MAKING PLACES, MAKING LEARNERS: PLACE-BASED APPROACHES TO DESIGNING LEARNING ENVIRONMENTS IN THE AGE OF THE INFOBAHN

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Whenever humanity seems condemned to heaviness, I think I should fly like Perseus into a different space. I don’t mean escaping into dreams or into the irrational. I mean that I have to change my approach, look at the world from a different perspective, with a different logic and with fresh methods of cognition and verification.

Italo Calvino, *Six Memos for the New Millennium*

This dissertation is dedicated to my parents, Dr. Paul J. Wolff II and Gloria Elaine Wolff. They were the first in their families to graduate from college. My mother finished her bachelor’s degree in her thirties while also battling lung cancer and at a time when the idea of working mother who attended college was rare. She participated in commencement ceremonies just a few weeks before she died, a true testament to her determination and thirst for knowledge. My dad also received his MBA at a time when this credential was not yet common and when many in his family considered reading books and academic research to be acts of caprice. Despite this resistance and while raising a family, he went on to pursue three additional degrees, the last at Yale University—a master’s degree in archeology, earned at age 70. His time at Yale overlapped with my architectural studies at the Graduate School of Design at Harvard University. We enjoyed one of the oldest football rivalries attending games together in New Haven or Cambridge. Although during our time in school the series was split 2/2, he always reminded me about the Bulldog’s historic edge over the Crimson. We lamented about the academic demands, shared stories of brilliant and eccentric professors, and discussed our passions over a cold Fosters in Mory’s Temple Bar (New Haven, CT) or at
the Pit in Harvard Square (Cambridge, MA). Those were “halcyon days,” as my dad used to call them.

In addition to my parents, I must thank several others who have touched my life and provided encouragement. For instance, the Eghtessad family, though residing in other parts of the world, have embraced my quest and treated me as one of their own. Without fanfare, they have provided a sense of belonging and a feeling of comfort that I will always cherish, especially after my dad’s passing. Longtime companion MJ and confidants Karen Lambert, Karen Shrader, and Janine Von Juergensonn remained stalwart, friendly beacons in the otherwise unexplored territory of academic research. I also thank cousins Les, Daniel, and my dear, sweet Aunt June, who still calls me “Paulie” and who listened, along with her cat Keeley, to my musings and aspirations for this research.

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I am also very appreciative that several Penn professors tolerated my artistic side and my penchant for making things, even though this program was housed within the
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At times during this process I have felt like some sort of alien in a foreign land. The experience is not unlike that of the three-dimensional visitor who descends upon the two-dimensional inhabitants of Edwin A. Abbott’s Flatland. In this fictional tale the problem is that the friendly visitor (a sphere) is so misunderstood by the inhabitants that he is considered to be a pariah because he is so different. But eventually he is able to
convince the narrator of the story (a square) that there is more to the world than might be apparent from his current vantage point, by peeling him away from Flatland. At the end of the story, the square spends his days trying to convince his countryman to escape the confines of limited dimensionality. My journey was also seemingly impossible at times, just as the journey was for the visitor to Flatland. But despite the many furrowed brows, crossed arms, rolling eyes, and the occasional disillusionment I have experienced, there is a happy ending. I am left with a feeling of hope that it is indeed possible to create new ways of seeing, open spaces for possibilities, and find new ways of discovering knowledge.
ABSTRACT

MAKING PLACES, MAKING LEARNERS: PLACE-BASED APPROACHES TO DESIGNING LEARNING ENVIRONMENTS IN THE AGE OF THE INFOBAHN

Paul John Wolff III
Eric Kaplan

The miniaturization of electronics, the commodification of information, and the growing domination of communications technology have created a culture characterized by a compressed sense of time and space. In this realm, technology allows immediate contact with people anywhere around the globe. Computers and smartphones collapse multiple geographies into one, with a touch of a button, by allowing real-time communication from any place. In this Age of the Infobahn, there are no physical buildings, landscapes, or bodies of water. Residents are likely to be avatars (digital representations of a people) whose sense of continuity and belonging is derived from being networked to the widely scattered people and places they care about. Functions that were once served by architecture, furniture, and fixed equipment are now shifting to portable devices. Places are constructed with bits (of information) and electronic glue.

Although making places for human habitation long has been the domain of architects, landscape architects, and urban planners, the realm of cyberspace does not yet utilize the theories, experiences, and practices that have guided the design of physical spaces for centuries. Just as there is a need for public parks and squares to be pleasant and
welcoming to a diverse population in order to function effectively, so must the interfaces and places in cyberspace be. Just as there are architecturally significant places in the physical world, there also must be significant places in the virtual world. Thus, architectural frameworks are important for facilitating functional, enduring, and aesthetically pleasing virtual places where real people may interact with each other and with the place. This dissertation explores the similarities and differences of physical and virtual placemaking, and the extent to which the approach may impact the learning experience for students and/or the shape of learning spaces in the future.
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Chapter 1

Introduction

Author’s rendering of the concept of the Infobahn, a metaphorical highway that connects us to each other, reduces physical distance and permits us to gather and communicate in virtual places.
The miniaturization of electronics, the commodification of information and the growing domination of communications technology have created a culture characterized by a compressed sense of time and space. In this realm, we enjoy a capacity to make immediate electronic contact with people anywhere around the globe. Technology allows images and voices to be compressed so that they can travel almost instantaneously to any region. Devices such as computers and smartphones collapse multiple geographies into one, with a touch of a button, by allowing real-time communication from any place. For example, the travel-time between geographies such as Twitter, Facebook, voicemail, websites, news and incoming calls, is almost instantaneous, as computer-processing speeds exceed 185,000 miles per hour (Fattahi, 2008). In practical terms, this means that friends may communicate easily via cheap phone cards whether in Rome or Rotterdam. Mothers or fathers stationed at military outposts located in Central Asia, Western Europe, Japan or Latin America can “see” their children, no matter how many miles or time zones may separate them. Astronauts living in the International Space Station may be orbiting the planet at 17,500 miles per hour (10 times faster than the average bullet leaves a gun), but they still communicate regularly with their commanders in Houston, and their families in America and Russia (Fishman, 2014). The collapse of space allows the earth’s continents to be joined conceptually as a supercontinent (a new Pangea), where South America is adjacent to Africa and North American is connected directly to Europe.

In this Age of the Infobahn, there are no buildings, landscapes, bodies of water, or the concepts of air and the planetary system. Topography is defined by electronic circuitry and unseen neural-like pathways. Settlements for habitation have no definitive physical boundaries. No one can explain their location on a map or give directions to
strangers who are lost. Instead, they are bound by bandwidths and formed through repeated interactions. Residents are likely to be avatars (digital representations of a people) whose sense of continuity and belonging is derived from being electronically networked to the widely scattered people and places they care about. Functions that were once served by architecture, furniture and fixed equipment are now shifting to portable devices (Mitchell, 2003). There are no buildings constructed with brick and mortar. Places are constructed with bits (of information) and electronic glue. Traditional spatial organization has been replaced by strategies for creating virtual worlds that feature nomadic occupation. Travel occurs on a metaphorical highway (the Infobahn) that is self-organizing and has no central planner. Unlike traditional highways, the Infobahn does not have fixed configurations and does not connect physical locations. Information highways have ever-changing configurations and link information sources. Like roads that allowed the movement of goods, people, and services, the Infobahn connects us to each other, reduces physical distance and permits us to gather and communicate.

But how is the concept of “place” manifested in the Age of the Infobahn? What gives meaning to virtual places when there are few if any physical artifacts, and limited face-to-face social interactions? What makes us “like” virtual places? What makes us return to these places and share them with friends? Is there an electronic equivalent of an Agora (the “e-Agora”)—the center of athletic, artistic, spiritual and political life in Greece and Rome, where citizens gathered to discuss politics, enjoy the marketplace and to seek understanding from great thinkers about the meaning of life?

Making places for human habitation long has been the domain of architects, landscape architects and urban planners (Kalay & Marx, 2011). Some of the principles
that have evolved over time are more clearly defined than others. For example, the *Vitruvian Triad*, a treatise dating from antiquity, outlines best practices for architecture. These ideals include *utilitas* (function/commodity/utility), *firmitas* (materiality/solidity/durability) and *venustatis* (beauty/delight) (McEwen, 2003). The first two dimensions (utility, durability) deal with how a space functions for inhabitants, and how long it lasts. These are more definitive aspects of a place than the third dimension, (venustatis), which deals with artistry and aesthetics. Even with detailed guidelines, the act of “placemaking” is not the mere creation of spatial arrangements using walls and furniture. It also involves the concept of co-presence, a sociological concept that describes ways in which people interact with one another (Mulbach & Prusslog, 1995) Slater, Sadagic & Schroder, 2000, Zhao) and the concept of the Zone of Proximal Development, which emphasizes the importance of social interaction in learning (Vygotsky, 1967). The process of placemaking also involves the use of *tacit knowledge*; a philosophy suggesting that what may be expressed in words and numbers is just a small part of an individual’s actual knowledge. In other words, tacit knowledge refers to knowledge acquired from previous experiences (Polanyi, 1966).

These placemaking strategies, both the defined and ephemeral, are also relevant to the creation of virtual spaces. For example, just as there is a need for public parks and squares to be pleasant and welcoming in order to function effectively, so must places be conceived on the Infobahn. Just as there are architecturally significant places in the physical world, there must also be significant places in the virtual worlds. Thus, there is a need to reconstruct ideas of placemaking in the evolving social, cultural, economic, and technological context of this new era of information (Matthew, 2011). And architectural
frameworks are important for facilitating functional, memorable and enjoyable virtual places where real people may interact with each other and with the place itself.

This dissertation explores the similarities and differences of the approaches to virtual placemaking in selected virtual classrooms, and the extent to which the approach or the institutional context may influence the spatial qualities and affordances found within the learning spaces. Interviews with those involved with the creation of virtual environments were conducted with course designers, software makers, external consultants, faculty, administrators, and information technology experts. The responses were analyzed using principles of the Vitruvian Triad to assess the balance of approaches to the design of classrooms and in terms of the affordances for social interactions in the classroom. In addition, artifacts such as screen captures from home pages, secondary spaces and virtual simulation activities were obtained from courses in the fields of mathematics, nursing and foreign languages. These artifacts were analyzed in terms of their spatial dimensions, the flow of information and communication (co-presence) and their embodiment, a term used to describe the amount of involvement of human bodies in the process of communication (Zhao, 1996).

Since the notion of a “sense of place” is not well understood outside the design fields, this research study seeks to define the concept within the realm of virtual learning environments. In addition, the research helps to fill gaps in knowledge related to describing virtual places in terms of their proximity (distance), co-presence/embodiment (the feeling of being together), visibility (can you see other people?), and territoriality (control/ownership of space).
There is a need to address the fact that digital technologies have influenced the behaviors, thinking and learning of today’s students (Digital Natives; those born after 1980, who have grown up with video games, instant messaging, and smart phones). As students have moved into the Age of the Infobahn, the learning styles are significantly different, yet prevailing pedagogies that are based on teachers talking in classrooms, textbooks, memorization and content-based tests, are becoming increasingly out dated. Digital natives prefer to learn from hyperlinked, random access, digital sources and with the assistance of online cameras, simulations, games, wikis, blogs that they help to create (Kelly et al., 2009). As such, the study of a sense of place in virtual classrooms is an opportunity to compare the use of solitary or social learning strategies and the ways in which social learning and collaboration are supported.

There is also a need to have a more complete understanding of a sense of place in virtual learning environments since there are high attrition rates for online courses (in comparison to face-to-face courses). For example, Columbia University’s Community College Research Center found that students who enroll on online courses are significantly more likely to fail or withdraw than those in traditional classes (Jaggars, 2011). A five-year study issued in 2011 tracked 51,000 students enrolled in Washington State community and technical colleges. It found that those who took higher proportions of online courses were less likely to earn degrees or transfer to four-year colleges. Other research from Harvard and MIT on 17 Massive Open Online Courses (MOOCs) offered in 2012–2013 found that 50% of people left within two weeks of enrolling and that student engagement was impacted by the asynchronous nature of courses (Hoe et al., 2013). According to Perna et al. (2013), only 2 to 14% of the one million MOOC users
that they investigated completed their courses, depending on the course. Thus, the study of a sense of place may help to provide insights that may be used to improve the engagement of learners in online classrooms as well as retention rates in small or large-scale applications such as MOOCs.

The ambition of the research is to inform understanding of how a sense of place in virtual learning environments may be operationalized in the future. The research questions are as follows:

1. What is the concept of a “sense of place” in virtual learning environments?
   a. What are the characteristics that constitute “a sense of place” in virtual learning environments?
   b. What are the boundaries and connectedness of virtual learning environments?
   c. To what extent is a “sense of place” associated with social interactions and collaboration in virtual learning environments?

2. In what ways can frameworks from the physical world be applied to the design of virtual space? Frameworks include the Vitruvian Triad, the Zone of Proximal Development (Vygotsky), and concepts of tacit knowledge (Polyani) and telepresence (Zhao).
Chapter 2

Literature Review

A brief overview of the constellation of ideas surrounding the concept of a “sense of place” helps in understanding how virtual and physical learning spaces relate to one another in the Information Age and within the context of higher education today.

What Is a Place?

People always exist in some place. A “place” may be defined as a unique physical setting that permits a wide spectrum of human activities and also affects social behavior. It is a composite arrangement of cultural, social, personal, and physical relationships that a participant in the space constructs through time (Matthew, 2011). The identity of a given place is rooted in human social interactions and, as such, no two places are exactly alike. It is the sense of other people’s presence and the ongoing awareness of their activities that gives meaning to one’s own actions and behaviors (Kalay & Marx, 2003).

A place is distinct from a “space” because a place embodies social and cultural values, and is defined by human activity (Casey, 1997). For instance, an auditorium space may be used for musical concerts, trade shows, or lectures by professors. The musical activity during the concert frames the human activity and provides cues that organize appropriate behavior. People likely would not sing songs and sway back and forth with their arms in the air in celebration during a lecture event, as they might during a concert by their favorite band. In this example, all three activities share the same space, but the activities define and organize the meaning of the place differently. People inhabit spaces, not places (McCarthy et al., 2005).
What Is a “Sense of Place?”

The term “sense of place” defines the attributes and experiences that give a space its meaning. This meaning is derived from human sensory experience and social interactions (Brown, 1981). The meaning of the place may be thought of as an added quality that is acquired by users through their actions and those of others (Kalay & Marx, 2003). The sense and quality of engagement makes the place, regardless of the physical environment. And it is the type of experiences and activities enabled that allows individuals to associate similar places and put them in relation to each other (McCarthy et al., 2005). In the example of an auditorium space that is rented for trade-show events, it is the sense of place that makes it appropriate to walk informally among the displays and exhibits, ask questions, take free samples of products, and enter raffles. This behavior is understood as appropriate because of the participants’ association with other trade-show events in the past. Not all physical places have a sense of place. In a similar way, virtual places also would have a spectrum as far as sense of place is concerned.

To further understand the concept of a sense of place, consider the popular High Line in New York City. This is a public park built on a historic freight rail line elevated above the streets on Manhattan’s West Side. Built in the 1930s as part of a public-private infrastructure project called the West Side Improvement, it was created to move freight and to isolate dangerous trains from the streets of what was a large industrial district (Jones, 2002). With the demise of the rail in the 1980s, citizens in the community formed a nonprofit group and worked with the city of New York to convert the abandoned railroad structure into a 1.5-mile-long public park. The High Line, designed by Diller Scofidio+Renfro, is inextricably linked to a long history of people and their activities;
it thereby represents a composite of many layers of human experience, including sensory perception, feelings, social engagements, the presence of others, as well as cultural rules and conventions (Louisiana Channel, 2013). (See Figure 1.) Upon closer inspection, then,

![Figure 2](https://www.friendsofthehighline.com)

**Figure 2.** The High Line runs through three of Manhattan's most dynamic neighborhoods: the Meatpacking District, West Chelsea, and Hell’s Kitchen/Clinton. When the High Line was built in the 1930s, these neighborhoods were dominated by industrial and transportation uses. Now many of the warehouses and factories have been converted to art galleries, design studios, retailers, restaurants, museums, and residences. The West Chelsea Historic District focuses on the industrial history of the neighborhood and includes many historically and architecturally significant factory and warehouse buildings.

The High Line’s sense of place includes a composite of many layers of human experience, including sensory perception, feelings, social engagements, and the presence of others, as well as cultural rules and conventions. Sources: Author’s photo (2012); inset image is from Friends of the High Line (www.friendsofthehighline.com).
the High Line is much more than the mere configuration of buildings and landscape elements (Jencks, 2002).

Scholars have unpacked the concept of a sense of place into social, political, personal, and physical attributes that a user brings to a location (Coifi & Bannon, 2005). (See Figures 2a, 2b.) These visualizations are important mechanisms for understanding the information that otherwise might be hidden from the casual observer. By unpacking the components of a well-known space, such as the Spanish Steps in Rome, it is possible to reveal unexpected cultural, social, personal, and physical layers of meaning. Designed by Francesco de Sanctis in the 18th century, the Spanish Steps link the Spanish Embassy and the Trinita dei Monti church leading to the Piazza di Spagna. The stairs work in concert with the famous Barcaccia Fountain (Bernini)—which references a fishing boat carried away by the flood of the Tiber River in 1598—to create an inviting public gathering place. It is flanked by the last home of the romantic poet John Keats and the Trinita dei Monti church, replete with art created by pupils of Michelangelo. The Spanish Steps are surrounded by a vibrant, mixed-use area of shopping, food, and residences (Marcu, 2012). This place also has special cultural meaning for Romanian immigrants. During their exodus from Spain as their country entered the European Union, Romanian immigrants flocked to Rome and found refuge in the neighborhoods adjacent to the Spanish Steps. Thus, many view the place as a symbol of freedom (Suleiman, 1998). It is the layering of human experiences—involving personal, social, and political components—and its physical location that give meaning to the Spanish Steps as a place.
Figure 3a. This diagram illustrates how the concept of place may be “unpacked” into different layers including cultural, social, personal, and physical components. (Source: Ciolfi, 2005.)

Figure 3b. The Spanish Steps in Rome, Italy, function as a mecca for arts, shopping, and culture. A public fountain (Fontana della Barcaccia) creates a social gathering place (literally, a “watering hole”) for visitors and residents. Buildings such as the Trinita dei Monti and the former residence of literary icon John Keats contain artwork by Caravaggio and pupils of Michelangelo. Other artifacts in the space include a symbolic obelisk and column (Colonna dell'Immacolata). Sources: Author’s photos; www.aviwomcities.com.

Sense-of-place research has theorized emotional connection between people and places and has attempted to quantify the meaning (Tuan, 1974). Scholars have divided the sense of place into smaller subsets including place identity, which is a person’s identity with relation to the physical environment (Prohansky, 1978); place attachment,
which is defined as the positive bond that develops between a person and his or her environment (Altman & Low, 1992); place dependence, which is defined as the perceived strength of association between a person and place (Stokols & Shumaker, 1981); and place satisfaction, defined as a person’s level of satisfaction with the services, environment, and needs provided for by a specific place (Stedman, 2003). Sense of place has been studied as associated with home (Jorgenson & Stedman, 2001), neighborhoods (Brown & Werner, 2009), natural areas (Davenport & Anderson, 2005), and historical places (Lewicka, 2008). The field of service learning has used the concept of a sense of place to describe place-based education for more than 30 years (Gruenwald, 2003; Smith, 2002; Sobel, 2004; Tuan, 1977). There is also a large body of work describing the sense of place in service learning in diverse academic specializations such as the arts (Hutzel, 2006; Vinson, 2013) and in deaf culture and interpreter education (Monikowski & Peterson, 2005).

Scholars also have studied the lack of a sense of place, which may be called “placelessness,” a feeling of not belonging (Relph, 1976) or of a place losing its soul (genius loci) associated with identity (Norberg-Schultz, 1980). For example, research has demonstrated that people in the city of Rjukan (Norway), a completely constructed town run by a single company (Norsk Hydro), experience a sense of loss (placelessness) owing to economic conditions. Industrial jobs, once the core identity of this rural town, created the material and immaterial conditions for a whole way of life and emerging feelings of Norwegian identity in the 1920s (Berkeland, 2008). This is not unlike the plight of many industrial towns in Europe, which have experienced declines in population and jobs since 1945 (Dahl, 1983).
Placemaking in the Physical World

Making places for human habitation has been the domain of architects for centuries. The earliest-known architect is Marcus Vitruvius Pollio (AKA “Vitruvius”), known only as the author of the first and most famous text (*De Architectura*) in the history of Western landscape architecture, architecture, engineering, and town planning. Vitruvius’s book became the chief reference on classical architecture throughout the Renaissance, Baroque, and Neoclassical periods and was the inspiration for other books such as Alberti's *Ten Books on Architecture* (1452), Palladio’s *Four Books of Architecture* (1570) and Henry Wotton’s *Elements of Architecture* (1624) (Kruft, 1994). Specifically, Vitruvius described several principles that still guide architectural design today, including *utilitas* (function/commodity/utility), *firmitas* (materiality/solidity/durability), and *venustatis* (beauty/delight) (McEwen, 2003). The original Latin text follows (Vitruvius, Pollio, & Krohn, 1912):

> Haec autem ita fieri debent ut habeatur ratio firmitatis utilitatis venestatis., firmitatis erit habita ration, cum fuerit fundamentorum ad solidum depression et quaque e material copiarum sine avaritia diligens election, utilitas autem, cum emendate est sine inpeditone uses locorum disposition et ad regions sui culusque generis apta est commode distribtio, venustatis vero cum fuerit operis species grata et elegans membrorumque commensus iustas habeat symmetiarum raticinatios.

Although this treatise reflects the architecture of antiquity, the three principles are related to contemporary placemaking. Vitruvius theorized that architecture must be understood with regard to all three aspects in order to create enduring human environments. For instance, if a building were functional but poorly constructed, it would not endure. In a similar way, if a building were beautiful but not functional, it also would perish ultimately. The most complex of the Vitruvian triad is *venustatis*,

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because it requires a sense of artistry, personalization, and aesthetics (Zotic, 2013).

Aesthetics is a subjective, multifaceted concept that originated in 18th-century philosophy (Shelley, 2009; Zangwill, 2009). The concept of aesthetics is often associated with art and architecture, but is also found in literary studies, visual arts, and philosophy. Aesthetics can be described as a concept that seeks to crystalize human perception and sensations (Gigliotti, 1995), often in terms of beauty (Carlson, 2009; Jacobson et al., 2004; Shelley, 2009; Zangwill, 2009). Some scholars consider aesthetics to be a bridge that melds the sensory experiences through cognitive processes (Eisenberg, 2006; Weick, 1995) while others consider aesthetics to be a form of knowledge gained from the five senses (sight, touch, sound, smell, and taste) and by the human capacity for aesthetic judgment (Strati, 1999).

The concept of aesthetics is directly related to the Vitruvian dimension of \textit{venustatis}, and it is what distinguishes ordinary places from great ones. For instance, both the Highline in New York City and the Spanish Steps in Rome are considered to be remarkable places because of their aesthetic qualities, which stimulate all the senses and create a visceral “knowledge” that spans a wide range of experiences. The observation that people “can know more than they can tell,” otherwise referred to as “tacit knowledge,” may explain the remarkable places, though it is a challenge to articulate the reasons (Polanyi, 1967). The dimension of \textit{venustatis}, as part of the Vitruvian framework, has been applied to urban planning, game design, computing, fine art, and other design-related fields. Scholars also have applied the Vitruvian framework to nonphysical constructs such as higher education leadership and organizational design (Daas, 2013).

Architects’ dominance in the realm of placemaking for colleges and universities
dates back to the 13th century in Europe, with the first buildings constructed at Oxford, such as University College (1249), Balliol (1263), and Merton (1264). The first well-known campus architect was undoubtedly Christopher Wren, who influenced the physical fabric of Oxford and Cambridge University with classically styled buildings that have been emulated throughout the world. Other well-known campus architects include Alexander Davis (Yale University, University of North Carolina, and Virginia Military Institute), Thomas Jefferson (University of Virginia), Frederick Law Olmstead (Trinity College, Stanford, and Smith College) and Le Corbusier (Harvard University and Chandigarh College of Architecture) (Turner, 1984).

In the context of existing research of learning spaces, it is also well understood that architectural design impacts collaboration and social interactions in an educational context (Harrison & Dourish, 1996; Semken & Freeman, 2008; Stevenson, 2008). Architecture also establishes and frames the co-presence of inhabitants to enable them to interact socially (Hillier, 1996; Schnadelback et al., 2007). In addition, aesthetic elements in built architecture, such as texture and color, have been found to affect mood, behavior, perceptions of room size, eye strain, and even work performance (Higgins et al., 2005). Lighting is another well-researched phenomenon in learning spaces and has been shown to affect the mood, long-term memory, and problem-solving ability of both male and female students. Lighting also has a significant impact on general learning performance and health of students (Engelbrecht, 2003; Woolner et al., 2007).

Although architecturally significant buildings are considered to be a primary development in campus planning during the last two decades, this trend of innovation, creativity, and experimentation appears to have stopped at the front door of the online
campus environment (Coulson et al., 2013). For instance, consider the Skysong at Arizona State University (Pei Cobb Fried & Partners) (Figure 4) and Simmons Hall at MIT (Steven Holl) (Figure 6). The facades of these buildings—which greet the public and contribute to creating a dramatic sense of place in Phoenix, Arizona, and Cambridge, Massachusetts—are in stark contrast to the façades of the virtual campuses/classrooms associated with these two institutions. (See Figures 3, 5.) (Note: Façade refers to the conceptual “face” of a building that is projected to the public.) This phenomenon is not unique to Arizona State University or MIT. In fact, it appears that the interfaces for virtual campuses are often indistinguishable from other schools, companies, nonprofit organizations, corporations, and government agencies.

Figure 4. The interface of the online campus for Arizona State University (ASU) contains a simple design layout and nearly two dozen links for additional information on their courses and the university. The site has a color palette of yellow and gray and is branded with the ASU online logo. Text is minimal on the page and there are links to several informational videos accessed by clicking on an icon of the people found within each video. Source: www.asuonline.asu.edu.
Figure 5. The SkySong Innovation Center at Arizona State University (2009) is a multiuse development on a 42-acre site in Phoenix. The unifying feature, and namesake of the development, is “SkySong,” a freestanding ornamental feature designed to provide shade to the four plazas located at the intersection of the two main streets of the development. The fabric mesh of the iconic structure reaches 80 feet at its highest point, and the structural supports reach 110 at their peak.

A collaboration between Pei Cobb Freed and Partners, FLT Design Engineering Studio, and AECOM, the site and buildings were designed to advance the concept of an “outdoor laboratory” to demonstrate how urban projects can be built in the desert environment. Interiors are designed with open plans and use of color to designate different types of working spaces that can be private, semiprivate, or collaborative.
Source: AECOM (www.aecom.com).

Figure 6. The interface of this online course (User Interface Design and Implementation) at MIT contains a design layout dominated by one primary four-color image. It also features 10 links for course-related information, four links for information related to the college, three links for social media, and a “submit” button for assignments. The site has a black-and-white palette branded with the MITOPENCOURSEWARE logo. Text is minimal on the page and there are no video links on the course home page. Source: www.mitopencourseware.com.
Turn sideways and the dorm reveals an unexpected use of color. The colors surrounding the windows were assigned according to the stress that this portion of the PerfCon wall must bear. Red means high stress, blue indicates a lesser load, and the windows that have no color (the unpainted aluminum panels) signify the least load. Simmons Hall transforms into a gigantic stress diagram that is as much an in-joke to engineering students as it is a wonderment of color to passers-by. Scientific rationale meets individual creativity.

Inside, students gather in communal “blob” spaces and reside in “neighborhoods” that provide privacy (Sokol, 2002).
Just as there are architecturally significant or insignificant buildings in physical places, there are also architecturally significant or insignificant virtual worlds. Online learning environments have been criticized for being faceless, frustrating, alienating, and unreal (Paxton, 2003). Other scholars assert that online learning environments can be isolating, inhuman, cold, even hostile (Brabazon, 2002), and disembodied (Clark, 2002) for students. Students have reported experiencing a “flood of information” (Cluett & Skene, 2007) and feeling alienated in what is termed the “jungle syndrome,” a shorthand for an organizational mess (Hudson, 2002) with uninviting aspects (Paxton, 2003). These observations were especially true in the early days of online environments, but are still prevalent today. A sense of place is unquestionably needed in online learning environments (Brook & Oliver, 2003; Lorian & Newbrough, 1996) to maximize the quality of student learning.

Creating a “sense of presence” is a means to build an online community where participants experience a sense of belonging to overcome the disorientation and isolation commonly experienced by students in online classes (Brooke & Oliver, 2003; Lehman & Conceicao, 2010; Northcote, 2008).

And it appears that transferring Vitruvian frameworks from physical worlds to virtual worlds could be a useful strategy for improving a sense of place. Virtual classrooms already borrow many familiar forms from physical worlds such as the desktop, files and folders, pages, and even the trash can. The design of places in virtual worlds often relies on our experience and knowledge of architectural design (buildings and landscape elements in particular) in the physical world. The metaphor of place and reference to architectural design concepts provide a consistent and familiar base for
people in the virtual world (Gu & Kaher, 2014). Thus, it might be said that no virtual environment can exist without some reference to a physical setting.

**Placemaking in Cyberspace**

Making places in cyberspace is currently the domain of instructional designers and technology specialists. *(Note: The term “cyberspace” may be thought of as a metaphor for describing the nonphysical terrain created by computers.)* The use of the term “instructional designer” came into common use in education during the 1970s. It refers to the process of systematically applying instructional theory and empirical findings to the planning of instruction and is linked conceptually with the field of applied educational psychology (Schwier et al., 2007). The process for developing learning materials typically begins with a focus on an instructional goal that represents what the learner will be able to do when the instruction is complete (Dick, 1987). Professional training for instructional designers emphasizes the study and application of systems to create learning products and includes exposure to design models, various types of skill development, and achievement of a generally accepted set of competencies (IBSTPI, 2000; Richey et al., 2001). The International Board of Standards for Training, Performance and Instruction (IBSTPI, 2000) lists four categories of competencies: professional foundations, planning and analysis, design and development, and implementation and management. Despite the successes and satisfactions experienced by students, many feel that a number of required skills are not addressed in formal instructional design programs (Schwier et al., 2007). In that light, the disconnect between what instructional designers are taught, and what they are required to perform in the workplace, needs to be explored.
Best Practices for Placemaking and the Design of Online Learning Environments

During the last decade, researchers in architecture-related fields have defined specific criteria for placemaking in virtual environments that suggest best practices for those designing places. These include creating a setting for complex and rich events that provide a reason and purpose for being there; engagement with objects or people; and embedding a relative sense of location to let a participant know where he or she is, as well as what is behind and ahead. Placemaking guidelines for virtual environments also include making places adaptable to allow for the appropriation of the specific needs of the user and to make the place personal, affording a variety of experiences that can provide multiple points of view, different scales, levels of abstraction, and temporal perspectives; and designing places that are memorable (Kalay & Marx 2003). Other scholars have developed similar recommendations for aspects of placemaking such as association, authenticity, activity, and task-based criteria (Coyne, 1999); recommendations for mixing experiences within a space (Relph, 1986); and recommendations for engagement and personalization of space (Laurel, 1990). In addition, recent scholarship proposes a matrix of considerations for placemaking professionals. (See Table 1.) The matrix correlates the multiple dimensions of virtual environments in terms of the purposes they serve, features they require, and experiential potential they offer, instead of using the degree of visual correspondence between real and virtual worlds to discuss place (Arya, 2012).

Scholars in the field of human-computer interaction also have created guidelines for the design of online environments (user interface design) that are widely adopted as best practices (Nielson, 1999). “Heuristic evaluation,” a process for exploring
experience-based problem solving and learning, includes 10 basic tenets. These include
visibility of systems; matching system and the real world; user control and freedom;
consistency and standards; error prevention; recognition rather than recall; flexibility
and efficiency of use; aesthetic and minimalist design; helps users recognize, diagnose,
and recover from errors; help and documentation. The general idea behind heuristic
evaluation is that multiple evaluations help to quickly identify potential usability
problems and solutions (Golob, 2010).

Table 1. This matrix illustrates a variety of types of virtual environments, features, and cultural attachments. The simplest stage of visualization is capturing and manipulating three-dimensional objects; a more advanced stage is the ability to navigate through landscapes. Technology now allows one to capture realistic detail and to mimic physical laws accurately, so this type of digital environment, while achievable and useful for various scientific purposes, only represents spatial configurations and navigation through them.

The second type of virtual environment, the one that affords activity-based interaction, allows a more interactive form of wayfinding. Tasks can be formulated inside the environment through interaction, supplemented with decision making and navigation for a more immersive experience. Computer games and flight simulation are examples of this type of digital environment.

The third type of virtual environment is the one that evokes a notion of other people interacting with the environment in ways similar or dissimilar to us. Thus, a hermeneutic environment requires the ability to personalize and communicate individual perceptions through artifacts. The more deeply this cultural communication can be un-self-consciously expressed through our modification of our surrounds, the more this environment becomes a dwelling, a home, a place (Champion et al., 2012).
There are differences between guidelines developed for placemaking and those developed for the design of online environments. For example, the instructional design guidelines are more focused on function, usability, practicality, and production. In contrast, place-making guidelines are focused on human activities and the more ephemeral goal of creating places that are meaningful.

![Image](image.png)

**Figure 8.** Augmented Reality (AR) allows users to experience the museum outside the physical walls of its buildings.

One example of AR in the British Museum draws on archival photographs from the museum’s collections to reveal what areas of the cities looked like in earlier eras (image at left). The photos are plotted on a map that displays them as *points of interest* to the user when he or she is in the vicinity. These applications rely on GPS positioning and so cannot work indoors (Mannion, 2014).

Another way that AR is used is through interpretive mediation. For example, in 2005, media artist Hugo Barroso’s installation (Prêt-à-Porte at the National Centre for the Arts in Mexico City) introduced wearable AR in the museum (image at right). Children stood in front of a digitally augmented mirror wearing simple garments and headgear decorated with AR markers. Depending on which markers they wore, different costumes appeared in the mirror superimposed over the children’s own clothes (Manning, 2012).

**Using Digital Technologies to Enhance Learning Spaces**

Designers of virtual classrooms utilize digital technology as a primary means to enhance the classroom environment. One such technology is known as augmented reality (AR). In technical terms, AR is an amalgamation of computer graphics, vision, and
multimedia that enhances users’ perception of the real world through the addition of virtual information. (See Figure 7.) The main advantage of AR over more traditional teaching methods is that learners can actually “see” and “listen to” supplementary information (Liarokapis et al., 2010).

Another technology available to enhance online classrooms is virtual learning environments (VLEs). One of the most recognized three-dimensional (3-D) virtual environments is called Second Life (http://www.secondlife.com). Launched in 2003, it allows users to create their own identities (avatars) and built environments in which they live, work, and play within its imaginary boundaries. (See Figure 8.) The technology allows teachers to access environments that they might not be able to share with students any other way. For instance, they can visit virtual representations of the Alamo (San Antonio, Texas), the Holocaust Memorial Museum (Washington, D.C.), and the Louvre (Paris, France) in the span of a few hours. Initially, there was a lot of excitement about the possibilities of using Second Life as a professional-development tool for educators. For a number of reasons, however, those expectations largely have fallen short, offering cautionary lessons about using technology for professional development (Ash, 2010).

Some faculty members have created their virtual learning environments for specific courses. For instance, faculty members at Carleton University (Ottawa, Ontario, Canada) utilize a 3-D educational virtual environment called CV, which stands for Carleton Virtual. The design keeps some of the characteristic features and elements of the physical campus but allows modifications to improve the space usage and customize it for the virtual activities. (See Figure 9.)
Figure 9. Images show a campfire meeting place, head shot/avatar, medical education classroom, and Mohawk College’s iWing building created for Second Life.

Images: Creative Commons.
Figure 10. Images from Virtual Carleton (Carleton University’s virtual campus). Their virtual campus includes lecture halls, a library, meeting rooms, offices, a social gallery space, a native village, and an excavation site. Pictured are views of the campus, classroom, and students interacting in the library.

Carleton utilizes an avatar-based 3-D virtual environment for students to attend lectures, have real-time conversations, access multimedia content, and practice their learned skills by acting in simulated situations. They employ the web-alive technology as the base framework and, through collaboration with educators, designed and developed the virtual environment, animated characters, customized multimedia content, interactive training scenarios, and other parts of the educational experience (Arya et al., 2012). Source: www.Carleton.edu.
In summary, virtual 3-D worlds provide immersive, realistic experiences that can combine communication, entertainment, training, and access to a variety of data types (Boulos, 2007). There appears to be little published research on the design and evaluation of 3-D virtual world learning spaces and the extent to which they influence students’ perception of a sense of place, their communication related to learning, or outcomes such as grades or the development of problem-solving skills.

Another method for enhancing the online learning environment is called adaptive-learning technologies. At a simple level, an adaptive-learning system behaves differently based on how the learner interacts with it (Araya et al., 2012). In contrast to the one-size-fits-all system found in many online courses, an adaptive-learning system will adjust to what the learner’s interactions with the material suggest about the mastery of the materials through time; and, based on the learner profile, it will anticipate the level of difficulty appropriate for an individual (Stokes, 2013). As a result, in a language course, one learner might be challenged to master conjugation of verbs better, while another working with the same material might be challenged on sentence structures (Wolff, personal communication, March 6, 2013). The goal of adaptive-learning strategies is to allow faculty to mold coursework around individual student abilities. (See Figure 10.) There are currently more than 70 such companies active in the higher education market; adaptive learning appears to represent a significant trend in the evolution of educational technologies (Newman & Curran, 2013).
Figure 11. Screen shots from ME6345 Course (Environmental Issues in Manufacturing and Product Use), a four-credit course that explores the environmental and economic aspects of different materials used in products throughout the product life cycle. It introduces concepts of industrial ecology, life-cycle analysis, and sustainable development.

The screen shots illustrate how adaptive-learning technologies work. Students review primary materials for the course (videos, lectures, and readings) and then answer a series of assignment questions in the online classroom environment. If they answer correctly, they receive a message that verifies their answer and allows them to proceed. If they are incorrect, they will be directed to another learning path that will review and explain the content. The process requires extensive input from content experts and the creation of numerous “paths” to the correct answers and understanding of the content presented within the module. Source: Northeastern University.
Collaborative community mapping is another technology approach for engaging students in online courses with the relationships between geographical features of neighborhoods, built structures, and linkages between features of a place and their potential influence on a community (Perkins, 2007). Geographic Information Systems (GIS) enable interactive viewing and intersection of multiple spatially coincident maps representing diverse cultural and natural themes and promote cross-disciplinary thinking (McKee, n.d.). Collaborative mapping tools such as Google Maps and Google Earth have been used with students to collect data to map community information such as access to fresh food, places to exercise, and assessments of food quality in marginalized communities (Lefer et al., 2008). There appears to be more evidence of collaborative online mapping projects in the K–12 sector than at the college level. For instance, I recently was a guest instructor for a course called A Sense of Place, offered at Phillips Academy in Andover, Massachusetts. Although students meet in person each week during the semester and experience a variety of landscapes, they document their experiences via Google Maps with pins that mark specific highlights of their journey. The result of this strategy, through time, is the creation of a collective picture of the given place, shaped by students (Wolff, personal correspondence, 2014).

Using Social-Presence Theory to Enhance Learning Spaces

Most instructional designers are well versed in social-presence theory. Early scholars define social presence as the “degree of salience of the other person in the interaction and the consequence of the interpersonal relationship” (Short et al., 1976). Since its inception, the term’s definition has been simplified and now may be thought of as “the degree to which a person is perceived as a real person in mediated communication” (McLellan,
The definitions during the last 40 years tend to fall on a continuum between those who focus on whether others perceive a person as being there and on being real (Lowenthal, 2010).

Research on social presence, as related to computer-mediated communications and learning, is extensive and may be generally divided into four distinct phases. In summary, Phase I (Incubation, 1965–1980) is characterized by inquiry on computer-mediated communications, which originated in organizational or business settings and migrated to educational settings. Phase II (Challenge, 1981–1999) is characterized by the increase in interest in online education and electronic communications. Phase III (2000–2008) was dominated by the Community of Inquiry process model that attempted to define the components of online learning environments. This model was quickly studied and widely accepted until some started to question and doubt the efficacy of social presence in relation to learning outcomes during Phase IV (Revisionism, 2009–Present).

The most notable milestone of the evolution of social-presence theory, in relation to virtual learning, is the creation of the Community of Inquiry (COI) model—a dynamic process model designed to describe and measure elements supporting the development of online learning communities (Garrison et al., 2000). It originally was developed to help make sense of issues confronting the researcher’s new online graduate program that utilized computer-based discussion forums. (See Figure 11, Appendix A.) The three principal elements identified by the COI model are social presence, cognitive presence, and teaching presence. Social presence has been defined as “the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as real people” (Garrison et al.,
Teaching presence is “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Rourke et al., 2001). Cognitive presence is “the extent to which learners are able to construct and confirm meaning through sustained communication” (Garrison et al., 2000).

![Figure 12](image.png)

**Figure 12.** A diagram of the Community of Inquiry Construct. Three “presences” (social, teaching, and cognitive) influence and interact to create the online learning experience. Source: Garrison et al., 2000.

Most of the COI-related research has examined the factors that create a Community of Inquiry, particularly course features such as group learning activities and faculty teaching behaviors that facilitate online discussion to support deep inquiry (Boston et al., 2009; Richardson & Swan, 2003; Rourke & Kanuka, 2009). In addition, the COI generated other research that explored topics such as differences in the
perceptions of the three presences (Arbaugh et al., 2008) and applications to blended learning (Nagel & Kotze, 2010; Vaughn et al., 2008). The COI was important to the evolution of social-presence theory because it linked the social aspects of the virtual environment with a *systems approach* to thinking about how classrooms work and how learning happens in virtual environments. The COI framework since has been adopted and adapted by hundreds of scholars working throughout the world, but many argue that it has not evolved to keep pace with developments in communication technologies during the last several years (Annand, 2011).

**Conclusions: What We Know and What We Need to Know**

*Sense of Place*

Although many scholars acknowledge the importance of a sense of place in physical worlds, there is a lack of a clearly defined definition of the concept across disciplines. For example, environmental psychologists define a sense of place as a particular experience of a person in a particular setting and that the spirit of a place, or its “personality” constitute the sense of place of a given space (Steel, 1981). Phenomenologists use concepts such as “topophilia,” “character of place” and “spirit of place (from the Latin genius loci)” to explain the concept of a sense of place. The term topophilia means “love of place, and is used to describe the existing and remarkable bonds between people and physical settings (Tuan, 1974).

Geographers such as Relph explain that a sense of place is the ability to recognize places and their identities through longtime connections between users and places that may be influenced by personal and collective values, beliefs and behaviors (Seamon, 2008; Relph, 1976). Relph’s definition of a sense of place has been augmented in recent
years. He now defines a sense of place as “synaesthetic,” which means that it combines sight, hearing, smell, movement, touch, memory, imagination and anticipation. He believes that a sense of place can also be learned and developed through observation, but does not think it can actually be designed (Relph, 2007).

Occupational therapists refer to the concept of a sense of place in the definition of a person’s or group’s “Lifeworld,” a term used to describes the lived structures and dynamics of places that carry meaning (Finlay, 2011). Other authors contend that a sense of place can only emerge through physical immersion within a space (Harrison & Dourish, 1996). Architects have also described the notion of a sense of place as a “bottom-up model” in which users draw from their personal political, economic social and technological stories to construct a shared meaning of the same place (Matthew, 2011).

Despite the lack of agreement on a specific definition, scholars have concluded that a sense of place is needed in online learning communities to maximize the quality of student learning (Brook & Oliver, 2003; Lorian & Newbrough, 1996). Without meaningful interactions and learning activities, online learners can find themselves confused, misplaced and frustrated. Without a sense of place, students may not be able to contribute or participate in their online communities since a sense of community comes from a shared sense of identity (Marrett & Harltey, 2001). In an educational context, sense of place has been viewed as something that enhances learning (Clark and Maher, 2001; Harrison and Dourish, 1996; Semken and Freeman, 2008; Stevenson, 2008).

As a result of this disparity in definitions and previous research that indicates the importance of a sense of place for learners, there is a need to understand the specific
characteristics that constitute a sense of place in virtual environments. This is important because most of the existing definitions for a sense of place were originally conceived to apply to physical worlds.

**Affordances Related to the Concept of a Sense of Place**

*Proximity*

Since students and faculty may never meet in-person during an online course, it is important to consider strategies that can reduce the distance (proximity) between them. This distance can be an obstacle to effective communication, and may impact student engagement and retention. Previous research suggests that close proximity (distance) between people is associated with numerous cognitive and behavioral changes that affect the work progress for the better. (Kiesler and Cumings, 2002). Proximity also facilitates transitions from encounters to communication and it fosters informal conversations that are important for collaboration. Close proximity also helps to maintain task and group awareness; an important concept since the understanding of the activities of others provides a context for one’s individual activities (Kendon and Ferber, 1973).

The constructivist theory of the Zone of Proximal Development suggests that a close distance is required between the learner and the teacher for effective learning (Vygotsky, 1967). But how is it possible to create this optimal zone in virtual spaces with asynchronous communication and great distances between faculty and students? There is little research that explores how proximity can be a tool for the design of online classrooms. (Links to RQ #2).
Telepresence

Copresence is the cornerstone of collaboration since it is the objective experience of being together that generates the most intense sense of co-presence (Shao, 2002). Copresence is a psychological phenomenon that may or may not correspond to the physical location of people. In virtual worlds copresence is referred to as telepresence and to refers to the sense of being together in the virtual environment (Held & Durlach, 1992). Researchers have learned that audibility is an important aspect of co-presence is audibility: being able to perceive the sound in the environment: overhearing other’s conversations, someone picking up an artifact, other’s verbal shadowing, the running of commentary that people commonly produce alongside their actions, spoken to no one in particular (Gaver, 1991). Creating a strong sense of telepresence appears to be related to the amount of solitary or social learning activities found in a given classroom. Thus, if collaboration is a means to creating a sense of being with others in a virtual classroom, it is important to understand the amount of solitary or social affordances are available in virtual multi-user environments (Nova, 2005) (Links to RQ #1b).

Movement in Virtual Space

Most of man’s actions have a spatial aspect that requires an understanding of how he is related to other people and things (Norberg-Schultz, 1971), and of his own shape and posture (Tuan, 1977). Man construes and organizes space based on experiences with his body and his relations with others (Tuan, 1977). Being able to move and interact in a range of directions is a core concept in understanding how and why individuals manipulate objects as well as their own avatars in virtual spaces (Saunders et al., 2012). How does the ability to move about in a virtual classroom influence the affordances that
are made available in the space? Does the ability to move impact the perception of the boundaries of the space? What are the implications for students in these environments, versus those in environments with three dimensional, immersive simulations? There is little research on analyses that examines the two and three-dimensional characteristics of virtual classrooms that help to define the boundary of the spaces, and their respective affordances (Link to RQ 1b.).

**Territoriality**

Scholars have also shown that when dealing with people and locations, the fundamental use of space concerns human territoriality (Edney, 1976). Territories can support social roles among a community are also associated with control: the ability of an individual or group to gain access to, utilize, influence, gain ownership over and attached meaning to a space (Francis, 1989). Territoriality also serves as a basis for the development of a sense of personal or group identity (Holahan, 1982). Jeffrey and Mark (1998) studied whether social norms like personal space, crowding or territoriality really exist in virtual space as they do in the physical world. They found that territoriality was important, such as the ability to build one’s own house in Active World (video game) is a way to provide a territorial marker and provide a feeling of ownership for the owner. However, there is very little research on defining the territories available within virtual learning spaces (Links to RQ #1b).

Scholars have learned that dynamic territories often have anchors such as monuments, parks and other coordination points or objects. Landmarks have a powerful role in navigation in both physical and virtual environments as they help to give meaning to a place (Sorrows and Hirtle, 1999). In a similar way, the collective memories of a
space give meaning to territories (Halbachs, 1950). Other researchers have concluded that building up a history of experiences helps to transform the mere space into a place with meanings (Harrison & Dourish, 1996). This research has studied territories in the physical world, so how might it apply to virtual classrooms? Are there territories that are, or should be delineated within the classroom space, in an effort to create meaning, which might also help to create a sense of place for students? Little research has been done to study the concept of territories, the role of landmarks and the importance of collective memory in virtual classrooms (Link to RQ #1b).

**Architecture and Virtual Space**

A number of scholars have based their research on the interaction between virtual space and learning. There is evidence that architectural design strategies can help to structure the pattern of, and the potential for, social interaction in virtual spaces. This strategy has been shown to have a direct impact on learning (Bouras et al., 2005; Minocha & Reeves, 2010; Schnädelbach et al., 2007). Multiple studies have arrived at similar conclusions regarding the educational benefits of purposefully designed virtual learning space (Bronack et al., 2008; Minocha & Reeves, 2010; Praslova–Førland et al., 2006). De Lucia et al. (2008) found that a virtual campus in *Second Life*—whose design was informed by a constructivist, sociocultural understanding of learning—increased peer-to-peer interaction, group work, and communication, facilitating sharing of knowledge and experience among students. These studies indicate that architectural design strategies can encourage learning and social interactions, but none of the research has applied the placemaking frameworks from the physical world, such as the Vitruvian Triad, as an analysis tool for online classrooms (links to RQ #2).
Chapter 3

Methods

Research Design

The case study method has been identified due to the exploratory nature of this study and the intention to understand a complex phenomenon (sense of place) that is not well understood outside the field of architecture. The multi-site case format provides a deeper understanding of the processes and outcomes found at selected institutions (Miles & Huberman, 2014). Multi-case sampling also adds confidence to findings because examining a range of similar and contrasting cases strengthens validity (Yin, 2009). The unit of analysis of this study is the virtual classroom, but the scope of the virtual placemaking process encompasses several organizational players, institutional decisions, informational technology systems and external forces. I served as the primary instrument for the collection and analysis of the data for this study.

As a prelude to this research, I conducted a pilot study between February and April 2014 that included interviews with instructional designers and an examination of an evaluation tool created for the assessment of digital interfaces. The pilot study revealed the importance of understanding the process of placemaking at a given institution since approaches to the design process were found not to be universal. Also revealed was the fact that the course “home-page” interface often does not represent the entire scope of spatial experiences for the students and faculty. As a result, it is crucial to consider a range of affordances in assessing a given interface. These include how interactions with peers and faculty are facilitated, what ranges of learning materials are found, how senses
are stimulated in a flat, two-dimensional environment, and how meaning is created.

**Sampling and Site Criteria**

The unit of analysis for this study is the virtual classroom. To select the classrooms, I first selected three academic institutions offering online courses. The selected institutions represent perspectives from both the non-profit and the for-profit sectors and utilize a spectrum of technologies and best practices with regard to the design of virtual classrooms. At one end of the placemaking spectrum is the practical, functional mathematics online classroom environment found at a non-profit institution that specializes in the delivery of online courses (University H). At the other end of the spectrum are research institutions that offer traditional, hybrid and online courses (University G, University W). To facilitate the deployment of online courses, University H utilizes the Sakai learning management system (LMS) and adaptive learning modules. University G utilizes the Blackboard LMS and one virtual simulation environment, while University W utilizes the Moodle LMS and five distinct virtual simulation environments. The selected classroom sites are a mathematics course at University H (UH), a nursing course at University G (UG) and a language course at University W (UW).

For the purpose of this study the actual names of the universities and have been changed. No personal names are used for those who were interviewed as part of the research. These individuals are identified only by their role at the respective institution. Because the study uses real-world sites, the explanations and descriptions will be true to life.

Specific criteria for selecting each institutions included the following: a) institutions offering online courses offered for college credit in the context of higher
education and b) the utilization of either adaptive learning strategies or virtual simulations as a required component of online courses. The criteria for selecting classrooms included a) the use of adaptive learning or virtual simulations and b) required courses within a degree program. With the array of sites selected, the phenomena of placemaking, both in basic and more advanced forms, will be evident.

**Approach and Instrumentation**

Yin (2003) suggested that case studies include six types of information: documents, archival records, interviews, direct observations, participant-observations and physical artifacts (Creswell, 2007). Consistent with this suggestion, the following data was collected:

1. Interviews of those involved with the creation of virtual environments, including perspectives from course designers, software makers, external consultants, faculty, administrators, and information technology experts. Since the process of placemaking in online courses involves a team of different individuals, I included at least two representatives in any given role.

2. Artifacts from selected courses including screen captures from course home pages, adaptive learning environments, and virtual simulation activities. Artifacts also include various materials such as Power point presentations, syllabi, assignments, and course videos. (NOTE: Affordances are expectations about actions that can be performed on objects in the world, based on people’s beliefs about their properties. Affordances invite and constrain people to interact with objects, including
computer interfaces, in specific ways. As such, they can influence people’s exploratory learning about objects, as well as their regular use of them (Oviat, 2013).

The interviews with faculty provided additional viewpoints on the process of placemaking. This viewpoint is different from others involved in the process such as instructional designers, who typically create the infrastructure for the course to function within the given learning management system. Likewise, staff and administrators also provided important perspective that may include details regarding policies or campus wide-initiatives that influence course development. Senior administrators at each institution were asked to recommend individuals in three categories (faculty, staff/administrators, instructional designers). A total of 33 individuals were recommended by senior administrators to be interviewed and from this group, a total of 24 individuals agreed to be interviewed for the study. The final group consisted of eight (8) individuals from each institution.

The course artifacts provided an additional opportunity to understand the classroom environment from a spatial standpoint and allowed examination of the affordances related to student and faculty communications, group collaboration and engagement. Artifacts that were requested included screen captures from primary and secondary course home pages, from adaptive learning environments and from virtual simulation environments. Presentations used in courses were also provided by faculty members and administrators if they were mentioned as part of interview inquiries, or requested as supporting material.
Data Collection: Instruments and Process

Interviews

Eight individual interviews were conducted at each selected site. The interviews were recorded and professionally transcribed. Reading and re-reading these documents is an important part of the collection process (Emerson et al., 1995). In addition, memos were written during or immediately after each interview to summarize observations and record information about the encounters. Memos are also considered to be an essential technique for qualitative analysis (Groenwald, 2008). Memos also help to capture analytic thinking about the data and facilitate insights (Maxwell, 2013). The author developed semi-structured interview protocols and these may be found in Appendix A. Deviations from the protocol included open-ended questions related to topics raised by the interviewees during the conversations. Selected individuals were interviewed multiple times to provide additional details and information.

One faculty member from each course also answered questions about the amount and types of course materials, technologies or activities available for students such as text-based PDFs, PowerPoint (plain), PowerPoint (with audio), YouTube videos, blogs, adaptive learning modules, forum posts, recorded audio/videos created by the instructor, collaborative group projects and virtual simulations. Please see below for a roster of the roles represented from each institution.
Table 2. Roles of Interviewees

<table>
<thead>
<tr>
<th>University H</th>
<th>University G</th>
<th>University W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Faculty #1</td>
<td>Nursing Faculty #1</td>
<td>Language Faculty #1</td>
</tr>
<tr>
<td>Math Faculty #2</td>
<td>Nursing Faculty #2</td>
<td>Language Faculty #2</td>
</tr>
<tr>
<td>Business Faculty #1</td>
<td>Fashion Design Faculty #1</td>
<td>Director of Simulations (External Vendor)</td>
</tr>
<tr>
<td>Business Faculty #2</td>
<td>Dean</td>
<td>Technology Specialist</td>
</tr>
<tr>
<td>Senior Administrator</td>
<td>Director of Instructional Design Unit</td>
<td>Technology Specialist</td>
</tr>
<tr>
<td>Instructional Designer #1</td>
<td>Instructional Technician</td>
<td>Instructional Designer</td>
</tr>
<tr>
<td>Instructional Designer #2</td>
<td>Instructional Designer</td>
<td>Instructional Designer</td>
</tr>
<tr>
<td>Math Chair</td>
<td>Department</td>
<td></td>
</tr>
<tr>
<td>Business Chair</td>
<td>Department</td>
<td></td>
</tr>
</tbody>
</table>

Artifacts

Individuals who were interviewed for the study also provided materials related to the course environment. These artifacts included screen captures of course home pages, adaptive learning environments and virtual simulations. In addition, faculty provided rosters of learning resources developed for students as part of the research. The rationale for selecting primary and secondary course homepages is that these represent the spatial equivalent of a plan diagram that describes the available space of a given classroom. Each homepage was also studied in terms of the distribution of the various homepage elements to understand visually the distribution of solitary and social access points. Since the criteria also included either adaptive learning or virtual simulations, screen captures were also collected for these environments to provide a visual reference to their respective affordances.
Analysis Plan

As an organizing strategy, the responses to the interview questions were rearranged into categories to facilitate comparisons and aid in the development of theoretical concepts (Strauss, 1987). The responses to the interview questions informed the codes selected and the development of categories based on what seems most important (Corbin & Strauss, 2007). For this study, placemaking themes, processes, production strategies, external triggers, organizational structures, creativity, interactive technologies were identified for coding, based on topics discussed in the Literature Review (Chapter 2). For the interviews, coding categories were narrowed to specific categories including process, aspirations, realities and challenges. These codes were selected because they encompassed the full array of placemaking activities beginning with the designing of the course (process) to implementation (realities, challenges) and discussion of the future direction of placemaking (aspirations). In addition, the codes aligned loosely with phases of construction found in built projects (design, construction, implementation).

For the artifacts, coding was divided into a Spatial Dimensions category that included two, three and four-dimensional sub-categories that were further divided depending on the affordances available. For instance two-dimensional spaces may consist of a flat interface (2D), or a flat interface with video/audio, or the use of adaptive learning strategies (2D+). Three-dimensional space was divided into solitary (3DSOL) or social (3DSOC) spaces with three-dimensional audio those that utilize live images of the actual students or faculty (4DALI). This system was deemed necessary to differentiate between the affordances made available in the classroom environment. This system aligns with
frameworks related to proximity and territory and with the research question (1b) that investigates the boundaries and connectedness.

The coding categories resulted in the creation of two conceptual matrices: the Vitruvian Triad and Spatial Spectrum Analysis. Scholars have found that matrices are an effective tool used to identify patterns, themes, explanations, relationships among people and theoretical constructs ((Maxwell, 2013; Miles & Huberman, 1994).

**Vitruvian Triad Analysis Strategy**

The data obtained from interviews and the collection of artifacts was analyzed using the Vitruvian Triad frameworks described in the Literature Review section (Chapter 2). For the interviews, responses were organized into coded categories (process, aspirations, realities, challenges) and then assessed according to the three Vitruvian principles (utilitas, firmitas and venustas). The data was then indexed by the specific role of the interviewee within the institution (faculty, staff, administrators, etc.). Extended Themes were used as a guideline for evaluation of interview responses (See Figure below).
**Table 3.** Vitruvian Triad Analysis Matrix. (Source: Author derived the concept from readings on telepresence and observations of two-, three-, and four-dimensional environments found in this study. Zhao, 2004.)

<table>
<thead>
<tr>
<th>DATA</th>
<th>CODES</th>
<th>VITRUVIAN TRIAD PRINCIPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Utilitas</td>
</tr>
<tr>
<td>Interviews</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aspirations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Realities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Challenges</td>
<td>F=faculty</td>
</tr>
</tbody>
</table>

**Table 4.** Vitruvian Triad Extended Themes (Daas, 2013)

<table>
<thead>
<tr>
<th>Utilitas</th>
<th>Firmitas</th>
<th>Venustas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Structure</td>
<td>Delight</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Durability</td>
<td>Beauty/Sublimity</td>
</tr>
<tr>
<td>Explicit Knowledge</td>
<td>Tacit/Explicit Knowledge</td>
<td>Tacit Knowledge</td>
</tr>
<tr>
<td>Mission</td>
<td>Artifacts (buildings, things)</td>
<td>Vision</td>
</tr>
<tr>
<td>Political</td>
<td>Scientific</td>
<td>Aesthetic</td>
</tr>
<tr>
<td>Potential</td>
<td>Actual</td>
<td>Phenomenal</td>
</tr>
<tr>
<td></td>
<td>Doing</td>
<td>Feeling</td>
</tr>
<tr>
<td></td>
<td>Usability</td>
<td>Objects</td>
</tr>
<tr>
<td></td>
<td>Leadership function and charge</td>
<td>Position occupied by leader in the organizational structure</td>
</tr>
<tr>
<td></td>
<td>Quotidian or Periodic</td>
<td>Robust and stable</td>
</tr>
<tr>
<td></td>
<td>Verbs</td>
<td>Nouns</td>
</tr>
</tbody>
</table>

Verbs

Adjectives
Explanation of the Presentation of Interview Data

Faculty, staff, administrators and instructional designers were asked questions related to the process of designing online courses. The interview responses were organized into four categories: process, aspirations, realities and challenges and assessed according to the three Vitruvian Triad principles, as explained in the Methods section. Then, each interviewee category (faculty, staff/administrators/instructional designers) was assessed according to their leanings toward one of the three Vitruvian principles. For example, Utilitas = purple, Firmitas = orange and Venustatis = green).

Spatial Analysis Strategy

The classroom environments were also examined through a series of charts and matrices created to represent the learning spaces created within each of the three classrooms. This information allowed the assessment of concepts such as telepresence (the mode of being with others), the proximity between participants (distance) and the dimensional typology of the space (2-D, 3D). The affordance of Proximity may be assessed by considering the “degree of online-ness;” a concept that may be assessed by the amount of course materials that are a) text based, b) hybrids (text with audio/video) and c) face-to-face (with real-time interactions).
The spatial analysis strategy draws from principles associated with the constructivist frameworks (Vygotsky, 1967), and ideas related to tacit knowledge (Polanyi, 1947) that was described in the Literature Review section (Chapter 2). For example, Vygotsky’s Zone of Proximal Development (ZPD) considers aspects of the environment related to proximity of the participants, the flow of information between them, the concept of “scaffolding” in the learning process, and the dimensional qualities of the space itself (Peters, 2013). Polanyi’s theories stem from the concept that we “know more than we can tell,” and that this has an impact on how people learn. This concept may be observed in most of the virtual simulations studied. For instance, visitors “know” they are entering a library building and behave accordingly. They do not jump up and down and scream as they would at a music concert. Virtual placemakers exploit tacit knowledge in the creation of these environments. Drawings, diagrams and illustrations reveal the degree to which these concepts may be identified within the learning environments.

**Explanation of the Presentation of Artifacts**

The artifacts collected include screen shots from the home page, secondary spaces and virtual simulation environments. These artifacts are analyzed in terms of their dimensionality and in terms of their affordances for solitary or social activities. For example, the dimensionality of the artifacts may be identified as two-dimensional environments that are measured in term of length and width. Three-dimensional environments are measured in length, width and height. Solitary learning involves either no-way, or one-way flows of information. For example, no-flow solitary learning would be reading and writing-related activities, while one-way flow would be watching pre-
recorded lectures, Ted talks, YouTube videos with people, images, and sound. Social learning may be characterized as two-way flow with three different manifestations: two-way flow (asynchronous), two-way flow (synchronous with text or avatars), and two-way flow (synchronous) real-time flow with video images and sound, as illustrated in the diagrams below. Activities associated with asynchronous social learning include forums, emails. Activities associated with digital synchronous communications include using avatars and texting in real time. Activities associated with social learning in real-time include WebEx and Skype. Please see the figures below for an illustration of these conditions.
Figure 12. Graphic illustration of Solitary and Social Learning Conditions. Author's Illustration.
Comparative Analysis

The Vitruvian Triad Matrix and Spatial Spectrum Analyses allow cross comparison of the three selected institutions. The author first constructed a case study report for each of the three selected classrooms and then identified cross-case themes and conclusions.

Role of the Researcher

I have always enjoyed the process of making and otherwise creating something from nothing. One of my earliest memories is of taking art classes at the Maryland Institute, College of Art (Baltimore) where I studied sculpture and drawing at age 6. I still remember the assignment to draw a large oak tree on the lawn of the adjacent museum and how the instructor encouraged us to be active participants in learning about art and in its creation. As a child I also remember spending hours with my dad doing projects that included making a customized wooden console for our VW Beetle that held the air pressure gauge, note pads, pens, extra fuses, coins for tolls and that included a secret storage compartment for emergency supplies of chocolate. My childhood was filled with such “making” projects that included designing cars and sending the drawings to Ford Motor company, developing photographic negatives taken with my beloved Rolei 35 spy camera and cross breeding live bearing fish in the ten (10) aquariums that constituted my imagined “Aqua-world” universe.

This penchant for hands-on learning, and in discovering the magic of places, real and imagined, continued with studies at the Rhode Island School of Design (fine arts) and at Harvard University (architecture), and in my post-graduate school professional life. For example, I have designed experiential degree programs and educational symposiums
for colleges (Boston Architectural College, Ben Franklin Institute of Technology, Bunker Hill Community College) and hands-on trainings for corporations (National Grid, Long Island Power Authority). I have created a variety of live, interactive and online green building tours (Sasaki Associates, National Grid) that educate on green building best practices, but that also engage participants by embedding meaning into the experience. Based on my previous experiences, I have found that learning strategies that emphasize networks, connections and a vision of de-centered learning can be used in both the traditional classroom and the online environments to create a dynamic sense of place.

**Triangulation and Validity**

The strategy of using different methods as a check to one another, determine the strengths and limitations of each, and ensure support of a single conclusion is known as **triangulation** (Fielding & Fielding, 1986). Thus, the use of a variety of individuals for interviews (faculty, administrators, instructional designers, technical support specialists, program directors) was intentional. In this study, which focuses on understanding different approaches to placemaking, it is important to be able to tease out the nuances in the perceptions of a the notion of a sense of place in a real-world context. The use of interviews (which are considered to be an elicitation method), combined with the use of artifacts (screen captures, assignment materials) may be considered to be a form of triangulation. Frameworks for analysis are widely varied and include the theory of social presence (Vygotsky, 1976), tacit knowledge (Polanyi, 1962) and the Vitruvian Triad (McMahan, 1960). The strategy of using multiple theories for analysis is also a form of triangulation (Denzin, 2001).
Validity refers to the transferability of concepts and abstractions and the willingness to accept other interpretations (Huck and Sandler, 1979). Alternative hypotheses, or rival hypotheses are other ways of understanding the data. To address concerns of validity of the data collected in interviews, there is a deliberate intention to formulate interview questions about specific events and actions in the classroom, rather than posing questions that elicit only generalizations or abstract opinions. Soliciting answers to questions about specific events is important because this strategy taps into what is termed “episodic memory” that enables someone to retrieve previous experiences (Flick, 2000). Within the context of this study, asking about a specific event within the context of their learning environment helps to avoid generalized accounts (Weiss, 1994).

Threats to validity also include the selection of interview subjects. To avoid threats, a variety of constituents directly related to the placemaking process were selected (i.e., program directors, faculty, instructional designers, technical support specialists, etc.). Threats to validity also include honesty of the respondents. Other threats to validity may be the author’s biases as an educator with experience in curriculum development, exhibit design, and placemaking in educational contexts. Formal training as an architect and professional experiences at international design firms such as Sasaki Associates and Michael Van Valkenburgh Associates may also influence the interpretation of collected data. Every effort was made to ensure that the research design methods were followed and that a variety of frameworks were applied in the analysis of data, to reduce and prevent undue bias.
Limits to the Methods and Approach

The multiple case sampling strategies help to strengthen the precision, validity, stability and confidence to the findings (Yin, 2009). The assumption is that findings in one setting will be applicable to other similar settings. However, with only three cases selected, this study is limited by a narrow sampling. As a result, greater variability is desirable in future research (Miles & Huberman, 1994). The other limitation to the approach is that it does not include participant observation, which would help to further validate the stated intentions of the instructional designers, and the programmatic ambitions of the faculty and administrators.

This is an exploratory study that will help to identify a path forward for the sense of place in online course development. In addition, the selected schools represent a disparate set of institutions with difference in the demands and approaches to designing and deploying curriculum.
This chapter describes the College Algebra Classroom, one of 1,600 courses offered at a for-profit, online-only institution, which will be referred to as University H, an institution serving 100,000 students each year. These students are located in all 50 states and in more than 100 countries. There is no physical campus for students, but corporate and administrative-support facilities are at one physical location in the eastern United States. The College Algebra course is offered within the mathematics department, which is organizationally positioned within the Science, Technology, Engineering, and Math (STEM) division.
The chapter includes detailed descriptions of the classroom from the perspectives of those who either created the courses (instructional designers [IDs], faculty, and program directors) or inhabited or supported the classroom (faculty, students, and technical support staff). The descriptions are framed primarily by the similarities and differences in the responses—on the one hand, of those who make and maintain the classroom and, on the other hand, of those who use the classroom.

**A Sense of Place**

Administrators and faculty explained that a sense of place is “not currently discussed” as part of the design process. One reason given is the belief that students do not understand the concept or its importance. In a similar way, neither IDs nor technology specialists use the phrase, “a sense of place,” to describe the process of the design, development, or deployment of the online classroom. The data that were collected (interviews, survey results, and artifacts), though, will be used to describe the nature of the sense of place that was found. Two themes emerged from the data: *Scale and Standardization* and *Desire for Connectivity*.

**Description of the College Algebra Classroom**

Examination of the digital artifacts (screen shots from the classroom interface) reveals that the College Algebra Classroom is two-dimensional and consists of two separate spaces as shown in Figures 2 and 3. The homepage is the primary access point for the course. This is the space where students access the course syllabus/description,

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1 The use of the phrase “two-dimensional” refers to the observation that the classroom interface is flat. It has two dimensions (width and length) but no depth. This is not a subjective determination but rather a statement of fact.
Figure 14. Screen capture of math classroom homepage. Source: University H.

Figure 15. Screen capture of MyMathLab space. Source: University H.
lessons, resources, assignments, and tests. It also contains an array of 12 links on the left side of the page including Announcements, Calendar, Messages, Forums, Forum Grader, Lessons, MyMathLab, Resources, Assignments, Tests/Quizzes, Statistics and for the Campus Library. All students, in every section of the College Algebra course, access the course materials through this interface regardless of the faculty assigned to the course. The mathematics program director characterizes the homepage space as the “place to learn about mathematics.”

The secondary access point for the classroom is the MyMathLab space that integrates adaptive learning modules as a feature of weekly assignments. This page has links for Weekly Assignments (either 8 weeks or 16 weeks, depending on the format of the course), Student Resources and Grades. Adaptive learning is a process in which the content changes, or “adapts,” based on the responses of the individual student. The adaptive-learning system used at University H is rule-based. This means that it creates a series of if-then statements. For example, if students enter the correct answer, then they receive a prompt that says “correct!” If they answer incorrectly, the computer adapts and leads them down a path of learning the correct response. As the student progresses in an assignment or quiz, algorithm-based systems take advantage of advanced mathematical formulas and machine-learning concepts to adapt with greater specificity to individual learners (Oxman & Wong, 2014). Administrators characterize the MyMathLab space as a place for “doing” mathematics.
The artifacts (screen shots from the course interface) revealed that both the homepage and the MyMathLab spaces contain no dedicated spaces for private meetings, informal discussions, or collaborative work. As a result, the majority of the learning activities that are possible in either space are solitary in nature. The homepage has one area dedicated to peer interaction, the forum, which permits primarily asynchronous communication (it is text based). The MyMathLab space has additional dimensional aspects because of the adaptive-learning feature that gives the illusion of responding to the learner. However, this module, created entirely by a third-party vendor (Pearson), has limited paths for learning. As a reference, please see Figure 4 for a visual of the spaces found in the Math Classroom as a reference.

**Theme #1: Scale and Standardization**

More than 23,000 students utilize the College Algebra Classroom each year, making it one of the most frequented places on the virtual campus of University H. This equates to 950 individual sections of the course delivered annually to a nontraditional student population with an average age of 34. With 1,600 courses offered annually at
University H, the volume presents a challenge for IDs who are responsible for monitoring the functional aspects of the classroom, as the math ID explained:

There isn’t time for follow-up or to integrate a lot of feedback once courses are made live with real students. We all have over a hundred courses assigned to us at any given point during the year, depending on the enrollments. The pace is relentless.

Two full-time mathematics faculty members mentioned that it is not uncommon to have 200 or more students assigned to them in a given eight-week period. This equates to about 1,300 students per year. According to one faculty member, “It takes effort. And sometimes it is frustrating. Sometimes I get depressed myself by my inability to reach so many.”

To help address the issues of scale that are apparent throughout the university, and to ensure consistent quality across disciplines, senior leaders initiated the development and deployment of a universal course template. The template was created “in an effort to build a uniform structure across all schools that ensures that everything maps specifically to a course objective,” according to the ID assigned to the College Algebra course. This template standardizes the components of a course. For example, each course has identical links to assignments and supporting materials. Each assignment is presented in an identical manner, with clearly defined learning objectives, due dates, skills to be learned, and schedule of assessments (tests, quizzes). The College Algebra ID explained:

The template includes a series of checklists that clearly define information requested from subject matter experts and program directors such as course objectives, assignments, supporting materials, and assessments, which may be formative or summative in nature. Formative assessments such as forum posts represent a smaller percentage of the total grade in comparison to summative assessments that include writing assignments or capstone projects. Before we had the template, the courses were all over the place in terms of consistency.
Although the ambition of the administrators was to create consistency, one veteran, full-time faculty member asserted that the “ability to make students feel absolutely stimulated requires a certain degree of personalization. . . . But that is just impossible with the course load we carry.” In addition, another veteran faculty member in the mathematics department quipped:

If I had to assess the impact of the standardized format on students, I would say it is one of boredom. Students get bored because we are not giving them anything to do that they are used to do[ing] in their everyday lives. They don’t want to be there because there is not reason to be there other than because they have to be there to get their homework assignments. That’s because there is a new social norm with Twitter, texting, Facebook, and other communications that has been very destructive because we are not adapting to this new world fast enough. But we don’t have any of those affordances in our classroom, especially within the constraints of the universal template. As a result, the students are bored.

The standardized system ultimately may have to adapt, as the math ID explained:

We’re going to hit a dead-end unless the technology changes. The classroom of today relies on the technology that exists. We can do so much more, but those technologies cost a lot more and are not affordable for some schools. So they settle for using a bargain-basement course management system, and the sort of “out-of-the-box” features can be limiting. . . . In the scheme of things the content management system that we currently use is really like a Toyota Corolla, but there are definitely Cadillac systems on the market, but it all depends on where your budget lies. So we are driving a Toyota.

Theme #2: Desire for Connectivity

There were 182 comments from students who completed the end-of-course survey distributed to more than 1,100 students who took the College Algebra course during one eight-week session as part of the spring 2014 semester. Eighty-nine of these comments were positive; 73 were negative. Nearly half of the positive comments (42) mentioned the importance of the quick response from specific instructors, and one-third (27) mentioned the social interactions from instructors. The negative comments fell into two primary
categories: functionality (23) and forums (13). More than half (12) of the negative comments about functionality were related to connectivity between students and faculty members. For instance, one 27-year-old male majoring in international security explained that it would benefit future students “to have a step-by-step process for what to do with questions that were answered wrong after the tests. . . . With it being an online class, it would be beneficial to . . . be able to see or hear directly from the instructor, and not a machine, exactly what step was missed or done incorrectly.” Another student, a 29-year-old male majoring in business administration, explained:

All of the tests were timed, but the clock on the test screen was not counting down to let you know how much time you had. Twelve minutes before the end of the test, you would get a pop-up notifying you the time was about to expire. If the clock counts down, it’s better because you have it on the same screen instead of having to look at your clock/watch, like you could do in a real classroom with real people in it.

With regard to the forums, a 26-year-old male student majoring in intelligence studies complained that the “forum structure left much to be desired. It felt unnatural to talk to people and not hear a response for so long. Also, it did not help with the concepts being learned each week.” Another student, a 34-year-old female management student, said that, “if the instructor sets a word count for initial forums, they too should adhere to their own policy and have to communicate at least that much with each student.” A third student (a 20-year-old general studies major) explained, “I feel as if there wasn't much of an interaction between student and teacher in these forums, and in the whole class.”

The next most frequent negative comment (after those related to functionality and forums) concerned social interactions. For instance, the following response is from a 20-year-old female accounting major, and is representative of several student responses:
I feel like there could be more actual homework that is turned into the instructor to be graded and then to receive feedback from them. This would create a more in-touch personal feeling with the instructor. Instead, right now, it feels like our instructor is a computer program.

The COI survey responses related to the importance of timely responses in the forum were similar to those received from 41 students who participated in the Where Do You Learn Best (WDYLB) survey. Fifty-nine per cent of students who responded to the survey indicated that they received responses from their peers within one to two days, while the response time in forums from most professors in one to two days was slightly lower (53%). Another student elaborated on the forum response times by saying:

Well, the response times really impact how I learn. If I don’t get an answer right away, my brain starts to simulate what the answers could be and why; and then [when] I finally do get an answer, I realize either how right or wrong I was. You could say it is a bit annoying to be disconnected like that, but I wasn’t raised American, so maybe this is a cultural thing, or maybe there is [sic] just too many students to reply sooner than that.

Staff and instructional designers (IDs) expressed aspirations related to connectivity, as a senior administrator explained during an interview:

One thing we are looking at very closely is interactivity, and part of it is improving how we do group assignments, collaborative learning. We want students to be interacting more with other students. We want to include even more features such as the use of what we call manipulatives, like drag-and-drop features so students can organize ideas and have the opportunity to prepare, practice, perform a learning sequence. Right now that is what we are missing.

The aspirations about interactivity expressed by administrators align with what students said when responding to questions in the WDYLB survey. For example, when asked about their experiences in the classroom, 50% indicated that interactions with faculty and students gave meaning to their learning experience. One student indicated that “the forums are the main things that I look forward to in the online learning
environment.” Another student said that “sharing stories of what has happened to each of us students brings the learning experience to a much higher level, especially when the forums that I post bring about my classmates’ private experiences.” Still another student indicated that “what makes this experience more meaningful and enjoyable is when the interactions happen with people from all around the world. We are working on a similar goal and the forums bring an image of other areas I haven’t seen before because we are connected.”

However, the reality of the students’ experiences in the classroom suggests that the social interactions can be challenging. Nearly one-third (28%) of all respondents in the WDYL survey indicated that interactions were problematic:

There were many concerns with the online classroom, especially with the lack of interaction and timely response from the professor when a question is asked about the material. There were too many tests and not enough teaching. The going back and forth with the instructor is important to ensure that each student was able to learn and apply what was learned with clarity. Another student indicated that the virtual classroom does not allow active group discussions. The student went on to explain the perceived value of group discussions, stating:

Students learn by watching a professor speak about the class material and about their experiences. When students can’t hear that kind of interaction, it’s much harder since none of my professors use videos. There isn’t any chat function in the classroom that offers versatility in interactions with ease such as with Facebook where you can be on the homepage doing one thing and then participate in chat interactions when needed.

Forty-two percent of respondents to the WDYL survey indicated that the classroom would be more appealing if there were more interactions.

To improve interaction, four faculty members who were interviewed devised strategies to connect with students to “counterbalance” the solitary nature of the “course-
in-a-box” feeling. For instance, one faculty member created customized forum topics that require students to identify and share real-world examples of mathematical concepts of relevance to their everyday lives. Another faculty member also sent personalized communication and changed due dates based on things happening in the real world, such as college football games. One example of a personalized forum message is as follows:

It’s football season. I’ll tell you what I am going to do. I am not going to grade papers on Sunday like usual. I am going to be watching football all day and holding my breath that the Redskins win. So your papers that were due on Sunday are actually due next Thursday.

**Summary**

Administrators and faculty explained that a sense of place is “not currently discussed” as part of the design process. There is a contradiction, however, in the administrators’ assumption that students do not understand why a sense of place is important for their learning. The data show that students do care about the environment and that they have ideas about what they want (social interactions, collaborative activities). The data also indicate that administrators knew a sense of place was an important consideration but perhaps did not know how to operationalize it or understand its overall significance.

Faculty and IDs complained of feeling overworked and overwhelmed with the number of classes and students. The ID assigned to the College Algebra courses used the analogy of a mass-produced automobile (Sakai) when describing the course-management system utilized by University H and the scale of the operations. Faculty also made references to an intense, “high-production” environment that limits their personal engagement, creativity, and ability to interact with students.
The data suggest that the university is not meeting its own expectations and measures of success with regard to the College Algebra course. The interview responses from IDs and administrators reflected a disparity between what creators aspire for the classroom to be (engaging and interactive) and what the experience actually is like for many students (distant and frustrating). The COI survey reveals that, for students, positive social interactions helped to make the online classroom successful, as did quick response times from faculty. The WDYLB survey results also suggest that students consider meaningful interactions with faculty and their peers important for learning. However, the design of the College Algebra Classroom environment allows only a limited amount of social interaction and collaborative activities.
Chapter 5

Nursing Classroom Case Study

This chapter describes the Nursing 939 Classroom, one of 450 courses offered at a public research institution, which will be referred to as University G. This institution serves approximately 21,000 students each year. Students hail from 48 states and 43 countries. The physical campus is located in the Midwestern region of the United States. The Nursing 939 Course (Health Assessments) is offered within the nursing department, which is organizationally positioned within the Colleges of Applied Science and Technology, a College that enrolls more than 10,000 students each year. Enrollment in the Nursing 939 course was approximately 47 students during academic year 2013–2014.
and is a required course for several programs, including the RN to BN, RN to LS, master’s, and doctorate of nursing practice.

The chapter includes detailed descriptions of the classroom from the perspectives of those who either created the courses (instructional designers [IDs], faculty, and program directors) or inhabited or supported the classroom (faculty, students, and technical support staff). The descriptions are framed primarily by the similarities and differences in the responses—on the one hand, of those who make and maintain the classroom and, on the other hand, of those who use the classroom.

A Sense of Place

The IDs at University G mentioned the concept of a sense of place in terms of its importance to the process of designing online learning environments. During the last several years, they have designed numerous environments for nursing courses that seek to create “meaningful experiences” for learners. When describing the online environment, one ID stated:

A sense of place is a crucial element for retaining students. We try to think of users as full-time “residents,” because somebody who is engaged and active will go there when they have a few minutes in their day and when they are invested, like most people are in the place that they call home; they are more likely to come back. In other words, it creates a sense of community that is similar to what we feel when we go to the park in our neighborhood or to the corner bar or restaurant to meet friends. The sense of place brings the environment to life, and it integrates people into their learning. . . . If it is fun enough, they will come back to it.

Faculty and staff did not specifically mention the notion of a sense of place, but all those interviewed mentioned the desire to mimic real-world situations, given that role playing was an important device for developing interview skills (otherwise known as interprofessional skills).
Three themes emerged from the data: *Being Real* (imitation of real-world experiences), *Tangibility* (desire for human touch) and *Coalescing* (desire to bring together and collaborate).

**Description of the Nursing 939 Classroom**

Examination of the digital artifacts (screen shots from the classroom interface) reveals that the Nursing Classroom consists of two separate spaces, as shown in Figures 2 and 3. The homepage is two-dimensional and serves as the primary access point for the course (shown in Figure 2).² This is the space where students access the course syllabus/description, lessons, resources, assignments, and tests. An array of 17 links on the left side of the page include the *Course Dashboard*, *START HERE*, *Course Information*, *Learning Modules*, *Course Resources*, *Clinical Information*, *FAQ*, *Discussion Board*, *Blogs*, *Blackboard eMail System*, *Instructor Contact Information*,

² The use of the phrase “two-dimensional” refers to the observation that the classroom interface is flat. It has two dimensions (width and length) but no depth. This is not a subjective determination but rather a statement of fact.
Classmates, My Grades, Online Student Support, Blackboard Online Help, and Blackboard Tutorials.

The secondary space in the nursing classroom is a standalone virtual building that includes five distinct areas: two patient rooms, one large conference room, one small conference room, one lounge, and a garage (shown in Figure 3). Together these rooms represent about 1,800 square feet. This space is also primarily two-dimensional; it is a flat screen with text and images on it. But the space also utilizes avatars (representations of people, created by users) that help to create an illusion of being in a three-dimensional space.³

³ Three-dimensional space refers to space that includes length, width, and depth. Four-dimensional space includes the use of time and sound.
Figure 19. Images of secondary space in the nursing classroom. Source: University G.
For example, students sign up for interview times and select a role of either a patient or student interviewer. Each participant must create an avatar, and all questions are asked and answered via text commands shown on the screen. This simulation environment does not allow the integration of live images of the users or real-time communications.

According to the program director, the primary benefit of the simulations is “to provide students the opportunity to practice their interviewing techniques. This benefits students who are shy or those who feel uncomfortable with speaking directly to a live person.” Research conducted by nursing faculty suggests that these simulated interviews help to reduce the fear associated with interviewing and, as a result, students ask more relevant questions. In addition, psychiatric clinical faculty identified that students were more prepared and demonstrated increased self-confidence on their first day at a real
facility after using the simulation trainings (Sweigert, 2012). Please see Figure 5 for a visual of the spaces found in the Nursing Classroom.

![Image of Home Page Space (2D) + Medical Interview Building (3D, 4D)]

**Figure 21.** Visual of the spaces found in the Nursing 939 Classroom. Source: Author.

The artifacts (screen shots from the course interface) revealed that the Homepage spaces contained no dedicated spaces for private meetings, informal discussions, or collaborative work. As a result, the majority of the learning activities that are possible in this space are solitary in nature. The homepage has one area dedicated to peer interaction, the forum, which permits primarily asynchronous communication (it is text based). The medical interview building simulation offers spaces for private meetings with clients, collaborative work and real-time communication (text-based only.)

**Theme #1: Being Real**

Nursing educators face challenges created by the changing face of health care, which has reduced inpatient stays and streamlined outpatient services. As a result, clinical agencies must limit access to patients at a time when nursing educational programs are increasing enrollment in light of a projected severe national and worldwide shortage of nurses by the year 2020 (Englert, Kameg, & Perozzi, 2011). The nursing program director explained that simulations have been used in schools of nursing in order “to
provide additional experiences in a safe environment. The types of simulations vary and include high- and low-fidelity simulation mannequins, as well as virtual-reality environments.” This was important given that “finding interview opportunities for students became harder and harder,” because there were more students who needed training than there were patients available for interviews. One faculty member explained that “each term we would have about 80 to 100 students that needed interview experience, and until we developed the simulations, the patients might be interviewed by a dozen students . . . this was not sustainable.” As a result, University G began integrating virtual simulations into its nursing curriculum in 2008.

Besides addressing the need to practice specific skills, simulations also help to provide a familiar context for learning, as one ID explained:

Most of the time, the simulations for the nursing course are extremely literal translations to the point of being almost a complete replica of the space that they are learning in the first place. This is actually an engagement strategy because the student can be held back by what they are comfortable with. If we make it real, it is somewhat familiar and students are more comfortable, especially the ones who don’t have a lot of experience in digital environments.

**Theme #2: Tangibility (feeling a human touch)**

One faculty member explained that, to increase the learning for students, faculty-led committees are investigating specifically what is it about the human touch that seems to make a difference in how one group of students (for instance, social work majors) interviews a patient versus another group of students (medical students). This is an important area of research because, according to another faculty member, “Human touch makes all the difference. It is possible to do that in online environments, but you can’t
rely on the same strategies as you would if the class were live and in person. But without
the human touch, no one cares.”

Technical support staff also indicated that human touch was important for
acclimating students to the virtual environment, especially for those who were not
familiar with simulations or video game-like experiences. As a result, technical support
staff created an optional training experience for students. If a student is located near the
campus, he or she can make an appointment for a one-on-one training with the technical
staff. If the student is remote, a WebEx meeting is arranged to help the student learn how
to navigate in the simulated environment.

Forty percent of the students who responded to the Sense of Place (SOP) survey
mentioned the importance of the human touch. For instance, one student explained, in a
comment that represents the views of numerous students, “I thought it was pretty cool to
look at the avatar version of myself, but ultimately it became more like me just typing
words and the other person responding with text. I really would like to have an avatar that
can show more expressions like a real person does.” Another student explained that the
content covered in the assessment of the patient was “very sensitive and the virtual
simulation lessened the embarrassment for the nurse and the patient when talking about
human issues.” A third student stated, “I would love to hear the voice-over when my
words are typed into the screen. I would like to be able to instill emotion into my words
through facial expressions that I could initiate on the patient, since that is more human.”

**Theme #3: Coalescing**

The program director explained that “interprofessional collaboration” is a wave of
the future but also a great challenge because “it is next to impossible to bring other
schools of nursing into University G’s physical campus because there is such a distance that they would have to travel to use the high-fidelity simulators.” According to another faculty member, interprofessional collaboration is a national standard for nursing programs and is now required for program accreditation:

To fulfill new accreditation requirements, we need two nursing students, one medical student, one radiology student, and one social worker for each planned session.

Large national studies have shown that patient safety is at risk without good interprofessional work and collaboration (Sweigart, 2012). As the program director explained:

So we use the Nursing Classroom to help develop those skills. It really is all about bringing people together. The agencies don’t care how you do it, just that you do it. It is all about bringing disparate groups together toward common goals. Another benefit has been that we could expose our students to more diversity, by creating diverse patient avatars, so they get a more accurate cross-section of patients than you would see in a hospital setting. That brings together our students as well. Since our student body is kind of homogenous, students would otherwise never interact with nationalities located throughout the world.

Although faculty and staff aspired to promote collaboration, 60% of the students who were interviewed for the SOP survey characterized the online classroom as “quiet”; only 20% characterized it as “social.”

**Theme #4: Overcoming Embarrassment**

Three faculty members mentioned that one of the unexpected benefits of the virtual environment was that it helped students to overcome their embarrassment about asking personal questions to patients during health assessments. Faculty also described conducting research that confirmed that students overcame their shyness after having the opportunity to ask a variety of questions via their avatar.
Twenty percent of the students also mentioned that the environment was helpful in overcoming their embarrassment in asking questions on the sexual health interviews.

**Summary**

IDs used the term “a sense of place” to describe the online environment and considered it to be a “crucial element” for engaging students. Faculty also expressed a desire for their environment to be “as real as possible.” They did not use the term “a sense of place,” but seemed to understand the concept. The data showed that, for the majority of students, when the online environment seemed “real,” it was more meaningful, and that the “human touch” was an important part of their learning. The text-based environment did not convey the same sense of human touch as real-time, in-person interaction, according to the majority of survey responses.

Administrators and faculty expressed a desire to create collaborative learning experiences for students, but there appears to be a limitation in the design of the current virtual environment given that it is text based. Although students can see themselves interacting with a patient (via avatars), they cannot hear the words that are being exchanged. They can only be seen via text on the screen. The majority of students indicated that the communication was lacking because there was no use of sounds (voices) and limited use of facial expressions and gestures. The majority of students also characterized the environment as being “quiet,” which seems to contradict the ID and faculty’s stated desires for a highly interactive and collaborative settings for learning.
Chapter 6

Language Classroom Case Study

Figure 22. Image of the primary space found in the Language Classroom. Source: University W.

This chapter describes the online Language Classroom, one of 300 online courses offered at a public research institution that serves approximately 23,000 students each year. The physical campus is located in Canada and this language course is organizationally positioned within the Arts and Social Sciences division at the school. Language courses serve approximately 500 students per semester.

The chapter includes detailed descriptions of the classroom from the perspectives of those who created the Nursing 939 course (instructional designers, faculty, program directors) and from those who have inhabited or supported the classroom (faculty, technical support staff). The descriptions are framed primarily by the similarities and differences in the responses.
A Sense of Place

None of the faculty, staff/administrators and instructional designers interviewed at University W used the phrase, “a sense of place,” when describing the process of creating or implementation of courses. However, the data suggest that there is an understanding across the institutional roles that the sense of place is enhanced when the environment emulates the real-world and when it creates elements from the gaming world, such as different levels of achievement and rewarding correct answers. Faculty research on the Language Classroom revealed that students interact with the virtual spaces in a similar way to being in a physical space (Hartwick, 2013). The data that were collected (interviews, survey results and artifacts) will be used to describe the nature of the sense of place that was found. Three themes emerged from the data analysis: Apprehension about Virtual Classrooms, Being Real and Making it Fun.

Language Classroom Description

For the purposes of this study, the online classroom space is divided into three distinct areas: the main space (homepage), a secondary space (e-portfolio page) and numerous virtual-simulation spaces. The homepage is the primary access point for the course. This is the space where students access the course syllabus/description, lessons, resources, assignments and tests. It is organized into six primary information portals: Email Communication, 3D Live Class Portal, and Assignments and Due Dates Portal, My Hoe Course Portal and Activities Portal. In addition, there are six different
links located within the portal navigation menus: Databases, Feedback, Lessons, Quizzes, Resources, and E-Portfolio. The home page and e-portfolio page are two-dimensional.\(^4\)

The secondary space in the language classroom has one large portal that displays information in an expanded format. It also has the following four secondary links: About Me, Explore Your Career and Education Preferences, Reflections and Research Topic. The e-portfolio space is meant to provide students with an opportunity to understand their strengths and weaknesses, explore career paths and develop a self-selected research topic.

\[\text{Figure 23. Image of the home page of the Language classroom. Source: University W.}\]

\(^4\) The use of the phrase “two-dimensional” refers to the descriptive observation that the classroom interface is flat. It has two dimensions (width and length), but no depth. This is not a subjective determination but rather a statement of fact.
The Language Classroom also has five virtual simulation spaces (Student Residence, Library, Rainbow Classroom, Wordle Game and Match Game) that provide an array of three- and four-dimensional activities. Three of these environments (Student Residence, Library, and Rainbow Classroom) provide opportunities for social learning. In addition, they include the affordance of being able to see the actual person behind the avatar, as illustrated in the figure below. The gaming environments (Wordle and Match Game) have a different intention, as they are used primarily for assessments of course content. Students proceed through the “games” and answer questions that take them to the next level of understanding. When complete, students receive credit for the activity. These virtual environments are different from the others given that they are solitary.

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5 Three-dimensional space refers to space that includes length, width, and depth. This gives the illusion of being in a physical space. Four-dimensional space includes length, width, depth and the element of time.
activities. See Figure 4 for a visual description of the spaces found in the Language Classroom.
Figure 25. Visual description of the spaces found in the Language Classroom. Source: University W.
Examination of the artifacts (screen shots from the course interface) revealed that the homepage contained no dedicated spaces for private meetings, informal discussions, or collaborative work. As a result, the majority of the learning activities that are possible in either space are solitary in nature. The homepage has one area dedicated to peer interaction, the forum, which permits primarily asynchronous communication. However, the homepage does include a video recording of the instructor that is updated every week. Although this is not a real-time communication, it does feature the instructor’s image and the sound of his voice. The e-portfolio space contains areas for private meetings and informal discussions between the teacher and the student. Communication is text based and asynchronous.

The virtual-simulation spaces have spaces for private meetings, informal discussion, and collaborative work. These environments include special features such collaborative surfaces (graffiti boards; allow for synchronous group work), collaborative discussion spaces, and affordances such as access to other media such as web-cams and media players. The environments also include three-dimensional sound that mimics the way sound works in real life. For instance, as one avatar (a virtual representation of the user) moves away from another, its voice appears to become less audible. Hearing the volume of the voice diminish as the avatar moves farther away from the student triggers the brain to believe that the distance between the two has changed. Some of the simulations also allow the user to see a real-time image of the actual person represented by the avatar.
Theme #1: Apprehension about Virtual Environments

In traditional classrooms, a common strategy is to promote collaboration and critical thinking through group work and careful task design. Faculty members devise an array of activities that allow students to practice speaking the new language and to interact and collaborate with others. In an online course, this challenge is heightened because the students do not share the same physical space (Arya, 2012). Faculty explained that “students may have varying levels of expertise with digital technologies and with navigating in the simulated environments. Students have trouble learning the basics of how to use the keyboard in different ways to control their avatar.” According to one Russian teacher, students can feel “overwhelmed” with the technology, which makes
them perceive the space as being “uninviting.” An English teacher who has studied the behavior of students in the Language Classroom explained:

Sometimes the number of movement options and gestures, landing areas, and presence of random avatars was overwhelming. The interaction can be confusing and many avatars did not engage or were inappropriately dressed in an academic learning context. (Arya, 2012)

To help students make the transition to working in virtual worlds as easy as possible, faculty members explained that they dedicated an entire class and several assignments to acclimating the students in the environment. Instructional designers also deploy various strategies to help make the environment more familiar:

We try to make things as simple as possible. The idea is not to implement too many things at once, so we ease them into each simulated environment so it is not overwhelming. We design activities that help them to learn the language, but that also allow them to practice being in the environment. We also try to be consistent and launch the same type of learning elements for consecutive weeks, to develop a familiarity and comfort level for students in the classroom.

One faculty member explained that it takes time to learn the etiquette in the virtual world if a student is not experienced in the gaming world. IDs seek to “make things reference the real world as much as possible. This calms the student down and allows the learning to happen.” Another ID agreed that, “You can’t just run around and shoot things in our environments and create havoc.” As a result, most of the spaces in the simulated environment are public, like a marketplace, or meeting room. By giving the student a familiar reference, it helps to shape his or her behavior. For example, the program director explained:

We teach them to point their avatar at the person who is speaking. We explain that they should not be making wild gestures for no reason and that they shouldn’t start singing or shouting while peers or the faculty member are speaking to a group. But it’s not so different than real life, and that helps the student to become acclimated a bit faster.
One technical staff member explained that faculty members are also often “leery” to try something new. One faculty member explained that several longtime faculty are “often afraid of the digital classroom and of being made to look like they don’t know what to do. In addition, faculty sometimes worry that if they technology might make them obsolete, and that they might lose their job.” As a result, the adoption of simulated environments at University W has been slow. Although there are more than one dozen language-related subject areas offered each academic year, there is currently only one faculty member using simulations in the language department.

Theme #2: Being Real

The virtual environments used in the Language Classroom replicate several of the actual spaces found on the campus of the university. This was an intentional strategy so that there would be some level of familiarity for students, according to faculty members and IDs. If they knew the campus library, for example, they would recognize the library when spending time in the online classroom. If they visited the marketplace, they would likely recognize the resemblance to the marketplace in the main part of town in which the university is located. One ID explained:

One thing that the students and faculty want is some kind of a connection to the physical campus, to give them some kind of a reference point to things that are familiar. This kind of brings a connection that they are part of a real school or university when they seem buildings that they expect to see, like a library, and a quad area. It’s very important.
The option to personalize an avatar was appealing to many students, according to one faculty member:

The simple act of representing oneself somewhat fictitiously (though a personalized avatar) generated spontaneous language production and even humor as group members commented on each other’s changing appearance from day to day.
But the balance between reality and illusion can be delicate, according to another designer, who indicated, “You don’t want to be modeling everything and having the greatest detail because that’s almost distracting in a sense. You want to have enough to get the feeling, but not too much to distract.” A language teacher agreed that finding the right balance is tricky and that “we may be doing students a disservice if we put too many things in these online classrooms, especially since there are now so many options for technology these days.”

Research conducted by faculty at University W on the Language Classroom simulations indicated that students liked the fact that communication was easy, synchronous and more “real” (as one has in face-to-face communications) when comparing the simulated environments with “regular” online environments that are text based. Students also commented that they liked the “real-time access to web browsers” offered as part of learning activities in the simulated environments (Arya, 2012).

Theme #3: Engagement and Making It Fun

All of the interviewed IDs and faculty agreed that they want the classroom to be as engaging as possible. Designers were more specific and identified the characteristic of “fun” as being critical for the success of online environments.

One of the most important things you can do to make students want to stay in the classroom is to make it fun. Students should want to be there for some reason. Maybe instead of boring questions, students can compete in a game as they search for the correct answer. It doesn’t have to be complicated, but thinking more about the activity more active than just delivering the information is very important. And communities are way more fun than things that happen in isolation.

One designer explained that, to make a dynamic classroom, it is important to think of the “narratives” when it comes to learning. Everybody loses when you create
“mass-produced learning. The Language Classroom is its own ecosystem and educators need to do better to catch up with technology,” according to instructional designers. Faculty research on their own courses suggested that students like the “game-like” scenarios found in the simulation environments and had fun using the avatar options to communicate (Arya, 2012).

**Summary**

None of the faculty, staff/administrators and IDs interviewed at University W used the phrase, “a sense of place” when describing the process of creating or implementation of courses. However, the data suggests that there is an understanding across the institutional roles that the sense of place is enhanced when the environment emulates the real-world and when it integrates elements from the gaming world, such as rewarding correct answers and publically recognizing different levels of achievement (with leader boards showing the highest score on a task, for instance).

Faculty and IDs felt that it was important to make the simulation environments as real as possible to provide a common reference point for users. Students appear to like working with avatars because they can be customized and make communication more realistic. In addition, the connection to physical spaces is perceived to make students feel more comfortable in the online classroom. This is a challenge because even if virtual simulations that mimic the real world can reduce students’ stress and feeling of being overwhelmed, it takes time for them to learn the skills needed to function in these spaces.
Chapter 7
Cross-Case Analysis

The three prior chapters also reflect the results of the analysis. Each of the three case studies revealed several themes. For the College Algebra Classroom the primary themes pertained to Scale and Standardization and Desire for Connectivity. For the Nursing Classroom dominant themes were Being Real, Tangibility and Coalescing. For the Language Classroom, the main themes were Apprehension About Virtual Environments, Mimicking Physical Space and Engagement/Making it Fun. Please see Table #1 for a roster of case study themes.

Although the themes of each case were distinct, cross-case analysis revealed the following three crosscutting themes: Social Interactivity and Collaboration (*noted in red), Referencing the Physical (**noted in italics) and Uncertainties (**NOTED IN CAPITALS).
### Figure 28. Theme matrix illustrating the case study themes and the identification of cross-cutting themes.

Source: Author.

**Cross-Cutting Themes**

* Social Interactivity  
** REFERENCING THE PHYSICAL  
***Uncertainties

<table>
<thead>
<tr>
<th>Math Classroom</th>
<th>Nursing Classroom</th>
<th>Language Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale and Standardization*</td>
<td>BEING REAL**</td>
<td>Apprehension about Virtual Environments***</td>
</tr>
<tr>
<td>Desire for Connectivity*</td>
<td>Tangibility*</td>
<td>MIMICKING THE PHYSICAL WORLD**</td>
</tr>
<tr>
<td>Coalescing*</td>
<td>Engagement and Making It Fun*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overcoming Embarrassment***</td>
<td></td>
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</tbody>
</table>

**Cross Cutting Theme #1: Social Interactivity and Collaboration**

The *Scale and Standardization* (Math classroom), *Desire for Connectivity* (Math Classroom), *Coalescing* (Nursing Classroom), *Tangibility* (Nursing Classroom) and the *Engagement and Making it Fun* (language classroom) case study themes are related to the broader theme of social interactivity and collaboration. For example, the Math Classroom case study revealed that several faculty members were frustrated with the volume of course assigned to them because this heavy load did not permit them to interact with all the students who needed their help. Several faculty members expressed that the standardized template limited their ability to customize content and personalize their interactions with students. Math faculty mentioned specific strategies that they utilize to personalize the content and “draw out” students in the learning activities such as
public forums, so that students’ experiences are not as isolated. These findings suggest a lack of connection between students and faculty. The issue of isolation is an important criterion for student satisfaction with online classrooms. The feeling of distance and separation between student and instructor is one that might be overcome, but it is unlikely to be completely be eradicated (Daugherty & Funke, 1998).

Scholars have concluded that persistent contact between students and the class community is considered to be a main factor in explaining the difference in quality of learning experience between face-to-face learners (Nesson & Nesson, 2008). Other researchers have confirmed the importance of developing community and social interactions (Paxton, 2003; Richardson & Swan, 2003). It would appear to be a great challenge to create a meaningful sense of place in a classroom characterized by the faculty’s perception that there are too many students, not enough stimulation and no time to interact with them.

The Nursing Classroom case also revealed that the instructional designers and faculty had a goal of bringing students together for collaborative activities in support the interprofessional skill development. Forty percent of students expressed a desire that the virtual simulations used in Nursing Classroom be made more “human-like.” Some students also complained that they had a desire to hear the voice and read facial expressions of patient avatars, to help understand the human-side of the communications. These data align with previous research on the benefits of humanization and personalization of online learning environments (Hudson, 2002; Jacobson, 1993; Keough, 2005). Although the virtual simulation environment (medical building) did provide several different types of spaces to interview patients, the communication was text-based.
Previous research also shows that there are issues with text-based communications because they can be misinterpreted (Curtis & Lawson, 1999) due to the lack of visual expressiveness by the participants involved. In addition, text-based communication is the least “embodied” type of communication, which means it may not reveal characteristics of the co-present individuals that help to understand the meaning of the communication (Zhao, 2012).

The data from the Language Classroom case indicated that IDs used specific strategies to increase engagement such as creating a narrative for each classroom and making affordances for “game-like” in an effort to engage students and make learning “fun.” These data support the findings of previous researchers suggesting that a sense of place in virtual environments develops through participation and engagement (Relph, 2007). Game-based learning often includes narrative arcs, immersion activities, dramatic themes and well-developed context for learning (Parrish, 2009).

My research illustrated that many of these elements were present in the environment, but further research is required to understand fully what it is like to be IN these environments over the course of time. In other words it is one thing to be on the outside looking in at this phenomena and another to be immersed within it. Known as the connoisseurship model, this approach is a means of “getting inside” a given experience (Balland, 1991). Using this approach could allow a better understanding of the sense of place from the perspective of actually being in the actual classroom.

Cross-Cutting Theme #2: Referencing the Physical

The Being Real (Nursing Classroom) and Mimicking Physical Space (Language Classroom) cross-case themes involve an intentional referencing of the physical world.
For instance, in the Nursing Classroom, faculty and IDs made a point to mimic real-world environments in support of the objective to train students for jobs in the real world. Faculty research of their own courses shows that this training was effective at teaching skills needed to obtain employment (Sweigert, 2013). Faculty and IDs in the Language Classroom intentionally copy physical spaces that are familiar to students around the world, such as a library building, to provide a comforting reference point. Faculty research suggested that creating familiar spatial types (such as existing campus buildings or a well-known public square) helps to acclimate students to using the keyboard in a new way and to learn the rules of how to act in these environments. Faculty refer to the rules are known by faculty as the “etiquette” in a given virtual simulation.

Simply re-creating the real world, however, does not necessarily ensure a strong sense of place. Copying campus buildings is an example of generation of space without consideration of place. This appears to be a failure of the language classroom’s virtual simulations, since replication of reality does not necessarily create a strong sense of place in spaces that people want to inhabit (Jones, 2013). The creation of a sense of place has more to do with what users do in these spaces, as Salveson explains (2002, p. 73).

A sense of place has to do with the interaction of several elements—location, landscape and personal involvement; each by itself usually is insufficient to create a sense of place.

Thus, further research is required to understand how students behave in the virtual simulation environments to determine if they go beyond copying physical buildings and move into the realm of contributing to a strong sense of place.

Cross-Cutting Theme #3: Uncertainties
Apprehension About Virtual Environments was a primary theme identified in the Language Classroom. The analysis indicated that some faculty members were unsure about trying new technologies because they did not want to look stupid and because they feared that they might lose their job. Some students also had trouble navigating in the simulations. Although not as prevalent, the Apprehension theme was also mentioned in the other classrooms. For instance, nursing students expressed a concern about “being embarrassed,” when interviewing patients and asking for personal information. In that instance, the virtual simulation created a feeling of protection, given that the meeting was not face-to-face, which helped students to overcome their fears (Sweigert, 2012). As a result, technical support specialists designed training for new students to acclimate to the environment. Feeling apprehensive is not unique to the Math, Nursing and Language Classrooms. Previous research has found that students spoke of frustration, alienation and disembodying experiences when working in online educational environments (Brabazon, 2002; Clark, 2002).

Spatial Characteristics: Boundaries and Movement

In this study, I divided the spatial elements of the classroom into six descriptive categories: 2D (two-dimensional, flat interface), 2D plus (two-dimensional flat interface with the use of audio or video supplements, or the use of adaptive learning strategies), 3DSOL (three-dimensional space for solitary activities with three-dimensional sound), 3DSOC (three dimensional space for social activities with three-dimensional sound), 4DALI (three dimensional space using avatars and with live images). Please see Figure 2 for a comparative illustration of the spatial elements in classrooms.
The **primary and secondary** spaces (MyMathLab in Math Classroom, E-Portfolio in Language Classroom) have clearly limited boundaries. Within these spaces, students may only “move” up or down, or side-to-side, while navigating on the flat, two-dimensional computer screen with a keyboard or a mouse. There are no separate areas for collaboration, private discussions, or small group meetings. Only the language classroom provides a private and customizable work area (E-Portfolio).

The **virtual simulation spaces** utilized in the Nursing and Language classrooms have broader boundaries as they provide the illusion of three-dimensional space. These environments also require the use of avatars, so users must create a personalized representation of themselves and also control the avatar’s movements, gestures and speech. These spaces include the medical building (nursing classroom) that provides the equivalent of approximately 1,850 square feet of virtual space for students. The Language Classroom has several virtual spaces such as the **Student Residence (1507 square feet of virtual space) and Library (3000 square feet of virtual space).** The **Rainbow Classroom (more than 5000 square feet of virtual space), Wordle Game and Match Game** are also simulated environments used for collaborative activities and assessments.

It appears that the virtual simulation spaces expand the amount and type of interactions possible for students and set the stage for interaction and collaboration. Additional research is needed to determine if there is a relationship between the amount of space, and student satisfaction and learning outcomes.
**Spatial Elements Analysis**

<table>
<thead>
<tr>
<th>Math Classroom: Spatial Elements</th>
<th>2D</th>
<th>2D+</th>
<th>3DSOL</th>
<th>3DSOC</th>
<th>4DALI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Page</td>
<td>✗</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MyMathLab</td>
<td>✗</td>
<td>✗</td>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Nursing Classroom: Spatial Elements</th>
<th>2D</th>
<th>2D+</th>
<th>3DSOL</th>
<th>3DSOC</th>
<th>4DALI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Page</td>
<td>✗</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Interview Building</td>
<td>✗</td>
<td>✗</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Language Classroom: Spatial Elements</th>
<th>2D</th>
<th>2D+</th>
<th>3DSOL</th>
<th>3DSOC</th>
<th>4DALI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Page</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Portfolio Space</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Residence</td>
<td>✗</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>✗</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainbow Classroom</td>
<td>✗</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wordle Game</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Match Game</td>
<td>✗</td>
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</tbody>
</table>

**Proximal Typology Key**

- **2D**: flat interface
- **2D+**: flat interface with video/audio, or adaptive learning strategies
- **3DSOL**: 3D solitary space with 3D sound
- **3DSOC**: 3D social space with 3D sound
- **4DALI**: 4D space with live images

**Figure 29.** Roster of spatial elements in the Math, Nursing, and Language Classrooms. Source: Author.
Applying Frameworks from the Physical World: The Zone of Proximal Development

The constructivist theory of the Zone of Proximal Development suggests that a close distance is required between the learner and the teacher for effective learning to take place (Vygotsky, 1967). Given that students and faculty may never meet in-person in an online classroom, it is important to consider strategies that can reduce the distance (proximity) between them. This distance can be an obstacle to effective communication, and may impact student engagement and retention.

Previous research suggests that close proximity (distance) between people is associated with numerous cognitive and behavioral changes that affect the work progress for the better (Kiesler & Cumings, 2002). Proximity also facilitates transitions from encounters to communication and fosters informal conversations that are important for collaboration. Close proximity also helps to maintain task and group awareness, an important concept given that the understanding of the activities of others provides a context for one’s individual activities (Kendon & Ferber, 1973).

How can the constructivist theory of the Zone of Proximal Development be applied to online learning environments? One way is to consider whether the learning activities offered in the environment are solitary or social. **Solitary activities** involve the student working alone and include activities such as reading, writing, watching pre-recorded lectures, Ted talks and YouTube videos with people, images and sound. These activities would create the greatest distance between the student and the faculty and thus would be the least desirable, from a standpoint of social interactions. **Social activities** involve students working with other students, faculty or those outside the classroom.
These may include asynchronous or synchronous communications such as public forums, email messages or online chats. The activities also may also include the use of avatars (physical representation of the user) that interact with other avatars and in virtual environments in which they exist. Other social activities include real-time interactions such as Skype and Webex which allow the users to see and hear one another during communications. Presumably, the sense of place would be stronger in a classroom that has more social activities. Please see Figure 4 for an illustration of the types of solitary and social activities found in online classrooms.

As a means of quantifying the amount of social and solitary activities in each classroom, faculty members were asked to report if there were any of the following activities in their classroom: text-based PDFs, documents, plain PowerPoint, PowerPoint with audio or video, YouTube videos, blogs, adaptive learning strategies, forum posts, recorded audio/video from instructor, collaborative group projects, virtual simulated environments, Facebook/Twitter and live meetings via Webex or Skype. Social and solitary activities are shown in Figure 5.

The Social Spectrum reveals that the majority of the materials for all three classrooms fall within the solitary and social/asynchronous categories. Given that text-based materials create more distance between the student and faculty member, they would be detrimental to the creating a zone of proximal development. The Math Classroom faculty reported no synchronous activities, while both the Nursing Classroom and the Language Classroom reported social synchronous activities, which are more desirable from the standpoint of Vygotsky’s theory.
Figure 30. Illustration of solitary and social learning activities on online learning environments. Source: Author’s illustration.
Figure 31. Illustration of solitary and social learning activities in math, nursing, and language classrooms. Source: Author's illustration.
The limited opportunity for social interactions in the primary and secondary spaces found in all classrooms is inconsistent with the ambitions expressed by IDs and faculty to make the classroom as interactive and engaging as possible. This disconnect may be partially the result of the limitations of the content management systems (CMS) utilized at each school. (Math; Sakai CMS, Nursing; Blackboard CMS, Language; Moodle CMS). Faculty may also not be considering the potential for each learning activity in the classroom to be solitary or social. When faculty members were asked to identify the materials in their classrooms, they said they had never thought of materials as being solitary or social.

**Applying Frameworks from the Physical World: The Vitruvian Triad**

A number of scholars have based their research on the interaction between virtual space and learning (De Lucia et al., 2008; Minocha & Reeves, 2010). Architectural design strategies can help to structure the pattern of and the potential for social interaction in virtual spaces. This strategy has been shown to have a direct impact on learning (Bouras et al., 2005; Minocha & Reeves, 2010; Schnädelbach et al., 2007). De Lucia et al. (2008) found that a virtual campus in Second Life—whose design was informed by a constructivist, sociocultural understanding of learning—increased peer-to-peer interaction, group work, and communication, facilitating sharing of knowledge and experience among students.

How can the three principles of the Vitruvian Triad be applied to online learning environments? One way is to assess the interview responses in terms of the Vitruvian principles and to observe the balance (or imbalance) between them. As stated in the methods chapter, faculty, staff, administrators and IDs were asked questions related to the
process of designing and inhabiting the Math, Nursing and Language classrooms. The interview responses were assessed according to their leanings toward one of the three Vitruvian principles.

The Vitruvian Triad theorized that architecture must be understood with regard to all three principles in order to create enduring human environments. For instance, if a building were very functional but poorly constructed, it would not endure. In a similar way, if a building were beautiful but not functional, it also would perish ultimately. Applying these principles to the design of online classrooms in the Vitruvian Triad Analysis (VTA), one might assume that a balanced online environment would have a strong sense of place and would also be enduring.

The results of the VTA, however, indicate that none of the classrooms had a balance between the three principles. Moreover, the majority of those interviewed discussed what was lacking in the classroom, the interfaces were two-dimensional and the majority of learning activities were either solitary, Thus, I conclude from the analysis that none have a strong sense of place. The Vitruvian Triad Analysis (VTA) revealed that the Math Classroom leaned more toward Utilitas (function, commodity and utility). The Nursing and Language Classrooms both leaned toward Firmitas (materiality, solidity, durability). Of the three, the Nursing Classroom had the most balance among the three Vitruvian principles. Venustatis was the least common principle found in all three classrooms. Please see Figure 6 for an illustration of the balance of Vitruvian principles, by role that was interviewed and each respective classroom.

Analysis of the findings also reveals a pattern. The “leanings” of the respective classrooms coincide with basic tenets of the institutional type. For example, it might be
expected that a for-profit institution (Math Classroom) would be driven by efficiency and
the bottom line (Utilitas) and the data reflects this focus. Likewise, it might be expected
that public universities would be concerned with the durability of the classroom
(Firmitas), and looking toward the future (Nursing and Language Classrooms).

**Comparing Data Sources with the VTA**

The VTA data indicates that the **Math and Nursing classrooms** are lacking most
in Venustatus. This finding is supported by faculty descriptions, in these two classrooms,
that the classroom is a “boring” environment that does not provide enough stimulation,
and by students’ identification of problems related to the classroom interface and
communications. Spatial analysis revealed that both classrooms offered primarily solitary
learning activities, which may not be the most conducive platform for creating a strong
sense of place. Although the Nursing Classroom supplemented the primary space with a
virtual simulation, the communication in this environment was text-based and contrary
to the students’ desire for more human touch (40%) in the classroom.

The VTA analysis revealed that the **Language Classroom** is lacking in Utilitas.
This finding is supported by the cross-cutting theme of *Apprehension About Virtual
Environments*, according to which as students expressed frustration with the practical
aspects of having to learn how to navigate in the virtual environment, while faculty
expressed fears about trying new technologies.
Figure 32. Vitruvian Triad Analysis for Math, Nursing, and Language Classrooms. Source: Author.
Chapter 8

Conclusions

In this chapter, I summarize the key findings, implications and possible trajectories for further research on the notion of a sense of place in virtual learning environments.

Conclusions and Implications

The concept of a sense of place was not articulated, but it was understood. The analyses indicate that most of those interviewed in all three cases could not articulate the definition of a sense of place in their classroom. However, they were able to explain what they thought would make the environment a place that they would want to spend time in and tell their friends about. The fact that those interviewed did not use the phrase a sense of place, but could articulate the characteristics of a place they want to inhabit suggests that those interviewed had a tacit understanding of the concept of a sense of place. They “knew more than they could tell,” about what was missing in their classrooms and what would make the experience more meaningful (Polyani, 1967).

As users of the classroom, students may be a valuable source of information for refining the sense of place in the classroom. Scholars suggest that digital natives (those who have grown up in a world surrounded by and using computers, videogames, digital music players, video cams, cell phones and other modern technology tools and toys) think and learn differently from previous generations. These students have typically spent less time reading and more time playing video games, as well as communicating via instant text messages and with social media (Kivunja, 2014). Perhaps the future model for instructional designers (IDs), faculty and technical support specialists might include
creating a stronger sense of place online classroom environments might increase the stimulation available in the online environments and include active student involvement in the design process. If these environments are to address the needs of emerging generations and the problem of high attrition rates observed in online courses (Schneider, 2013) and massive open online courses (Perna et al., 2013), then perhaps a collaborative approach that intentionally includes the users (students) would be beneficial.

**A sense of place was defined in terms of what was lacking.** Although this study was a limited to three online classrooms at very different institutions, specific characteristics emerged from descriptions of those who were interviewed that articulated what was lacking in the environments. The data suggests that a strong sense of place may be associated with social interactivity, personalization, and sensory stimulation. The ability to see facial expressions and to hear voices and sounds are also important as are references to the real world that help to orient users, as well as the creation of dedicated spaces for collaboration, small-group interaction and personal work spaces. Thus, based on this data, a new operational definition is as follows:

An online classroom with a strong sense of place may be characterized as an environment that may be personalized by its users, and that allows regular opportunities to interact with peers and the faculty using real-time media. This environment has a tangible sense of the human being on the other side of the computer screen, and provides a variety of spaces for collaboration, small-group interaction and one-on-one meetings.

**The classroom homepage spaces afforded mostly asynchronous text-based communications and solitary learning activities.** This research reveals that all three classrooms relied on content-management systems that facilitate the delivery of education materials with a generic classroom “shell.” These off-the-shelf systems allow for some
customization, but none of the classrooms utilized this feature. As a result, there were few characteristics that distinguish one classroom home page from the next; they were all text-based and had limited use of color, texture, or sound.

All three schools utilized off-the-shelf content management systems and all three schools also attempted to augment the generic Blackboard, Canvas, and Sakai platforms. The math classroom integrated adaptive learning strategies to provide additional interactivity. The nursing and language classrooms integrated virtual simulations that offer a higher level of engagement compared to text-only environments, according to students and faculty.

But the findings indicate that each of these strategies may negate the benefits of increased interactivity. The adaptive learning modules in the math classroom provide the illusion that someone is responding to the student as they work on solving problems. According to the IDs, though, there are a limited amount of potential “paths for learning” in the adaptive modules that are created by a third-party vendor. As a result, students can exhaust the options very quickly and become bored, as one faculty member noted. Given that these modules are created by a third-party contractor and meant to standardize the content that is delivered, there is also a limited amount of customization available for the faculty who actually teach the course.

With regard to virtual simulations, the data revealed that IDs utilize strategies such as creating narrative stories and converting assessments into games, thereby providing students with an opportunity to have fun while also conveying what they have learned. Students, though, can become overwhelmed with learning how to navigate in these virtual environments.
The lack of identity in the online classroom is surprising considering the arms race many colleges are engaged to entice students with amenities and image (Newlan, 2014). There are many examples of extraordinary campaigns to create distinct identities that help to entice new students to their physical campuses (Tyson, 2014). For instance, Auburn University recently spent $72 million to build a new Health and Wellness Center that features the nation’s longest indoor running track, a five-story climbing wall and a 45-person hot tub shaped like a tiger’s paw (Wright, 2014). More than $10.9 billion was spent on construction projects in the United States. Some of this construction was necessary as enrollments increased by 3.1 million from 2001 to 2011, but the improvements to colleges have included eighteen-foot diving wells (University of Iowa), water parks (Texas Tech University) and movie theatres (High Point University).

The online classroom is an extension of the physical campus, but the primary identifier found in this study to associate these classrooms with their home university was the modest university logo on the homepage. The virtual simulations in the Language Classroom emulated real-world campus buildings, like the library, but only from the basic outward appearance. Inside, the rooms were generic and there was indication of the use of emerging technologies and innovative, collaborative work areas and new reading spaces that garnered numerous awards. The virtual simulations in the Nursing Classroom also did not mimic an existing building on the campus. In fact, upon closer inspection, the medical building did not even have a roof or any other markers (like logos, distinctive architectural details, or other branding) that might distinguish it as a unique space. This finding suggests that these spaces are not really thought of as distinct places that extension campus identity. If these spaces had a distinctive sense of place, they could be
used to entice students and to differentiate further the university’s educational product that is offered by the university. It seems possible to create an entire virtual campus, replete with emerging technologies such as Oculus Rift and Magic Leap (described below) for much less than the $72 million invested at Auburn. Further research, however, is needed to understand why the non-descript, monoculture-like environment is acceptable, and why it is apparently not considered an opportunity to entice new students or to solidify a campus identity.

**The virtual simulations provided more spaces for social learning opportunities.** The simulation spaces in the nursing classes (medical building) and language classroom (student residences, library building, rainbow classroom, Wordle game, match game) provided different types of spaces for collaborative projects, small group meetings and one-on-one consultations that were not available in the math classroom. These simulation spaces essentially added about 1,850 square feet of virtual space to the nursing classroom and at least 3,000 square feet to the language classroom. The language classroom simulations also integrated numerous interactive components, known as “assets” within these environments. For instance, students could enter the student residences and explore what was in their refrigerator, look inside their closets, and tell what kind of books were on the shelf. Hypothetically, the increased amount of things to do within the virtual spaces would enhance the sense of place because there are more opportunities for meaningful interaction with the environment. Future research is needed to validate if that really happens.
Trajectories for Future Research

Several scholars have perceived aesthetics as a valuable perspective in educational research. Parish (2007) claimed that learning has an intrinsic aesthetic dimension: every meaningful learning experience will have notable aesthetic qualities in the sense that it is experienced as immersive, coherent and complete. The fact that Venustas was the least evident principle in the VTA analysis is expected from the math classroom which exists in an environment that does not allow time for interactions, let alone the consideration of beauty. At the same time, it is ironic, given that aesthetics could be a key to engaging students, encouraging collaboration and creating meaning and a strong sense of place. The disparity could be explained if aesthetics in the virtual realm is something innately different from the aesthetics of physical space (Gullstrom, 2006). Thus it may be of interest to develop a new conceptual framework to enable a better understanding of virtual space aesthetics as part of future research.

Interactions and connectedness within a given virtual space have been shown to give it meaning (Saunders et.al., 2012). According to socio-cultural and activity based learning theories (Artmeve, 2006; Vygotsky, 1986), learning is a social activity that occurs when learners interact, engage, negotiate and participate in authentic activities. In addition, the environment and social interaction are considered to be the two most important aspects of the learning process. Central to Vygotsky’s learning theory is the idea that concepts form and develop through experiences and systematic cooperation (Vygotsky, 1986, p. 148). The studies suggest that the math, nursing, and language classrooms do not fully support social learning given that the majority of learning activities are solitary in nature. Furthermore, opportunities for real-time communication
between students and faculty are limited. Further research is needed to better understand the dynamic of communication, which is more nuanced than assessing the number of opportunities for asynchronous or synchronous communications. Future study could examine aspects of response time, sequencing and frequency of communications. For example, how long are the gaps between communications? What are the sequences of communications between individuals? How are students behaving in the virtual simulations during communications? The answers to these and related questions may be found by studying the viewpoint of the student as either an avatar in a simulated environment or as an observer in the same physical space. Getting inside the classroom experience could push research further by considering the human use in such places, not simply the use of those spaces.

The Social Spectrum Analysis tool, which may be useful to faculty and instructional designers and technology specialists who design and administer classrooms. The tool measures the “online-ness” of the course at a given institution. Faculty or instructional designers provide “yes” and “no” answers when asked about which of the following course materials are offered: text-based documents, PowerPoint presentations, PowerPoints with audio and/or video, YouTube videos, blogs, adaptive learning strategies, forum posts, recorded audio/video from instructors, virtual simulated environments, Facebook, Twitter, and live meetings via WebEx or Skype. The tool can provide a quick assessment of the repertoire of learning activities in a given classroom to determine the distribution of solitary and social-learning activities. Please see Figure 5 in the Analysis Chapter for a sample of the Social Spectrum. This tool could be validated with further research and made to be more specific in terms of the relative amounts of
each of the learning materials found in the classroom. For example, the current tool only suggests that there was the use of a given activity, but would not identify a situation where there were twice as many solitary activities as social activities.

There are numerous emerging technologies that have the potential to impact placemaking in virtual environments in the future. For example, Oculus Rift is an emerging technology that may impact the design of virtual environments in the future. The Rift uses custom tracking technology to provide ultra-low-latency 360° head tracking, allowing one to look seamlessly around the virtual world just as one would in real life. Every subtle movement of one’s head is tracked in real time creating a natural and intuitive experience (Bohmer, 2015). This technology potentially could immerse students even more within the virtual environment and liberate the online learning experience from the constraints of a desktop.

Figure 33. Illustration of Oculus Rift that allows panoramic experiences when wearing special headgear.
Another promising technology mentioned by external developers during the interviews is Magic Leap, a Florida-based “cinematic reality” startup that recently received $542 million of venture capital from Google, Legendary Entertainment and Adresseen Horowitz. Magic Leap’s promise rests on a lightweight head-mounted device that houses a tiny projector that beam images onto the user’s retinas, creating a dynamic light field signal. The result is the perception of otherworldly images within the context of everyday activities. The idea is based on the future of user interfaces that come in the form of ordinary objects imbued with virtual, interactive powers. Described as “totems,” these are tangible objects that combine physical craftsmanship and computational projection. For example, the totem may provide a physical surface that appears to the user to be a virtual computer keyboard or track pad, with no need for the physical computer or mouse (Flaherty, 2015).

Figure 34. Illustration of the capabilities of Magic Leap. Magic Leap technology, which allows viewers to see things in three dimensions that are not actually there. Image Source: Bohmer, 2015.
There are other examples such as the Minerva project - an alternative model for delivering education envisioned by entrepreneur Ben Nelson in which all courses are accessed online, even though students all live together in a dorm located in a different city each semester. The Minerva Project does not use off-the-shelf products such as Blackboard, Canvas or Moodle. Instead, developers create their own learning management system that has an interactive interface that allows easy collaboration among students for group projects and the ability to see student responses to classroom discussion questions in real time (Wood, 2014).

These innovations appear to address some of the challenges indicated by my research. Occulus Rift and Magic Leap appear to shorten the distance (proximity) between users and objects to a greater extent than is possible in text-based environments of the math classroom. These tools may provide more sensory stimulation than is
currently evident in the virtual simulation environments that were studied. However, emerging interfaces may also prove to generate new, unique characteristics of a sense of place in online environments that are not only referential to the physical world, but unique unto themselves.
Appendix A: Sample Interview Questions

The types of questions may include the following:

- How would you describe the sense of place in the online classroom at your University? (Link to RQ #1,1a)

- What are the lessons learned from your research in placemaking in physical and virtual environments? (Link to RQ #1,1a, 2)

- What are the applications for the design of virtual learning spaces in higher education in the future? (Link to RQ #1a)

- How important is the connection between virtual and physical spaces in design of new virtual worlds in the future? (Link to RQ #1b)

- What are emerging insights from your research that would inform the making of learning spaces in the future? (Link to RQ #1,1a)

- Please describe a place that you remember that made you want to be there and interact with others. In other words, it had a strong sense of place. (Link to RQs #1a, 1b)

- Please describe a specific event in the classroom that made you understand the importance of placemaking for encouraging engagement of students, collaboration, and learning. (Link to RQ #1a)
Appendix B: Participant Correspondence Request

University of Pennsylvania
Research Subject Recruitment Materials

Dear (name of the individual):

Greetings! I am writing to request your participation in a qualitative case study of placemaking in virtual learning environments. This dissertation explores the similarities and differences of physical and virtual placemaking, and the extent to which the approach may impact the learning experience for students and/or the shape of learning spaces in the future.

Since my dissertation research focuses on the experiences of those who have participated in the creation and facilitation of online courses for college credit, I would like to have a conversation with you about your experiences in online courses at (name of university) and the concept of a sense of place, as related to the virtual classroom environment. Your participation is voluntary, and the commitment involves a 60-minute interview with me. Follow-up interviews may also be requested. This research is being conducted as part of the requirement for the Executive Doctoral Program at the Graduate School of Education at the University of Pennsylvania.

If this sounds interesting to you, please let me know as soon as possible. I am glad to answer questions that you may have about the interview. All replies will be confidential. I look forward to hearing from you and thanks in advance for your cooperation.

Regards,

Paul Wolff
Doctoral Student at the University of Pennsylvania
Appendix C: Analysis Framework and Coding Strategies

1) Vitruvian Triad Analysis Extended Themes (VTAET)
(VTAET used to evaluate interview responses that were organized into four categories: process, aspirations realities, challenges)

<table>
<thead>
<tr>
<th>Utilitas</th>
<th>Firmitas</th>
<th>Venustas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Structure</td>
<td>Delight</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Durability</td>
<td>Beauty/Sublimity</td>
</tr>
<tr>
<td>Explicit Knowledge</td>
<td>Tacit/Explicit Knowledge</td>
<td>Tacit Knowledge</td>
</tr>
<tr>
<td>Mission</td>
<td>Artifacts (buildings, things)</td>
<td>Vision</td>
</tr>
<tr>
<td>Political</td>
<td>Scientific</td>
<td>Aesthetic</td>
</tr>
<tr>
<td>Potential</td>
<td>Actual</td>
<td>Phenomenal</td>
</tr>
<tr>
<td>Doing</td>
<td>Being</td>
<td>Feeling</td>
</tr>
<tr>
<td>Usability</td>
<td>Objects</td>
<td>Interactions</td>
</tr>
<tr>
<td>Leadership function and charge</td>
<td>Position occupied by leader in the organizational structure</td>
<td>How leadership is manifested as experiences</td>
</tr>
<tr>
<td>Quotidian or Periodic</td>
<td>Robust and stable</td>
<td>Inspirational</td>
</tr>
<tr>
<td>Verbs</td>
<td>Nouns</td>
<td>Adjectives</td>
</tr>
</tbody>
</table>
2) Spatial Analysis (SA)
(SA used to evaluate dimensional characteristics of online classrooms)
- 2D: flat interface
- 2D+: flat interface with video/audio, or adaptive learning strategies
- 3DSOL: 3D solitary space with 3D sound
- 3DSOC: social space with 3D sound
- 4DA: 4D space with avatars
- 4DALI: 4D space with live images
3) Social Spectrum Illustration

Solitary Learning
a) No Flow (example: reading, writing)
   a. One-Way (example: watching prerecorded lectures, TedTalks, YouTube videos with people, images, sound)

b) Social Learning
   a. Two-Way Flow Asynchronous (example: forums, emails)
   b. Two-Way Flow Real-Time Communication with Avatars (example: classroom activities, small-group work, collaborative projects)
   c. Two-Way Flow Real-Time with Live Video Stream (example: Webex, Skype)
Social Spectrum Analysis (SSA)
(used to evaluate course resources)

Spectrum Parameters
- Text-Based (PDFs, PowerPoint)
- PowerPoints with Audio or Video
- YouTube Video
- Blog
- Adaptive Learning Strategies
- Forum Posts
- Recorded Audio, Video from Instructor
- Collaborative group projects
- Virtual Simulated Environments
- Facebook, Twitter, etc.
- Live Meetings, Lectures (WebEx or Skype)
- Meet in Person

![Social Spectrum Analysis Diagram]
Appendix D: IRB Approval

University of Pennsylvania
Office of Regulatory Affairs
3624 Market St., Suite 301 S
Philadelphia, PA 19104-6006
Ph: 215-573-2500 Fax: 215-573-0438
INSTITUTIONAL REVIEW BOARD
(Federalwide Assurance # 00004028)

27-Aug-2014

Eric J Kaplan
Attn: Paul Wolff
peripherypaul@yahoo.com
sk@upenn.edu

PRINCIPAL INVESTIGATOR
TITLE: Making Places, Making Learners: Place-based approaches to Designing Learning Environments in the Age of the Infoshin

SPONSORING AGENCY: No Sponsor Number
PROTOCOL #: 820869
REVIEW BOARD: IRB #8

Dear Dr. Kaplan:

The above-referenced research proposal was reviewed by the Institutional Review Board (IRB) on 26-Aug-2014. It has been determined that the proposal meets eligibility criteria for IRB review exemption authorized by 45 CFR 46.101, category 2.

This does not necessarily constitute authorization to initiate the conduct of a human subject research study. You are responsible for assuring other relevant committee approvals.

Consistent with the federal regulations, ongoing oversight of this proposal is not required. No continuing reviews will be required for this proposal. The proposal can proceed as approved by the IRB. This decision will not affect any funding of your proposal.

Please Note: The IRB must be kept apprised of any and all changes in the research that may have an impact on the IRB review mechanism needed for a specific proposal. You are required to notify the IRB if any changes are proposed in the study that might alter its IRB exempt status or HIPAA compliance status. New procedures that may have an impact on the risk-to-benefit ratio cannot be initiated until Committee approval has been given.

If your study is funded by an external agency, please retain this letter as documentation of the IRB’s determination regarding your proposal.

Please Note: You are responsible for assuring and maintaining other relevant committee approvals.

If you have any questions about the information in this letter, please contact the IRB administrative staff. Contact information is available at our website: http://www.upenn.edu/regulatoryaffairs.

Thank you for your cooperation.

Sincerely,

Maiuse R.
Pascual
IRB Administrator
Appendix E: Sample “Where Do You Learn Best” Survey

Where Do YOU Learn Best?

Please tell us about an event in your online classroom that encouraged collaboration and/or that gave meaning to your learning experience.

Have you experienced any challenges in your online classroom(s) that had an impact on your learning experience? (Please describe.)

Please select any words that you might use to describe your online classroom. (Select all that apply, even if they seem to contradict each other.)

Open
Closed
Bright
Dark
Noisy
Quiet
Lonely
Happy
Indifferent
Social
Antisocial

My online classroom could be more appealing (look/feel better) if . . .
My online classroom could be more functional (how it works) if . . .
My online classroom could be better structured if . . .

If you have recommendations for making the online classroom more appealing, functional, and/or better structured, please share them in the space below.

Please indicate which of your senses are (or have been) stimulated by your online classroom. (Select all that apply.)

Visual
Audio
Taste
Touch
Smell

Please use the space below to tell us anything else about how you would describe your online classroom in comparison to a physical classroom.

Please select the items that are integrated into your online classroom(s). (Select all that apply.)

virtual reality (when there is a simulation of a real experience)
augmented reality (when a real place is enhanced by computer-generated features such as sound, video, or graphics)
virtual office hours with faculty
avatars
simulations
video game activities
use of social media
none of the above
other (please describe)

Which of these devices do you use to access your online classroom(s)? (Select all that apply.)
  - desktop/laptop
  - tablet
  - smart phone/mobile phone
  - web-enabled TV

If respondent DOES NOT select more than one, SKIP this question
Which of these devices do you use most frequently?
  - desktop/laptop
  - tablet
  - smart phone/mobile phone
  - web-enabled TV

Please select the kinds of space(s) available to you in your online classroom(s). (Select all that apply.)
  - space for the whole class to interact
  - space for small groups to interact that is separate from the whole class
  - space for private meeting with the faculty
  - space for you to meet with other students that is separate from the whole class
  - other (please specify)

Please select the phrase that most accurately completes this sentence:

*When I access my online classroom, I am . . .*
  - Primarily in a public place (public library, internet café, etc.)
  - Primarily in a private place (my home, a private office at my place of work, etc.)
  - An equal combination of public and private places

Do you use social media tools outside the online classroom to assist in your learning process?
  - Yes
  - No
If NO, skip next 2 questions

Please select the social media tools you use outside of your classroom that assist in your learning process:

- Chat/Instant Message
- Discussion Boards or Forums
- Blogs
- Wikis
- Facebook and/or Google+
- Twitter
- LinkedIn
- Photo Sharing (such as Flickr or Picasa)
- Video Conferencing (such as FaceTime or Skype)
- Social News and Bookmarking (such as Reddit or Delicious)
- Rating and Recommendation (such as providing a star rating or commenting on an academic resource)
- Private Group Sharing (such as Google Groups and YapTime)
- Other (write in)

Please use this area to describe how these tools contribute to your learning process.

Please use the table to indicate the average response time for social interactions in the classroom.

<table>
<thead>
<tr>
<th></th>
<th>Within hours</th>
<th>Within 1–2 days</th>
<th>More than 2 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fellow students respond</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most professors respond</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How do these response times impact how you learn?

You have completed the research portion of this survey.

[page break]

**Virtual Research Activity**

As a subsequent but separate initiative related to my research, I invite you to participate in a future group activity where I will gather students from various schools and we will participate in an online team-building activity using avatars.

If you would like to be contacted about participating, please provide your information below. This information will not be associated with any of your responses to the research portion of this survey.

Name
Email
[SUBMIT]

THANK YOU PAGE – after SUBMIT, the respondent will see a THANK YOU page. Please include the following information for us to incorporate on the THANK YOU page.

Thank you for your time.

If you have any questions about my research, please contact me.
Paul J. Wolff III
REFERENCES


Clarà, M., & Elena, B. (2013). Learning online: massive open online courses (MOOCs), connectivism, and cultural psychology. *Distance Education 34*(1), 129–36.


Keough, M. (2005). Relationships not technology are the keys to online learning. Paper presented at the 17th Biennial Conference of the Open and Distance Learning Association of Australia Charles Stuart University, Adelaide, South Australia.


