakeholders’ perceptions and the creation of a more professional setting. This professional setting had a direct impact on teacher and student behavior. Mrs. Antonini described this general feeling when she said,

Our library has booths in it and flexible seating, same with our lobby. And it really promotes kids from feeling a more professional setting that you might feel
in some workplaces, but I think it promotes students to feel empowered when they are collaborating and working on projects and problem solving for that space. (T1, 66-69)

Where Mrs. Antonini described the built-in booths and furniture options as connection and an arrangement of physical features like that of a lounge or a coffee shop, Mr. Johnson described a flexible wall partition that allowed the traditional and flexible, physical learning environments to coexist:

The flexible wall allows us to go into smaller groups but then to still have spaces that have very permanent tables and heavy stools for project work, for project-based learning that might require water and those types of things and having a variability in the spaces they do have is a central component too. (T4, 107-110)

Flexible or movable partition walls enable connection and arrangement of physical features while also acting as form and size of physical features with their capacity to create large or small rooms when they are opened or closed. Doors, when located and designed with connectivity in mind, also act as form and size, and connection and arrangement of physical features. Mr. Johnson continued to describe the impact of doors and movable wall partitions in his space:

I have four doors in my classroom that all basically go in different directions. So, if I’m working with another teacher, if I’m team teaching with another teacher in my classroom, my space is big enough where I can partially close and divide, have a small group working in one place or a group working on [a] lab, and they rotate through the lab. But, in addition to that, I can accommodate students in
groups of three immediately out in the halls, outside my classrooms, in three separate locations. (T4, 125-130)

Mrs. Todd also described the use of the movable wall partition to support transdisciplinary learning when she said:

Our science room is basically a double room, we have in the past, that also has a door, the flexible wall that can be moved. It’s usually open in just one large room, but we’ve closed that before and done another class next door. (T7, 135-138)

Mrs. Niziol also described how doors created a variety of form and size physical features options. “In our science classroom they actually put in a double set of doors so that we could spill out into the hall and you can start using that hall space as classroom space, which was really neat” (T5, 86-88). Later in the discussion, Mrs. Niziol went on to describe the ability of the doors to transform space, “The kids know when we say that, we open up the double door, they push themselves back because now we have 50 more kids that are coming in to join us” (T5, 439-441).

Form and size and connection and arrangement of physical features play a big role by creating transparency between connected spaces of varying sizes in the hallways, common areas and breakout spaces via doors, movable wall partitions, built-in benches, and a variety of flexible furniture. At the same time, writable surfaces and paint colors act as texture and decoration for the physical features to enhance sense of place when Mr. Shedd mentioned that the small breakout spaces have whiteboards and Mrs. Todd described the role accent paint plays. “We’re the orange team, our walls in our hallway are actually painted orange. Kids know that this is our space” (T7, 45-47). Physical features also have an impact on students’ sense of place when students are actively
creating their own space with texture and decoration. Mrs. Todd described this when she said,

I feel like kids have ownership in this space. They go into our corridor. We have showcase[d] that we will put projects in and things like that, and it’s their projects and they know [it], and [when] they come in there, they’re going to see their stuff. (T7, 241-245)

Mrs. Todd elaborated by describing student ownership in terms of how it was different than a traditional physical learning environment:

It gives kids that sense that this is their space as well. Whereas in the past, it was school; I felt like it was always the stark white hallways, not much hanging on the walls, not much going on. You have lockers that were on all the hallways and so I do feel like that there is that sense of ownership in their space. (T7, 255-258)

Each participant described how flexible the physical learning environments’ physical features of form and size, texture and decoration, and connection and arrangement promoted a feeling of a more professional setting. These data provide reinforcing evidence that well-designed physical features and architectural elements promote positive and desired behaviors thus supporting a connected and collaborative culture.

**RQ1, Theme 4: Students feel empowered when connected and collaborating.**

Connectivity and collaboration are supported by a learning environment with a sense of student ownership of space. Innovative and engaged students create a sense of place and community. Flexible, physical learning environments play a vital role in creating this
Mr. Shedd enthusiastically captured the essence of connectivity and collaboration by stating,

What we’re allowing is them [students with] the ability to be creative and ability to be able to show what they know and understand and in more creative, innovative ways. And I think that this environment encourages that more so than certainly your traditional classroom would allow for. So, I think with that having the ability and being able to see that students show their strengths and their abilities in, and we encourage the arts and in music, having all of those outlets to show their skills, I think allows people, and kids especially, to step out of their comfort zone and probably demonstrate more leadership abilities that you might not necessarily see in a traditional setting. (T6, 359-366)

Mrs. Antonini described connectivity as the ease of moving between different learning areas created by movable wall partition physical features. “Classrooms are connected so that they can flow nicely between different work areas. Students can flow from one space to another based on a project they’re doing within the classroom setting that allows . . . with the walls that open” (T1, 43-46). Mrs. Antonini went on by describing collaboration and connectivity as important to the teachers and their ability to be innovative and take calculated risks:

It’s a variety of areas that just promote that collaboration and really allow teachers to take risks with their planning and the ideas that they bring to their students. And not only the students collaborate, but our teachers often collaborate and what they come up with our librarian and with each other [is] to offer a lot of great learning opportunities for our students. (T1, 138-141)
Mr. Morse described the variety of space types supporting creative and collaborative opportunities for the students. “We have breakout space in the hallways, in the learning zone areas, in multiple locations to support small group instruction, to support student collaboration, project collaboration.” (T3, 148-150). Mrs. Antonini echoed Mr. Morse’s comments about the influence small breakout spaces had on student collaboration. “The building design also allows for a lot of breakout spaces for when students are working collaboratively in small groups” (T1, 92-94). Teachers were collaborating with each other to create student autonomy while being able to monitor students at the same time. Mrs. Todd elaborated on the ability to achieve this sense of place, sense of community and trust:

If you want to go out in the hallway, work with a partner or something in the hallway, they know that they’re staying within our space. There are benches for them to go to. They can go out there and feel comfortable. And I know that they’re still within kind of an arm’s reach of where I am, and know that there’s other people around, too, other classroom’s kind of checking in on them. (T7, 47-51)

Mrs. Todd went on to describe teacher collaboration and a sense of safety among both the students and teachers:

We’re very flexible on being able to switch kids in different rooms or different spaces. And we’re all, kind of, monitoring all the spaces. The hallway, there’s a table in one section of the hallway with a bench that kids can go work at. And if we need a teacher to go out there with them and maybe do a small group
instruction with a group, they can. We have lots of different spaces for different opportunities. (T7, 89-93)

With connectivity and collaboration, new innovative methods of problem solving have evolved. Mrs. Antonini described innovation as healthy risk taking:

The building design supports perfectly the learning models that we have in this building and provides great opportunities for that innovation, the risk taking, and allows us to do what we do and take that to another level in this building. (T1, 247-250)

Mrs. Antonini went on to say that physical space also allowed teacher innovation and creativity by saying, “It allows our staff to push the envelope” (T1, 270-271) and more importantly, flexible, physical space “allows the planning time to be more productive and focusing on more innovation and taking it a step further instead of focusing on the logistics” (T1, 258-260). Innovative and connected pedagogy and space increased student and teacher engagement. When students and teachers are engaging each other, a sense of place and community begins to develop. Mr. Morse described community as connectivity to real-world applications:

It’s that community piece and using a real-life example of environmental history writing, reading, and the science behind it. Using that as a real-life application for them to learn. Hearing it then on the news at times and getting news clips and then they go and visit the sites. (T3, 94-97)

Mr. Morse continued to describe how flexible, physical learning environments support real-life pedagogy when he said, “the kids are more part of resetting the room for the different activity,” and elaborating on that thought further:
The kids are anticipating and knowing when they have large groups with some teams. The kids appreciate the learning environment, as well, because they know and they’re part of it and the space supports them in what we do. (T3, 138-140)

Each participant described how the students felt empowered when connected and collaborating. The data reflect that flexible, physical learning environments played a substantial role in promoting student and teacher engagement through innovation. Sense of place and community were the byproducts of student and teacher ownership of space.

The four themes presented in this section demonstrate the impact flexible, physical learning environments have on supporting multiple student learning preferences, greater utilization of space, teacher and student mobility, and student grouping. Variety of connected physical space types with flexible, physical features create fluidity, enabling a transdisciplinary learning model. Fluidity promotes a collaborative and positive culture by empowering students and educators to “push the envelope” beyond the traditional physical learning environment.

**Research Question 2**

What contributed to the district’s decision to proceed with a flexible, physical learning environment model?

The protocol questions were developed to gather interview data on the second research question. While few schools have adopted this model, the desire to create student sense of place is present, yet many K-12 stakeholders are reluctant to make the change and implement flexible, physical learning environments in their school districts (Kennedy, 2015). There are many reasons for this reluctance including educator allegiance to the traditional classroom model and educator territoriality. Administrators
may be fearful of creating inequity between schools within a district when limited resources narrow the number of schools scheduled for a physical learning environment design change.

Along with the initial protocol questions, probing questions were designed to initiate deeper discussion about the reasons the school district chose to implement a flexible, physical learning environment renovation project into the existing CNY Middle School. Within the analysis of the participant responses, two predominant themes emerged. The first theme, teaching school versus. embracing learning highlights the vision and mission required by a supportive administration to overcome potential resistance to making changes to an existing educational model that may not be meeting the needs of, and skills required by, today’s students. The second theme was, opportunity to have these discussions about the “what ifs.” This theme focuses on the steps that were taken to successfully implement a flexible, physical learning environment renovation project. Table 4.3 presents the two themes for this research question, along with the key concept for each theme. In addition, subthemes are indicated for both themes.

Table 4.3

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<th>Research Question 2 – Themes, Key Concept, and Subthemes</th>
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<td><strong>Theme</strong></td>
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<td>1. Teaching School versus. Embracing Learning</td>
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<td>2. Opportunity to have these discussions about the “what ifs”</td>
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**RQ2, Theme 1: Teaching school versus. embracing learning.** This study’s interview data reinforced the importance of an educational organization’s mission and
vision. When proactively supported by the administration or leadership, mission and 
vision are vital to a school district’s success. Mrs. DeBottis described this fundamental 
principle. “Our vision was to become an exemplary 21st century learning community 
whose graduates are prepared to excel in a complex, interconnected, changing world” 
(T2, 63-64). Mrs. DeBottis built on that introductory statement by describing that a K-12 
educational organization needs to first determine if their educational environment meets 
the needs of its teachers and, most importantly, its students when she said:

How is becoming a 21st century learning community different than a 20th century 
learning organization or school? And the reason why I use the different term is 
because, I don’t know, in the 20th century, that we actually embraced a learning 
community. I think we implemented teaching school. (T2, 66-69)

The school district’s mission and vision were to no longer just teach school, but to 
embrace a learning community. As a result, it was important that the physical learning 
environment support change in mission and vision. As an educator at the CNY Middle 
School, Mr. Johnson’s response to the same question aligned with Mr. DeBottis’s 
comment when he said:

Our goal was not to create a space and then learn how to work within that space, 
but to create a model, first, of how we think we can better educate children and 
then build a structure that would facilitate that learning model. (T4, 30-32)

Much later in the conversation, Mr. Johnson reiterated that the design is 
supportive of education, not vice versa. “The teaching model comes first, then building 
to support came second. Which for us it’s not you build it, and then you’ll change. It’s 
you change it, and then you build something to accommodate” (T4, 280-282). A flexible
physical learning environment design, physical features, and acting in a supportive role to the educational environment pedagogy aligns with the sense-of-place model (Falahat, 2006). Physical features are one of four sense-of-place elements, activities, meaning, and individual features, the other three elements are pedagogical, and they are the leading elements of a holistic educational environment. Mrs. DeBottis captured the essence of how this cultural transformation via the CNY Middle School’s flexible, physical learning environment renovation project would begin to change how the district administrators and educators thought about design, “[The design process] really began to make us question, ‘is the actual [existing] design of the building’ also both somewhat of a constraint and ‘is it perpetuating a model that no longer should be in existence and yet is?’” (T2, 109-111).

The resistance to change is what has perpetuated the industrial (factory) model since it was created more than 150 years ago (Baker, 2012). How is the “teaching school” cycle successful broken? It begins with a new mission and vision that is supported by district administration.

**RQ2, Subtheme 1A: Supportive administration to overcome resistance to change.** An administrator, Mrs. DeBottis outlined the need for change. She discussed the problem. To Mrs. DeBottis, the world is transforming to require that K-12 schools prepare students for life, career, or academia in a different way than ever before— in a way they were not providing:

And we began to really discover that, in addition to the fact that the world had changed dramatically, certainly since the time that CNY Middle School was built in the late 1960s, and now it was 2010s, we were . . . . We also began to realize
that, in those changes in the world, there were also changes in what really we
needed to be preparing students for in being successful in the world. (T2, 79-83)

Mrs. DeBottis described how an administrator must lead in a time of change.
How a leader must empower those they lead. “I talk about my role in giving permission,
support, and protection. So, the permission of ‘yes, you want to actually look at space
differently and the learning environment differently’” (T2, 246-248).

Mr. Johnson described the element of safety felt via the protection provided by
the leadership when they lived the mission and vision:

That permission from administration to experiment, to pilot; that idea of being
trusted with tasks given goals but trusted with the tasks to accomplish the goal.
That administrative piece cannot be overlooked. The safety that I feel as an
educator to be able to try new things. (T4, 289-291)

Mr. Shedd, also a CNY middle school educator, commented similarly about the
authentic support and protection that the administration provided that encouraged a
positive attitude for change, “The superintendent was willing to be innovative and, just as
I said, willing to hear and try to incorporate as much as she could of people’s needs and
wants while finding that balance” (T6, 463-465). Even with tremendous support and
autonomy given by the district administration, change came with substantial internal and
external resistance. Mr. Morse, an administrator, described one area of the teachers’
contention, “A lot of the teachers wanted to hang on to their desks, their big steel desks,
and I said, ‘No, that’s not going to happen.’ That was transforming in itself” (T3, 390-
391). Mrs. DeBottis described an example of external resistance that existed from
outside agencies that continued, “perpetuating a model that no longer should be in existence and yet is” (T2, 109-111):

Taking it [the design] to a state level, we have to have our folks understand what 21st century learning is really about before we start redesigning our schools. And of course, in those kinds of conversations, you get a lot of pushback from people.

(T2, 179-182)

This resistance to a change in the school’s mission and vision—to do what is right for kids and the renovation that supports this new learning model resistance—was overcome with discussions about opportunity during the information-gathering process.

RQ2, Theme 2: Opportunity to have these discussions about the “what ifs?”

A formula for a successful information-gathering process begins with an administration that supports an open discussion with the school district educators. This opportunity creates a safe environment for teachers to express their opinions about the mission and vision for a learning environment that supports a sense of place, sense of community, and a 21st century learning community. Mr. Morse described the critical role a supportive administration plays when he stated:

The what if’s: if we only could do this; if we only could do that. When you have that in your mind, combined with an extremely supportive administration in your school district, the supportive community who would support a building project and an actual building that was going to be renovated, you have the power at that time. You have the ability to bring it all together. (T3, 428-432)

Educators who are passionate about this mission for change, champion the transformation to flexible, physical learning environments by taking tours of schools and
classrooms in other districts that had similar missions and renovation projects. The information brought home from these tours was then used to design their transdisciplinary team environments. After the tours of other districts that had similar missions and similar renovation projects, these teachers took an active role in designing the prototype learning environments that were eventually built in their district.

**RQ2, Subtheme 2A: Touring and team structure.** Immersing a small group of proactive educators and administrators in existing flexible, physical learning environments with tours was an important first step. The district leadership felt obligated to provide this opportunity. Mrs. DeBottis described this important step at the beginning of the information gathering process:

> [At] the very earliest stage, when we took our own learning tour to Ohio and visited Metro, which is on the Ohio State Campus, so it’s an early college high school that’s been located on a college campus. We also went to a place in Austin, Texas, Lake Travis, and they were really more about creating like academies within a high school that were career pathway academies. (T2, 199-205)

A teacher, Mr. Johnson, described the impact these tours had on him. Gathering information from an existing flexible, physical learning environment allowed him to extract space elements that aligned with their school district’s educational mission and vision, and he stated,

> We saw a magnet school and high school, respectively, that were both just doing things differently with scheduling and spaces. Neither of those are models for what we have here. However, they got the ball kind of rolling to start to have
conversations about how we might be able to instruct [our] students differently.
(T4, 276-280)

Mr. Shedd described overwhelming excitement about touring the physical and cultural elements through the lens of an administrator:

Small groups, they went to a couple of different outside districts that have created some more innovative learning spaces, and then having them come back and share in the excitement and the idea of this really, has a huge impact on so many layers, like we said, from the culture and the climate to the actual learning environment, to students’ emotional learning, all those pieces; that’s when we’re excited. (T6, 448-456)

Mrs. DeBottis summed up the touring experience as facilitating the conversation of innovation among their flexible, physical learning environment leadership group. Touring promoted an environment that supported questioning the status quo, “Those visits created for us an opportunity to have these discussions about the ‘what ifs’” (T2, 214-215). Building on the energy that was initiated by touring, the next step was to create a team structure with prototype of a flexible, physical learning environment with physical features at the existing CNY Middle School. Mrs. DeBottis described how this was done by stating:

We’re going to even have our architects do a mini makeover of that area by putting in the two double doors to enter a classroom, two of the classrooms, and things like that, carpeting one of the classrooms that opened up to a huge double space, so they could bring the entire hundred, or a hundred plus kids, together and do a morning meeting and things like that. (T2, 252-255)
Mrs. DeBottis went on to describe how the flexible, physical learning environment physical features provided conversations about greater space utilization and engagement opportunities:

And from that prototype that we built that summer, and got to practice some of the aspects of, did it provide a greater degree of flexibility, adaptability, utilization of space for a higher degree of student engagement, and what from that might we do in designing the building? (T2, 269-271)

Mrs. Niziol, a CNY Middle School teacher, described how the change in physical environment positively impacted her students, “We had some things that we were able to use and test out. We definitely, for sure, and I know it was documented, saw an increase in attendance, which was cool because the kids were engaged” (T5, 477-479). Mrs. Todd, also an educator, aligned with Mrs. Niziol’s comments about attendance by commenting, in awe, about how students with behavioral issues were now engaged because of the flexible, physical learning environment:

They’re interacting with each other as a hundred kids all together at once. And it was really shocking to see that change in kids, kids with behavior problems, that were doing exactly what they needed to do every day. And kids that just didn’t like school, didn’t want to come to school, would be coming to school because they knew that they were going to have opportunities to do these large group activities in those situations, and kind of feel that closeness as a group. (T7, 376-381)

Mrs. DeBottis summed up the first two information gathering steps, which were touring and team structure, by allowing the flexible, physical learning environment
leadership team to experience existing success stories, firsthand, and then implement those physical features prototypically when she said:

You have to immerse people in a learning process of their own discovery of, you know, it would be interesting if we had different size[d] rooms for different size[d] purpose[s]. It would be interesting if, when you went into an area of the building, you could create a learning commons. (T2, 291-294)

Creating an educator team structure to experience a prototype of a flexible, physical learning environment’s physical features allowed educators to communicate their enthusiasm and champion lessons learned for systematic change. It is imperative that the administrative leadership and design team listened to teacher feedback, information gathering, step three. Immersing a small group of proactive educators and administrators in existing flexible, physical learning environments with tours was the first step. Creating a team structure with a prototype of a flexible, physical learning environment was the second step in the three-step process.

**RQ2, Subtheme 2B: Listening to teachers.** The teachers became champions for change through their experiences touring successfully implemented applications. Empowering educators with a sense of autonomy and allowing them to create their own environments generates educator’s sense of place. First, listening to teachers is about giving permission to ask the what if question. Next, supporting and challenging educator ideas are borne out of those inquisitive exchanges. Then, protecting those ideas through implementation. Mrs. DeBottis described how this process was initiated:

Two teachers were instrumental in asking enough questions and building enough interest in, “what if we really did look at middle school” and that’s where our
journey for this started, with regard to the design of the building differently. (T2, 227-229)

Mr. Morse described how he, a building administrator, supported the process Mrs. DeBottis described when he said:

I did a lot of listening to staff. My mindset was already moving forward. I think I attribute that to our superintendent who is just a tremendous leader and always looking to the future and for the best interest of our district. (T3, 373-375)

Mr. Morse would later discuss the importance of support across the leadership and staff hierarchy, “I had great support. You listen to your staff” (T3, 553-555). The design team also played a vital role in the listening process. Mrs. Niziol described how she felt when she and other teachers interacted with the design team and how important physical features were brought to life through the listening process:

They [the designers] really picked our brains about the learning spaces and so to be involved in the conversations and the, kind of, the planning of it, and then to see them come to life. It was probably one of the coolest things I’ve been able to do. (T5, 393-395)

The two themes that emerged from the Research Question 2 data showed that an educational organization’s mission and vision, when proactively supported by the administration or its leadership, is vital to its success. A successful information gathering process begins with an administration that supports an open discussion with school district educators. This opportunity creates a safe environment for teachers to express their opinions about the mission and vision for a learning environment that supports a sense of place, sense of community, and a 21st century learning community. Teachers
become champions for change through experience from touring successfully implemented applications, teaming in prototype flexible, physical learning environments’ physical features, themselves, and then they trust that their administration is going to listen and apply their feedback.

**Summary of Results**

This chapter presented the results of seven individual interviews of district and school administrators and teachers from the CNY Middle School. Interviews were conducted to determine if sense-of-place architectural design elements of the learning environment impacted K-12 stakeholders’ perceptions. Perceived experience of a place can be defined as sense of place (Jalili & Azar, 2016). Sense of place is an awareness that a person is part of a culture, something greater than him- or herself, a sense of belonging (Falahat et al., 2017). Sense of place is experienced through all five senses and is impacted by (a) activities, (b) meanings, (c) individual features, and (d) physical features (Falahat et al., 2017).

Within the analysis of the Research Question 1 participant responses, four predominant themes emerged. The first theme, fluidity, is important to build and support a positive culture, highlighting that a variety of space types are required for flexible, physical learning environments to successfully meet the need of multiple student learning preferences. This theme was then broken down into three additional subthemes because of the complexity of fluidity as it relates to a variety of space. The second theme was transdisciplinary learning, which focuses on the flexibility required to accommodate many teaching and learning models. This theme was then broken down into two additional subthemes. The third theme was physical space design, which promotes the
feeling of a more professional setting, supporting evidence that physical features, appropriately and collectively designed, can create a positive and desired behavior. The fourth theme pointed out that students feel empowered when they are aware that they are connected and collaborating. The theme reveals the power that a strong sense of place and sense of belonging has within the context of positive culture and an engaging community.

Research Question 2 revealed two predominant themes. The first theme, teaching school versus embracing learning, highlights the vision and mission required by a supportive administration to overcome educator resistance to make changes to an existing educational model that may not be meeting the needs and skills required by today’s students. The second theme noted opportunity to have discussions about the “what ifs.” This theme focused on the steps that were taken to successfully implement a flexible, physical learning environment renovation project.

The data collected and analyzed from both Research Questions 1 and 2, while thematically consistent between administrators and educators, showed contrasting levels of benefit. The educators discussed the benefits of the flexible, physical learning environments they occupied daily in terms of how the physical features positively impacted the way they taught. Their relationship with peer educators benefitted in terms of communication and coordination of student-centered pedagogy. The educators also discussed how their students, having multiple learning preferences, benefitted in ways they could not have in a traditional physical learning environment. Building and district administrators described the same benefits, but in holistic terms, from a leadership perspective. A key takeaway from the building administrators was their discussion of
how flexible, physical learning environments positively impacted their relationship with the educators. Building administrator/educator relationships were strengthened due to the permission and protection the educators received while seeking and implementing innovative teaching methods and opportunities. District administrators discussed the benefits in terms of overall improvements to the culture, benefitting a larger organizational community. Alignment at all levels of the district hierarchy through meanings or symbolic gestures was critical to the success of implementing a flexible, physical learning environment model.

The level of alignment in administrative responses indicated a clear understanding of the district mission. The district mission was communicated with passion, persistence, and follow through, which was embedded in permission to explore, support, and protect, at all hierarchical levels. This consistent alignment is evidence of a successful K-12 educational culture shown, in part, by the flexible, physical learning environments that support a desired sense of place, a sense of community.

Chapter 5 discusses the research implications based on the results presented in Chapter 4 as well as recommendations for research and for application.
Chapter 5: Discussion

Introduction

Empirical research on flexible, physical learning environments is primarily limited to the higher education perspective. Workplace physical environments have been adapted to meet the variety and flexible, physical space needs of employees, but K-12 school environments have not been so adapted. Research regarding the impact of K-12 flexible, physical learning environment design elements on stakeholders is all but nonexistent. This chapter provides an overview of the research findings, along with the implications of these findings. Limitations to this study are provided, as well as recommendations for future research and practice. The sense-of-place model (Falahat, 2006) was the framework that guided the following research questions, which were asked of K-12 educators, building administrators, and district administrators of a single K-12 school district that had recently, at the time of the study interviews, experienced flexible, physical learning environment renovations:

1. What impact, if any, does a flexible, physical learning environment have in K-12 settings, and how is this impact different in any way from the impact of a traditional physical learning environment?

2. What information and processes contributed to the school district’s decision to proceed to a flexible, physical learning environment model?

Data analysis of seven individual, one-on-one interviews yielded several emerging themes resulting in three key findings.
Implications of Findings

The study findings are interpreted through the sense of place (Falahat, 2006) framework and aligned with existing physical learning environment literature. Sense of place is experienced through all five senses, and it is impacted by the model’s four characteristics: (a) activities, (b) meanings, (c) individual features, and (d) physical features. This study produced three key findings. First, fluidity and connectedness, allow teachers and students to transition more easily from bigger spaces more easily to medium to small spaces within a flexible instructional model. A variety of connected physical space types with flexible, physical features create fluidity, enabling a transdisciplinary learning model. Fluidity promotes a collaborative culture and a greater sense of place, empowering students and educators to, push the envelope beyond the traditional physical learning environment. Flexible, physical learning environments are defined as a variety of sizes and shaped physical architectural spaces or room configurations that are interconnected or networked (Jankowska & Atlay, 2008).

Second, flexible learning space does a better job engaging multiple student learning preferences. Options for student groupings with localized flexible, physical learning environments support transdisciplinary learning. Park and Son (2010) used the term, transdisciplinary learning, to describe the use of collaborative learning-centered practices that increase student engagement opportunities. Transdisciplinary learning, therefore, allows inclusivity of multiple student learning preferences. Flexible, physical learning environments provide the ability to personalize learning by creating student autonomy and a culture supported by individual and group sense of place. Student learning preferences are defined by the four learner types or senses that influence student
engagement and capacity to learn different areas of content based on (a) genetic differences or individual innate qualities; (b) ability and interests, or the activities that pique individual curiosities; (c) background knowledge or fundamental skills that promote learning secondary skills within similar content; and (f) learning disabilities (Riener & Willingham, 2010).

Third, seeing is believing; teachers need to become champions for change to flexible, physical learning environments. Taking tours of other districts with similar missions and similar renovation projects is critical to the process. After seeing other districts in action, teachers take an active role designing the prototype learning environments that are eventually built in their district.

**Finding 1: Fluidity and connectedness allow teachers and students to transition easily.** This study describes a variety of space sizes and types interconnected by flexible sense-of-place physical features. Sense of place physical features can be described as form and size, texture and decoration, and connection and arrangement (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014). Space connectedness allows fluidity, movement within a space and from space to space, which creates a sense of community or sense of place that cannot be achieved within a traditional physical learning environment. This study’s data clearly identify how physical learning space connectedness benefits K-12 administrators, educators, and students.

The study revealed the importance of three space types, working collectively to create a high level of connectedness and fluidity. District and CNY Middle School administrators and teachers spent most of their time enthusiastically describing the positive impact their existing flexible, physical learning environments had on them.
phenomenologically. Very few comments detailed the challenges of their former traditional physical learning environments. Although, when asked, all the participants commented that they would not choose to go back to a traditional physical learning environment model. Each participant described their existing flexible, physical learning environments holistically through their influence on them, their staff, and their students.

Teachers and administrators found value in the connectedness that a variety of space types provides. When a variety of connected space types and student-centered learning methods are combined, student and educator sense of place thrives. A flexible environment creates a community of learners, and it creates a unique connection between educator and student, facilitator, and learner. Teachers want students to enjoy learning lifelong skills unobtrusively. Administrators want teachers to enjoy the process of connecting with students in ways that allow lifelong learning to flourish. Ultimately, students benefit from the holistic organizational impact connectedness has on individual and group sense of place.

In the literature, traditional physical learning environments are defined by Nair (2014) as a series of classrooms connected by a corridor. Traditional physical learning environments promote compliance and assimilation (Parsons, 2017). Conversely, flexible, physical learning environments promote creativity, autonomy, and self-regulation, all which are emotional intelligence skills (Parsons, 2017). Flexible, physical learning environments are defined by a variety of sizes and shaped physical architectural spaces or room configurations that are interconnected (Jankowska & Atlay, 2008). Furniture and technology are flexible, mobile, and allow for a higher level of student-to-teacher and student-to-student interaction than in traditional physical learning
environments. When flexible furniture, technology, and connected spaces are designed to work together, fluidity and active learning are achieved through their collective impact.

At CNY Middle School, the flexible, physical learning environments’ physical features provided fluidity through transparency, and they were used as educational instruments. The transparency of glass sections that connect spaces allow teachers to communicate with each other and students visually. Glass and other writeable surfaces on desks, walls, and whiteboards allow communication and transmission of ideas to take place in ways and areas that traditional learning environments do not. Byers et al. (2018) determined that transparency using glass partitions and surfaces are critical to the connectedness and the success of ILEs. Movable partitions allow spaces to be big, medium, or small, depending on the required student group size. The study’s data show small breakout spaces adjacent to traditionally sized classrooms promote a variety of student groupings or sizes. Physical features actively and fluidly connect educators to students and peer educators in ways traditional learning environments do not.

Jankowska and Atlay (2008) defined connectedness by three interconnected space types: the traditional physical learning environment, the formal space or F-space, and social learning spaces or S-spaces, are the informal spaces that connect learning environments, and small group or creative learning spaces or C-spaces. It is C-space that encourages creativity that is designed for exploration. C-space also encourages critical-thinking and problem-solving skills (Jankowska & Atlay, 2008). The study’s data reveal C-spaces are the critical element missing from traditional physical learning environments.

C-spaces are student-centered, where the educator acts as a facilitator in lieu of an instructor. Creative spaces are breakout spaces or areas. Breakout spaces are essential
for small group instruction connectedness to a larger student group that moves fluidly between other formal and social learning spaces. In the workplace, these spaces are used for collaboration and the exchange of ideas. C-spaces include think-tank space, project areas, and medium-to-small group meeting places (Schittich, 2011). Breakout spaces are critical in both K-12 academic and workplace environments because they maximize opportunities for creativity more effectively than traditional physical environments. Breakout spaces also allow K-12 education environments to flex and react to the everchanging needs of student-centered learning.

Flexible, physical learning environments’ physical features positively impact administrator, educator, and student sense of place. A variety of adjacent and connected spaces allows educators and students to untether themselves from the rigidity and confines of traditional physical learning environments. Untethering student autonomy is at the core of engaging multiple student learning preferences and individual sense of place.

**Finding 2: Flexible learning space does a better job engaging multiple student learning preferences.** Flexible, physical learning environments have a positive impact on the ability to provide personalized learning, creating student autonomy and a culture that is supported by an individual’s and group’s sense of place. The study revealed that flexible, physical learning environments support multiple teaching models and multiple student learning preferences, where traditional physical learning environments do not. In the literature, PBL, student-centered learning, participative learning, and transdisciplinary learning models were analyzed (Ahlfeldt et al., 2005; Landau & Meirovich, 2011; Meece, 2003; Park & Son 2010). This study discussed each
of these models through the lens of their impact on the sense-of-place framework. Each of these models is an effective method for fostering and ensuring a more inclusive student learning environment. The study’s data found that flexible, physical learning environments are more inclusive than traditional physical learning environments.

Teachers are more innovative in their lesson plan delivery methods within flexible spaces. In this way, sense-of-place individual features are positively impacted. Individual features are closely linked to physical features and can be described in terms of relations, expectation, and attachments (Falahat, 2006). Scale and its relationship to the human proportion, as a child or adult, influences sense of place through individual perception. Individual perception is different between children and adults (Jalili & Azar, 2016). Many participants discussed the positive impact the unexpected had on student engagement. The unexpected elements of space design or physical features provide something new to discover every time a student walks into a room. The unexpected encourages students, as co-creators of their space, to envision opportunities that promote collaboration. The unexpected and cozy elements align with White and Lorenzi’s (2016) creative space study. The unexpected nature of grouping different students throughout the day creates exciting and unique interactions and communication between students who would not have been together to each other in a traditional physical learning environment. Teachers can reach more individual student abilities, background knowledge, and interests because personalized learning flourishes by grouping students within a variety of creative spaces.

This study showed that a student-centered learning approach, using a transdisciplinary learning model, cannot survive easily in a traditional physical learning
environment. Park and Son (2010) described transdisciplinary learning as student participative collaboration between different and multiple disciplines. New and innovative lesson plans, using problem-solving methods in a transdisciplinary learning model, are more effectively supported by flexible, physical learning environments.

Innovation and creativity accelerate when PBL and participatory learning methods are used in the transdisciplinary model because flexible space allows a greater level of teacher/student interaction and access. Physical access to other educators and students requires the support of properly designed flexible space to successfully implement student-centered learning opportunities. Meece (2003) defined the educator’s role in student-centered learning classrooms as providing students with opportunities to choose, opportunities for collaboration, opportunities to have a variety of instructional strategies, to activities that were relevant, to give facilitation, and to provide a sense of belonging or a sense of place. Student-centered learning methods are more effectively supported by flexible, physical learning environments.

Students have fewer disciplinary issues, less absenteeism, and greater levels of participation and engagement in a transdisciplinary model supported by flexible, physical learning environments. Flexible, physical learning environments are less restrictive to distractible students and students with disabilities because of their ability to break off into smaller groupings in smaller adjacent spaces. Smaller student grouping areas adjacent to larger grouping areas more effectively support special education students than traditional physical learning environments. In terms of gender inclusivity, Landau and Meirovich (2011) provided strong evidence that female students speak more briefly than male students, and they participate less than male students when the learning environment is
not perceived to be supportive and safe. The traditional physical learning environment, lacking flexible, physical spaces, prevents student engagement for some and equity for individual student learning preferences. Jankowska and Atlay (2008) identified that flexible layouts of the physical learning environment increased the opportunity for students to practice professional conduct. Greater perceived student autonomy and problem-solving skills are a product of the less formal and strengthened teacher-learner relationship. Small group or creative C-space increases students’ enthusiasm and excitement. Students feel they can express themselves safely and more authentically.

Riener and Willingham (2010) defined a variety of individual student-learning preferences based on genetic differences, ability and interests, background knowledge, and learning disabilities. The study’s data confirm individual students’ needs cannot be addressed with an exclusive one-size-fits-all solution of the traditional physical learning environment. This current study establishes that flexible, physical learning environments, using a student-centered approach, do a better job of engaging multiple student learning preferences.

**Finding 3: Seeing is believing. Teachers need to become champions for change to flexible, physical learning environments.** District and school administrators need to communicate the differences between traditional and flexible, physical learning environments in terms of their schools’ missions and visions. Alignment at all levels of district hierarchy through sense-of-place *meanings* is critical to the success of implementing a flexible, physical learning environment model. Meanings are described as identity, aethesia, and symbols (Falahat, 2006). Meanings are the symbolic gestures that make up an organizational culture through its mission, vision, and goals. A group
identifies with a common understanding of what it stands for and what its members are trying to accomplish as a group. Aesthesia, or the ability to perceive sensations via physical or metaphoric symbology, also determines physical and/or emotional connectivity or separation (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014). Leaders of districts and schools seeking educational change must discuss the benefits flexible, physical learning environments have on culture at large.

Teachers who have experienced flexible, physical learning environments must describe to other teachers how flexible space positively influenced their communication or sense-of-place activities. Activities are described as social interactions, satisfaction, and sense of community (Falahat, 2006). The activity of social interactions between peer students, mentors, educators, and staff have a direct influence on sense of place. Activities, understood through familiar experienced traditions and formal spaces, or experienced for the first time in unique spaces, impact the comfort of an environment differently. An individual’s or group’s satisfaction with these activities and pedagogies elicit either positive or negative responses (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014).

District administrators can effectively motivate change by facilitating tours with building administrators and educators of schools and classrooms in other districts that have similar missions and renovation projects. District administrators benefit by immersing school administrators and teachers in educational environments that embrace learning and make a meaningful gesture to move away from just teaching school. Sense of place is experienced through all of the five senses (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014). Reading books about flexible, physical learning
environments is not enough. Seeing is believing also means hearing and touching are believing.

By touring schools and classrooms in other districts that have similar missions and renovation projects, educators can see, hear, and feel exemplars of flexible, physical learning environments in action. Educators experience how interconnected rooms work to the benefit of multiple student learning preferences. The interconnected variety of space and sense-of-place physical features, including mobile furniture and technology, architectural elements, including movable partitions, doors, benches, and finishes, allow students and teachers the fluidity required to create a more effective level of sense of place. Teachers can feel the writable surfaces and hear the transmission of sound through movable partitions. In person, teachers can see how furniture is easily moved and how technology creates connectedness. Teachers can envision how the activities and interactions on these tours can potentially be implemented in ways that create the greatest impact on their students. School administrators and teachers use this immersion of the senses and lessons learned to create prototype spaces where they turn the what ifs into action. At this point, “you have the ability to bring it all together” (T3, 428-432).

Limitations of the Study

The study was limited to semi-structured interviews of seven educators, K-12 teachers, building administrators, and district administrators, who had recently experienced flexible, physical learning environment renovations. The study participants were from a single K-12 school district in New York State. The district was selected because the CNY Middle School was a recent example of a full-building, flexible,
physical learning environment renovation in New York State. However, the results may not be widely generalizable due to the sample size.

**Recommendations for Future Research**

The study analyzed the perspectives of the K-12 stakeholders and examined their understanding of flexible learning environment designs and support for students’ sense of place. Future research may contribute additional findings to the K-12 education field and the professional architecture field.

First, it is recommended that the same qualitative study be conducted in elementary and high schools that have recently experienced flexible, physical learning environment renovations. It is also recommended that this study be conducted with urban and rural K-12 school districts and with K-12 school districts outside New York State. Providing the same study with greater socioeconomic and geographic breadth would provide a more generalizable data sample.

Second, quantitative studies should be conducted on the impact that flexible, physical learning environments’ sense-of-place physical features and architectural design elements have on student engagement compared to traditional physical learning environments. Data collection, using Likert scale surveys of teachers and students of the impact flexible, physical learning environments have on student engagement may provide greater validity by factoring out socioeconomic counterfactuals.

Third, the designer’s and architect’s perspectives must be included in the data-gathering process. The architect’s perspective can be captured both qualitatively and quantitatively. Understanding the impact of the learning environment design from the architect’s perspective is as important as the teacher’s perspective of educating. A more
comprehensive level of research and collaboration with K-12 educators and building and district administrators is required to design future successful physical learning environments. Additional research of flexible space is required (Rands & Gansemer-Topf, 2017). Architect and K-12 stakeholder collaboration is important because architects can help bridge the gap that has been created by the lack of K-12 learning environment evolution. The K-12 learning environment design needs to align with flexible workplace design more closely. A collaborative process between architects and K-12 stakeholders is critical. This process will provide school districts with the information necessary to make the most effective design decisions for all K-12 stakeholders, students, staff, and community members.

**Recommendations for Practice**

The study shows that flexible, physical learning environments have a great impact on the perspectives of K-12 stakeholders and their understanding of support for students’ sense of place. Perceived experience of a place can be defined as a sense of place (Jalili & Azar, 2016). Sense of place is an awareness that a person is part of a culture, something greater than him- or herself, a sense of belonging (Falahat et al., 2017). Sense of place is experienced through all five senses and is impacted by (a) activities, (b) meanings, (c) individual features, and (d) physical features, as shown in Figure 5.1 (Falahat et al., 2017; Jalili & Azar, 2016; Vali & Nasekhiyan, 2014). Figure 5.1 is the same as Figure 1.6. Physical features are described as the architectural space and design elements, form and size, texture and decoration, and connection and arrangement of a location. Physical features are the focus of this study.
Figure 5.1. Sense of Place Model. Adapted from “The Sense of Place and Its Factors,” by M. A. Falahat, 2006, HONAR-HA-YE-ZIBA, 26, 57-66.

Physical features are the architectural design elements that play a supportive role in a successful K-12 school organizational community with a strong sense of place. When designed with sense of place in mind, flexible, physical learning environments provide K-12 educators with the foundation that allows student-centered educational models and student learning preference to thrive. Student-centered educational models supported by flexible, physical learning environments promote creativity, autonomy, and self-regulation (Parsons, 2017), and skills that are increasingly required by employers today (Jerald, 2009). Even with all this evidence considered, K-12 educators have been slow to adapt from a traditional to a flexible, physical model. Specific recommendations may provide K-12 stakeholders with information to welcome this evolution more rapidly.

The first section provides recommendations for K-12 school district and building administrators. The second section discusses recommendations for K-12 teachers. The third section contains recommendations for policy makers who serve the education and architectural professions.
**District and school administrators.** This study presents an opportunity for K-12 school district and school leaders to provide a more sustainable education for their students. First, district and school leaders must provide a district-wide mission of fluidity and connectedness for inclusivity grounded in a sense of place (Falahat, 2006) to address multiple student learning preferences (Riener & Willingham, 2010). Second, district and school leaders must provide permission, support, and protection for their teachers. Initially, by giving permission to the teachers to be innovative and creative in their teaching methods. Teachers should be encouraged to ask the what if questions. Then, leaders have to encourage and support teacher initiatives for change, and leaders need to provide support to teachers as they pilot initiatives through to completion. Providing permission, support, and experimentation of teacher-led flexible learning space initiatives allows teachers to do a better job at reaching more students through their unique learning preferences. Third, district and building leaders must walk the talk. Leaders need to show their support for flexible, physical learning environments. District and school leaders must provide data that support and communicate the benefits of flexible, physical learning environments. They must facilitate meetings and tours of schools and classrooms in other districts that have similar missions and flexible, physical learning environment renovation projects. Seeing is believing. District and school leaders must provide teachers with the opportunity to apply lessons learned from these tours using student-centered teaching methods (Ahlfeldt et al., 2005; Landau & Meirovich, 2011; Meece, 2003; Park & Son 2010) to create prototypes of flexible, physical learning environments in their own schools.
**Teachers.** Teachers are the ones who have the “boots on the ground” regarding the change. If they are so lucky to have leadership that is ready to provide permission, support, and advocacy of a mission for sustainable inclusivity, they must take advantage of this opportunity. Teachers can take advantage of this opportunity by being open to new ideas, being proactive, and trusting the process that their leaders have laid in front of them. Teachers should volunteer to become a champion for change and tour exemplar schools to get firsthand knowledge. Teachers should explore and implement student-centered learning and teaching methods that reach more students. Student-centered learning and teaching methods shift the focus of instruction away from the instructor and onto the student. The educator acts as a facilitator, encouraging student autonomy and independent problem solving (King et al., 2014). Further teachers must be prepared to embrace the learning curve that flexible learning environments require. New physical features (Falahat, 2006) include interconnected rooms of varying size and shape (Neill & Etheridge, 2008); mobile furniture and technology; and architectural elements such as movable partitions, doors, and finishes. Teachers can embrace these features that allow student and teacher fluidity and connectedness. Fluidity and connectedness are a stark contrast to traditional physical learning environments where furniture is static and faces the front of the room while the teacher presides over the class (Parsons, 2017).

**Policy makers.** Boards of education and state policy makers play a key role by acting as advocates for the implementation of flexible, physical learning environments. They have the power to create new opportunities by developing policies of architectural design that encourage greater inclusivity supported by flexible, physical learning environments. Flexible, physical learning environments promote emotional intelligence
skills (Landau & Meirovich, 2011) that are increasingly required by employers today (Jerald, 2009). Therefore, policy makers hold the key to workforce development as well. The perceived change to flexible, physical learning environments can be a challenge as traditional physical learning environments have been a staple of our educational identity for more than 150 years (Baker, 2012; Leland & Kasten, 2002; Rose, 2012).

School district boards of education represent the voice of district community members. First, boards of education must work closely with district leadership to act in the best interest of all students. This means ensuring environments that allow for inclusivity of all student learning preferences. Second, boards of education must act on leadership recommendations when they are provided with credible data that support flexible, physical learning environments.

Policy makers at state education departments can either welcome or prevent flexible, physical learning environment architectural design elements based on their interpretations of the building codes they use and enforce with K-12 education facilities. In unique circumstances, state planning and design standards create a barrier to sense-of-place physical features that allow collaboration, fluidity, and connectedness of adjacent spaces. First, state policy makers must regularly update their standards, regulations, and building codes to address the evolving nature of educational environments that support the emotional intelligence skills that students need, educators crave, and employers now require. One example is the antiquated New York State Education Department’s Manual of Planning Standards fire and smoke barrier code (The University of the State of New York, 2018). The fire and smoke barrier code was created to isolate spaces from each other for safety. This code has not been updated since 1998, and it does not recognize the
protection that fire sprinklers provide. The 2020 Building Code of New York State (New York State, Department of State, 2019) recognizes a sprinkler system provides the same level of safety as fire and smoke barriers. Unfortunately, the Manual of Planning Standard takes precedent as a more stringent requirement. The fire and smoke barrier code reduces the ability to provide fluidity and connectedness in New York State, K-12 educational facilities. Without the modification or elimination of the fire and smoke barrier code, New York State educational facilities will continue to be designed in alignment with traditional physical learning environments.

Second, state policy makers do not need to start from scratch. They can look to exemplar state education departments and facilities planning departments for flexible, physical learning environment guidance and best practices. States bordering New York State, such as Massachusetts, Ohio, and Pennsylvania are examples of jurisdictions that provide regularly updated design manuals that recognize state building codes while valuing flexible, physical learning environment design.

**Conclusion**

This study aimed to gain a better understanding of K-12 stakeholders’ perspectives of the impact physical learning environments have on student engagement. Flexible, physical learning environments impact student engagement differently than traditional physical learning environments. Traditional physical learning environments promote compliance and assimilation (Parsons, 2017). In contrast, flexible, physical learning environments promote emotional intelligence skills (Landau & Meirovich, 2011). Emotional intelligence skills, which are gained through participatory student-centered learning, are increasingly sought after by employers (Jerald, 2009). Goleman
(2004) posited that emotional intelligence skills are more important than technical skills for developing executive leaders. Awareness of emotional bonds, and the ability to regulate or adapt emotion to a space and fellow space users, is defined as emotional intelligence (Uzzaman & Karim, 2018). Emotional intelligence and sense of place are, therefore, closely linked. This study examined K-12 stakeholders’ perspectives and their understanding of flexible learning environment designs and support for sense of place. Falahat (2006) described sense of place as an awareness that a person is part of a culture, something greater than him- or herself, a sense of belonging. Sense of place is experienced through all five senses and is impacted by (a) activities, (b) meanings, (c) individual features, and (d) physical features. The findings of this study reveal that flexible, physical learning environments provide fluid movement through a connected variety of spaces types that allow educators to implement student-centered learning models more effectively. The use of student-centered learning approaches in flexible, physical learning environments allows educators to inclusively reach more students by safely and effectively addressing multiple student learning preferences. Educators thus become champions for change from traditional to flexible by experiencing the positive impacts flexible, physical learning environments have on student engagement. Educators also benefit by growing into leadership roles as change agents.

A review of the literature revealed substantial relationships linking three topics. One, flexible, physical learning environments have a positive impact on supporting students’ sense of place (Adedokun et al., 2017; Jankowska & Atlay, 2008; King et al., 2014). Two, the link between student sense of place, student emotional intelligence, and student engagement play an important role in student learning (Ahlfeldt et al., 2005;
Three, workplace environments benefit from employees who have strong emotional intelligence skills, and workplace physical environments have adapted to address these employee sense-of-place needs (Dul & Ceylan, 2011). Examination of the literature also revealed two significant gaps regarding the impact physical learning environments have on supporting students’ sense of place. First, there is limited empirical research on flexible, physical learning environments (Blackmore et al., 2011; Brooks, 2011; Chapman et al., 2014; Cleveland & Fisher, 2014; Parsons, 2017). While empirical peer-reviewed studies on physical learning environments exist, most are based in higher education environments. Empirical peer-reviewed studies on K-12 flexible, physical learning environments are all but nonexistent. Second, the architect’s perspective about K-12 flexible, physical learning environments is nonexistent within empirical peer-reviewed studies. Understanding the impact of learning environment design from the architect’s perspective is an important part of the process because teachers may not be thinking about the benefits of design. A more comprehensive level of research and collaboration with K-12 educators and building and district administrators is required to define successful future physical learning environments.

A qualitative study was used to gather the data. A phenomenological research design approach was used to get to the “essence of the experiences for several individuals who have experienced the phenomenon” (Creswell & Creswell, 2018, p. 13) of flexible, physical learning environments. One-on-one, individual interviews used open-ended semi-structured, research questions. Field notes were also collected.
Analysis of the individual interview transcripts included three cycles of coding. Several themes emerged from both research questions. For Research Question 1, in determining the impact flexible, physical learning environments have and if they differ from traditional physical learning environments, four themes emerged: (a) fluidity is important to build and support a positive culture, (b) transdisciplinary learning, (c) physical space design promotes the feeling of a more professional setting, and (d) students feel empowered when they are aware that they are connected and collaborating. For Research Question 2, in determining what information and processes contributed to the school district’s decision to engage a flexible, physical learning environment model, two themes emerged: (a) teaching school versus. embracing learning, and (b) opportunities to have these discussions about the what ifs.

Analysis of the themes revealed three key findings. First, fluidity and connectedness allow teachers and students to transition more easily from bigger spaces to medium to small spaces within a flexible instructional model. Second, flexible learning space does a better job inclusively engaging multiple student learning preferences. Third, seeing is believing. Teachers need to become champions for change to flexible, physical learning environments.

Recommendations for future research were made based on these themes. The same qualitative study should be performed on a larger sample, with greater breadth, in elementary and high schools, rural and urban schools, and schools outside New York State. In addition, quantitative data should be gathered on the impact of flexible, physical learning environment sense-of-place physical features, on architectural design elements,
and on student engagement compared to traditional physical learning environments. Finally, the architect’s perspective must be included in the data-gathering process.

School district and school level leaders should provide a districtwide mission of fluidity and connectedness for inclusivity that is grounded in a sense of place and addresses multiple student learning preferences. As teachers provide a safe environment for student expression, K-12 leadership must provide teachers with permission, support, and advocacy for innovation. Reciprocally, teachers must take advantage of district leadership opportunities by becoming champions for change. By using student-centered learning approaches in flexible, physical learning environments that do a better a job of reaching more students, teachers can be change agents for greater inclusivity. Boards of education need to act on administrator recommendations for physical space that promote equitable opportunities for greater engagement. State policy makers need to welcome design solutions from architects that safely break down barriers, preventing collaboration by increasing a variety of space adjacency, fluidity, and connectedness.

Flexible, physical learning environments provide too many opportunities for improving the current state of education to be ignored. The traditional physical learning environment is no longer an effective model for educating today’s and tomorrow’s students. Flexible, physical learning environments remove the obstacles to student inclusivity and benefit all stakeholders. This study may assist districts that are having trouble shifting their educational paradigm. The study may also serve as an important genesis for educators and architects with convincing evidence that flexible, physical learning environments do more to help our children find their sense of place. A sense of place transcends existing traditional learning environments and educates our future
leaders as lifelong learners for jobs of the future. Providing flexible, physical learning environments is the obligation of executive leaders to foster change and more effectively serve all students and families.
References


Appendix A

Informed Consent Form

St. John Fisher College Institutional Review Board

Statement of Informed Consent for Adult Participants

Flexible, physical Learning Environment Design Elements: How Do They Impact K-12 Stakeholders?

SUMMARY OF KEY INFORMATION:

- You are being asked to be in a research study of flexible, physical learning environment design elements and how they impact K-12 stakeholders. As with all research studies, participation is voluntary.
- The purpose of this study is to examine the perspectives of K-12 stakeholders and their understanding of flexible learning environments design and support for sense of place.
- Approximately six to eight people will take part in this study. The results will be used for an Education Doctorate in Executive Leadership (Ed.D.) dissertation.
- If you agree to take part in this study, you will be involved in this study for a 40-minute individual interview to take place in your school district. Follow-up information will be collected six months after last study visit.
- Individual interviews will take place in your school district and will take approximately 40 minutes each. Interviews will be audio-recorded. There is no preparation needed for the interview. Your participation or non-participation in this research study will not impact any current or future professional relationships with your institution.
- Minimal risk exists, as the probability of and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during routine tests. Participants will be audio-recorded during interviews. There are no additional anticipated emotional or physical risks associated with participating in this study. Participation or non-participation in this research study will not impact professional relationships or collaboration with the researcher or research institution. By participating in this study, participants will contribute to study results, which will add to the current body of research on K-12 stakeholders’ understanding of flexible learning environments design and support for sense of place. If you participate and become uncomfortable answering the questions, you can choose not to answer. In addition, this study is voluntary, and you may withdraw your participation at any time.
- In appreciation of your willingness to meet me for the interview and your time, you will receive a $25 gift card for participating in the interview.
DETAILED STUDY INFORMATION (some information may be repeated from the summary above):

You are being asked to be in a research study of flexible, physical learning environment design elements and how they impact K-12 stakeholders. This study is being conducted and interviews will take place in the school district, District Office and middle school building. This study is being conducted by: Joe Kosiorek, candidate for the Education Doctorate in Executive Leadership (Ed.D.) at St. John Fisher College.

You were selected as a possible participant because you are a District employee that meets the following criteria; (a) you worked in a school building within the District prior to a flexible, physical learning environment renovation project and, (b) you work(ed) in that same school building within the District for at least one year after the flexible, physical learning environment renovation project.

Please read this consent form and ask any questions you have before agreeing to be in the study.

PROCEDURES:

If you agree to be in this study, you will be asked to do the following:

Participate in one 40-minute individual interview of open-ended questions with observation notes taken during interviews. Participants will be audio-recorded during interviews.

COMPENSATION/INCENTIVES:

You will receive compensation/incentive. In appreciation of your willingness to meet me for the interview and your time, you will receive a $25 gift card for participating in the interview.

CONFIDENTIALITY:

The records of this study will be kept private and your confidentiality will be protected. In any sort of report the researcher might publish, no identifying information will be included.

Identifiable research records will be stored securely and only the researcher will have access to the records. All data will be kept by the investigator. All study records with identifiable information, including approved IRB documents, tapes, transcripts, and consent forms, will be destroyed by shredding and/or deleting after 3 years.

When not in use, the audio and electronic files of the data, as well as interview transcriptions, will be secured with access only to the researcher for a period of three years after the successful defense of the dissertation and then destroyed.

VOLUNTARY NATURE OF THE STUDY:

Participation in this study is voluntary and requires your informed consent. Your decision whether or not to participate will not affect your current or future relations with St. John Fisher College. If you decide to participate, you are free to skip any question that is asked. You may also withdraw from this study at any time without penalty.

CONTACTS, REFERRALS AND QUESTIONS:

The researcher conducting this study: Joseph C. Kosiorek. If you have questions, you are encouraged to contact the researcher at _____@sjfc.edu or Faculty Supervisor, Dr. Marie Cianca at _____@sjfc.edu.

The Institutional Review Board of St. John Fisher College has reviewed this project. For any concerns regarding this study/or if you feel that your rights as a participant (or the rights of another participant) have
been violated or caused you undue distress (physical or emotional distress), please contact the SJFC IRB administrator by phone during normal business hours at [redacted] or irb@sjfc.edu.

If you experience emotional or physical discomfort due to participation in this study, please contact your personal health care provider or an appropriate crisis service provider (Onondaga County Mental Health @ [redacted]).

STATEMENT OF CONSENT:

I am 18 years of age or older. I have read and understood the above information. I consent to voluntarily participate in the study.

Signature:_______________________________________________ Date: _________________

Signature of Investigator:_________________________________  Date: __________________

I agree to be audio recorded/transcribed  ____ Yes ____No  If no, I understand that the researcher will explain alternatives to audio recording.

Signature:_______________________________________________ Date: _________________

Signature of Investigator:_________________________________  Date: __________________

Please keep a copy of this informed consent for your records.
Appendix B

Sense of Place Interview Handout

Sense of place is a perceived experience of a physical or cultural environment. An awareness that a person is part of a culture or community, something greater than themselves. Sense of belonging, sense of community, sense of identity, sense of self-worth, are a few derivatives of the term. Sense of place is experienced through all five senses: sight, smell, hearing, taste, and touch.

There are four characteristics of sense of place: activities, meaning, individual features, and physical features. The purpose of this study is to examine perspectives and understanding of flexible learning environment designs and support for sense-of-place physical features.

Sense of place physical features can be defined as learning environment architectural design elements. Collaborative learning, physical comfort, instructor-student interactions, and student-student interactions are four criteria to gauge sense of place.
These four criteria are impacted by physical features described as form and size, texture and decoration, and connection and arrangement.
Appendix C

Introductory Email and Study Information – Superintendent

Date

Dear ________,

My name is Joe Kosiorek. I’m an architect and senior associate at SWBR Architects in Rochester, NY. Currently I’m a doctoral candidate in the Executive Leadership Program at St. John Fisher College. As a requirement for my Ed.D. degree in Executive Leadership, I’m conducting a research study involving district administrators and educators in the field of K-12 education. I’d like to invite you to participate in the study by allowing me to interview you, the Assistant Superintendent for Instruction, the Middle School Principal, Vice Principal, and three Middle School educators. As a follow-up to this email, I will contact your administrative assistant to set up a time to discuss this research study further.

The purpose of this study is to examine the perspectives of K-12 stakeholders and their understanding of flexible, physical learning environment designs and support for sense of place. I’ll be conducting individual interviews with you, the Assistant Superintendent for Instruction, the Middle School Principal, Vice Principal, and three Middle School educators. All interview participants must have experienced the Middle School building for at least a year prior to, and a year after the flexible, physical learning environment renovation project. Critical to this study are the names of Middle School educators who have experienced the Middle School renovation project.

Individual interviews can take place in your school district and will take approximately 40 minutes each. Interviews will be audio-recorded. There is no preparation needed for the interview. Your participation or non-participation in this research study will not impact any current or future professional relationships with your institution.

If you participate and become uncomfortable answering the questions, you can choose not to answer. In addition, this study is voluntary, and you may withdraw your participation at any time.

In appreciation of your willingness to meet me for the interview and your time, you will receive a $25 gift card for participating in the interview.
Thank you for your consideration. Feel free to contact me at (___) ____-____ or ______@sjfc.edu with any study-related questions or concerns.

Please see additional information on the study and confidentiality attached. Also, this information will be reviewed at the time of the interview, and you will be asked to sign the Informed Consent Form prior to participation.

Sincerely,

Joe Kosiorek, AIA
Education Doctoral Candidate, Executive Leadership
St. John Fisher College, Rochester, NY
Appendix D

Introductory Email and Study Information – Administrator & Educator

Date

My name is Joe Kosiorek. I’m an architect and senior associate at SWBR Architects in Rochester, NY. Currently I’m a doctoral candidate in the Executive Leadership Program at St. John Fisher College. As a requirement for my Ed.D. degree in Executive Leadership, I’m conducting a research study involving district administrators and educators in the field of K-12 education. I’d like to invite you to participate in the study by allowing me to interview you. As a follow-up to this email, I will contact you to set up a time to discuss this research study further.

The purpose of this study is to examine the perspectives of K-12 stakeholders and their understanding of flexible, physical learning environment designs and support for sense of place. I’ll be conducting individual interviews with administrators and teachers. All interview participants must have been involved with the Middle School building flexible, physical learning environment renovation project.

After communicating with __________, they forwarded the names of District employees with connections to a district school with a flexible, physical learning environment that would meet the objectives of the study. You are a District employee who meets the criteria of this study.

Individual interviews can take place in your school district and will take approximately 40 minutes each. The interviews will be audio-recorded. There is no preparation needed for the interview. Your participation or non-participation in this research study will not impact any current or future professional relationships with your institution.

If you participate and become uncomfortable answering the questions, you can choose not to answer. In addition, this study is voluntary, and you may withdraw your participation at any time.

In appreciation of your willingness to meet me for the interview and your time, you will receive a $25 gift card for participating in the interview.
Thank you for your consideration. Feel free to contact me at (___) ___-____ or ______@sjfc.edu with any study-related questions or concerns.

Please see additional information on the study and confidentiality attached. Also, this information will be reviewed at the time of the interview, and you will be asked to sign the Informed Consent Form prior to participation.

Sincerely,

Joe Kosiorek, AIA
Education Doctoral Candidate, Executive Leadership
St. John Fisher College, Rochester, NY
Appendix E

Interview Protocol (Flexible, physical Learning Environment Design)

Introduction:
Thank you for agreeing to meet with me today. I am a doctoral candidate at St. John Fisher College who is conducting research on Flexible, physical Learning Environment Design Elements and How They Impact K-12 Stakeholders. The purpose of our interview today is for me to gain insights on the perspectives of K-12 stakeholders and their understanding of flexible learning environment designs and support for sense of place (Falahat, 2006). Empirical research on flexible learning space is limited to the higher education educator perspective (Blackmore et al., 2011). Workplace physical environments have adapted to meet space variety and flexible for physical space that employees need but K-12 school environments have not. Research about the impact K-12 flexible, physical learning environment design types have on stakeholders is all but nonexistent.

You were selected as a District employee who meets the criteria explained in this protocol. All participants in this research study are employed within this district. The interview will last approximately 40 minutes and all comments will be kept confidential. I ask that you not share comments made by the other persons participating or not participating in this interview process. Your name and school will not be connected to any specific comments or conclusions articulated in this study. If specific quotes are used, your position may be identified (example, central office administrator, building administrator or teacher) but not your school, specific title, or district.

With your permission, I will be recording our interview today for purposes of transcription. The recording will not be used in any publication or presentation. Lastly, I will provide you with an opportunity to ask questions, so you can clarify any comments you may have made during our conversation. Do you have any questions before we start?

Interview Protocol (Flexible, physical Learning Environment Design)

Interview Location: ____________________________  Date:

Participant Name: ____________________________  Time:
Question 1 (RQ1). To begin, tell me if there is anything different about the design of CNY Middle School that sets it apart from other schools.

Probes:
- In what ways, if any, is the school’s physical space influenced by pedagogy?
- In what ways, if any, is the school’s physical space influenced by technology?
- Can you describe any physical features of the school that contribute to greater sense of place?
- In what ways, if any, do you see these features or parts working together?
- In what way, if any, has the new design impacted culture?
- Is culture or sense of place important and if so, why?

Question 2 (RQ1). Describe the physical features of the CNY Middle School before the renovation project.

Probes:
- What were the benefits?
- What were the challenges?
- In what ways, if any, did these features impact students?
- In what ways, if any, did these features impact educators and/or administrators?

Question 3 (RQ 1). Describe the physical features of the CNY Middle School after the renovation project.

Probe:
- In what ways, if any, are spaces different now?
- What are the benefits?
- What are the challenges?
- What changes, if any, did you see in students?
- What changes, if any, did you see in educators and/or administrators?

Question 4 (RQ 2). Can you describe any information that contributed to your confidence in a flexible, physical learning environment renovation project for you and students?

Probes:
- Prior to working in this district, did you work in a district with flexible, physical learning environments?
- Where did you first hear about flexible, physical learning environments?
- What, if any, were desirable physical features of the flexible, physical learning environment model?

Question 5 (RQ 2). How were you involved in the decision to proceed with the WNY Middle School renovation project?

Probes:
- What was the consensus building process, and if so, how were you involved?
- What barriers or obstacles were there to implementing a flexible, physical learning environment renovation project?
Question 6. Our interview is coming to a close. Are there any key aspects that we haven’t discussed that you would like to add.