Learning Spaces are WAC: Investigating How Classroom Space Design Influences Student Disciplinary Identities

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LEARNING SPACES ARE WAC: INVESTIGATING HOW CLASSROOM SPACE DESIGN INFLUENCES STUDENT DISCIPLINARY IDENTITIES

by

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ABSTRACT

This dissertation used classroom observations, movement mapping, instructor interviews, and student focus groups to examine the ways in which both instructors and students navigated the classroom spaces they were assigned in upper-level, discipline-specific courses. By focusing on three diverse disciplines (writing and rhetoric, education, and chemistry), this dissertation makes arguments about how the design of classroom spaces (as well as the tools that are housed therein) support, facilitate, and detract from a student's ability to develop a disciplinary identity, which is defined here as the social and linguistic construction of a practitioner of a discipline that is shaped by the language, positions, and peer acknowledgement negotiated by that discipline. Moreover, this dissertation also makes arguments about how tools that are common across many disciplines (desktops, chairs, etc.) support or detract from student engagement. Ultimately, this dissertation argues that teachers across disciplines can be mindful of the spaces they are assigned (even if those spaces were perhaps not designed with disciplinary goals in mind) in an effort to help students begin to think of those spaces as extensions of their discipline so they can better imagine themselves as future professionals in those spaces.
To Dennis K. Berry. I wish I could have shared this with you in person, but I’m grateful that I had your memory with me through the entire process.
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INTRODUCTION

We dwell, think, and act in a physical, three-dimensional world. Everything we do is spatially-situated. Because we always already exist in this material, three-dimensional world, we are forever bound by its physical and metaphysical confines. In other words, our physical structures do not only provide for us shelter and warmth, but they also provide for us a sense of purpose, and they even suggest how we move and act within them. For example, if you live in a rectangular home, as many do, then your arrangement of your living quarters will likely be guided by the proximity of right-angular walls and right-angular furniture. Those living quarters, if say occupied by a set of parents, will likely look very differently than the living quarters of their children. The size of those rooms, their layout, and their decoration will all fit semi-rigid contexts we share about the values and purposes of those rooms. Kids’ rooms are meant to be fun and can perhaps be a little smaller because they are occupied by physically smaller people. Parents’ rooms are perhaps more organized and are perhaps much larger, because, as homeowners, parents have a right to larger, physical spaces. The physical, three-dimensional world which surrounds us, we might say, is always already contextual.

This dissertation aims to explore the contexts and the physicality that exists within current classrooms in universities. Using Tuan’s (1977) guiding principles of space and place, this dissertation understands spaces and places as both being physical locations, but with spaces serving the more abstract understanding of locations as confines and structures. Place, on the other hand, carries with it a connotation of homeness or homeland (p. 149), and will be treated as a physical location that has meaning and purpose for specific people. Think of the difference between coming home after a long day at work and going over to a colleague’s house for a get-
together. Both structures are likely similar in layout and even functionality. However, only one of them feels like home. These same feelings, this dissertation will show, carry over to the classrooms assigned to instructors and students on campuses. Every classroom is a space, meaning that it is a confined structure, but not every classroom is a place. What I hope to show in the chapters that follow, is the importance of paying attention to space design on university campuses, and namely, how that design plays a critical and palpable role in facilitating a student’s disciplinary identity, which I define as the social and linguistic construction of a practitioner of a discipline that is shaped by the language, positions, and peer acknowledgement negotiated by that discipline. What follows—in this introductory chapter—in “Defining Disciplinary Identity,” is a look into the literature surrounding student disciplinary identity and writing across the curriculum (WAC) that provides the foundation for this definition. After grounding this definition, in “WAC and Student Identities: Professional-in-Training and Professional Models,” I will explore how student disciplinary identities are promoted by WAC writing initiatives as well as real-world, simulated assignments. In “Classroom Spaces: The Missing Piece of the Equation,” I will demonstrate how the classroom is often left out of larger conversations on student thinking and learning. Next, in “Research on Learning Spaces: The Age of Flexibility, Sustainability, and Student Agency,” I will review studies on learning spaces in the university, and how the goals of those learning spaces have traditionally focused on the promotion of flexibility, sustainability, and student agency, not disciplinary identity. Finally, in “Learning Spaces and WAC Converge: The Gap of the Classroom as an Agent of Identity,” I will argue for the need to explore the connections between student disciplinary identity and
To begin our discussion on disciplinary identity, which I again define as the social and linguistic construction of a practitioner of a discipline that is shaped by the language, positions, and peer acknowledgement negotiated by that discipline, it is important to acknowledge that student identities are built over time and from learned habits and practices. These habits and practices are categorized by Walvoord and McCarthy (1990), in their foundational study on student learning through writing, as “roles” that college students performed through academic writing. First is the “text-processor” (p. 10), a role often taught and reinforced in high school, where students read texts solely for information and then write in a way that regurgitates and thus demonstrates their acquisition of that information to a teacher who is in charge of evaluating them and assigning them a grade. This is a very common role for students to occupy because it supports the idea that reading texts and listening to instructors facilitates learning. In other words, learning involves experts (teachers or texts) pouring knowledge into vessels (students). Demonstrating learning, then, involves showing that the information has been retained. What’s more is that many of the assignments students encounter during their education are structured in a way that prioritizes regurgitating information. Summarizing, memorizing dates/formulas, matching concepts, etc., all signal to students that learning equates to rote memorization and regurgitation. This is not to say that memorizing certain concepts is ill-advised or unhelpful. Building a database of information is a very important part of the learning process, but as Walvoord and McCarthy noted, it alone cannot support the gaining and practicing of disciplinary
expertise. What’s missing when students don the text-processor role is their attention to a specific issue, problem, or rhetorical situation. But is the failure to address a specific rhetorical situation problematic? What makes emphasis on the rhetorical situation a key part of the learning process?

To answer these questions, we can examine the cognitive processes behind learning. Bean (2011) argued that in order for students to take part in the types of writing that are important for their disciplines, they need to have their confidence in their beliefs undermined. Using the principle “cognitive dissonance,” Bean stated that in order for students to begin building new networks of thought, their existing networks need to be partially dismantled (p. 29). By having their confidence undermined or their networks partially dismantled, students start asking “how” or “why” about the information they learned, allowing them to begin placing information within very specific (often disciplinary) contexts. The contextualizing of information helps students move away from Walvoord and McCarthy’s (1990) text-processor role. For learning to take place, information cannot stand on its own and be regurgitated. It must be dealt with as part of a larger construct. For many students, this process involves being tasked with problem-based assignments which allow them to see clear rhetorical situations at play in their writing. In other words, students need to see that there is an audience beyond their instructor and that their writing can be evaluated not on summary and comprehension of a text, but on the ways in which they successfully navigate a rhetorical situation that is important to their discipline (Wardle, 2009).

This shift from regurgitation to contextualization can unintentionally create what Walvoord and McCarthy (1990) identified as the layperson role. The layperson is the student
who addresses the problem at hand, but does not use the specific knowledge and methodology taught in their course. The difference between laypersons and text-processors is that while text-processors actively refer to discipline-specific knowledge, they do not use that knowledge in an effort to tackle the present problem or question. Laypersons, on the other hand, address the problem or question, but do not refer to specific knowledge from their discipline or class. Instead, they rely on common knowledge or previously-held beliefs. Ultimately, both fail to employ discipline specific knowledge successfully.

The opposite of the text-processor and layperson, according to Walvoord and McCarthy (1990), is a “professional-in-training.” Professionals-in-training can be defined as “either a professional in the teacher’s own field or a professional in some other field who would be able, as an informed citizen, to employ knowledge about the teacher’s discipline” (p. 9, my emphasis). The distinction between the text-processor and professional-in-training is critical, as the text-processor is equipped only to regurgitate information, but the professional-in-training is equipped to employ knowledge. In other words, when students are given the opportunity to engage with real-world problems and conversations, they are better poised to develop identities as future professionals. But what does it mean to engage with real-world problems and conversations? One answer to this question lies in introducing students to communities of practice.

O’Brien and Bates (2015) examined the ways in which undergraduate aviation students developed a disciplinary identity through a community of practice. This community, called Mentoring Aviators Through Educational Support (MATES), gave students opportunities to be mentored by more experienced classmates, talk with and learn from industry professionals, and
even dress in professional uniforms, which—according to O’Brien and Bates—had a profound effect on the students’ sense of identity. The continued engagement with a professional community of practice helped the students to feel more confident and more “like a professional” (p. 826), which ultimately led to the students’ ability to develop domain knowledge and engage in professional practices (e.g., making radio calls) more implicitly. In other words, the more the students felt like future professionals, the more instinctively and accurately they were able to think and act like professionals.

Moreover, the development of these feelings of oneself as a future professional is largely connected to social practices. According to Geschwind and Melin (2016), identities are both social and linguistic constructions that are shaped by language, position, and the acknowledgement of one’s peers. Geschwind and Melin constructed their definition, in part, from Gee’s (2000) discussion of identity, where he established four frames through which to view it:

1) Nature-identity, which is developed from natural forces and characterized by the state one is in

2) Institution-identity, which is authorized by forces within an institution

3) Discourse-identity, which is recognized by one’s use of a community lexis

4) Affinity-identity, which is shared by the practice of an affinity group

Geschwind and Melin (2016), who compared the effects of interdisciplinary environments and multidisciplinary environments on doctoral students, are in a unique position to examine disciplinary identities because doctoral students are at a point in their careers where they have been in the process of developing a specific identity for several years. Unlike
undergraduate students, doctoral students often hold authoritative positions in their institutions (instructor of record, teaching assistant, research assistant, etc.), are treated like colleagues by their peers, instructors, and mentors, and are better able to engage with and use specific discourse. While identity development is not a universal process (i.e., there is no lock-step process for developing an identity that can be applied to every individual), the presence of these factors—along with time-of-investment in their education/discipline/profession—position doctoral students in a way that helps them to more clearly and confidently mold their disciplinary identity.

Similarly, Hirschy, Wilson, Liddell, Boyle, and Pasquesi (2015), argued that disciplinary identity is connected to specific professions, built over time, and aligned between personal values and the values of a specific field. Hirschy et al. examined survey data-measuring perspectives on socialization processes and professional identity—completed by 173 graduate-degree-holding, entry-level student affairs professionals (0–5 years)—and discovered that one of the most critical factors in the development of an individual’s disciplinary identity is socialization. In other words, experience working with and learning from other, more experienced members of a field directly correlates to one’s own confidence in and connection to that field.

Unlike new professionals, undergraduate students, according to Walvoord and McCarthy (1990), are positioned as professionals-in-training rather than as colleagues on the verge of their careers. Put simply, a professional-in-training is someone who is developing the ability “as an informed citizen, to employ knowledge about the teacher’s discipline” (p. 9). Walvoord and McCarthy, like Hirschy et al. (2015), are quick to point out that a professional-in-training role
can best be defined by individual instructors, individual departments, or practitioners in a specific field. The professional-in-training, then, like a disciplinary identity, is contextual. The ways in which students engage with texts and employ knowledge will have different value in different disciplines. A student of theatre, for example, may be required to employ a combination of both summary and critique of a text when writing a review, whereas a student of technical writing may be required to focus predominantly on summary when drafting a user manual. In other words, a student of one discipline, who may adequately employ the knowledge of their discipline and address the issue at hand may in another discipline not adequately employ knowledge or address the issues at hand. The professional-in-training, the text processor, and the layperson are fluid roles.

It is important to distinguish between Walvoord & McCarthy’s (1990) use of the word “role” and Geschwind and Melin’s (2016) use of the word “identity”. When examining the definition of identity given previously—a social and linguistic construction that is shaped by language, position, and the acknowledgement of one’s peers—one can see that an identity is a long-term negotiation of the self. This is not to say that an individual only ever works toward one identity. Multiple identities can be negotiated over time, and an identity can even change over time or connect to other identities over time. Gee (2000) acknowledged that identity formation can occur in any one of four categories: nature, institution, discourse, and affinity. I, for example, am an only child by nature. I did not choose this state of being for myself, but have had to deal with social constructs surrounding being an only child (being referred to as a brat or being accused of being spoiled). My reaction to this identity was, at a young age, to go out of my way to help others (holding doors, carrying tables and chairs up the basement stairs during family get-
togethers, etc.). There is a good chance that my nature-identity as an only child had a bearing on my institutional identity as a teacher of writing and as a facilitator of WAC. After all, I got into teaching because I wanted to help students. These identities have been built over time at different stages of my life (i.e., I have always been an only child but I have only been a teacher for the past six years). Walvoord and McCarthy’s roles, on the other hand, are methods by which students complete a required task. A student would not likely, for example, self-identify as a text-processor. On the other hand, a student might employ a text-processing strategy as a means to complete a writing assignment or even achieve a degree, which would largely contribute to that student’s identity as a practitioner of that discipline/degree.

However, though Walvoord and McCarthy (1990) label the professional-in-training, the text processor, and the layperson as roles, I argue for understanding the professional-in-training as an identity instead. My reasoning behind this distinction is that while the text processor and the layperson focus more on methods used to complete tasks, a professional-in-training aligns more with Geschwind and Melin’s (2016) and Gee’s (2000) understandings of identity, in that it describes a student who is negotiating his/her position within a specific discipline or community. Though professionals-in-training are not necessarily given positions of authority like doctoral students as described in Geschwind and Melin’s study, they are given definitions of what professionalism means for their specific discipline and expectations they must meet in order to earn a degree. Using Gee’s viewpoints, we may say that their institutional title is that of a student, their discursive experience may be advanced but not professional, and their affinity may not yet extend outside of their university (though some students may have had internship and shadowship experiences at this point). A professional-in-training, then, likely still identifies as a
student, but may also occupy an identity that establishes him or herself as an almost-professional, or an individual who is actively building his/her disciplinary identity. Instead of examining professionals-in-training as in-between identities, I posit that these students are occupying an identity that, while situated between that of student and professional (one who has formed his/her disciplinary identity), is still a unique identity. Just as Walvoord and McCarthy (1990) state that a professional-in-training can only truly be described by a specific teacher of a specific discipline, so can a disciplinary identity only truly be defined by the practitioners of that discipline. One of the goals of this dissertation, therefore, will be to work with the selected instructors to create a concrete definition of what a disciplinary identity means for each discipline-specific course that was observed.

**WAC and Student Identities: Professionals-in-Training and Professional Models**

Now that disciplinary identity has been grounded and explored, this section will demonstrate how the field of WAC focuses on discipline-specific writing and learning, and how both writing assignments and simulated, real-world assignments support student disciplinary identity growth.

The universities of the twenty-first century wield a wide range of spaces and technologies (both high and low) to mold students into professionals in their disciplines as well as critically-engaged, global citizens. Technologies, systems and tools of writing in particular, from Microsoft Word to Slate, Post-it notes to whiteboards, have been studied extensively and have been found to influence and shape student thought and communication. According to Langer & Applebee (2007) in their year-long study of the teaching of writing across disciplines, “writing activities can provide varied and effective ways for students to think about and reformulate new
learning and to integrate new information with their previous knowledge and experience” (p. 19). In this way, we can understand writing as a tool that promotes critical thinking, revision, and synthesis across disciplines. Langer & Applebee noted that the ways in which students understood writing were primarily constrained by their individual teachers’ perceptions of how writing should be performed in their specific discipline as well as their teachers’ personal notions of what teaching and learning should look like. An individual teacher, therefore, has the potential to shape how a student envisions him/herself as a future professional in their discipline based simply on the types of writing that is assigned in the classroom, not necessarily the understanding of the material displayed by the individual student. This idea challenges the age-old belief that some students just get it while others do not. The romantic notion that intelligence or genius is transposed from brain to pen is one that is still alive and well today, as I see every semester when I ask students to write about their drafting processes. *First I think it, then I write it* is always the mantra my students share when entering my first-year writing course.

In opposition of this notion, however, and one that is important for this dissertation, Olson (2001) argued for a historical-linguistic understanding of writing that positions it as a precursor of linguistic awareness. Olson challenged common assumptions of writing as simply being a transcription of speech and instead argued that speech is a model founded upon writing. Once again, it is not necessarily the understanding of material that shapes a student’s learning, but the system and type of writing they are asked to perform. This view is significant for studies on student disciplinary identities because it acknowledges the profound impact multimodality has on the ways students think and communicate. Consider the prevalence of PowerPoint in many college classrooms. We might say that the format and structure of PowerPoint suggests
that students follow a specific speech pattern which can be characterized by beginnings, middles, ends, headings, subheadings, and bullet points. This is perhaps even more pronounced in a program like Prezi, which uses motion and movement to capture an audience’s attention as the speaker takes them on a “journey” of signs, symbols, and text, from point A, to B, to C. According to Olson, “…the script becomes a useful model for the language, turning some structural aspects of speech into objects of reflection, planning, and analysis” (p. 121). Media’s impact on the ways in which people write is further echoed by Hayes (2001), who identified that cognitive processes (writing, for example) are controlled by rhetorical situations, media, and motivations. In other words, students don’t plan PowerPoint presentations around speeches, they plan speeches around PowerPoint presentations. PowerPoint, as a technology, is the script that designs student presentations.

Baron (2009) offered a similar view by stating that:

…the technologies that we use to compose, disseminate, and archive our words—the machinery that ranges from pencils to pixels, from clay tablets to optical disks—not only make reading and writing possible, they also have affected our reading and writing practices. (p. 14)

The technologies that facilitate writing, Baron argued, have a major bearing on the ways in which writing is thought of and explored, the identity of writers, and the structure of power where writing takes place (social, political, etc.). We can see, therefore, how the perceptions college students have of their future careers might be largely dependent on the reading and writing practices they encountered throughout their college education, particularly in classes required for majors and minors. The genres valued by and composed in specific fields of study
signal to students that writing and communication look like this or that. A business student’s perception of an oral presentation might be contingent upon his/her practicing of “elevator pitches” just as his/her understanding of writing might be contingent upon a 100 page business proposal, where the most important element is a one-page executive summary.

Oftentimes, one of the most powerful signifiers of what a genre should look like is the implicit or explicit identification of the audience to whom students are instructed to write. Melzer (2014) conducted a nation-wide study of college writing assignments across disciplines, which focused on the types and purposes of those assignments both connected to and disconnected from WAC initiatives. His results found that an overwhelming number of assignments were transactional in purpose, meaning they asked students to inform rather than persuade a reader. Moreover, an overwhelming number of assignments either implicitly or explicitly identified the audience of a writing assignment as the instructor of a course whose goal it is to evaluate the writing assignment. These types of writing assignments leave little room for students to include personal expression/reflection because they serve very narrow rhetorical situations and contexts if they serve any at all. For Melzer, the recurrence of teacher-as-audience writing assignments reinforce for students that their main goal is to display knowledge. The displaying of knowledge, he argues, lacks an in-depth rhetorical understanding and does not adequately prepare students to engage in writing tasks post-college where they will be required to (and have the agency to) navigate complex rhetorical situations and make decisions/implement ideas and concepts specific to their discipline/career. One positive finding for Melzer was that there was a key difference in the purposes of writing assignments within courses that were attached to WAC initiatives. According to Melzer, “Only half of the transactional writing
assigned in WAC courses was writing to inform, compared to 66 percent in the sample at large” (p. 113). While the percentage of assignments geared toward informing was still large for these WAC courses, it marks a shift toward curriculum change brought about by WAC initiatives. By focusing on these initiatives, Melzer advocated that institutions can better implement rhetorical situations that are geared toward real-world and discipline-specific work that can better prepare students for continued education or performance in the job market. In other words, by asking students to write toward audiences that are frequently targeted by professionals in their discipline, and writing in genres that are actually used by professionals in their discipline, students can build upon a more realistic and authentic knowledgebase. Simulation and authenticity, then, go beyond merely looking like or feeling like writing associated with professionals in a field. They actively engage students rhetorically and critically.

Similarly, McCarthy (1987), using a combination of observation, composing-aloud protocols, and text analysis, examined the writing experiences of one student, Dave, across three classes taken during his Freshman and Sophomore years (freshman composition, introduction to poetry, and cell biology). Her findings indicated that though his writing assignments were all similar in nature, Dave rarely saw them as such and instead viewed them as independent of each other. Because of this belief, Dave’s approaches to these assignments differed vastly in all three classes, though each predominantly relied on writing-to-inform efforts. McCarthy argued that Dave’s success in writing was mainly situated in how relevant and personally-meaningful he perceived each class and task to be to his own personal life. Because Dave was a biology major, he found the most success in his Cell Biology class, believing that his work there directly correlated to his future career. What is interesting is that while McCarthy found that Dave’s
writing assignments across all three classes tended to follow the teacher-as-examiner and writing-to-inform models, because of his personal connection to the field of biology, Dave was able to rhetorically situate the assignments, find personal meaning in them, and use those experiences to support his advancement as a student writer. We might say, then, that the degree to which students find assignments personally meaningful greatly impacts their ability to rhetorically situate those assignments, despite the lack of rhetorical complexity built into those assignments.

When looking at Melzer’s (2014) study of transactional writing assignments, Walvoord and McCarthy’s (1990) study of student roles, McCarthy’s (1987) examination of one student’s perception of writing contexts, and O’Brien and Bates’ (2015) examination of a community of practice together, we can see the argument that if students were expected to use writing to demonstrate knowledge, then they typically adopted the role of text-processor. However, if students were instructed to write for simulated authentic audiences and purposes, or found personal meaning in or connection to the field for which they were writing, then they could begin to build a professional-in-training identity. In turn, the ways in which instructors position writing in relation to learning, knowledge, and professional contexts create for themselves a role of either examiner or professional model. Unfortunately, according to Bazerman, Little, Bethel, Chavkin, Fouquette, and Garufis (2005), there is a “lack of alignment to the professional world” offered in college courses, creating a “distance between students and their writing assignments, which they do not see as meaningful” (p. 45). This disconnect between students, writing assignments, and meaning is especially problematic if college students are expected to leave their institutions able to engage with real-world problems and situations. It is here, perhaps most of
all, where we see the importance of fostering student identities through simulated, real-world assignments in college writing classrooms: it is not enough to hope that students like Dave in McCarthy’s study can find that meaning for themselves; that meaning needs to be built into curricula and highlighted for students. But what might these meaningful, simulated authentic assignments look like and how might they exactly contribute to a student’s identity? One example comes from Christina Haas’ (1994) study on Eliza, an undergraduate molecular biology student, and her growth toward rhetorically understanding discipline-specific texts. In this study, Haas followed Eliza across all four years of her undergraduate by conducting periodic interviews with her and performing discourse analyses on the texts she wrote for classes in her discipline. Haas found that as she advanced in her program, Eliza began to rhetorically situate reading and writing and view her role as a professional-in-training, not as a student-sponge or text-processor. Haas attributed this development to several phenomena including her “increased facility with the terms and concepts of biology” (p. 74), her exposure to varied curricula and instructors within the biology department (p. 75), and her process to becoming an “insider” which was facilitated through her work experience and mentorship with a graduate student/lab assistant (p. 77). Eliza’s exposure to varied curricula and instructors within her department echo Geschwind and Melin’s findings (2016) that student disciplinary identities are developed over time and are strengthened by exposure to alternative perspectives and new approaches. Her familiarity and ability to use terms specific to her discipline as well as her experience working with and around other scientists echo O’Brien and Bates’ (2015) findings that the activities of communities of practice not only engrain disciplinary knowledge, but help members feel a sense of belonging. In Eliza’s own words:
When I go to lab meetings now, I understand what they’re talking about. And it’s not just Shelly’s work either. It’s other people who are working on the same project. I understand what they’re saying [emphasis hers]. It’s great because I never understood before. (pp. 77–8)

Eliza shared these thoughts with Haas (1994) during her senior year, more than a year after being mentored in a virology lab by Shelly, a graduate lab assistant. Eliza’s real-world work alongside more experienced community members (described as “a larger team of scientists” by Haas, p. 77) greatly facilitated the process of her becoming an insider. In this way, we can see the transition from novice to professional-in-training as involving more than writing to simulated, real-world audiences as described by Melzer (2014) and Bazerman et al. (2005). We can see that transition as involving actual real-world work and rhetorical situations, including being mentored by and exchanging discourse with mentors and professionals. Providing students with the means and opportunities to engage in real-world work with communities of practice, then, seems to have a profound impact on the development of student disciplinary identity.

We can see another example of real-world work shaping student disciplinary identities in the classroom from Coleman (2015), who examined the use of scamping in a general design course. Scamping is a common design practice where the designer will create rough sketches (scamps) for a client to better illustrate his/her main points and ideas. This process is usually conducted early on so that the designer can get essential feedback from the client before finalizing designs. This practice, as Coleman noted, is integral for the students of general design, because, just like in real-world client-designer-relations, the students are able to create scamps for their projects, present them to the instructor and then receive valuable feedback early on. This
process, then, positions the instructor as a client, and the students as designers, mimicking a real-world, authentic process. Moreover, scamping is inherently communal in practice, providing students with opportunities to develop their disciplinary identity by engaging with authentic terms and discourse (explaining a scamp to a potential client), but also by receiving feedback from more experienced community members (not as practitioners as in Eliza’s case, but as clients who have specific needs and constraints of their own).

Looking back to O’Brien and Bates (2015), we can see how the building of a community of practice into aviation curricula greatly influenced how students positioned themselves as members of that community/field. Even before progressing to or arriving at the level of flight training (which we can identify as a real-world practice), the aviation students in O’Brien and Bates’ study came to view themselves as members of a community. The acts of speaking with more experienced members (including students and industry professionals), digesting industry updates, preparing for interviews, using discipline-specific terms and tools, and even wearing the gear of the profession (pilot uniforms), all gave the students a sense of belonging and identity transformation. It is important to note that the students who participated in MATES—the aviation community of practice—did so over a period of several years. Once again, we see the importance of Hirschy et al.’s (2015) assertion that disciplinary identity is longitudinal. Building a disciplinary identity takes time, practice, rhetorical situatedness, personal investment, and involvement. Not all programs build longitudinal communities of practice, like MATES, into their curricula. While Eliza in Haas’ (1994) study found longitudinal involvement in the form of mentorship and lab work, many students build their identity course-by-course. That is not to say that individual courses cannot be effective in helping students build disciplinary identities. In
fact, individual courses can create many salient opportunities for student growth, especially in regards to creating rhetorically-situated writing assignments and simulated, authentic experiences for students.

Thus far, this dissertation has explored perspectives on disciplinary identity and established a definition upon which the research conducted in this dissertation hinges. Before moving forward, however, it is important to underline the importance of researching student disciplinary identity. We have seen that learning takes place when students have their beliefs dismantled and begin to rhetorically explore ideas in their discipline and engage real-world or authentic audiences beyond those of their instructors (Bean, 2011; Wardle, 2009). The students who rhetorically-situate problems in their discipline and engage authentic audiences actively employ the knowledge from their discipline, not just regurgitate it (Walvoord and McCarthy, 1990). When students employ knowledge from their discipline in rhetorically-rich and accurate ways, they develop a more confident sense of self as a member and future practitioner of their discipline. Inversely, the more students are made to feel like practitioners of their discipline, the better able they are to employ the knowledge of that discipline as seen with the aviation students of MATES who were given opportunities to be mentored by professional aviators, use professional tools such as flight simulators and radios, engage in professional discourse, and even dress in professional uniforms (O’Brien and Bates, 2015), as well as Eliza, whose experiences working in a virology lab under the guidance of a more experienced graduate lab assistant helped her to feel more confident in her work, which was further instantiated when she discovered she could understand and speak the discourse of professional scientists (Haas, 1994). If our definition of disciplinary identity is the social and linguistic construction of a practitioner
of a discipline that is shaped by the language, positions, and peer acknowledgement negotiated by that discipline, then we can see a clear connection between the ability of students to employ disciplinary knowledge and how they view themselves as that social and linguistic construction of a practitioner of their discipline. To put it succinctly, the more students feel like or view themselves as professional practitioners, the stronger their sense of rhetorical situatedness regarding the problems faced by their discipline, the better able they are to employ disciplinary knowledge, and the more confident they are in their learning. To cultivate student disciplinary identity, then, is a critical and foundational step in preparing a student for life after their degree. If universities share a mission of preparing students to enter the working world as critically and rhetorically-aware professionals, then cultivating their disciplinary identity is of the utmost importance. This section has explored some ways in which WAC has studied connections between disciplinary identity, writing, and rhetorical learning, however, as discussed in the following section, there seems to be one critical factor that studies on student identities and student learning overlook: the role of space in shaping those identities.
Classroom Spaces: The Missing Piece of the Equation

Thus far, we have seen how the technologies of the university, namely writing, shape student thinking and learning. Moreover, we have seen how both writing assignments and simulated, authentic experiences create powerful opportunities for students to position themselves as members of a field and begin to transition into professionals-in-training. However, the spaces in which these tools and technologies are placed, are often seen as tertiary, if not left out of the conversation entirely. In other words, research has often focused on the ways in which computers, whiteboards, or Post-it notes facilitate literacy and learning or identity, but not how the spaces in which those technologies are housed and used influence literacy and learning or identity. For example, DeVoss, Hawisher, Jackson, Johansen, Moraski, and Selfe (2004) examined four cases of young people—ranging from high school students to young professionals—who engaged with digital literacies in their free time (gaming, art, computer programming, etc.) in addition to the literacies they encountered in school. With each case, school literacies were typically print-based and did not explore the 3D, digital literacies sought out by each participant. Ultimately, the authors argued that schools need to engage students with digital literacies that are valued by students in their personal lives. These technologies, the authors believe, are integral for student success in a world that increasingly values online communication, the crossing of digital borders, and a prevalent use of symbolic systems. Moreover, as seen with McCarthy (1987), personal investment on the part of the student greatly improves the chances that that student will rhetorically situate specific coursework in a way that supports that student’s disciplinary identity. For DeVoss et al., then, the incorporation of digital literacies that are valued by students outside of the classroom should be brought into the
classroom in an effort to engage those students in real-world practices that will support their
career development and literacy acquisition.

However, though DeVoss et al. (2004) emphasized the importance of digitally wiring
classrooms and incorporating 21st century software on computers, they do not focus on the
design of these classrooms and how they might facilitate the teaching of these digital practices.
As someone who has invested in digital practices outside of school over the years, I can attest to
the great deal of care placed on both the availability of technology and the design of the spaces
that house those technologies. I remember quite fondly the days of LAN parties, where several of
my friends would get together, set up our computers or gaming consoles, and play cooperative
and competitive games together. When planning a LAN party, the obvious emphasis is on
making sure everyone has access to the proper equipment. After all, how could one play HALO
without an Xbox, a controller, a LAN cable, and a television or monitor? DeVoss et al.’s
recommendation for schools to accommodate digital technologies is well-intentioned, but
doesn’t address the other necessary component: the space. For a LAN party, participants not only
need access to the aforementioned tools, but also need enough space to place televisions or
monitors apart to prevent screen watching (no cheating aloud in competitive gaming). They also
need enough electrical outlets to accommodate each console or PC, and enough extension cords
to aid with the placement of each console or PC. Light and glare can also be a factor. Basements
were favored by my group of friends because they were darker and helped to eliminate that nasty
glare that could oh so easily be blamed for an avatar’s death. However, basements aren’t always
the most comfortable. Does the host have enough chairs to accommodate all players? Is the
basement carpeted? Is it cold? Do players need to bring a sweatshirt? Is there access to a
bathroom? Do the parents of the host allow food in the basement, and if so, is there room to set up a snack table? All of these elements may seem fickle to some, but to those who planned and attended LAN parties, they were crucial. Careful thought and consideration were given to space any time a LAN party was planned. The assumption given by DeVoss et al. when they recommend that schools accommodate the digital practices of young people is that the spaces in which those technologies are housed are already flexible enough to successfully accommodate the implementation of these practices and technologies. The idea here is that if a classroom has four walls, a roof, and electrical outlets, what more does it need?

Though this assumption is problematic, and though issues of space design do not often address disciplinary classrooms, DeVoss, Cushman, and Grabill (2005) offer the when of infrastructure as a perspective that allows us to explore this problem more in depth and in such contexts. Describing infrastructure as a when and not a what, DeVoss, Cushman, and Grabill draw attention to the rhetorical, historical, and spatial situatedness of infrastructure, namely that it is always a product of cultural contexts and their connection to and disconnection from materiality (e.g., current and available technology/software, physical location, etc.). Being mindful of and understanding these contexts, DeVoss, Cushman, and Grabill argue, allow both students and instructors to better engage rhetorically, institutionally, and technologically with these infrastructures, and support student learning and writing. Similarly, Walls, Schopieray, and DeVoss (2009) focus on the breaking down of infrastructure within specific classroom spaces, and suggest the reclaiming of “hacking” as a mechanism for creating pedagogical change. Here, Walls, Schopieray, and DeVoss highlight a common concern surrounding classroom spaces on college campuses: scheduling. Because classrooms are often scheduled months (even years)
ahead of time, and because instructors often have little to no agency to request specific spaces, the concept of hacking a classroom becomes an in-the-moment solution to disconnects between pedagogical purpose and the features or allowances of a specific classroom. By first identifying the pedagogical goals of a specific course, individual instructors can then begin to take stock of how a classroom restricts the meeting or facilitating those goals. Once those restrictions are identified, instructors can look for opportunities to make small adjustments to the layout, design, or features of the room to redirect it toward their pedagogical purposes.

While current conversations on space design pull strongly in the direction of pedagogy and student learning, one area still lacking is the connection between space design and disciplinary identity. When looking back at Haas’ (1994) examination of Eliza, who made tremendous strides in terms of building a disciplinary identity while working and being mentored in a virology lab, what intrigues me the most is how the lab itself is not described as playing a role in her identity development. While the lab is described by Haas as a setting, it is positioned as a “sociocultural setting” (p. 77). In other words, it is not necessarily the design of the lab, the ways in which it suggests to students that certain tools be used, or the ways in which it facilitates specific types of work that shaped Eliza’s sense of identity as a scientists, it is that she experienced these things in a social setting. However, a lab, we might say, is a space in which scientists do science. Labs facilitate the actions necessary to conduct scientific work. For Eliza, the lab acted as an agent in facilitating this feeling of being an insider. It is this site, I argue, that most profoundly shaped her identity as a professional-in-training.

First, it is important to note that for Eliza’s first two years as an undergraduate student, she largely occupied the role of text-processor. This is not at all uncommon for first year college
students, many of whom were trained throughout their high school careers to recognize text books and teachers as the ultimate authority. However, as noted by Russell (2011), WAC/WID literature overwhelmingly points to the success of writing assignments that do not merely ask students to digest information but invite students to become further involved with a disciplinary activity, thus positioning them as stakeholders in discourse communities they may enter or become more involved with in the future. Russell identified “ill-structured problems,” or situations that do not have one correct answer, as being the types of problems most commonly found in the workplace. This commonality is significant, because as pointed out earlier, throughout students’ high school careers, they are often taught rote memorization and regurgitation as strategies for tackling problems. This indicates that for first year college students, their framework for understanding how real-world problems work is largely shaped by problems that have a single answer and can be solved through memorization and regurgitation. Writing assignments, especially those found in classrooms connected to WAC initiatives, Russell noted, can help students learn to navigate complex rhetorical situations that are common to careers in their field. Eliza’s first and sophomore year of her undergrad revolved almost entirely around writing assignments that positioned texts as authorities and asked her to digest and regurgitate them. It wasn’t until her junior year that she encountered a learning situation that allowed her to break away from the text-processor role and begin engaging with the real-world problems she would one day encounter as a professional: her work study job. Eliza’s transition from text-processor to professional-in-training, then, was marked by a shift from rhetorically-simple, well-structured problems, to rhetorically-complex, ill-structured problems, which were housed in the virology lab where she grew protein mutants under the guidance of her graduate
lab assistant, Shelly. Throughout Eliza’s work study experience, Shelly acted as a mentor and a more senior member of the discourse community that Eliza hoped to join, and the practice of performing simulated authentic experiments and working with a senior colleague (as opposed to a professor/authoritative figure) helped Eliza to think about her work as being more rhetorically situated and more ill-formed (Bean, 2011; Russell, 2011) than contrived (requiring her to find the answers instead of accept the answers that were pre-determined by an instructor). Perhaps most importantly, Eliza began to feel very proud of and confident in her work. Creating protein mutants on her own seemed to her to be much more meaningful than displaying her comprehension of texts in her field. This act of creation is not necessarily something that can be facilitated by a sociocultural setting alone. It would have been impossible without the physical existence of the lab.

To imagine Eliza working on protein mutants in any setting outside of a virology lab without the proper equipment seems silly. Similarly, imagining the aviation students of MATES (O’Brien and Bates, 2015) donning pilot uniforms and conducting their flight training anywhere outside of a flight simulator or an actual runway seems equally silly. The activities of communities of practice are inherently linked to space. We might say that the genres of communities of practice are spatially-situated. Ackerman (2003) makes this case by arguing that:

Within the spaces of the everyday, as well as the language representing these spaces and emanating from them, sites and site analyses add a physical dimension to Bitzer’s (1963) concept of ‘rhetorical situation.’ This concept has operated relatively untouched in modern rhetorical practice, even though the material world [has] changed dramatically from that of 1963. (p. 96)
Just like Ackerman (2003), we can see that studies on student identities and literacies seem to ignore the influence of specific spaces in favor of the activities being performed by the students themselves, or if the space is mentioned, as in the case of Haas (1994), it is explored in terms of relationships and socioculture. Another example is Coleman’s (2015) description of scamping for general design students. While Coleman noted that the advent of scamps is that because they are meant to be temporary, they can be created using low-cost materials, interestingly, there is no discussion on the spaces a designer would travel to or occupy to create these scamps. If low-cost materials are typically used, do designers create scamps in their studios using professional-grade pencils or pens, or do they create them at home or in the office break room? Are scamps usually created on a napkin at a coffee shop or on a notebook page on a porch swing? Do designers travel to the locations in which their future designs will be featured to get a sense of the scale and perspective of the location? Any of these elements would have a powerful bearing on the design process itself, and ultimately the product that is created. It is interesting then, that given the goal of authenticity in the general design course, spaces are not mentioned.

Other studies, even when directly acknowledging spaces, do not seem to attribute to them any agency in the development of student identities or student literacies. Roozen (2008; 2009; 2010), for example, traced the literate trajectories of college students across multiple contexts. In “Tracing trajectories of practice: Repurposing in one student’s developing disciplinary writing process,” Roozen (2010)—by examining the note-taking strategies of an English Language Arts MA student—argued that “Textual production… is informed by practices and processes associated offered up by the immediate setting as well as practices and processes repurposed from memorial texts, texts involved with previous encounters, and projected texts, texts involved
in anticipated events” (p. 320). However, though Roozen’s research examined relationships between curricular and extra-curricular activities and literacies, it does not spend time describing the physical features of the spaces in which those literate activities were performed and how they played a role in facilitating those activities, even though they seemed to play an important role in Lindsey’s (the subject of his research) text production. For example, Lindsey would copy phrases heard during church sermons verbatim, copy Bible passages into her journal while sitting on her bed in her room, and sketch panes for a two-dimensional design course at her personal drafting table and then arrange/rearrange those panes on her kitchen table, desk, and apartment walls. All of these activities occurred within very specific settings. While Roozen acknowledged that textual production is situated within these settings, it is the method of textual production and not the setting itself that he studied. The connection between the two is not explored.

While research on student identities and literacies sometimes acknowledge that literate practices are spatially-situated, and while studies on learning spaces often account for pedagogy and student learning, save for studies such as those conducted by DeVoss, Cushman, and Grabill (2005) and Walls, Schopieray, and DeVoss (2009), we do not often see studies that position spaces as having agency. However, research on spaces, especially those in university settings, does exist in other areas. The following section explores research on spaces in university settings, however, unlike the research mentioned previously, it does not focus on student disciplinary identity. First I will explore this research, and then in the final section, “Learning Spaces and WAC Converge: The Gap of the Classroom as an Agent of Identity,” I will situate the research questions posed by this dissertation within the gap between these two bodies of scholarship.
Research on Learning Spaces: The Age of Flexibility, Sustainability, and Student Agency

Much of the scholarship on learning spaces in the university revolves around the designing of university-common spaces such as writing and multiliteracy centers, or technology commons that promote flexibility, sustainability, and student agency, though some—as is the case with Gierdowski (2015)—explore the sustainability of classroom spaces. Gierdowski described the results of a study where a flexible composition classroom space was designed and observed. The furniture in the space was designed to be easily and quickly rearranged, which gave it a flexibility that appealed to both students and the instructor and TA. Though there were some issues with the mobile furniture causing the space to feel cluttered, the instructor and TA identified that the ease of arranging the space promoted collaborative learning activities. The simple act of digitizing the classroom\(^1\) by furnishing it with chairs and tables that are intended to be moved as individual units, and understanding that it has the ability to be renegotiated, allowed it to be rearranged based on the goals of individual lessons and projects. This flexibility, Gierdowski argued, supported the sustainability of the space, allowing it to be continually adaptable and useful to a myriad of university needs. Similarly, Inman (2010) argued for a “zoning” approach to learning spaces, where specific locations within the space are designed to facilitate specific purposes. Inman provided the example of audio recording in a multiliteracy center. If the goal is to create a space for students to perform this specific action, then the design of the space needs to account for the tools, technologies, and their arrangement to both facilitate the activity and prevent breakdowns in the activity from happening. Noise pollution, for

\(^1\) Here I refer to digitizing as the breaking down of classroom elements into units or digits
example, would impede students’ ability to record audio and should therefore be a factor in the
design of the space (a solution here might be to install acoustical foam or provide students with
noise-cancelling microphone shields).

Connecting to Inman (2010), Lee, Alfano, and Carpenter (2013) argued that
decentralizing learning spaces grants students agency over those spaces. Decentralizing spaces
oppose the design of lecture-style classrooms (rows and columns of chairs facing a single
podium) wherein if the podium were to be removed and the students freed from their rows and
columns, those students would have more agency over the space and could take a more active
role in their own learning. McWilliam, Sweet, & Blythe (2013) also advocated for learning
spaces that break away from traditional models that promote rigidness and a lack of
individualization. They argued that “When we enter a space of and for learning—whether it is a
physical or virtual space or a combination of both—we receive strong messages about what our
experience of learning is likely to be” (5). For them, the structure of the coffee house is an ideal
design for learning spaces because it promotes sociability and shared learning, the exact opposite
of the lecture-style classroom. The ability to share learning in a social environment creates what
they refer to as a “meddler pedagogy” (p. 6). The instructor, instead of standing at the front of
the classroom as the all-knowledgeable sage, serves as the “Meddler-in-the-middle” and is able
to move among learning groups in an effort to promote social engagement and collaboration (p.
5).

One key argument made by McWilliam, Sweet, & Blythe (2013) is that spaces
themselves send messages about the kind of work that should be done in them. Head and Burnett
(2015) furthered this notion by discussing the designing and building of a campus
communication center—situated within the undergraduate learning commons—that focused on collaboration and community-building. Recognizing that spaces themselves have agency, Head and Burnett focused on what metaphors the space might offer to the campus community, and therefore included in the space’s mission statement that the space was student-owned, collaborative, and multimodal. This message, they argued, will continually influence the thinking and work that happens in the space, supporting the space as a sustainable resource for students as their individual goals and tasks change with time.

Pigg (2014) discussed the role of physical spaces in student mobile composing habits when she examined two informal learning spaces, a coffee shop close to a university campus, and the campus technology commons. Pigg found that mobile devices are important components of students’ processes for thinking and learning, but their use is situated in physical space. For example, many students preferred to do academic work on their laptops at the coffee shop because it kept them away from many distractions that they find at home. While the location isn’t distraction-free, it provided enough comfort and quiet-space that they were able to work optimally. Pigg concluded that learning spaces need to be designed with the concept of persistence in mind. Persistence, according to Pigg, is “the ability to sustain interest and attention to short- and long-term projects” and is “an embodied and emplaced habit—a product of interactions with places and materials—as much as it is internal or cognitive” (p. 270).

While many studies on learning spaces focus on non-classroom environments, several key studies have recently explored or examined what we might call “traditional” classrooms. Park and Choi (2014) charted the evolution of the traditional classroom. First, ancient Greek classrooms were characterized by open forums where listeners positioned themselves around a
speaker in a semicircle. Much like the amphitheatres of the day, this structural pattern creates an inherent relationship between teacher and student in that the teacher is the central focus (and of central importance) within the space. This model became more uniform during the Medieval period when paper was a scarce commodity. The lack of tools for all students to engage with necessitated that students all face the sole instructor, who could read aloud to them from his/her own copy of texts. Like it’s ancient predecessor, the inherent relationship in this structure indicates that the teacher, and in this case the text, is of greatest importance. During the industrial age, the classroom changed again, but only so much that it expanded its size to account for a rapidly increasing student population. Where students were placed into rows and columns before, they were now placed in larger spaces which could accommodate a greater number of rows and columns. In other words, classrooms still retained their rows, columns, and podium, and fostered a relationship between student listeners and a central, important teacher, but on a larger scale. This model is one that is predominant in universities still today.

Economically, this model makes a great deal of sense. Rows and columns are adept at packing as many students into a classroom as possible. The more students who can attend a lecture, the more students can be enrolled at one time. A more positive way of looking at this notion might be that the more students who can attend a lecture, the more students can pursue their education. However, it is important to consider that this classroom model, while economical and utilitarian, also comes with its challenges. According to Park and Choi (2014), “A standard lecture hall, with immovable chairs all facing the lectern, may represent an educational philosophy of essentialism, which focuses more on ‘injecting content into students’ brains’” (p. 750). In other words, when classrooms position students as empty vessels to be filled by
instructors, they communicate to the students that their agency and engagement are not as important as the voice and presence of the instructor. This relationship, as we’ve seen earlier, can suggest to students that information digestion and regurgitation are what the instructor wants (McCarthy, 1987) and cause them to implement text-processing methods in order to meet those expectations (Walvoord and McCarthy, 1990).

One effort to mitigate this challenge is the student-centered activities for large enrollment undergraduate programs (SCALE-UP) project. According to Beichner, Saul, Abbott, Morse, Deardorff, Allain, Bonham, Dancy, and Risley (2007), SCALE-UP is an effort to incorporate studio pedagogy into large university courses. Based on space design that incorporates both lecture-style and hands-on learning, SCALE-UP classrooms offer students and teachers a host of digital technologies that are meant to support inquiry-based learning for students. SCALE-UP also borrows from flipped-classroom pedagogies, asking that students engage with key texts outside of class so that time and effort can be placed on collaborative research and experimentation during class hours. Students frequently encounter simulated, real-world problems in SCALE-UP classes, which according to Melzer (2014), Bazerman et al. (2005), and O’Brien and Bates (2015), support student identity formation. Seating in the classrooms typically positions students at large round tables so that the students around each table can function as a research team or discussion group. This style of seating also works to decentralize (Lee, Alfano, and Carpenter, 2013) the space so that instructors can easily move from table-to-table, supporting learning where needed. At the time of their publication, Beichner et al. had collected five years-worth of data on over 16,000 students. By comparing focus groups, interviews, classroom video and audio recordings, and student portfolio collections, Beichner et al. argued
that SCALE-UP classrooms increased conceptual understanding, improved student problem-solving abilities, improved student attitudes, increased class attendance, and drastically decreased failure rates, especially for women and minorities.

In sum, current research on learning spaces focuses primarily on the design of spaces or how those spaces create flexible and sustainable learning environments and promote student agency/collaboration. In these studies, learning spaces can range from writing centers, to classrooms, to coffee shops. While these studies have found great success in exploring student learning and literate practices, little work has been done to examine how these spaces are facilitating student disciplinary identities. Certainly, efforts such as SCALE-UP or pedagogies such as the meddler pedagogy support student disciplinary identity development by promoting inquiry-based learning with simulated, real-world tasks, but current research seems lacking in two areas: (1) examinations or explorations into student behaviors in/uses of disciplinary classrooms in naturalistic settings, and (2) the agency of disciplinary classrooms in shaping student disciplinary identities. The following section will explore this gap and make an argument for research on disciplinary classroom spaces and how they may influence student disciplinary identities. While student agency may play a role in the building of these identities, my study will differ from previous research in that instead of focusing on student agency specifically, it will seek evidence of how the disciplinary classrooms themselves might influence student disciplinary identities.

Learning Spaces and WAC Converge: The Gap of the Classroom as an Agent of Identity

In light of Melzer’s (2014) and Haas’ (1994) advocacy for simulated authentic assignments in academia, and Pigg’s (2014) findings on the effects of physical space on learning,
one question in particular is raised. For students to engage with their discipline long-term, and make the move from text-processor to professional-in-training, or to make the attempt to enter a real-world discourse community, we might ask: how might access to physical spaces help them embody simulated authentic learning experiences? This, as shown by Eliza’s ability to rhetorically situate texts and write in the real-world genres of her discipline by her senior year, has a profound effect on a student’s ability to develop their disciplinary identity. Just as Pigg argued for spaces on campus that promote persistence, we might investigate how instructors involved in WAC/WID programs can take advantage of spaces on campus that can promote disciplinary persistence. These spaces can help students embody professional habits so that in their academic work, they will be better positioned to embody a position of authority and take on a professional-in-training identity.

In order to uncover the connections between students and spaces, then, it makes sense to further observe students’ actions in physical spaces as they happen in real time, in naturalistic settings. This is especially true of students who do not seek specific spaces out, but are required to conduct work in them nonetheless. A classroom is an example of a space in which students and instructors alike are required to perform specific actions and achieve specific goals, but have little or no agency in choosing. This begs the questions, how do spaces facilitate specific actions and what actions do spaces suggest should take place in them? To answer those questions, this dissertation primarily uses naturalistic observations (McCarthy, 1987; Vogt, Gardner, and Haeffele, 2012) of students in discipline-specific classrooms and video recordings of those classrooms. This is important to writing studies, and specifically WAC, because it places theoretical and pedagogical emphasis on students and their experiences within classroom spaces.
If we take writing to be spatially-situated, then it should be the priority of universities to evaluate how classroom spaces might be facilitating student learning. By doing this, this dissertation hopes to provide recommendations to universities and faculty on how to be aware of and utilize disciplinary instruction and classroom spaces in ways that help students feel more connected to and better prepared for their experiences across and outside of the university.

In light of these discussions on spatial and embodied learning, my dissertation will fill the gap between research on learning spaces and research on WAC that student identity-growth within specific disciplines is connected to simulated authentic learning experiences, but not necessarily to physical sites of learning. Haas (1994) provided the most intriguing example of this gap in that Eliza’s growth as a molecular biologist is so heavily attributed to her work in the virology lab and her mentorship under Shelly, but not the lab itself. In essence, I am interested in how the beakers, pipettes, safety glasses, and table surface area (among other things) prompted Eliza’s learning and writing. What types of interactions with Shelly did the table prompt? What writing tools (notebooks, computers, calculators) did Eliza use while in the lab? What aspects of the lab influenced Eliza’s thinking and writing? Hass and Witte (2001) point to similar questions when they identify writing as an embodied act and criticize the long-held belief that mind and body are distinct. For them, ways of thinking and acting are always situated within physical bodies, and those bodies are always situated within physical spaces.

Using qualitative research methods in naturalistic settings, this dissertation investigates classroom space design as a facilitator of student thought, actions, and disciplinary identities. Specifically, I ask the following two questions:

1) Does the design of classroom space/place influence disciplinary identities?
2) How are students thinking about the relationship between the design of their classroom and their discipline?

To answer these questions, I conducted an IRB-approved study utilizing qualitative methods: student and instructor observations, video capture, instructor questionnaires, and student focus groups. These methods will be discussed in detail in chapter two.
METHODOLOGY

The goal of this dissertation is to examine how disciplinary classroom spaces support the development of student disciplinary identities. As mentioned in the previous chapter, much work has already been done on connections between simulated, real-world assignments and student identities, and connections between the design of university spaces and the promotion of student agency and collaborative pedagogy. Between these two areas exists a gap that this dissertation fills: a study that explores the agency of disciplinary spaces and their effect on student learning/identity formation. Because this work is concerned both with how the design of disciplinary classrooms affect students, and how students understand and perceive these spaces, research in naturalistic settings was necessary. Here, I use “naturalistic” in the way that McCarthy (1987) used the term to describe research that observes participants and settings that existed before and outside of the context of the study. The three courses I examined, and the spaces they inhabited, weren’t created or altered for my study in any way. In other words, their design and function were the same before, during, and after my research. This is important because, as noted in the Introduction to this dissertation, students have little agency in terms of selecting specific disciplinary spaces in which to take classes. They have a certain degree of agency in terms registering for certain courses or professors, but classroom selection is largely outside of their hands. If we are to expect students to build disciplinary identities in the types of spaces in which they are currently placed, then a naturalistic observation of how they make use of those spaces is the most appropriate.

The specific methods that will be explored in this chapter are qualitative. According to Roshan and Deeptee (2009), qualitative research “provides a more realistic feel of the world”
than the numerical and statistical nature of quantitative research, it offers up more flexibility in
the collection, analysis, and interpretation of data, and supports description over graphic
representation (p. 6). Similarly, Park and Park (2016) argued that qualitative methods allow
researchers to “… understand and explore the descriptive accounts and similarities and
differences of various social events” (pp. 3–4). In this way, the methods used in this dissertation
aimed to better understand and conceptualize lived student experiences in the spaces they were
placed. To borrow Roshan and Deeptee’s phrase, I wanted to become mindful of the “realistic
feel of the world” for these students. As a researcher, I valued methods that Rossman and Rallis
(2003) argued lend themselves to learning and conceptualizing. The observations, video
captures/mappings, and interviews/focus groups described in this chapter, when triangulated
(McCarthy, 1987), positioned me to do just that: learn about how students use disciplinary
spaces, and conceptualize a framework for understanding how these spaces support student
disciplinary identity growth.

**Participant Selection**

I selected three upper-division classes at the University of Central Florida to examine:
ENC 4416: writing in digital environments, EDG 4410: education methods: classroom
management, and CHS 3511: chemistry: trace evidence. The instructors of each course were
affiliated with the WAC program in some way. The instructor of the writing in digital
environments class, Professor Mark², had worked as an affiliate of the WAC program; the
instructor of the education methods: classroom management course, Dr. Carol, was involved in

² All instructor and student names are pseudonyms.
the WAC SOTL (scholarship of teaching and learning) project; and one of the two instructors of
the chemistry: trace evidence course, Drs. Rosetta, completed the WAC Fellows program. These
classes were chosen not only because they represent a wide range of disciplines (and
consequently a wide range of what it means to be a professional-in-training), but because each
instructor finds value in having their students complete assignments that simulate the writing and
tasks of professionals in their field. According to Melzer (2014), these assignments are important
for WAC because they ask students to consider a range of audiences that reflect the real-life,
rhetorical situations that they will find themselves in as professionals in their fields. As discussed
in the Introduction, when students complete assignments that only ask them to display domain
knowledge to a singular audience of their instructor, they miss opportunities to self-reflect and
imagine the role that they can play as future professionals. Because of their affiliation with
WAC, the three instructors I selected understand the value of creating simulated, real-world
assignments for their students, which as we saw with Melzer (2014), Bazerman et al. (2005),
Haas (1994), and O’Brien and Bates (2015), supports the development of student disciplinary
identities. For example, Professor Mark asked his writing in digital environments students to
work in teams to compose a web audit of a website of their choosing. Their assignment not only
asked them to critique websites as professional web designers do, but it also asked them to write
using the format of a professional web audit.

Because the goal of my study was to investigate the ways in which classroom design
supports disciplinary identities, it made sense to include instructors and students that might be
more likely to use their classroom spaces in ways that engage with or mimic professional
activities. Knowing that each of the aforementioned instructors valued WAC practices, that is to
say having their students engage with simulated professional writing/activities, led me to believe that the ways in which they and their students navigated and acted in classroom spaces would best highlight the impact classroom design can have on one's disciplinary identity.

Steps in the Selection Process

Before visiting each course, I worked with the instructors to select a day that would be most appropriate for me to introduce myself and my research. Each instructor provided me with a specific date that worked best with their teaching schedule. During my first visit to each course, I introduced myself, described the goals and scope of my research project, and then administered an optional survey (Appendix A) that asked for each student’s name, major, and if they identify as a strong, intermediate, or struggling writer in their discipline. I instructed the students that they should interpret what it means to be a strong, intermediate, or struggling writer in their discipline however they saw fit. For my research, I believed it was valuable to ask students to self-identify on the survey as a strong, intermediate, or struggling writer in their field because it would allow me to see what correlations exist between how students think about classroom spaces and how students think about their writing as a future professional. Unfortunately, due to the small number of focus group participants, and because not all focus group participants filled out a survey, I was unable to draw any connections between how a student self-identifies as a strong, intermediate, or struggling writer and their disciplinary identity. However, because part of the survey provided students with information on consent and withdrawing from the study, I have included it in Appendix A.

Once surveys were collected, I explained to students that part of my data collection methods would include observing their classes as well as video recording several of those
classes. I asked that students provide me with verbal confirmation that they consented to be video recorded. All students consented to participate in the study. I explained to students that if at any time they would like to withdraw consent, all they would need to do is notify their instructor(s) or myself and I would work with their instructor(s) to make sure that their seating arrangement or my position in the room during my observations would not cause them to appear in the frame of the video camera. I explained that neither participating or withdrawing from the study would have any bearing on their grade. No student withdrew their consent to be video recorded or participate in the study.

I also invited students to participate in an optional focus group. To participate in the focus group, I asked students to respond to an email that was sent to them by their instructor(s) on my behalf. Five students responded to the email from Dr. Carol’s class, two students responded to the email from Professor Mark’s class, and five students responded to the email from Drs. Rosetta and Mary’s class. Each of these respondents participated in a focus group. For privacy reasons, no demographic information was collected.

Observations

Because I was concerned with identifying how classroom design might support student disciplinary identities, I needed to observe the “naturalistic” behaviors of participants (students and instructors) that directly work within and are directly impacted by classroom design. My first concern when observing (and video recording, which will be discussed in the following section) was to be as least intrusive to the classes as possible (Vogt et al., 2012). Sunstein and Chiseri-Strater (2007) argued that fieldworkers always step into research spaces as both inside and outside observers, as both objective and subjective researchers. While I approached this study
with loosely-defined expectations of what a professional-in-training might look like for an education class, a digital writing class, and a chemistry class, I knew that in order to better understand how classrooms affect the day-to-day goings on of specific courses, I needed to remove myself from the action as much as possible. For this study, this meant observing classwork instead of participating in it. In this way, I was better able to identify how current students navigate their disciplinary classrooms instead of how I, as a non-member\(^3\) of their discipline, was able to navigate classrooms.

Vogt et al. (2012) also argued against intrusion by noting that one of the ethical issues related to observations is the potential harming of participants. While I did not expect that any harm would come to students or instructors through my research, I did acknowledge that my presence in the room could be distracting to students. As an instructor myself, I value student engagement, and it is that engagement that I did not want to harm while observing. Therefore, each time I stepped into a classroom to observe, I made sure not to speak with, stop, or interrupt students in any way during their lessons.

**Steps in the Observation Process**

I attended each class a minimum of seven times to observe (including the day on which I administered my survey and sought verbal consent). Given that the Fall 2016 and Spring 2017 semesters were 15 weeks long (minus one week for Thanksgiving in the Fall and one week for Spring break in the Spring), that left me with a possible 14 weeks to conduct observations. Each

\(^3\) While I identify as a writing studies and texts and technology major, writing in digital environments is very much out of my wheelhouse. I was pleasantly surprised, during my observations of ENC 4416, to find that the theories and practices described therein were entirely new to me.
instructor recommended a specific date that I should arrive and observe so as to give their
students time to adjust to the new semester. For Professor Mark and Dr. Carol, this period of
time was three weeks. For Drs. Rosetta and Mary, this period of time was one week. Given these
stipulations, along with various scheduling conflicts (Hurricane Matthew arriving and shutting
down campus in the Fall of 2016, Spring break, Thanksgiving break, etc.), the amount of time I
had to observe ranged from 7–12 weeks\(^4\). One limitation to this study is that the amount of time
to observe students and record data (one semester) was so brief. However, I think that this time
period is significant because a fifteen-week semester is a time period adopted by many
institutions of higher learning. If universities and teachers expect students to successfully
navigate a fixed span of learning (a course) in fifteen weeks, then it makes sense to observe
students strictly across that unit of time. Certainly, other studies have found (Haas, 1994;
Roozen, 2010) and will find value in tracing student-identity formation across several semesters
or years, but if we are to understand the ways in which classroom spaces support student
disciplinary identity growth within a single course, then the semester is the appropriate time
frame.

For each class I attended, I sat down at an unoccupied desk or chair, most often in the
corner of the room, and took field notes on my laptop while the instructor(s) and students went
about their day-to-day activities. While I acknowledge that even my presence could have been
disruptive for some students, I always tried to be conscious of staying out of students’ ways so
that they could move and act like students of their respective disciplines without interruption on

\(^4\) It should be noted that Dr. Carol and Professor Mark’s classes met face-to-face once a week, but Drs. Rosetta and Mary’s class met face-to-face twice a week (once for lecture, and once for lab)
my part. During my observations and in my field notes, I tried to identify sites of action (what Sunstein and Chiseri-Strater, 2007, p. 201 refer to as “focal points”)—the locations in which actions are taking place—and the context or variation of those actions (Rossman & Rallis, 2003; Vogt et al., 2012). Moreover, like Hagan and Houchens (2016) who used observations to identify what signs of Catholic culture exist within meeting spaces of Catholic schools, I tried to identify what signs of disciplinary culture existed within the classroom spaces, and if so, what role they played in the day-to-day actions of the students and instructors (e.g., safety and warning signs in the chemistry labs). Observing in this way allowed me to identify and attempt to understand how even the most seemingly mundane actions (e.g., placing a calculator next to a notebook) facilitated disciplinary actions and writing within the context of each specific class.

Observing student actions within the context of each class allowed me to explore what Vogt et al. (2012) referred to as variation, or the “sensitizing concepts, variables, attributes of interest, causal connections” (p. 68). Observing variation is important because it allowed me to better ascertain both the purpose behind each action students took and how the classroom space may have influenced those actions. Using a different method, a survey that asked students to self-report the actions they typically perform in a specific classroom for example, would have given me a list of actions performed in a specific space, but would not have allowed me to see the context that surrounds those actions in that space. In other words, what that action looked like, what motivated it, and what specific goals it tried to meet would have been lost.

Again, my goal in observing was to identify unique or interesting ways in which students acted, moved, used, or placed themselves within the classroom space. Roozen (2010) argued that “data collection needs to address a wide range of participants’ semiotic performances, not just
activities that involve the production of seemingly similar kinds of texts (e.g., extended prose essays)” (p. 347). When observing, therefore, my goal was not just to identify what students were likely to do in their classrooms (e.g., take notes during lecture; put on goggles before entering a lab; etc.), but to try and take in a wide range of performances and actions (e.g., get down on one knee to pour liquid into a glass container; juggle a phone, laptop, and notebook on their lap while sitting cross-legged; etc.). Just like Latour and Woolgar (1979), I knew that I had enough of an understanding of my subjects and the spaces they occupied to make assumptions about their actions and what goals motivated their actions. I made a very conscious effort, therefore, to take note of seemingly mundane actions just as I did actions that were—for whatever reason—very captivating. Observing for these phenomena positioned me to uncover a wider range of student performances than textual analysis alone would allow. Moreover, I thought it important to approach my observations without specific phenomena in mind, lest I blind myself to other important phenomena that I am not yet aware of. For example, had I approached my observations of the chemistry: trace evidence course with only the use of chemicals and glassware in mind, then I would have missed the ways in which students used their smartphones and paper notebooks to navigate their approach to their experiments, which turned out to be one of the most integral actions to the students’ successful completion of their experiments.

**Video Capture and Movement Mapping**

According to Sunstein and Chiseri-Strater (2007), recording is one of the methods recommended for researchers to learn about how research subjects use space. While observations are useful in that they allow a researcher to be in the moment and identify interesting or
noteworthy phenomena, recording the behaviors of a group supplies the researcher with a re-
playable data source that can be mined more thoroughly at a later point. However, two of the
main challenges for recording data are selecting the most appropriate mode of recording for the
research study, and deciding where to best place the recording device. For my purposes, video
recording was selected because it allowed me to see how students and instructors navigated
spaces, and how those spaces in turn facilitated specific behaviors. This is important because the
behaviors that were facilitated by the spaces instructors and students inhabited were not ones that
were audibly announced by either party. For example, students did not often sit down next to a
whiteboard and then state “This whiteboard is here, so let us write our ideas on it.” While the
announcing of available tools did sometimes happen, more often than not, I observed instructors
and students initiating practices without verbal confirmation or discussion. An audio recording
device, therefore, would not have allowed me to observe the relationships between space and
disciplinary behaviors as well as a video recording device.

In terms of device placement, Sunstein and Chiseri-Strater (2007) recommended the
finding of a focal point—“a spot, an area, or a place where the insiders’ activities cluster” (p.
201). Through my observations, I was able to discern where each class clustered their activities,
allowing me to identify focal points that would best capture the professional behaviors of each
class. Typically, the students’ desks and the instructor’s computer station served as the most
active clusters. My goal, therefore, was to set up my video recording device so that both could be
present in the frame. The only exception was the Dye Lab used by CHS 3511, where the
computer station was used infrequently in favor of the trace evidence machines that were set up
in several labs on the third floor of the Chemistry building. Drs. Rosetta and Mary, as well as
their students, tended to cluster around the individual workstations set up in the middle of the labs. In this case, I set up the video camera in the corner of the room to fit as many workstations in the frame as possible.

Throughout the study, I video recorded each class a minimum of three times. The number of times I was able to video record each class was negotiated with individual instructors. As mentioned previously, my primary goal was to be as unobtrusive as possible to the students (Vogt et al., 2012). Part of my mission to be unobtrusive was negotiating with individual instructors a timeline for both observing and video-recording classes. I worked with each instructor to identify a day during the semester to first bring a camera and record class. When speaking to each instructor, student-comfort was of the highest importance, and each instructor made suggestions for how many times I should observe a class before recording. My presence without a camera, they felt, would help students get used to my presence so that when I did finally record, they would feel less nervous and distracted. Professor Mark and Dr. Carol specified a specific date on which I could begin recording and carry on through the semester. Dr. Rosetta and Dr. Mary provided me with a list of dates on which I could record.

Steps in the Video Capture Process

To video record, I used a Panasonic Lumix digital camera which was mounted on a tabletop tripod. I positioned the camera on top of the desk at which I sat so that both the instructor(s) and the students would be in frame. In an effort to be unobtrusive to students, I rarely panned the camera or moved it to keep any specific person in frame; when I did, I attempted to do so discreetly. I feared that moving the camera during class would distract and interrupt students. The only situation that called for a panning of the camera was during my recording of one
chemistry lab where all of the students moved away from one section of the room to work with specific machines. Of course, as mentioned previously, it should be noted that the mere presence of a video camera could have been distracting to students.

My goal in video capturing several classes throughout the study was to provide myself with reviewable data that would allow me to map instructor and student movement within the classroom spaces. According to Sullivan and Porter (1997), maps help researchers create frames of reference that highlight gaps in research, categories of interest, and areas of repeated use. For Latour (2005), maps allow the researcher to identify a network of unconscious actions. Put more simply, mapping allows the researcher to “learn about how the people [he/she is] studying use their space” (Sunstein & Chiseri-Strater, 2007, p. 194). By mapping the movement of instructors and students around the classroom spaces, I uncovered patterns that speak to relationships between locations within the spaces, individuals, and actions that were both performed consciously and unconsciously.

My method of mapping was based off of an assignment shared by Dr. Carol (Appendix C), which asks education students to chart the movements of the teacher they were assigned to observe. Students draw a diagram of the classroom they were observing and then, at the beginning of a class period, place a mark on their diagram that represents where the teacher moves to every 30–40 seconds. The students would then answer four guiding questions that aim to uncover the purpose of the movements to specific locations, how occupying those locations affected students, and which locations seemed to be more effective (Kaptelinin and Nardi, 2006).
Vogt et al. (2012) argued that interviews and focus groups are appropriate for a research study when the research questions focus on the thoughts and intentions of participants. Because my research focused on the relationship between classroom space and student disciplinary identities, I found it fitting to identify how each instructor imagined what a disciplinary identity should look like for their students, and what connections students drew between their classroom environment and a career in their discipline. The challenge inherent in interviewing, according to Sunstein and Chiseri-Strater (2007), is that the interviewer must be both structured and flexible, both a good listener that is willing to change plans and a focused inquirer with structured questions. For my instructor interviews, I chose to conduct them in a more rigid fashion (described below). The purpose behind this choice was that I wanted to clearly identify how each instructor defined a disciplinary identity for his/her own field. To adapt questions mid-interview, even in an attempt to suss out meaning, would have left me with a lengthy, potentially unclear description of that identity. Having a clear definition of a disciplinary identity for each instructor, I believed, would present me with a clear measurement of analysis when identifying how classroom space facilitated certain disciplinary behaviors.

In contrast, I elected to conduct student focus groups in a less-rigid format. While I approached the focus groups with specific questions in mind, a recommendation made by Sunstein and Chiseri-Strater (2007), I frequently asked students follow-up questions and sought clarification on their responses. By asking that students expand on their own experiences, as Vogt et al (2012) argued, I hoped to uncover “networks of information, narratives, and meanings to understand the context in which they operate” (p. 39). The benefit of sussing out these
narratives and contexts is that unlike the instructors of each class, the students did not necessarily enter the semester with a vision of how specific assignments and activities might facilitate learning, and how introducing those assignments and activities in a specific order might best facilitate the movement from novice to expert learner in a field. I certainly acknowledge that some students may begin a course with these thoughts in mind, but it is the very job of instructors to be conscious of these elements. In response to this assertion, I believed that a more flexible conversation with students was necessary to uncover the myriad ways in which students were thinking about their classroom spaces. Moreover, asking students to expand on their own experiences from the class allowed me to more fully understand the context behind my observations, and triangulate my data (McCarthy, 1987). Berry and Dieterle (2016) used student interviews in this way to uncover the motivations and purposes behind student actions (some of which seemed significant at the time of the observations and some of which seemed insignificant) made during writing center consultations in a space that was designed for both group and multimodal work. Berry and Dieterle’s interview data (in combination with their observations) highlighted the importance of combining observations with interviews in an effort to more fully understand the motivations behind actions as well as how designed spaces can facilitate and suggest specific actions.

Steps in the Interview Process

Toward the end of each course, I asked each instructor to respond to several questions (Appendix E) via email. I formulated these questions based off Walvoord and McCarthy’s (1990) descriptions of the professional-in-training, and Geschwind and Melin’s (2016) descriptions of disciplinary identity. They were designed to probe instructors about how they
defined disciplinary identity for their field. I chose to have the instructors respond in writing, in part, because I felt that it would work better with their end-of-semester time constraints. The purpose for delivering these questions to instructors at the end of the semester was to allow the instructors to reflect upon their and their students’ work throughout the class. I believed that this would be more valuable than having instructors respond at the beginning of class, where there would be more room to think ideally about how students might approach disciplinary identities through their work in the course.

Steps in the Focus Group Process

All focus groups took place in the main classroom space for each course. For Drs. Rosetta and Mary’s chemistry class, the focus group took place in the Microscopy Lab used often during their “lab days.” This suggestion was made to me by Dr. Rosetta, who identified a specific lab day (meaning a day in which specific experiments were planned) where students would have plenty of down time (while they waited on their machines to finish running experiments) and felt that this day would yield a better turnout. The focus group for Professor Mark’s class took place on study day (the day before final examinations began) because it gave me and the students access to the classroom without fear of it being scheduled immediately after their exam. Dr. Carol suggested that I conduct the focus group for her class during her final examination period. She estimated that the examination would not take the full allotted time, and that I would have over an hour to speak to students, which turned out to be spot on.

The goal of conducting the focus groups in the classrooms in which students worked for most the semester was to allow them to look around and reflect on the design of and their experiences in the room. Students were asked to first state their major and to discuss their
experiences with writing within their major. They were then asked to discuss any specific careers they have considered, and if so, to describe what practitioners of those careers do and where they do them. Students were then asked to discuss how they felt their class helped to prepare them for a specific career or a career in their major. Finally, students were asked to discuss what features (design, layout, tools, etc.) of the classroom helped them feel like a practitioner of their major or career, and what features, if any, they would have liked to have had in their classroom that would have made them feel more like a practitioner of their major or specific career. See Appendix B for a full list of questions asked during the focus groups. These questions, as mentioned previously, allowed me to gain a more robust understanding of student motivations and ways of thinking about their classroom spaces. Moreover, these questions allowed me to triangulate my observation data, and assign student motivation to the actions I noted in my field notes.

Data Coding

Once data was gathered, I used the coding software ATLAS.ti to identify evidence of the thirteen codes described below. These codes were created based on research in WAC and learning spaces that identify disciplinary learning as spatially-situated (Haas, 1994), tool-mediated (Kaptelinin and Nardi, 2006), and genre-focused (Melzer, 2014, Devitt, 1993); student learning as a process of persistence (Pigg, 2014) and necessitating student agency (Lee, Alfano, and Carpenter, 2013); and classroom spaces/places as nexuses of movement, action, and signs of disciplinary culture (Sunstein and Chiseri-Strater, 2007; Walls, Schopieray, and DeVoss, 2009; Hagan and Houchens, 2016). Because my dissertation aims to understand the ways in which students are currently navigating and thinking about the classroom spaces they are being asked to
occupy, I believed that these codes in particular would help me to garner a robust understanding of the ways in which they move, use tools, perform, and dwell within these spaces/places.

1. Naturalistic behaviors
   - Movements such as eating, drinking, or making oneself comfortable in a chair or other position.
   - The purpose of this code was to identify the ways in which students practice persistence (Pigg, 2014) by negotiating their physical space to achieve comfort and perform ritualistic distractions.

2. Disciplinary behaviors
   - Behaviors in the classroom as they pertain to teaching and learning in that discipline (e.g., working in teams on a web audit in Professor Mark’s writing in digital environments course).
   - The purpose of this code was to highlight how specific disciplinary actions are performed and aided by or inhibited by physical space.

3. Sites of action
   - Any locus or hub where activity seems to recur.
   - The purpose of this code was to identify what Sunstein and Chiseri-Strater (2007) refer to as focal points and thereby pinpoint what specific locations within classrooms dominate the actions or movement performed in them.

4. Signs of disciplinary culture
   - Symbols that suggest or promote disciplinary identity. These can include clothing, language, signage, and relationships.
The purpose of this code was to examine how signs of disciplinary culture (Hagan and Houchens, 2016) suggest or facilitate the use of or movement within classroom space, as well as create a sense of community within those classrooms.

5. Disciplinary tool
   - Any tool or machine that serves a physical, disciplinary or professional purpose (e.g., using a pencil to take notes in a lab notebook in Drs. Rosetta and Mary’s forensic science course).
   - The purpose of this code was to identify the ways in which disciplinary tools drive movement and action within classroom spaces and how classroom spaces facilitate or inhibit disciplinary tool use.

6. Professional spaces
   - Any reference to a space that is used by a professional or practitioner of a discipline.
   - The purpose of this code was to identify how students were picturing the spaces/places used by professionals in their discipline and how the spaces/places they currently occupy might mimic those professional spaces/places.

7. Professionalism
   - Any focus on professional practices or professionals in a field.
   - The purpose of this code was to identify how students were picturing the practices performed by professionals in their discipline.

8. Modeling
The ways in which people or spaces teach professional practices by actually performing those practices.

The purpose of this code was to identify ways in which classroom spaces/places facilitated the use of modeling as an instructional strategy.

9. WAC influence

- Any focus on disciplinary or professional writing.
- The purpose of this code was to identify any specific instance where instructors used writing for disciplinary and rhetorical purposes (Melzer, 2014).

10. Genre

- Any text that serves a disciplinary or professional purpose. The difference between genres and disciplinary tools was tricky to navigate. Because tools can be read as texts and would therefore function as genres, I chose, for the purposes of this dissertation, to identify tools as serving a mechanical purpose and genres as serving a textual/rhetorical purpose.
- The purpose of this code was to identify how classroom spaces/places facilitated the use of disciplinary genres (Devitt, 1993).

11. Features of the space

- The features/descriptions of the physical space.
- The purpose of this code was to categorize and describe each space/placed used during the observation process.

12. Navigating space
o Any focus on moving within a space or how people arrange the space around them.

o The purpose of this code was to identify areas in which restrictions or breakdowns occurred when students attempted to navigate the classroom space around them (Walls, Schopieray, and DeVoss, 2009), as well as how students and instructors consciously moved about the spaces/places to perform disciplinary actions.

13. Opinion of space

o The opinions of a professional or academic space stated by a student or instructor.

o The purpose of this code was to gather and identify how students or instructors were thinking about the classrooms they occupied over the course of the semester.

Conclusion

By using the aforementioned methods, my goal was to attempt to identify and understand how each space/place occupied by students and instructors contributed (or not) to the development of student disciplinary identities. In the chapters that follow, I explore each individual course that was studied—CHS 3511: a forensic science/trace evidence course, EDG 4410: an education methods course, and ENC 4416: a writing in digital environments course—by first providing a brief overview of that course, then describing the spaces/places used by those courses, and then by exploring the main methods used to observe and analyze each course: in-class observations, movement mapping, and student focus groups. I conclude each chapter with some final thoughts that were garnered by performing these methods. I then finish this dissertation by collating these final thoughts and offering up suggestions for how universities, departments, instructors, and WAC programs can foster student disciplinary identity.
development and institute both short-term and long-term, sustainable change regarding the
design and use of learning spaces/places on campuses.
CHEMISTRY: INSIDERS AND IDENTITY

The Course

CHS 3511, chemistry: trace evidence, is a core course within both the biochemistry and chemistry track of the Forensic Science B.S. degree program. The course is dedicated to helping students identify and compare evidence, utilize statistical significance, and navigate the societal and professional ethics of a career in Forensic science. While the course is designed to help students gain experience running the types of experiments they would encounter in a career in Forensic science, it is also designed to help students gain a broad knowledge of the field and help them identify and establish internship opportunities that are required by the B.S. program. Writing is heavily emphasized, and students are expected to write in genres common to the field such as lab reports and publishable articles based on the results of their experiments. The course is divided into two components: a lecture component and a lab component. Lectures precede experiments by guiding students through various theories, ideas, and practices, while experiments focus on putting key theories into action. In other words, once students become familiar with key ideas presented in lecture, they put those ideas into practice by running their own, self-guided experiments. During experiments, students are encouraged to use their lecture notes as well as their smart phones to look up procedures, conversions, etc. The co-instructors, Dr. Rosetta and Dr. Mary, want students to have the agency that a professional chemist would have to decide how to set up and enact an experiment to reach a desired outcome. The tools students surround themselves with during experiments (which range from notebooks and phones to microscopes and mass spectrometers), help to establish this agency.
Throughout the semester, Dr. Rosetta and Dr. Mary invited guest speakers to talk with students before labs about internship opportunities. Flyers were given to students advertising various internship-providing agencies, which included serving as a chemist at the national level in Washington, D.C. At other times throughout the semester, Dr. Rosetta would speak to students about the importance of writing as a chemist, and would explain that she would grade student work based on their ability to continue to draft toward publishable-quality manuscripts.

**The Space**

CHS 3511 took place in two main spaces: a lecture room found in the Business Administration building, and three laboratories found in the Chemistry building. The lecture room, BA 126, has seven walls that are not evenly sized (Figure 1). The front wall (which I have named because it houses the projector screen and the student desks all face it) and the back wall are the greatest in size, with five smaller walls connecting at slight angles to create a semi-heptagonal shape. There is a whiteboard on the wall directly left of the front wall. There is another whiteboard continuing counterclockwise to it (with a small wall in between). There is another whiteboard located on the back wall and a final whiteboard on the wall directly to the right of the front wall. Off-center at the front left of the room is a computer station, which contains a PC and monitor, Elmo (doc camera), and a control panel for the projector.
The desks wrap around the computer station with a pathway cutting down their middle. On either side of this pathway are three sets of desks that ascend—stadium style—until they reach the back of the room. The first row holds 6 chairs on each side, the middle 8, and the third 9. The room seems to seat about 50 students, including a few office chairs that have been added to the room. The students in this class are afforded a lot of room both because of the size of the desks and the ratio between students and desk space. There are about 17 students present on any given lecture day. This allows students to have plenty of desk space so that they can spread their bags, drinks, notebooks, calculators, binders, etc. out in front of them. There are a few electrical outlets scattered around the walls of the room. No outlets are placed in the floor, so students in the first two rows cannot plug in electronic devices. Though the walls are more heptagonal than
rectangular, the design of this room still fits into Park and Choi’s (2014) model of a lecture hall, since all of the desks face a “front” of the room which houses a projector and computer station.

The three labs used by students in the Chemistry building are all housed on the third floor and are adjacent to one another. The largest lab used by CHS 3511 is Lab 304, or what students refer to as the Dye Lab (Figure 2).
The Dye Lab contains three long, rectangular tables that dominate the center of the space. The tables are taller than typical tables, allowing students to stand and work on them comfortably without bending over. The tables seem to offer enough space to provide each student with an individual workstation, though this is rarely needed as students typically occupy all of the three labs simultaneously so that the entire class is never working in the same lab at once. Though not
necessarily a lecture hall, the Dye Lab does contain a “front” of the room with a whiteboard, projector screen, and computer station. Around two of the edges of the room (left and back) are shelves that stand the same height as the three middle tables. These shelves can be used as workstations and house important tools such as sinks and cubby holes into which students can stow bags and clothing. The right wall contains two large vents with glass enclosures that can be used to handle materials that are hazardous to breathe. There are two doors in the Dye Lab: the door on the left wall leading into the main hallway of the Chemistry building and a door on the front wall that leads into a smaller room containing scales and various forensic materials.

The second largest lab used by CHS 3511 is the Microscopy Lab (figure 3).
Figure 3: Berry, L. (2018). Microscopy lab. [Illustration].

The Microscopy Lab is rectangular, with a front of the room containing a projector screen that could be raised into or lowered from the ceiling by an instructor. The lab is split by a pathway down the middle, on either side of which are three rows of workstations that contain four microscopes each. The workstations contain cabinets underneath that straddle empty space into which wheeled chairs may be pushed in. This design allows for two students to sit on one
side of each workstation, and two on the other. Part of the way through the semester, the microscopes were replaced by newer models that connect to monitors. Previously, the lab only contained several computer-assisted microscopes, which were located at the front and back of the lab on the same tall shelving found in the Dye Lab. Like the Dye Lab, these tall shelves also contain cabinets and cubbies into which student materials and bags could be stored. Above the shelves were stored, older model microscopes.

The final and smallest lab occupied by CHS 3511 was referred to as the Trace Evidence Lab (Figure 4). The Trace Evidence Lab is a small, rectangular room that houses tall shelves around each side. The shelves can be used as workstations but their primary purpose is to house machines that can identify and work with trace evidence specimens. Above and below the shelves are storage compartments.
Observations

One of the first things that struck me when observing Drs. Rosetta and Mary’s CHS 3511 course was the sheer amount of disciplinary tool use both in lectures and in labs. Tool use accounted for 28.39% of codes assigned to in-class observations for CHS 3511, and while I expected a great deal of tool use regarding certain types of scientific instruments such as microscopes and beakers, I was most intrigued to discover that simplicity was often the name of
the game for chemistry students and that the design of the furniture in both the labs and lecture hall facilitated this simple tool use. For CHS 3511, disciplinary tools ranged from lab notebooks and pencils, to microscopes and razor blades. During lectures, at first, the use of notebooks and pencils to take notes on Dr. Rosetta’s or Dr. Mary’s slideshows and lectures seemed all-too-common for a college setting. In fact, across all three courses, one commonality I noticed was that as soon as a “slide” appeared on a projector screen, students were quick to grab writing utensils and paper and take notes. This was especially true if a numbered or bulleted list appeared on the projector. However, once I was able to observe students in their lab setting, the specificity of the spiral notebook and the pencil became clear. Both of these tools saw frequent use in lab and lecture settings and supported students as they transferred knowledge in lectures to practice in labs. In other words, the spiral notebook and the pencil didn’t just serve as mere tools for grappling with and retaining knowledge, they supported the practice of performing disciplinary writing and disciplinary behaviors. In this way, we can see a clear distinction between the text-processor role and professional-in-training identity (Walvoord and McCarthy, 1990) in that these students did not write for the sake of being able to regurgitate information (though recalling information—as will be discussed shortly—is advantageous for chemists), they wrote to support their own agency as chemists when it came time to employ their knowledge in a lab setting.

During lectures, the dynamic that was created was that of a knowledgeable expert passing on information to professionals in training. The design of the space—as discussed by Park and Choi (2014)—promoted this distinction as the main focus of the space was on the computer station and projector screen, with the professor standing in between these key tools (Figure 5).
One of the recurring themes in this dissertation is that the structure of the lecture hall is often not conscious of disciplinary purposes. However, this is not to say that the dynamic of expert teaching novice is not helpful or not purposeful for a specific discipline. If, according to Dr. Rosetta, the goal of CHS 3511 is to enable students to “solve problems/answer questions related to forensic science (identification/comparison of evidence, statistical significance of evidence, ethics, quality assurance),” then the division between lecture and lab days served to build a foundation of discipline-specific knowledge that could be built on in authentic settings with authentic practices. To build that knowledge, lecture days made use of what I came to identify as very specific, critical disciplinary behaviors. The disciplinary behaviors that took place during lectures predominantly focused on student notetaking, the drawing of molecules,
and the application of specific formulae such as the Woodward-Fieser rules. All of these practices were facilitated by students’ spiral notebooks, the computer station (including the PC and Elmo doc cam), and the projector screen. In combination, these tools facilitated active engagement on the part of both professor and student. Typically, lectures would begin by Dr. Rosetta or Dr. Mary turning on the projector, using the computer station to switch to the Elmo display, and then placing sheets of paper onto the Elmo, which would then be projected on the projector screen. Seeing this sequence of events suggested to students that they needed to open up their spiral notebooks and get a pencil at the ready. More than this, the form and structure of Dr. Rosetta or Dr. Mary’s lecture note pages also suggested to students that their time would be best served taking notes in their spiral notebooks. The typical structure of these lecture note pages followed the format of header: white space, header: white space; with a specific header written across the width of a page with a large section of white space underneath it. Students would copy the header down in their notebooks, and as Dr. Rosetta or Dr. Mary began to talk, they would also begin to write down key information in the white space underneath the header. The Elmo doc cam caught this action and projected it onto the projector screen in real time. This seemed to signal to students that the information being written was important, and should be transcribed into their own notebooks. In other words, because Dr. Rosetta or Dr. Mary was writing, the students believed that they needed to write as well. This use of writing became a vehicle for transferring knowledge between lecture and lab.

Before beginning my observations, I knew that writing would be heavily emphasized in CHS 3511, as Drs. Rosetta and Mary conveyed to me in our initial meetings that they believe that writing is an integral part of a chemist’s job. I took this to mean that the drafting of
professional genres such as lab reports or research articles would be heavily emphasized (they were, of course), but what I came to realize after observing both lecture days and lab days, is that what chemists write ranges from these prototypical genres to sketches of molecules, notes on chemical reactions, and common mathematical formulae that can be applied during experiments. All of these genres were made manifest during lecture, and it was the combination of the spiral notebook, Elmo, and projector that made this manifestation possible. Furthermore, the facilitation of this process was greatly aided by the furniture found in BA 126, namely the tables. In fact, tables played a large role in facilitating writing both in lecture and in labs, but my goal is to discuss these spaces in turn. Because the structure of the course flowed from the gaining of knowledge in lecture to the application of that knowledge in lab, I will focus first on the tables in the lecture hall and then on the tables in the lab and how the combination of these types of furniture supported student disciplinary identity growth.

At first glance, the use of BA 126 as a chemistry classroom seemed absurd. The fact that it is separated from other chemistry spaces by an entire building signals that it is not a chemistry space, but knowing that the goal of CHS 3511 is to practice working with trace evidence makes the layout of BA 126 all the more inconceivable with its bolted-down desks, stadium seating, and chairs that swivel on metal bars. In other words, the space itself doesn’t seem designed to facilitate the work that chemists do; rather, it seems designed to force students into stationary positions around a projector screen (not at all how one pictures the hustle and bustle of chemists in laboratories). However, what I came to learn is that even though this space is clearly not a lab space (it is certainly not intended to be), it does facilitate very specific actions that have strong repercussions in the actual lab spaces themselves. As discussed above, one of these key actions is
writing, which can take the form of sketching, diagramming, and notetaking in a spiral notebook. While I first began to see and comprehend the importance of these actions, I also began to see and comprehend the affordances BA 126 offered to these chemistry students, namely in terms of the affordance of personal table space.

As seen in Figure 6, the tables in BA 126 offer a decent amount of surface area per chair. However, because the number of chairs far outweighed the number of students enrolled in CHS 3511, that ratio was even greater, providing individual students with a large amount of table space. The affordance of this space allowed each student to set up a personal work area where they could lay out their lab notebooks, pencils, calculators, folders or binders (Dr. Rosetta and Dr. Mary often passed out hard-copy informative papers that could be easily stored in a binder or folder), cell phones, and tumblers or water bottles. Having each of these tools arranged in a personal way allowed students to easily access these tools and make quick use of them. Therefore, when Dr. Rosetta or Dr. Mary began writing on the Elmo, students could quickly reach for their notebooks, open them, and begin writing as well. Very little time was wasted rearranging space in order to facilitate these writing processes. As noted by Pigg (2014), student agency over space and the ability of students to arrange tools to meet their specific learning needs creates persistence, or a sustained interest in their work. We might say, then, that the affordance of table space in BA 126 promoted persistence for students of CHS 3511, as it enabled them to create and control their own workstations and take part in cooperative writing-to-learn activities such as notetaking and diagramming alongside their expert teachers, Dr. Rosetta and Dr. Mary.
According to Dr. Mary in my personal interview with her, one of the goals of CHS 3511 is to help students “learn analytical methodologies, and use their scientific knowledge holistically toward solving forensic problems.” To accomplish this, students were tasked with setting up and running their own experiments during lab days. While many chemistry students in universities across the county take lab courses that provide them with step-by-step instructions for how to achieve certain reactions, students of CHS 3511 are given scenarios that are realistic to forensic scientists and are then tasked with solving ill-formed problems (Bean, 2011) through experiments that they design and run. By doing this, students combine knowledge learned in lecture with rhetorical thinking and acting (Melzer, 2014) in labs, and are given the agency and reign of space to succeed or fail as forensic scientists might do in real-world labs. In much the same way that I presumed that the most important types of writing forensic science students...
completed would be prolific genres such as lab reports and scholarly articles, I presumed that the most common and influential tools that forensic science students used during labs would be high-tech machines and computers. While disciplinary tool use during labs often included those types of machines, and while those machines were extremely important to the work that the students of CHS 3511 did, I was powerfully struck by the importance of the tables, or what I will hereafter refer to as “workstations” in the Dye Lab, the lab in which the students CHS 3511 spent most of their time.

As seen previously in the Dye Lab, the workstations ran vertically through the middle of the lab space in three columns. These workstations served a multitude of purposes, and were able to do so because of a very discipline-conscious design. In Figure 7, one can see that the defining feature of these workstations is that they stand slightly taller than waist-height for most students. The benefit of this height, I observed, is that it allowed students to set up materials, including their spiral notebooks, and manipulate them without having to bend over or pull up chairs. In fact, there were no chairs located in the Dye Lab or the Trace Evidence Lab. I took this to be a sign of forensic science’s disciplinary culture as well as a safety measure. Because the materials used during experiments are often harmful if inhaled or absorbed through the skin, it makes sense that labs necessitate having clear pathways. One trip or fall could mean hazardous materials flying across the room.
I will discuss the various tools used in the Dye Lab, Microscopy Lab, and Trace Evidence Lab shortly, but first, I think it important to highlight the way in which the workstations in the Dye Lab supported student learning and writing, thereby bridging lectures and labs. First, as discussed previously, one of the main goals of the course was to bridge knowledge gained during lectures to practices experienced in labs. Second, to facilitate this, Dr. Rosetta and Dr. Mary built CHS 3511 around the principle that students were in charge of running their own experiments and were therefore given the agency to make decisions as forensic scientists do to achieve a desired outcome. In order for this to happen, it was imperative that students be able to easily employ knowledge gained during lectures, and the vehicle that accomplished this was the spiral notebook.
Each lab day, students set up their workstations by gathering any necessary materials they need to run their experiments. These materials could range from glass vials to paper towels, but always included their notebooks. Notebooks would be kept face up and open on their workstations and pencils would be kept beside or on top of them. Students seemed to use their notebooks both to refer to notes they had taken during lecture and to take new notes as they conducted their experiments. My understanding of this practice is that documenting each step in the experiment process is critical to the work of a forensic scientist. Certainly, in general, the ability to replicate each step in the experimentation process is important for scientists of any field, but because forensic scientists often testify in court rooms, their conclusions and evidence often carry ethical concerns. For this reason, Dr. Rosetta and Dr. Mary both indicated the importance of training students of CHS 3511 to consider professional and societal ethics as they transition from student to professional practitioner. The notebook, therefore, serves to remind students of this ethical knowledgebase learned during lecture, create a record of steps taken during experiments, and potentially act as evidence in a court of law or in a scholarly journal. We can see that amidst the various genres and practices of a professional forensic scientist, the notebook functions as the epicenter. It is the heartbeat of the matter, and is therefore given first consideration in both lecture and lab settings. And once again, it can be seen that the design of the space directly supports the use of this important tool. While BA 126 is a space that was perhaps not designed with chemists in mind, the Dye Lab in the Chemistry building was, and we can draw the conclusion that the height of the table, the open space offered in each workstation, and even the slight lip raised around the edge of the workstations (perfect for catching rolling pencils or glassware) contribute to the ease of use of the notebook. Returning to Pigg (2014), we
might say that the design of these workstations supports disciplinary persistence for students of CHS 3511 as they transition from professional-in-training to practitioner. They are currently doing the same type of work of professional forensic scientists, using the same type of workstations, and using the same simple yet powerful tool, the notebook.

That students of CHS 3511 are agents in a professional-like space is all the more apparent when a lab space like the Dye Lab or the Trace Evidence Lab is viewed alongside a lab in which professional practitioners actually work. One of the benefits of the forensic science program at the University of Central Florida is its proximity to and partnership with the National Center for Forensic Science (NCFS), a research and crime lab that specializes in ignitable liquids, explosives, bodily fluids, and digital evidence. The first day I observed CHS 3511 was the day that its students were able to tour the NCFS. With the permission of several of its lab professors, I was able to capture images of these lab spaces in which professional research in the field is conducted. Figures 8, 9, 10, 11, 12, and 13 show NCFS labs, while Figures 14, 15, 16 show the Dye Lab used in CHS 3511 and Figures 17, 18, and 19 show the Trace Evidence Lab used in CHS 3511.
Figure 8: Berry, L. (2017). NCFS lab a-1. [Picture].
Figure 9: Berry, L. (2017). NCFS lab a-2. [Picture].
Figure 10: Berry, L. (2017). NCFS lab a-3. [Picture].
Figure 11: Berry, L. (2017). NCFS lab b-1. [Picture].
Figure 12: Berry, L. (2017). NCFS lab b-2. [Picture].
Figure 13: Berry, L. (2017). NCFS lab b-3. [Picture].
Figure 14: Berry, L. (2017). UCF dye lab-1. [Picture].
Figure 15: Berry, L. (2017). UCF dye lab-2. [Picture].
Figure 16: Berry, L. (2017). UCF dye lab-3. [Picture].
Figure 17: Berry, L. (2017). UCF trace evidence lab-1. [Picture].
Figure 18: Berry, L. (2017). UCF trace evidence lab-2. [Picture].
Key similarities between the two spaces are their use of tall workstations that support writing in lab notebooks, and a division between workstations that house specific tools such as printers, burners, and mass spectrometers, and workstations that offer more open space onto which moveable tools such as glassware, chemicals, and smartphones can be placed and used. What is most striking, however, is that the tools housed and used in the UCF Chemistry building are nearly identical to the tools housed and used in the NCFS. While the tools used by forensic scientist students at UCF are predominantly what we might identify as baseline-tier tools (glassware, microscopes, etc.), the Chemistry department does possess and use high-end tools such as mass spectrometers. My understanding is that students need to use these tools with permission and faculty guidance because of their cost to use and maintain, students still have access to them and certainly learn about their purposes and functions as part of their coursework.
Even the so-called baseline-tier tools such as microscopes have recently received an upgrade, with the Microscopy Lab being fully outfitted mid-semester with computer-assisted microscopes, allowing students to capture high-quality images of their samples and analyze them in new ways. Drs. Rosetta and Mary identified that these types of tools directly support the drafting of scholarly manuscripts, as the images can and should be used as supporting evidence in an effort to make arguments. Previously, students would either have to use their cellphones to take a makeshift picture of their samples or choose to not use samples at all. Access to these types of tools even further help the students of CHS 3511 to conduct professional practices and draft professional genres.

If we return to Geschwind and Melin (2016) and Gee’s (2000) perceptions of identity, namely institutional, discursive, and affinity-identities, we can see that the hyper focus of the Chemistry department on creating learning spaces that mimic real-world practitioner spaces in form and function positions the students of CHS 3511 as professionals-in-training. The design of their labs along with the tools they house (from workstations, to glassware, to mass spectrometers) do not merely suggest to students that they are doing the work of professionals in the field, but actually allow them to do that work in spaces that feel and function like professional spaces. If employing knowledge as a professional-in-training (Walvoord and McCarthy, 1991) to Drs. Rosetta and Mary means “To use knowledge/understanding of chemistry/forensics principles to solve problems/answer questions related to forensic science (identification/comparison of evidence, statistical significance of evidence, ethics, quality assurance)” and to “to use scientific knowledge to design analytical protocols toward identification of unknown samples. This includes using this knowledge to alter the protocols as
necessary, depending on the behavior of the sample during the course of analysis,” then the lab spaces in particular endow students of CHS 3511 with the agency and ability necessary to employ that knowledge both in the forms of experimentation and writing. That the experimentation and writing required in CHS 3511 asks students to not merely follow pre-designed steps but make rhetorical choices about ill-formed problems supports not just a gaining of experience as hours of time-on-task are accrued, but a building of a sense of self within a well-established institution, discourse, and community of practice.

Movement Mapping

So far, we have seen how the design of the lecture hall (BA 126) and labs (Dye Lab, Trace Evidence Lab, and Microscopy Lab) for CHS 3511 support the transition of discipline-specific knowledge to discipline-specific practices. In other words, the knowledge gained from lecture is directly being employed in lab. Furthermore, we have seen how the tables contained in each of these spaces facilitate very specific types of writing in the spiral notebook, a tool that is widely used across the discipline to complete discipline-specific and professional practices. In doing so, the design of these spaces supports the agency students are given in lab to engage with real-world, rhetorically-based problems and thereby bolsters their ability to think and act like professionals in the field. What further supports the students’ ability to think and act like professionals is how closely the design of the lab spaces mimic the design of real-world lab spaces such as the ones found in the NCFS. The question at this point is in what other ways are these spaces being navigated, and how might the ways in which those spaces suggest and facilitate movement contribute to a student’s disciplinary identity?
With Dr. Rosetta and Dr. Mary’s permission, I was able to video record five class sessions: two lectures in BA 126, and three labs, two taking place predominantly in the Dye Lab, and one in the Microscopy lab. As stated previously, the goal of video recording class sessions was to identify what Sunstein and Chiseri-Strater (2007) describe as focal points, or “a spot, an area, or a place where the insiders’ activities cluster” (p. 201). To best identify these focal points, I took advantage of a mapping assignment used by Dr. Carol in her EDG 4410, education methods: classroom management course. The maps below contain diagrams of each classroom space, and either chart instructor or student movement at thirty-second intervals. The decision to map either student or instructor movement was made based on which parties move most in each space. As will be discussed below, when students were in lecture in BA 126, they stayed at their desks for the entirety of each class session. The only time students got up to move was when they were asked to create space between them to take their weekly quizzes. For lecture days, therefore, I mapped the movement of Dr. Mary as she moved about the space delivering lecture. During lab sessions, as discussed previously, students were given the agency to move about the labs and use the tools or various lab spaces to conduct their individual experiments at their discretion. In these instances, I mapped student movement. What follows is an examination of movement in each of the spaces occupied by CHS 3511 in an attempt to identify focal points and understand how each of these spaces suggest they be navigated. I will begin with BA 126 and then follow with the Dye and Microcopy labs.

If the goal of movement mapping was to identify focal points, then the mapping of BA 126 clearly indicated four in particular. Dr. Mary was in charge of lecture both of these days and her movement captured on camera showed that she frequently positioned herself around the
computer station, the projector screen/whiteboard, and in the isle way beside student desks.

Figure 20 shows Dr. Mary’s movement during lecture on February 27, 2017, and Figure 21 shows Dr. Mary’s movement during lecture on March 20, 2017.

Figure 20: Berry, L. (2018). BA 126 movement mapping - 27 Feb 2017. [Illustration].
Figure 21: Berry, L. (2018). BA 126 movement mapping - 20 March 2017. [Illustration].

In these maps, the circle indicates the point at which Dr. Mary was positioned at a thirty-second interval. Each number represents the end of a thirty-second interval (e.g., 1 represents thirty seconds having passed during the recording while 2 represents 60 seconds having passed). The color of the circles indicates frequency, with green indicating 1–5 times positioned at a location, yellow indicating 6–14 times positioned at a location, and orange indicating 15 or more times positioned at a location. The size of the circle indicates the area covered. I used three sizes of circles which I will hereafter refer to as small, medium, and large. In Figure 22, we can see that Dr. Mary only covered very specific areas as all circles were small. In Figure 23, we can see that Dr. Mary covered very specific areas except for one, which was labeled as a medium-sized circle at the computer station.
From both of these maps, we can see that the design of the room itself very strongly suggests that a teacher occupy the space around the computer station and the students occupy the desks that surround the computer station. I will once again identify this type of space as a traditional lecture hall, according to Park and Choi (2014), because the design itself positions a teacher at the front of a room with the students all facing that teacher by sitting in desks. What further establishes this dynamic is the placement of the projector behind the teacher. With these two tools at the front of the students’ vision, the students have little need or reason to look anywhere else. The emphasis is always surrounding the teacher. We can identify Dr. Mary’s movements in both of these maps, therefore, as largely functional. If the design of the room, at its most basic, suggests that students sit at desks and the teacher occupy the front of the room, there are few options besides occupying space around the computer station.

In terms of functionality, we can again examine the connection between lecture and lab for CHS 3511. If the ultimate goal is to support student agency so that they can make rhetorical decisions in lab settings, then lecture supports that agency by offering students knowledge from an expert in the field. Students engage with and transport this knowledge through the use of a spiral notebook, which allows students to recall and employ disciplinary knowledge in authentic settings. For CHS 3511, then, lecture days are always focused on the transfer of knowledge. To facilitate, this, Dr. Rosetta or Dr. Mary would deliver a lecture that made use of speech, text, and diagrams. Drs. Rosetta and Mary had several tools at their disposal to accomplish this task, but the primary tools they chose were the computer station and the projector screen via the Elmo doc cam. The whiteboard occasionally facilitated the drawing of figures, namely diagrams of molecules and formulae, but its use required more mechanical effort as the figures themselves
needed to be large enough so that students sitting at the back of the room could clearly see them. The benefit of using the Elmo doc cam or the computer is that anything written or drawn on these tools would automatically be scaled to a large size and projected onto the projector screen. Because this was the case, Dr. Mary elected to either maintain a position beside these tools, or return to them frequently during the lecture period. Her position her directly enabled her to run lecture.

Dr. Mary would also frequently step into the isles of BA 126 as she talked through her lecture. This tended to happen once she reached a stopping point while writing via the Elmo doc cam. As mentioned previously, any time Dr. Mary wrote on the doc cam, the students would write as well. While students were writing, Dr. Mary would step out into the student desk area and continue to talk about the main point(s) she had just written. The response to this movement was twofold: first, students would often stop writing and look up so as to catch Dr. Mary’s eyes, and second, students would often put away cell phones or other devices that were potentially distracting from their engagement. This entire process, then, seemed to serve as a means for engaging student learners. While writing on the doc cam was one mechanism that promoted student engagement (through writing of their own), walking about the space and entering the student space promoted a different type of engagement, but engagement nonetheless.

There were a few positions in particular at which Dr. Mary was often captured when performing this type of movement. First and foremost was in front of the projector screen/whiteboard. This position, it seemed, allowed her to gesture to any notes or diagrams that were currently being projected onto the projector screen. If, as stated previously, Dr. Mary had two mechanisms for promoting engagement (writing and walking), movement to this location
seemed to create a third mechanism, gesturing. By gesturing to specific notes or diagrams, Dr. Mary could highlight their importance in general, or point out specific features or ideas and draw student attention to them specifically. Dr. Rosetta did something similar during her lectures by using the laser pointer on the clicker (a device that controls slideshows on a program such as PowerPoint). By using this device, Dr. Rosetta could pinpoint specific parts of molecules that were either drawn via the Elmo doc cam or on the whiteboards themselves, all from her stationary position at the computer station. Dr. Mary, on the other hand, elected to physically walk to these spaces and use her body to gesture, an action that we could argue has more of a dramatic effect for the students in attendance. While the data collected cannot make an argument as to which method of attention-drawing may have been more effective to students, it is important to note that both instructors saw the importance of drawing student attention to specific elements in an effort to share knowledge and promote engagement, and used deliberate movements to do so.

One additional element that became highlighted in the video recordings of Dr. Mary’s lectures was her physical discomfort in positioning herself in front of the Elmo doc cam. The computer station in BA 126 is raised to about thigh-level and even contains space in front of the computer monitor into which a chair can be pulled. The room, to further highlight this aspect, contains an office-style roller chair that remains positioned by the computer station at all times. The design of the computer station suggests that one sit at it. However, because the placement of the doc cam is adjacent to the computer monitor, it is not reachable from the chair’s intended position. To control the doc cam, in other words, one has to move to the adjacent side of the computer station. The challenge here is that the width of the station does not allow for a chair to
be pulled under it, and in Dr. Mary’s case (and in anyone’s case who is not well-above average height), it is too wide to sit with the chair flush against the station, with her knees straddling its side. To control the doc cam, therefore, Dr. Mary had to either stand and bend over the doc cam, or turn the chair sideways or backwards to sit by the doc cam. Dr. Mary discovered that the most comfortable position to perform this action was to kneel in the chair whilst it was flush against the computer station, but even this position proved to cause extreme discomfort after a short time. The design of the computer station, and the placement of the doc cam, we might say, is in stark contrast to the design of the workstations in the Dye and Microscopy labs which suggested very specific ways for students to place themselves while working at them. While Dr. Mary was still able to use the doc cam to facilitate her lectures, it no doubt caused discomfort and wasted class time when she had to readjust herself or find a different position in which to sit. As will be discussed in a later chapter, writing in digital environments: Where Do Writers Write?, comfort in a space is strongly connected to both utility and to the facilitating of a disciplinary identity.

While movement in BA 126 tended to promote student engagement, student writing, and the sharing of disciplinary knowledge, movement in the lab spaces tended to primarily facilitate tool usage. To capture this movement, I adopted a different method than in BA 126, as I was now observing the movement of over a dozen subjects at any given time. However, in keeping in line with identifying Sunstein and Chiseri-Strater’s (2007) focal points, I marked the larger zones that were being occupied at the end of every thirty-second interval and color-coded them as green (1–5 times occupied), yellow (6–14 times occupied), or orange (more than 15 times occupied). For example, in Figure 22—which shows movement in the Dye Lab on March 1, 2017—at interval one, students were occupying all three of the workstations in the middle of the

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lab space. Therefore, I marked a number one for each of those zones. In other words, the possibility existed that any given focal point in the space could be used simultaneously as another point for any given interval. This is significant to the space, of course, as it shows that the labs themselves both suggest and facilitate the use of multiple workstations or tools at any time. This, as discussed previously, further highlights the agency given to students of CHS 3511, as they are free to move about the lab spaces and occupy various zones as they see fit, all with the goal of completing their experimentations.
In particular, the mapping of the Dye Lab highlighted its versatility. As seen in both Figure 22 and Figure 23, the three long workstations dominated students’ time throughout the duration of the lab. As discussed previously, these workstations, because of their surface area,
facilitated the use of multiple types of tools including glassware, paper towels, razor blades, etc. Students were able to set up their own workspaces on the table tops based on what actions they needed to accomplish during their experiments, and in what order they needed to accomplish them. As someone who enjoys cooking at home, I began to think of these workstations as creating an opportunity to set up a mise en place. This French term, meaning “everything in its place,” is used in cooking to promote a workstation that has been outfitted with all of the proper tools and ingredients one will need to begin the cooking process. The idea is that if all of the gadgets and ingredients are out, ready, and arranged neatly, then the cooking process will be smoother, quicker, and less likely to contain errors. That same idea seemed to be alive and well in CHS 3511, as the students would spend the first few minutes of each lab period going to their stations, setting up their notebooks, putting away their bags (which fit conveniently into cubby holes underneath the workstations), reviewing their experimental goals for the day, and then gathering the proper equipment they would need to meet those goals. Just as in a kitchen, the setting up of these workstations was an extremely important part of the process and made experiments run smoother, quicker, and more error-free.
Moreover, because the workstations were waist-high and suggested that students stand at them, they seemed to allow for more movement to take place. In other words, because there were no chairs to pull out and push in, students were able to more easily leave their workstations, cross the lab space to retrieve tools or perform specific actions, and then return and begin
working quickly. The combination, therefore, of the workstations’ height and surface area, suggested to students that they were the primary location at which to work.

Dr. Mary only made a short appearance during these two lab sessions, and when she was present, she stayed predominantly by the computer station. Dr. Mary and Dr. Rosetta were rarely present during lab sessions, and that seems to coincide with both the disciplinary culture and the mission of the course. If CHS 3511 is meant to allow students to design and run their own experiments—an expectation for when they enter the working world—it makes sense then that students were largely left to their own devices. Students were able to succeed and fail on their own, and both of those outcomes greatly support student learning and agency. That is not to say that it was Dr. Mary or Dr. Rosetta’s intention to leave students completely unattended. Their limited presence and their interaction with students during labs signaled to students that they were still available for professional support. Their presence, we might say, still promotes student agency but also continues to support their growth as a professional-in-training. In other words, the students of CHS 3511 are not yet being treated as professional colleagues (with all of the expectations and stresses that come with that territory), but are being tasked with very specific and rhetorical discursive expectations within a controlled and safe environment. This safety, we might say, encourages students to ask questions, experiment, and attempt to employ the knowledge of their discipline without the threat of say, being fired from a job.
When looking at student movement in the Microscopy Lab (Figure 24), we can see similar recordings of movement, though very different patterns. Like the Dye Lab, the Microscopy Lab is dominated by workstations. These workstations, however, offer different features and therefore suggest and facilitate different activities. For example, these workstations, instead of taking up almost the entire length of the space, are divided by a large isle way down.
the middle of the space. This isle way separates the workstations into six smaller stations instead of three larger ones. Moreover, these stations are thigh-high, provide space into which chairs can be pulled, and are each outfitted with rolling chairs. This design, we might say, suggests to students that the work that takes place here is meant to be accomplished while sitting. Moreover, because tablespace is more limited in the Dye Lab, the Microscopy Lab suggests that a very limited range of work is meant to take place here. This, of course, is highlighted by the placement of microscopes at each workstation. It’s very name suggests that microscope work is what is meant to take place here. Therefore, while the movement map shows that students were positioned at select regions throughout the lab (like in the Dye Lab), this movement was much less dynamic than the movement in the Dye Lab. Students tended to stay at a single workstation and were less likely to move to various parts of the lab space while conducting their experiments. This movement and this design of space highlights a very important aspect of the discipline itself and its professional practices, that work is always divided up into types and separated accordingly by space. The students themselves were keenly aware of this division (which will be explored in the following section), but the professional forensic scientists at the NCFS made special note of this during CHS 3511’s visit there. In professional labs, work is always divided by method and machine, so that each space expertly focuses on one particular aspect of forensic investigation. Once again we can see that the design of the lab spaces in the Chemistry building directly mimic the design of professional lab spaces in form and function. Both the layout of the spaces and the tools included within reflect the very same workflow that takes place in places like the NCFS. Orienting students to this workflow, in an effort to help them solve rhetorically-
based, discipline-specific problems, helps them to think, move, and perform like professionals in their discipline.

**Student Perceptions**

One of the most striking elements that arose during my interviews with the students of CHS 3511 was the their awareness and knowledge of professionals in the field and where those professionals work. Of the seventy-eight codes assigned to my interviews with these students, 37.18% dealt with their perceptions of professional forensic scientist spaces and 29.49% dealt with their perceptions of professionalism within the field. According to these students, forensic scientists operate in one of two types of spaces: lab spaces or crime scenes. The professional behaviors exhibited by and required by forensic scientists are divided based on these two spaces. In other words, a forensic scientist can either specialize in crime scene investigation or lab experimentation. Students were quick to point out the fallacy in popular crime scene investigation shows such as *CSI* is that on those shows, the characters first go to crime scenes and then process the evidence they collect in a lab. According to these students, it would not make sense for these characters to do both. The separation and specialization of these spaces and tasks helps to make sure that the specific tasks performed at each location are done most efficiently and expertly. This same argument was discussed earlier regarding the specialization of individual labs. Labs at both UCF and the NCFS are divided based on the type of task performed so that the instruments included and scientists staffed therein can specialize in a small range of tasks and perform them with the greatest amount of expertise. That is why the students of CHS 3511 occupied three different labs over the course of the semester: a Microscopy Lab which focused on using microscopes to identify and analyze samples, a Trace Evidence Lab
which focused on using high tech machines to identify trace evidence within samples, and a Dye Lab which acted as a more general space but still allowed students to perform specific tasks such as cutting and dying materials. The division of spaces and tasks within the profession of forensic science, we might say, serves specific, rhetorical purposes for the field, and the students of CHS 3511 were keenly aware of this.

Moreover, the students of CHS 3511 already had very specific career goals and ambitions. During my interviews with them, they were quick to point out the exact type of work they would like to do, and if they were still unsure at this point, they pointed to the benefit of the required internship for their major and suggested that the internship would help them identify their strengths and help them make a decision about where they would like to practice forensic science. When I asked their opinion on the spaces provided to them for CHS 3511, the students immediately noted the similarities between UCF’s labs and labs used by professionals in the field. Many of the students interviewed had already completed their internship and were able to speak from their own personal experience. To them, there was little to no difference between the labs they occupied as a student and the labs they occupied as an intern. However, though the labs offered by UCF directly mimic the labs used by professionals in the discipline, students were quick to point out that there isn’t a space offered to CHS 3511 (or to the major in general) that mimics the spaces occupied by crime scene investigators, which many of the students were interested in pursuing. One student, Claire, suggested that different forensic science programs will offer up different types of spaces to students. She stated that a friend who attended Keiser University was given the opportunity to work in field-work-oriented spaces, but not lab spaces. This suggests that the forensic science major at UCF, and even UCF itself prioritizes lab work
over field work. That may not be the intention, but the availability of specific spaces sends that clear signal to students. Another way of saying this might be that the forensic science major at UCF specializes in lab training and is able to support student-identity growth by granting them agency in a variety of labs that mimic the labs found in the profession. This is not surprising given UCF’s partnership with the NCFS. Professional labs are right outside the forensic science major’s back door, and drawing clear connections to it and offering spaces like it to students is likely a large draw for the program. The required internship, we might say, is an opportunity for students to grow beyond the confines of the spaces offered to the forensic science major, as specialized as they might be.

Finally, I found it particularly interesting to hear students’ opinions on their experiences in BA 126, which overall pointed to a begrudging-usefulness. When I first mentioned BA 126 during my interviews, one student blew a raspberry, which in that context seemed to point to her disapproval of or unhappiness with the space. This, quite honestly, was the reaction I expected to get from students, as indicated in my observation notes I often found myself quite uncomfortable in the molded, plastic chairs. However, though students found the room to be “a normal UCF classroom,” or “isolated” from the Chemistry building, they also found that it facilitated lecture quite well. Specifically, students found benefit in the stadium-style seating that centered around their instructor. To me, this signals that the expectations students bring into a space like BA 126 is that—as students—they will be listening to and learning from a professional in their field. This certainly proved to be the case during the course of the semester, and seemed to greatly support the structure and purpose of the class. As stated previously, students would listen to Dr. Rosetta or Dr. Mary during lecture, take notes in their spiral notebook, and then take that knowledge into
the lab spaces and employ it by navigating rhetorically-situated, disciplinary practices. That students seemed aware of this structure and found benefit in the design of BA 126 further highlights the awareness CHS 3511 students seemed to have regarding their progression from novice to expert in their discipline. In other words, they seemed aware of the role each space played in their education, in how they mimicked professional spaces, and how they will eventually help them cross into those spaces as young professionals. The students of CHS 3511, we might say, are currently occupying a professional-in-training role, and with the aid and mindfulness of the spaces offered to them as a forensic science major, are ready to transition into a fully-fledged disciplinary identity upon completion of their degree.

Final Thoughts

If we return to Pigg’s (2014) notion of persistence—the “the ability to sustain interest and attention to short-and long-term projects” and “an embodied and emplaced habit—a product of interactions with places and materials—as much as it is internal or cognitive” (p. 270)—we can begin to identify the ways in which CHS 3511 plays a role in developing disciplinary persistence for forensic science majors at UCF. During the course, students learn disciplinary knowledge from a professional in their field, use writing to engage with and transfer that knowledge to spaces that mimic professional spaces in the field, and then employ that knowledge in rhetorically-based, ill-formed problems (Bean, 2011) that require not only a great deal of agency to solve but the ability to navigate multiple discipline-specific spaces and coordinate multiple discipline-specific actions. In so doing, these students have become very cognizant of their place within the trajectory of their major, which includes a sharp focus on where that trajectory moves once the major is complete and students’ degrees are in hand. In other words, the students of
CHS 3511 already have a solid idea of what to expect as young professionals, and are able to move, act, and think like young professionals in their field. According to Gee’s (200) and Geschwind and Melin’s (2016) definitions of identity, we may say that the students of CHS 3511 are authorized by their institution to wield the agency necessary to think and act as professional forensic scientists, are able to speak and write in the discourse shared by forensic scientists, and expertly execute the practices of those in their affinity group, all while drawing upon the support and knowledge of their instructors, Dr. Rosetta and Dr. Mary. Another way of saying this is that the students of CHS 3511 are already well-instantiated as insiders in their field, and we can strongly connect this to the spaces in which they have worked, including the three lab spaces offered to CHS 3511 (the Dye Lab, Microscopy Lab, and the Trace Evidence Lab), but also to the labs toured in the NCFS and the labs and/or real-world crime scenes offered to them in their internship requirement (which was heavily stressed and even organized by CHS 3511). Just as Eliza began to feel like more of an insider by working in a virology lab in Haas’ (1994) examination of her writing and rhetorical practices, the students of CHS 3511 seem to share that feeling of becoming an insider by not only working in professional spaces but also by being conscious of how the spaces they occupy facilitate their disciplinary training. This was especially evident in the students’ discussion of BA 126, which, according to them, directly supported the learning offered in lecture and enabled them to operate efficiently and expertly in the lab spaces. To state it concisely, the students of CHS 3511 have a strong sense of self-awareness as professionals-in-training in their field, and as equal a sense of awareness of the ways in which their spaces/places facilitate the knowledge and experience required to become a professional in their field.
CLASSROOM MANAGEMENT: MODELING AND MIMICKING

The Course

EDG 4410, education methods: classroom management, is a course dedicated to preparing future teacher candidates for a career in teaching in the K-12 system. Dr. Carol, who is in her final year of teaching before retirement, stated that the College of Education and Human Performance is very purposeful in its method of preparing teacher candidates to employ the knowledge gained in the classroom because the student population they will be working with is a vulnerable population. For this reason, classroom management, in particular, is highly focused on skill-building, the rehearsal of those skills, and the performance of those skills in simulated environments/assignments which include a microteaching lesson, the use of the TeachLivETM5 classroom, and experience in a Junior Achievement program where teacher candidates learn from and support K-12 teachers in the local area. Feedback is highly emphasized and is given by Dr. Carol, TeachLivETM coaches, the Junior Achievement classroom teachers, and by student peers. The texts produced in the course include genres such as lesson plans, simulated letters to parents of students, and “love notes” which are written in support of fellow classmates to provide feedback and encouragement after performing the simulated teaching assignments.

While this course in particular focuses on the skills needed to manage a classroom of K-12 students, it is not unlike other courses in the College of Education and Human Performance in that they all seek to provide students with simulated teaching experiences so that teacher

5 “TeachLivETM is a mixed-reality classroom with simulated students that provides teachers the opportunity to develop their pedagogical practice in a safe environment that doesn’t place real students at risk” (teachlive, 2018).
candidates can gradually feel more confident in their performances and take on the role of classroom teacher. Their learning experience in the college includes seventy-five hours of classroom field experience (fifteen of which is required in EDG 4410) and is capped by two internship experiences taken during their senior year, where they are asked to fully employ their knowledge under the guidance of a university supervisor and certified K-12 teacher. The program itself, therefore, is very mindful of skill-building, experiential learning, and the receiving of professional feedback in an effort to transition teacher candidates from students into professional educators. In addition to this professional transition, Dr. Carol also believes that teacher candidates need to be prepared for what she identified in her instructor interview as “citizenship education,” where students are enabled to “make their own decisions and take responsibility for their own lives and communities.” Dr. Carol added that she too must do this in her own life; a theme that will be explored further in this chapter.

The Space

The College of Education and Human Performance occupies several buildings on campus, including its own titular building containing offices, conference rooms, the Curriculum Materials Center, and a café, and the Teaching Academy and College Outreach building which contains classrooms used specifically for the college as well as other disciplines and the TeachLivE™ classroom, which according to Dr. Carol, will soon make its way to a permanent location on one of the university’s regional campuses. EDG 4410 occupied several spaces over the course of the semester including a classroom in the Teaching Academy building (TA 221) that had an adjoining Microteaching Suite, the Curriculum Materials Center, and the TeachLivE™ classroom. TA 221 (Figure 25), where EDG 4410 spent the majority of its time
during the semester, is what Park and Choi (2014) might refer to as a standard lecture hall, as it is laid out as a rectangle, with rows and columns of desks and chairs facing the front of the room, which contains a computer station and projector screen. The desks themselves are set up in three columns and hold two students each.

Figure 25: Berry, L. (2018). TA 221. [Illustration].
The back of the room contains a closet spanning the width of the room that is built into the wall. The closet contains teaching materials that might commonly be found in K-12 classrooms such as construction paper and colored pencils. The right wall (when facing the front of the room) contains a door that leads into the Microteaching Suite. The left wall contains a door that leads into a similar lecture classroom.

The Microteaching Suite contains four individual classrooms, labeled as A, B, C, and D, that can be entered via a hallway that runs parallel to the right wall of TA 221. The hallway can be accessed by the upper right door of TA 221 or by a door that connects to the main hallway of the second floor of the Teaching Academy. Each Microteaching Room is designed to replicate lecture halls like TA 221 but on a smaller scale. The design of the Microteaching Rooms can be seen in Figure 26.
Each Microteaching Room contains two columns of desks that face what I will call the “front” of the room. The front of the room contains a whiteboard and a small desk that rests perpendicularly to the front wall. Each Microteaching Room can hold between eight and ten students. In addition to the furniture, each Microteaching Room contains a camera and monitor on the back wall that allow students to record their microteaching performance. A flash drive can be inserted into the monitor so that the video recording can be downloaded directly. According to Dr. Carol, the purpose of this recording is for self-critique and reflection. In other words, the students watch their own performance and critique it in an effort to fine-tune their teaching and their ability to manage a classroom full of students.

The TeachLivE™ room (Figure 27), located in the Teaching Academy building, is set up like a large conference room. A large conference-style table dominates the main part of the
space, and is surrounded by plush, mobile, leather chairs. The smaller part of the room contains a welcome table, beyond which is a table containing a coffee pot and microwave. To the right of the entryway is an entrance to a technical room where a TeachLivE™ operator can control the TeachLivE™ experience. This room cannot be accessed by any other door, and, because it is separated from the main space by an interior wall, cannot be seen into from anywhere else in the space. The TeachLivE™ cart is set up at what I will label the “front” of the room (opposite the door).

Figure 27: Berry, L. (2018). TeachLivE™ room. [Illustration].
The Curriculum Materials Center, located in the College of Education and Human Performance building, is designed to replicate a K-12 library. The decorations, signage, and materials housed within all reflect the language, colors, and tools that are common to K-12 schools. When one walks in, there is a large marquee monitor that advertises new exhibits or useful tools housed within the CMC. To the left, the room opens up into a large sitting area with round tables and a long, rectangular table that houses desktop computers and a printing station (Figure 28).

![Figure 28: Berry, L. (2016). CMC main sitting space. [Picture].](image_url)

There is a long service desk, behind which employees stand. Past the desk are stacks of books and DVDs, reference collections, textbook collections (teacher editions, student editions,
workbooks & CDs, and manipulatives), as well as what the CMC circulation operators referred to as “things you use to help you teach in the classroom:” games, puzzles, etc. (Figure 29).

Figure 29: Berry, L. (2016). CMC stacks and reference collections. [Picture].

On the opposite side of the open space is a little cubby with more stacks of books. The CMC houses a “Production Lab,” a maker space which contains a laminator, printers, a dye cut machine, as well as several smart carts (Figure 30).
EDG 4410, above all else, was a lesson in modeling. What I mean by modeling is the conscious performance of disciplinary actions by an instructor in an effort to teach disciplinary actions, skills, or ways of thinking. The benefit of modeling, we might say, is that students do not only learn about a concept or practice, but they actually see that practice or concept being employed. According to Bazerman et al. (2005), when students observe modeling they take cues from the teacher’s performances and therein adopt disciplinary behaviors and ways of thinking even without explicit instruction. If we look back at Walvoord and McCarthy’s (1990) identification of a professional-in-training as a student that is able to employ the knowledge of their discipline, then it goes to say that seeing and experiencing those practices and performances firsthand supports their ability to adopt, replicate, and employ them. Dr. Carol, as stated
previously, was very conscious of modeling for her students, and even built it into her core mission statement as a teacher. In her interview response to me, she stated that:

Former Senate majority leaders, Trent Lott and Tom Daschle, urged in a recent Washington Post op-ed, ‘Democracy requires active engagement, mindfulness and tolerance.’ As an educator [I] believe that I must prepare the next generation in citizenship education—enabling them to make their own decisions and take responsibility for their own lives and communities—and I must do the same in my own life. (n.p.)

What follows, then, is an exploration into the ways in which Dr. Carol modeled the employment of disciplinary knowledge and practices for her students, and how the spaces allocated for EDG 4410 allowed facilitated this practice and enabled students to employ this knowledge themselves.

To begin this discussion, it is important to acknowledge that any action or performance on the part of Dr. Carol is modeling in the eyes of her students, be those actions or performances intentional or unintentional. While Dr. Carol was extremely conscious of modeling disciplinary behaviors for her students, the reality is that the relationship between her and her students was always that of current practitioner to future practitioner. In other words, by the very nature of the discipline, the students taking EDG 4410 were there because they plan to pursue a career in teaching. While that may not always be the case for every student who completed the class (some may go on to pursue different career interests), for that moment of time they were there because they wanted to do what Dr. Carol currently does: teach. This is different than both CHS 3511: trace evidence and ENC 4416: writing in digital environments, whose students were observing a professional in the field who happens to also be a professional teacher. In fact, some
of those students might have very well been interested in pursuing a career in academia, but therein lies the distinction. The fields of chemistry and writing studies offer jobs in both industry and academia, while education’s industry is academia to a large extent. That is not to say that professionals in the field of education do not pursue research or that there isn’t a section of the field dedicated to non-teaching practices. However, in terms of courses offered at the University of Central Florida, the breadth of the field only extends to the boundaries of classroom or workplace teaching. In other words, there is no class offered that is dedicated to non-teaching positions or practices. The closest course offered that is not explicitly geared toward teaching is EDG 4948, which focuses on service learning, where teacher-educators can take part in community service. However, even this course seems to serve the overall trajectory of preparing teacher educators for classroom or workplace teaching careers. It is important, then, in the pages that follow, to observe both how the spaces allocated to EDG 4410 support the conscious modeling on the part of Dr. Carol, and also suggest to students how the disciplinary knowledge of the field of education is meant to be performed. By observing these two facets, I argue, professional educators and the designers of their spaces can become more conscious of how their spaces facilitate the gaining and employing of disciplinary knowledge and practices, and in so doing, can better support teacher educators as they transition from professional-in-training to professional educator.

Over the course of the semester, Dr. Carol largely employed the use of two teaching strategies: student activities and lectures. My intent, in the following sections, is to discuss each strategy in turn and highlight the ways in which Dr. Carol modeled professional teaching practices for her students, and explore how the classroom space facilitated these activities. In this
Observations section I will focus on the student activities orchestrated by Dr. Carol. In the following section on movement mapping, I will focus on how Dr. Carol used lectures to model classroom movement and management and how her students took up that modeling and employed movement and management of their own in simulated teaching spaces.

First, one of the most overt modeling techniques Dr. Carol would employ was conducting an activity in which she acted out the part of K-12 teacher and asked her students to act out the part of K-12 students. I use the word “overt” here because Dr. Carol would announce to her students that they were about to take part in an activity and that she would be serving as their teacher. While her students were obviously keenly aware that Dr. Carol served as their teacher every day, these special announcements created a different expectation for the behavior that was to follow both for them and for Dr. Carol. In other words, her students knew that they could enter a different head space: that of a K-12 student, while at the same time learning from a position of a college student earning their degree in education.

One activity in particular that used this technique, which Dr. Carol later referred to as a “guided discovery,” worked to draw the students’ attention to the thought processes their future students might use. Dr. Carol stated that she had passed out some cards to the students and then asked shoulder partners to not write on them, but to look at them/read them and come up with some ways that they were alike (I was unable to see what about the cards were similar). She walked through the desks and passed out a few markers. She then instructed the students to which she gave markers to write on any of the whiteboards some of the ways that the cards are alike. The student who first finished writing asked Dr. Carol if she should give the marker to someone else. Dr. Carol said yes, so the student handed the marker to a nearby student. That
student then approached the other whiteboard and began to write. This process continued for several minutes with students writing and passing markers. At this point, Dr. Carol asked her students to dive a little deeper and to use their senses such as taste, sound, and smell. By the end of the activity, most of the whiteboards in TA 221 were filled with student writing. The purpose of this “guided discovery,” according to Dr. Carol, was to help the students of EDG 4410 envision the thought processes of K-12 students and see for themselves how participating in an activity in which you were only given a piece of the puzzle can allow you to explore and build a bigger picture. In other words, because the students started off by writing down similarities that immediately jumped into their own minds, they were constrained within one line of thinking. After seeing other ideas appear on the whiteboard, the students were suddenly opened up to different lines of thinking and could then delve deeply into them. This was heightened by Dr. Carol’s request that students begin to think using all of their senses.

These guided discoveries, like so many activities performed in Dr. Carol’s class, served as meta learning moments for her students. Because they were taking on the role of K-12 students, and because they were being led through a discovery-based activity, they were able to make discoveries and insights in three mindsets: K-12 student (the acting role they were taking on), college student (a professional-in-training role they currently occupy), and future practitioner (which allowed them to envision how they might use a guided discovery activity in their own classrooms one day). What made this type of activity so palpable was the ways in which the students had to navigate and utilize the space to come to their discoveries. For example, the presence of the many whiteboards in TA 221 allowed the students to look and even walk around, reading various thoughts and ideas before coming to different conclusions.
themselves. In other words, their very thinking process was tied to their physical, 3D environment. The act of moving around in their classroom space and the use of the tools included in the space (namely the whiteboards and markers) facilitated this guided discovery process. Once again, we can look at an activity such as this as not only a discovery process isolated in that particular moment of time, but as one that students can project into the future. We might say that the physical experience of navigating the classroom space by walking in between desks, reading the various whiteboards, writing on those same whiteboards, and then passing the markers off to peers is what allowed the students of EDG 4410 to envision conducting a similar activity in their future teaching careers.

Another interesting example of a student activity came from my very first observation of EDG 4410. Dr. Carol explained to her students that their upcoming activity was geared toward working with non-native speakers. She asked if any students were fluent in Italian. One student raised her hand and Dr. Carol said that she would serve as the native speaker for the activity. She then turned down the lights, and activated a video on the projector.

The video was of a woman making lemonade, but delivering the instructions in perfect Italian. She explained at the beginning of the video that its purpose was to help students identify how they feel experiencing directions in a non-native language. As the video played, Dr. Carol set up a table at the front of the room so that it contained a hand juicer, paper towels, oranges, limes, and lemons, as well as solo cups and a knife. Near the end of the video, Dr. Carol began calling on students and asking them to come demonstrate what they learned from the video. Dr. Carol would replay a small segment from the video and then ask the student volunteers (in Italian) to properly re-create those steps. As they began to demonstrate, Dr. Carol would look to
the rest of the students and ask them to respond in Italian if the student was performing the steps in their proper, sequential order. For example, the first student cut an orange in half. Dr. Carol would ask the class “ci or no?” The students would either respond with the affirmative or negative. Several students served as volunteers, and after each of the students performed the task, the rest of the class would clap. Dr. Carol continued to speak only in Italian during the activity. The fourth and final student was in charge of drinking the concoction, which looked to be mostly lemon juice. The rest of the class giggled, but Dr. Carol told him not to drink. It was a fun end to an otherwise challenging activity given the language barrier.

From this activity, we can look at the practice of modeling in two ways. First, like the previous example, we can see that instead of merely talking about or talking through a possible activity her students can use as future teachers, Dr. Carol actually guided her students through that activity, giving them the perspective of both K-12 student and future teacher. As we’ve stated previously, this practice can help students to engrain disciplinary performances and ideas. However, unlike the previous activity, Dr. Carol’s teaching performance was intended to be exclusionary. By speaking only in Italian and by playing a video that narrated a process only in Italian, the entire class (minus one student) was at a disadvantage. This disadvantage was highlighted by the assumed ease of the activity being replicated: making lemonade. Even though this process was one that most students were at least somewhat familiar with, being asked to replicated it while being given instructions in a language they did not speak proved to be an enormous challenge. What we might call this practice is a kind of inverse modeling, wherein Dr. Carol was demonstrating for her students what NOT to do as teachers and at the same time giving her students an experience that was challenging and isolating. The usefulness of this
inverse modeling is that it will likely help each student be mindful of being inclusionary in their future classrooms, especially if they plan on staying in the state of Florida which has a large population of Spanish speaking students, many of whom enter the K-12 school system with a very limited knowledge of English.

To sum up, when looking at both of these activities, what we can identify is not only a strong consciousness of modeling teacherly behavior on the part of Dr. Carol, but we also see how the classroom space itself made these activities palpable for her students. The physical act of moving around the space and being tasked with completing activities that required physical movement and the manipulation of 3D objects (using markers to write on whiteboards, cutting citrus fruits, etc.) took the students one step beyond the benefit of modeling as discussed by Bazerman et al. (2005). If modeling, according to Bazerman et al. is the observation of cues from a teacher’s performances and the adoption of disciplinary behaviors and ways of thinking even without explicit instruction, then what we get from looking at Dr. Carol’s examples is not only the observation of her cues, but the opportunity for her students to practice experiencing those cues from the perspective of a K-12 student. What’s more is that her students were able to experience these cues both positively and negatively, helping them become more mindful about what employing those cues will entail when they become professional educators. What will follow in the Movement Mapping section of this chapter is an examination of how the students of EDG 4410 were able to take these modeling cues and employ them in simulated teaching environments.
Movement Mapping

As with CHS 3511, I will explore each of the spaces occupied by EDG 4410 in turn so as to shed light on how each space works to support movement and student disciplinary identity. Moreover, as with CHS 3511, I will focus on the movement of Dr. Carol in the space in which she did the majority of the movement and on the students in the spaces in which they did the majority of the movement.

To begin, the space in which EDG 4410 spent most of their time throughout the semester was TA 221. As noted at the beginning of this chapter, TA 221 follows Park and Choi’s (2014) model of a lecture hall, with its computer station and projector screen being housed at the front of the room and with student desks lined in rows in columns facing them. Like in BA 126 with the students of CHS 3511, each class day the students would come in and sit down at their desks and face the front of the room. Dr. Carol, in turn, would occupy the front of the room behind the computer station, at which she could control the computer, projector, and lights in the room. As seen in Figure 31—which shows Dr. Carol’s movement on October 11, 2016—the space at
which Dr. Carol was captured the most in the video logs was at the front of the room, in front of the projector screen.

Figure 31: Berry, L. (2018). Movement mapping TA 221 - 11 October 2016. [Illustration].

This position, along with four other positions, occupied Dr. Carol’s time more than the computer station. What is surprising about this is that Dr. Carol, like Dr. Mary, relied heavily on
the computer station and projector to run class. While Dr. Carol did make some use of the Elmo doc cam, her primary tool was the computer which she would use to run slideshows that facilitated daily lectures. This difference in tool use, we might say, granted Dr. Carol more freedom to move about the space during these lectures. In other words, because Dr. Carol wasn’t relying on the doc cam or the computer to create text, only display it, she could use a clicker from a distance to advance slides she created in advance. However, while like Dr. Mary, Dr. Carol seemed to enter the students’ space in an effort to engage them, she did so with a very specific purpose in mind. It is here that we return to the practice of modeling, which was not only ingrained into Dr. Carol’s personal teaching philosophy, but the heart of the course as well.

First, when looking at Figure 32—which shows Dr. Carol’s movements in TA 221 on October 18, 2016—we can see that once again, Dr. Carol occupied the front of the room a great deal, but the majority of her movements extended into the students’ space.
Figure 32: Berry, L. (2018). Movement mapping TA 221 - 18 October 2016. [Illustration].

We can see that Dr. Carol’s movements typically revolved around student desks, and extended all the way to the back of the room. What is shown in the video logs but not on the movement maps is that when Dr. Carol approached these student desks or groups of student desks, she was doing so with the intent of speaking directly to students. In other words, when Dr. Carol approached a student desk, she looked at those student, spoke directly to them, and often even placed a hand on their desk. The effect of this was similar to the effect seen in CHS 3511,
in that students would refocus, make eye contact with the instructor, and put away any distracting devices. However, while Dr. Mary navigated the room like a speaker giving a conference presentation, Dr. Carol occupied her room like an elementary educator. The purpose of this, as discussed previously, is to model the kind of classroom movement valued by K-12 educators, and thereby show students what it looks like to employ these specific techniques.

At this point, we can also look back to Dr. Carol’s use of casting roles as a form of modeling. By taking on the role of K-12 teacher and asking her students to take on the role of K-12 student, Dr. Carol was able to help her students experience both what it feels like to be instructed as a K-12 student and what it looks like to instruct as a K-12 teacher. By looking at these movement maps, we can get a clearer picture of how this technique was often meshed into her lecture style and her conscious movement within the space. One way we can understand the effects of this technique is by looking at Berry and Dieterle’s (2016) examination of writing center consultations and how the entering of a student’s space promotes collaboration. Taking a cue from theatre, Berry and Dieterle identified that a common tactic used by writing center consultants was to cross into a student’s space by placing a tool or extending a gesture toward them. This type of action acted as an invitation to work collaboratively, and we can see similar tactics at work here. By moving to specific or even groups of student desks and by gesturing toward students or even making eye contact with them, Dr. Carol was essentially making them part of a scene and inviting them to participate. This invitation did not always necessitate a response or even an action, but it nevertheless created an atmosphere of collaborative learning that hinged on modeling. By observing Dr. Carol’s movement in the kind of space they will occupy as professional teachers, these student educators could better envision their own
movement in these types of spaces and—because of Dr. Carol’s invitation—envision what it would be like to be a student in their future class. In other words, by becoming part of those scenes, these professionals-in-training could get a stronger sense of self as a professional and better picture themselves in a classroom speaking with their future pupils.

These types of techniques did not happen in isolation. In Figure 33—which shows Dr. Carol’s movement on October 25, 2016— we can see the consistency with which Dr. Carol navigated the classroom space.
While the space near the projector is occupied quite frequently, Dr. Carol spent most of her time walking the room while delivering her lecture, engaging with students (both individually and as groups) in the process. One intriguing detail we garner from these maps is that Dr. Carol would often make her way to the very back of the room. Though these positions were not the most frequently visited, they made an appearance in each map of TA 221. What we
can surmise from identifying Dr. Carol’s frequency in occupying these positions is another modeling technique. By standing at the back of the room and delivering lecture, Dr. Carol can see her students, but they cannot see her. If we accept that Dr. Carol is modeling for her students how to navigate a K-12 classroom, then we can assume that the age range of the students being invoked is roughly six to eighteen years of age. At any of those age ranges, the power dynamic at play in a classroom is still very real. Indeed, that power dynamic is so deeply ingrained that during my experiences teaching writing classes with adult learners, those students know to sit in desks and face the front of the room, and of course, pay attention during class. The feeling then, of having an authority figure stand behind you, further heightens the reaction among students to put away distracting devices and pay attention, thereby fostering engagement during the lecture. This technique may be all the more important for these future educators who may occupy positions that ask them to teach younger students who perhaps do not have as long of an attention span as college-aged students. We might say, then, that Dr. Carol’s conscious movement to the back of the room serves two purposes: to foster engagement during her own lecture, and to model for her students how they can in turn foster that engagement in the classrooms they will one day occupy.

Though the goal of Dr. Carol’s movement suggests a conscious modeling on her part, and though we have discussed how the video logs show a very directed and personal engagement with her students, it is important to identify the patterns of movement that existed during the time spent by EDG 4410 in TA 221. For example, in Figure 34—which shows Dr. Carol’s movement in TA 221 on November 1, 2016—we can begin to see how the areas occupied by Dr. Carol
coincide both with the areas occupied by her during previous class periods and how the intervals at which those areas were occupied point to a very clear pattern of movement.

Figure 34: Berry, L. (2018). Movement mapping TA 221 - 1 November 2016. [Illustration].

For example, when looking at both Figure 33 and Figure 34, we can see that Dr. Carol’s position in front of the projector screen occupied a great deal of her time, and tended to occupy the majority of her time at the beginning of class. Though the intervals do not correlate exactly,
we can see that the majority of the first fifty intervals took place in front of the projector or out of frame. It is important to note that for this classroom’s set up, the camera frame reached to about the midpoint of the projector so that it could capture both Dr. Carol and her students. When Dr. Carol was out of frame, then, she was still at the front of the room, positioned near the projector screen. Moreover, though Dr. Carol occupied multiple locations in TA 221, the movement maps show that she tended to favor several locations over others. The projector screen, the front two rows of desks, and the very back of the classroom seemed to be her main go-to areas. What we can surmise from this consistency is that though Dr. Carol’s movement was very intentional, it too also functioned as a means for her to deliver her lecture. Just as with Dr. Mary in CHS 3511, Dr. Carol moved about the space like a presenter at a conference. While the movement maps cannot speak to her intentionality, they do indicate that she had favorite spots at which to pause, whether consciously or not. This is not to say that favoring some locations over others diminished her ability to model teacherly movement for her students, though it does present us with the question: how can teachers be conscious of their movement within classroom spaces and how can making students conscious of movement within a space be integral to identity development within a specific discipline?

Regarding this question, for disciplines such as forensic science, that movement may be less important depending on the setting. For example, modeling for students how to navigate lab spaces or raising students’ consciousness of how professionals navigate lab spaces may be considered more essential for the identity and skill development of students than modeling for students or raising students’ consciousness of how instructors navigate a lecture hall. That is not to say that there is no value in the latter. Certainly, there is a possibility that some of the
graduates from the program, like Drs. Rosetta and Mary, will pursue a career in education. Given the goals of the course discussed both by Drs. Rosetta and Mary, and by the course catalog for the Chemistry B.S. degree, however, we can safely assume that a greater emphasis is placed on the development of a lab-oriented, disciplinary identity. The successful navigation of a lab, therefore, would be considered more essential, and could be taught by a combination of modeling, consciousness raising, and student-practice in those spaces themselves. As discussed previously, the lab spaces occupied for CHS 3511 directly mirror lab spaces used by professionals in the field and by professional organizations, such as the NCFS. For Dr. Carol’s EDG 4410 class, however, though modeling and consciousness raising are heavily emphasized, the spaces in which students are able to exercise agency and practice their discipline mimic professional spaces, but do not mirror them exactly.

For example, in Figure 35, we can see the mapping of student movement inside the Microteaching Suite.
As discussed previously, the Microteaching Suites are miniature models of classrooms used by K-12 educators that come equipped with several standard pieces of equipment including a whiteboard, desks, and a table. The purpose of these rooms is to allow the students of EDG 4410 to take on the role of teacher and practice delivering a lesson to their peers, who take on the role of students that correspond to the target age group chosen by the student-teacher. For example, if one of the students of EDG 4410 plans to teach third grade mathematics, then that student would take on the role of third grade mathematics teacher and his/her student peers would take on the role of third grade students. This dynamic is meant to help the student-teacher practice their teaching strategies and performances in a simulated setting with a simulated audience. However, as seen from the scale of the room, and of course its very name, the
Microteaching Suite does not directly mirror typical teaching spaces like TA 221. While TA 221 contains three columns of five full-length tables (that hold two students a piece), the Microteaching Rooms contain two columns of four tables (that hold only one student a piece). Additionally, TA 221 contains much larger amounts of space at the front and back of the room to house tools such as the computer station, projector screen, and materials-closet. The Microteaching Rooms do not contain such extra space. The omission of this space, or rather the limited amount of space that the rooms contain, suggest to students how they are able to move within them. When looking at the movement that took place in the Microteaching Room above, we can see a clear distinction between the movement performed by students in the Microteaching Rooms and the movement performed by Dr. Carol in TA 221.

In Figure 35, we could see three distinct zones occupied by the four students who performed their microteaching lesson on October 4, 2016. The breakdown of student-occupancy per zone can be seen below in Table 1.

| Table 1: Microteaching suite intervals by student - 4 October 2016 |
|-----------------|----------------|----------------|
|                 | ZONE 1 | ZONE 2 | ZONE 3 |
| **STUDENT 1**   | 1, 7   | 2–4, 8–22 | 5, 6   |
| **STUDENT 2**   | 1–15, 17 |              | 16     |
| **STUDENT 3**   | 18, 21 | 1–12, 14–17, 19, 20 | 13     |
| **STUDENT 4**   | 2, 7–11, 13–16 | 3–6  | 1, 12, 17, 18 |
Zones one and two were the popular choice here, and the reason behind that is several fold, though it is important to first point out one element of the microteaching session that couldn’t be captured by the movement maps alone. As part of the requirements of the assignments, the students prepared a poster board, the design of which was meant to facilitate their planned lesson. Though the Microteaching Room contained a whiteboard and presented the possibility of plugging in an older model of projector, the students were required to prepare their own poster in advance. This, I imagine, helped to facilitate the changeover between students as they took their turns taking on the role of teacher. Because they had their materials created in advance, they could change over rapidly and ensure that all students were able to take their turn teaching during a single class period. Of course, this requirement also helped the students to be very thoughtful of their delivery and how to incorporate tools and visual aids into their classrooms. However, because creating a poster was part of their grade for the assignment, the students seemed to plan—for the most part—their entire delivery around it. In other words, because this visual aid was so important for their success in the assignment, they made sure that the majority of their gestures and movements revolved around the poster. Because the posters were placed at the front of the Microteaching Room (most being taped to the whiteboard), the students tended to stand either to the side or in front of their posters and thereby easily transition gestures between their poster and their students. The need to heavily incorporate this element into their lessons combined with the limited space available in the Microteaching Rooms constrained the movement the student-teachers performed during their lesson. While the student-teachers occasionally stepped out into the students’ space, the combination of these constraints kept them from venturing out too far.
In addition to the microteaching lesson, the students of EDG 4410 also completed two other course requirements that positioned them in authentic or simulated spaces. While I was unable to observe students taking part in their Junior Achievement program—wherein the students of EDG 4410 worked alongside a current K-12 teacher and supported their work in an actual classroom—I was able to observe the students’ interactions with TeachLivE™, a complex, interactive software program that allows student-teachers to interact with avatars (elementary-aged characters) in a digitally-rendered, virtual classroom. The virtual TeachLivE™ classroom was displayed on a large-screen monitor attached to a mobile AV cart, which was housed in a conference room in the Teaching Academy. The AV cart can be seen in the upper right hand corner of Figure 36 below.
Figure 36: Berry, L. (2018). Movement mapping TeachLivE™ Room - 8 November 2016. [Illustration].

From the movement map, one can see that the students only occupied certain spaces. Just as in the Microteaching Rooms, students had very few options of where to situate themselves in the space. Based on the design of the room—which we may identify as a conference room because of its large, central table, and the office-style, rolling chairs surrounding it—and the placement of the AV cart, students either knew to sit around the conference table (if it was not their turn to perform their TeachLivE™ lesson) or stand in front of the AV cart (if it was their
turn to perform their TeachLivE™ lesson). To conduct their TeachLivE™ lesson, students worked in groups to develop a set of classroom procedures that the TeachLivE™ avatars could understand and follow (e.g., how to line up before walking to the cafeteria), and then delivered them to the avatars. Like their microteaching lesson, the students were required to create and use visual aids, and like the Microteaching Rooms, students were constrained by the placement of their visual aid and the placement of the students they were teaching. However, though the Microteaching Rooms offered a little flexibility in terms of movement, the TeachLivE™ software offers very little reprieve because it requires students to stand in front of a camera that is attached to the AV cart. For this reason, when looking at Figure 36, we can see that the students performing their TeachLivE™ lesson were positioned solely in front of the cart. The significance of this limitation perhaps is miniscule if left in isolation. After all, TeachLivE™ necessitates that students stand in front of and close to the camera in order for it to run successfully. However, in combination with the microteaching lesson, we can see that while students are given the opportunity to conduct professional practices in simulated settings, the ways in which they are able to move are greatly constrained which in turn greatly affect the ways in which they are able to perform those practices. The question at this point is “does this limitation of movement in a simulated space impede the students’ ability to develop their disciplinary identity?” As will be seen in the following section, I believe the short answer is “no.” However, it does require that students find opportunities and spaces outside of EDG 4410 in which to practice moving and performing in ways that mimic the modeling they received from Dr. Carol. This opportunity may present itself as part of the students’ Junior Achievement program, but it may also present itself only when those students can no longer transition from
professional-in-training to professional. It may, for some, only happen when they are thrust into a professional role.

**Student Perceptions**

The overwhelming consensus among the students who participated in the focus group was that the spaces occupied by EDG 4410 helped them to experience the range of spaces they will encounter as professional teachers. In doing so, they argued, these spaces helped them to feel like professional teachers. What is most interesting about this assertion is that the students acknowledged the constraints imposed upon them by the spaces (e.g., the limited space offered in the Microteaching Rooms), but at the same time pointed to benefits that the constraints of these spaces offered. Specifically, because the Microteaching Rooms were small and limited their movement, they in turn created an intimate environment. This intimate environment seemed to have two effects on these students. First, this intimacy fostered engagement and encouragement during the microteaching lesson. One student, Chloe, discussed her experience in one of the Microteaching Rooms and argued the following:

> We were like oh this one’s kind of cramped. It’s very small in here. But I did like it because since we kind of were all forced to sit together in the Microteach rooms we were more able to engage more closely than if we would have been in this massive classroom. Because it was a smaller environment we got to know each other better. We got to encourage each other better. We got to at times talk about random stuff but still lead it back to the main concept and that small little community feeling that I guess [Dr. Carol] was striving for I think our group really did achieve that in our microteach. (n.p.)
Chloe’s experience was not felt in isolation. Another one of the focus group participants, Celine, described the microteaching experience as a support system and attributed that to the closeness fostered among students all semester. This closeness, which was clearly felt because of the physical confines of the Microteaching Rooms, was also felt during normal class sessions when Dr. Carol would ask students to turn to their “shoulder partners” (the students who shared a desk with one another) and briefly discuss parts of lectures or activities. Pausing to ask shoulder partners to converse was one of Dr. Carol’s most heavily-used methods, and its effects not only facilitated teaching and learning in individual class sessions, it also developed a sense of camaraderie among students. This camaraderie was intensified during the microteaching lesson both because of the nature of the assignment (the stress of teaching one’s peers, the “love notes” that were written to each student to encourage them after their performance) and because of how the space physically sponsored a closeness among student. In other words, the space quite literally brought them together.

Second, the space suggested to the students that, while it was intended to mimic a classroom on a smaller scale, its size and intimacy allowed them to work together in a type of space that they will likely use when collaborating with colleagues. This assertion was particularly interesting because the students were all very quick to point out the realism presented to them in each of the spaces they occupied over the course of the semester. TA 221, the Curriculum Materials Center, the Microteaching Suite, and the TeachLivE™ room—in the minds of the students—all represented actual spaces they will occupy and use as professional teachers. However, though the Microteaching Suite contains rooms designed to represent classrooms, Celine felt that her experiences working in the rooms will help her to later
collaborate with other teaching professionals. The design of the Microteaching Rooms, we might say, both helped students imagine themselves teaching in front of a class in an authentic space after completing their degrees as well as imagine themselves performing specific types of tasks with colleagues. In other words, the space itself helped students to think futuristically about both the locations and practices involved in teaching.

If we return to Gee’s (2000) and Geschwind and Melin’s (2016) discussions on identity, we can begin to see quite clearly how these authentic assignments situated in simulated spaces helped these students to build their discourse-identity by giving them the opportunity to speak both with and to small groups of peers as colleagues and as simulated students. This authentic practice also helped them to better build their affinity-identity, as they validated and supported each other by practicing the performances of their discipline. TA 221, the lecture hall, served as a space in which professional practices were modeled for them by Dr. Carol, but the Microteaching Suite and the TeachLiVe™ room gave these students the opportunity to take on the role of professional educator, which seemed to not only boost their confidence as a professional-in-training, but helped them to clearly envision themselves taking on that professional role. Because the students are authorized by the university to occupy and perform in these spaces, we may also say that having access to and performing in them supports their institution-identity as well, further validating them as future practitioners and certainly supporting their ability to envision their future, professional selves.

Final Thoughts

Over the course of the semester, the students of EDG 4410 occupied multiple spaces, each one of which was created to mimic the spaces those students would find themselves in upon
graduation. While certain spaces did not mimic real-world teaching spaces exactly, they did help students to visualize themselves in their future roles quite clearly. For example, the Microteaching Rooms, while not to-scale, helped students to imagine what standing in front of a class would feel like, as well as how to make use of tools such as whiteboards, markers, and tabletops. The TeachLivE™ room allowed students to engage with student-avatars in a virtual classroom, and though the technology constrained their movement, the students of EDG 4410 left that experience feeling like experienced, accomplished teachers. Even the space that was occupied for the least amount of time—the Curriculum Materials Center—had a lasting impact on the students, as it allowed them to visualize how they could make use of library and maker spaces at the schools in which they hope to teach.

What we can learn from this examination is that when asked to engage with disciplinary practices in disciplinary spaces, students possess the ability to visualize themselves in the role of professional practitioner. For the students of EDG 4410, this visualization was made all the more clear given Dr. Carol’s focus on modeling all throughout the semester. In other words, because they were able to learn from and with a professional model, and because they were able to practice these disciplinary performances in simulated settings, they developed both a strong sense of self as a professional practitioner as well as a sense of belonging within a community of practice. If we return to Pigg’s (2014) discussion on persistence, then we can see how this constant reinforcing of what disciplinary performances look like in the spaces in which these performances are professionally conducted, enables students to clearly see themselves as and identify as a future professional.
Additionally, not only were students able to envision their future professional selves performing the practices of their discipline in simulated spaces, they were also able to re-imagine those simulated spaces and envision other types of spaces that they believe they will encounter and use in their careers. This is significant because, as stated previously, instructors oftentimes have little to no agency when scheduling a room for a semester. While the College of Education and Human Performance is fortunate enough to have access to multiple types of simulated spaces, not all colleges have such dedicated spaces. However, when we examine the students of EDG 4410 and their ability to re-imagine and re-purpose spaces, we are left with a prime example of how the intended design and function of a space does not limit student thinking and student identity-formation. That is not to say that having access to these highly-specific, simulated spaces does not play a role in identity-formation. The exact opposite is true. After all, being part of a community of young students that is sanctioned to work in such simulated environments in their own titular building, and having access to spaces that directly reflect the professional work they aim to do helped these students to first feel validated as professionals-in-training, and then to clearly envision themselves as professionals. In other words, the institution, UCF, authorized these students to perform the work of professionals in their discipline by allowing them to practice and learn in simulated spaces, giving shape to these students’ institution-identity; through that practice and through learning by way of professional modeling (Dr. Carol being the professional model here), these students developed their discourse-identity; and by building a tight-knit community (which the physical proximity of the space helped facilitate), these students greatly shaped their affinity-identity (Gee, 2000; Geschwind and Melin, 2016).
What we can gather by examining the design of these spaces, the movement that took place in them, and the thoughts of the students who used them, much like the students of CHS 3511, is that the only thing more effective than authorizing students to perform their disciplinary practices in simulated spaces is having a network of simulated spaces available to those students. At its outset, this dissertation sought to examine the ways in which students move and think in classroom spaces within the confine of a single semester because that is a standard unit of time across many universities. However, what I have come to realize is that many programs, education and forensic science at UCF included, incorporate simulated spaces at multiple times throughout a student’s career. By exposing students over and over again to these materials, and furthermore, by granting them explicit access as members of a specific community of practice, these programs are naturalizing these students’ abilities to think and move in these spaces. Even more than that, they are helping students to think beyond the design of simulated spaces and helping them to further project themselves into the kind of work they will be asked to do as professionals. In other words, these students, over the course of earning their degree, have been so exposed to simulated and authentic environments (the Junior Achievement program included) that they have reached a point where they clearly see themselves as members of a community that is on the verge of earning a degree and immediately beginning their professional practices. They are, in every sense of the word, professionals-in-training, and clearly see themselves as such.

To clarify the importance of these networked spaces, we can return to Tuan’s (1977) dichotomy of space and place. If spaces are broadly defined as any physical location or structure, and places are those locations or structures that carry with them a sense of homeness or
homeland, then I propose that the physical structures allotted to and run by specific programs that continually expose students to simulated, professional environments move beyond—in the minds of students—a physical space and in turn create a network of places. That is to say, programs like chemistry and education at UCF have successfully cultivated a sense of homeland by both offering up and authorizing a network of places to its students. By continually exposing their students to these simulated classrooms and locations, these programs, as noted above, have greatly sharpened these students’ institution, discourse, and affinity-identities. The implication for universities, programs, and instructors is that perhaps instead of planning individual courses within the confines of a single semester within the confines of a specific classroom, they should begin to think about the simulated classrooms students will encounter throughout their coursework across the several semesters it will take them to finish their major. By doing this, these stakeholders can effectively create for their students a sense of place or homeland, and in so doing, as discussed previously, will greatly support a development of disciplinary identity for these students as they learn alongside their peers in simulated environments and more vividly envision themselves as future professionals.

Finally, while the Curriculum Materials Center, the Microteaching Suite, the TeachLivETM room, and TA 221 all mimic real-world, professional spaces, I now want to turn my attention specifically to TA 221. This classroom space has been somewhat of an enigma because, while similar in design and purpose to BA 126 (the lecture hall used by CHS 3511) and CNH 204 (the lecture hall used by ENC 4416), it functioned very differently for EDG 4410. While we might classify these spaces as lecture halls, and while they all facilitated lecture of some kind, the fact remains that for the students of EDG 4410, TA 221 also served as a
simulated, professional place because students were keenly aware that the classrooms they will teach in as professionals will look and function very similarly to it. For me, this raises an intriguing question: what came first, the professional K-12 classroom or the college classroom? This, of course, assumes that one is modeled after the other. Therefore, a related, clarifying question might be: are college classrooms modeled after professional classrooms or are professional classrooms modeled after college classrooms? While these questions may be benign for some, for others, they raise a very serious concern with causality, and with that causality, in light of this dissertation’s findings, comes a concern with the effectiveness of space design.

Historically, we might say that both the college lecture hall and the K-12 lecture hall evolved together from ancient Greek, Medieval, and Industrial Revolution lecture spaces as discussed by Park and Choi (2014) and Walls, Schopieray, and DeVoss (2009). These designs, through their evolution, prize individual learning, a focus on a central authority, and space maximization in the forms of rows and columns. Certainly, we have so far seen that the use of these lecture-style spaces can help instructors and students effectively meet their goals. In CHS 3511, for example, we saw how the arrangement of the lecture hall (BA 126) allowed students to learn from an expert and practice disciplinary writing using a key disciplinary tool (the notebook), and then use that tool to transfer knowledge into action in the lab. In EDG 4410, we saw how Dr. Carol modeled specific teaching techniques through the ways in which she navigated the classroom (e.g., standing at the back of the room while lecturing to promote engagement or acting out roles with students by moving in front of their desks and then speaking with or gesturing to them). This is to say that while the design of the traditional lecture hall may have nefarious historical purposes (an attempt to discourage collaboration or an attempt to force as many people into a
workplace as possible), they are not entirely insidious by design. However, it is important to question the breakdown between form and function of these designs, and by extension, question their very role and purpose in modern universities.

To do this, we might begin to look at classrooms as genres. For Devitt (1993), genres are commonly thought of as classification systems, wherein texts are grouped by similar features. For example, in this conception of genre, a horror movie is a horror movie because it has a common set of features such as gore, violence, the supernatural, etc. However, if the definition of genres stops here, argued Devitt, the roles genres play in rhetorical situations are minimized or disregarded completely. Instead, Devitt invited readers to begin first with a discussion of how genres operate within rhetorical situations, and then identify the ways in which their features support the goal at hand. In other words, genres are evolving and dynamic texts that both respond to and create rhetorical situations, or, according to Devitt, “genre is a dynamic response to and construction of recurring situation, one that changes historically and in different social groups, that adapts and grows as the social context changes” (p. 580). When I discuss genre with my students, I like to refer to the above example of a horror movie and then invite responses regarding the differences between films such as Friday the 13th and Get Out. If the discussion stops at genre as similar features, then both films are simply horror films because they feature violence, gore, scary situations, etc. However, if we begin with the context or rhetorical situation of both films, then we can begin to see how Friday the 13th responded to horror films such as Halloween which cultivated fear and horror without the overt use of gore. Friday the 13th used and then upstaged these filmic techniques by incorporating ultraviolence and gratuitous gore. On the other hand, Get Out transcends what many might refer to as the horror genre because it is a
response to racially-charged social situations such as the recent reports on the killing of unarmed black men and women across the United States. Yes, it contains gore, violence, and scary situations, but it also makes critical social statements. Stopping at the horror genre for both of these films removes their individual place in the history of horror by stripping them of the specific rhetorical situations they responded to.

Classrooms, like films, have responded to rhetorical situations across history. As both Park and Choi (2014) and Walls, Schopieray, and DeVoss (2009) have noted, classrooms have evolved over time and across a myriad of social and cultural situations. However, though they have their own histories, it seems that for many students, instructors, and administrators, the design of lecture-style classrooms is a given. In other words, the genre of a classroom is that of a specific set of features, namely the arrangement of student desks in rows and columns, a focal point at the front of the room which is occupied by the instructor, behind which is typically situated some form of whiteboard and often a computer and projector screen. Rhetorically, we must ask ourselves, what situation does this design respond to, and in what ways is it appropriate for the cultivating of a student disciplinary identity in any given field? By asking this question, universities can begin to plan for and arrange classrooms that support a network of places for students, ones that rhetorically and critically engage students in disciplinary work and that mimic professional workplaces. However, this is not an easy task. The following chapter will highlight certain challenges faced when teaching in a classroom that is not designed for specific, disciplinary purposes, and the Conclusion of this dissertation will offer up both short and long-term suggestions for how universities, departments, instructors, and students can think about and work within their assigned spaces in an effort to turn them into disciplinary places.
WRITING IN DIGITAL ENVIRONMENTS: WHERE DO WRITERS WRITE?

The Course

ENC 4416: writing in digital environments is a course that combines rhetorical thinking and writing with digital audiences and practices. By positioning the internet as a writing space different than that of print, Professor Mark—an Associate Instructor and long-time collaborator with the WAC program—asks students to think differently about how they read texts, orchestrate writing, and critique genres that are common to digital environments. The course engages students in verbal discussions on digital writing theories, collaborative group work, and web text audits in an effort to facilitate professional, digital writing practices. Writing is heavily emphasized, and is manifested both in word processing and hard coding using HTML and CSS. In this way, ENC 4416 builds off of other digital writing courses in the Department of Writing and Rhetoric’s B.A. that teach students foundational coding theories and practices. While the course uses the rhetorical web audit as a main assignment grounded in professional practices, one of Professor Mark’s overall goals of the course is to help students become more mindful and critical of their digital writing practices used outside of the course. In this way, ENC 4416 serves as a course that supports and supplements students’ digital practices (broadly defined) in their own lives.

The Space

The classroom occupied by ENC 4416 is located in a building that houses a myriad of departments including the Department of Writing & Rhetoric, English, History, and Modern
Languages & Literatures. The building contains several classrooms, offices, the writing center, the writing across the curriculum program, the graduate student center, as well as spaces for the Woman’s Studies program, Judaic Studies program, African Studies program, and the Latin American, Caribbean & Latino Studies program. The building itself has taken on many roles over its lifetime, with the classroom used by ENC 4416 once serving as a music room. Its wide design (Figure 37) allowed for the use of a grand piano, and one of the whiteboards on the back wall still bears permanent staff lines used to write sheet music (Figure 38).

Figure 37: Berry, L. (2018). Writing in digital environments room design. [Illustration].
This room also follows Park and Choi’s (2014) model for a standard lecture hall, with the desks arranged in columns and rows, facing a projector screen and computer station behind which a professor can stand (Figure 39).
Observations

Because the formal title of ENC 4416 is “writing in digital environments,” I expected—upon my first observation—to walk into CNH 204 and see it housed with a host of digital technologies, perhaps including large screen monitors, high-powered PCs or Macs, and high-definition projector screens. However, the classroom used by ENC 4416 offered its students and Professor Mark little in the way of digital technologies. Even the projector housed in this classroom displayed images with mediocre quality, dim colors, and low contrast. But while the digital technologies offered in the room itself were minimal, the majority of the students in ENC 4416 were able to bring laptops or smartphones to class regularly. Because the main assignment given to students in this class was a professional web audit, the HTML and CSS coding could
easily be handled on laptops. My expectation, then, was that I might see students deeply engaged in their hard coding work as they audited websites together in groups. This was not the case, and based on my observations, I attribute this to one technology in particular: the desks housed in CNH 204.

In Figure 40 below, we can get a closer look at the desks used by ENC 4416.

![Figure 40: Berry, L. (2016). CNH 204 desks. [Picture].](image)

This type of student desk is often standard fare in university classrooms. Each desk is built to seat one student, and is made up of two components: a chair and a desktop, on which students can write or place various types of tools. This model in particular, however, features a smaller desktop, allowing students less surface area on which to place the tools they use in the classroom. For Professor Mark’s writing in digital environments class, these tools took on
several forms. The most heavily used was paper, either in the form of a spiral notebook or loose-leaf paper. Second was a writing utensil, either a pencil or pen (some students made use of colored pens). Third was the various printed pages Professor Mark would provide students throughout the duration of the course (often selections from course readings) on which students could take notes. Fourth were smartphones, though these were used both for completing coursework and for personal use. Finally, were laptops, though only a portion of students brought these regularly. In addition to these disciplinary tools, students also brought to class with them various personal effects such as water bottles, tumblers, to-go coffee cups, and food items.

Picture for a moment, if you will, trying to balance a full-size laptop on the desktop in Figure 40. Now imagine trying to take hard copy notes on a spiral notebook. Do you balance it on your keyboard and hope that you don’t press too firmly, causing the keys to engage? Or do you lock the screen to your laptop, knowing that you may need to unlock it again shortly? Or, do you balance the notebook on your lap? If you take the third option, then consider also that you may also occasionally glance at your smartphone. Do you keep it in your pocket and carefully remove it each time you want to glance at it? Would that cause you to fumble the notebook on your lap? Perhaps you choose to keep it on the arm of the desktop, that little amount of unused space it offers? If that is the case, then you need to be mindful of your elbow, which could knock your phone off of your desk, potentially causing a scene or even damaging your device. Then consider that you brought a to-go coffee with you to class today. You could leave your coffee on the floor, but unlike a water bottle or a tumbler which have lids that can close and lock, you have no such option. The desks are not placed very far away from each other so there is the chance that another student could walk by and knock over your coffee. Or, perhaps, someone tries to
open their backpack, causing it to be pushed into your space, thereby knocking over your coffee. After all, there are no cubbies into which to place backpacks. The open, metal-framing of the desks may be the best option, but that same design can still cause bags, jackets, or umbrellas to spill out into the rows, potentially knocking over your coffee, causing a great mess and perhaps some embarrassment. So where do you place your coffee? Do you keep it in one hand? If so, how would you go about writing in your notebook or typing on your laptop?

The above scenario may seem like an extreme dramatization, but through my observations of ENC 4416, this scene played out over and over again. This scene is in stark contrast to the students of CHS 3511, who—in their lecture hall—had desks that stretched halfway across the room, and could hold about twice as many students as were enrolled in the course. The surface area of these desks, as discussed previously, allowed the students of CHS 3511 to easily and successfully manage their workspaces and use their disciplinary tools (notebooks, pencils, calculators) in a way that allowed them to transition their learning from lecture to lab. While Professor Mark’s writing in digital environments course did not necessitate the carrying over of knowledge from lecture to lab, it did necessitate that students engage in daily discussions, group activities, and note-taking during lecture. In order to participate in any or all of these activities, the students of ENC 4416 had to make use of their desk space, which was extremely limited. I often noticed students juggling various tools in their laps or on the floor. Some students’ laptops were large enough that they could not even balance on the desktops very easily, and in some cases, at all. The result of this constant balancing act—as revealed during my student focus group—was that students felt frazzled and frustrated about the work they were being asked to do in the space they were provided. In other words, instead of being engaged in
the learning and in the authentic work they were being asked to perform, they were thinking about how to manage their equipment, both class-related and personal. To put it shortly: they were distracted.

This sense of frustration was highlighted during class time that Professor Mark dedicated to group work. Group work was a staple in ENC 4416 as it could be used to mitigate discussions and low stakes activities. However, toward the end of the semester, there was a significant uptick in group work as the main course project, the web audit, drew nearer and nearer. As the end of the semester approached, Professor Mark would instruct students to get into their web audit groups and work on their projects. While work toward these projects was certainly accomplished during these times, I noticed two significant challenges posed to students.

First, the act of rearranging desks was a significant chore. Though the desks are built from light plastic and metal and are lightweight, their wide design created extra contact with the carpet, making them difficult to turn so that students could face one another. This was complicated by the scenario described above where students were often forced to arrange personal effects in the isles between rows. To simply turn the desks meant that students had to be mindful of book bags, umbrellas, coffee cups, and water bottles. The obvious solution, one would think, would be to pick the desks up and turn them (after all, they are lightweight), however, as discussed in the above scenario, students often made use of the space underneath their desk so that any attempt to lift the desks up would cause jackets and book bags to spill out into the isle ways. The scenario I often witnessed was that of a student holding his/her desk up in the air while trying to move their personal items aside with their feet so they could set their desk back down. This process often took several minutes to complete, which in the grand scheme of
things may not amount to much, but the sustained hassle of grappling with this process every class period created an atmosphere of frustration, which could be seen on the faces of each student, and which certainly came out during the student focus groups.

Second, once groups were successfully assembled, they faced the challenge of creating an environment of collaboration within a space that seemed to inhibit collaboration. What I mean by this is that the assemblage of desks, which would typically take the form of a circle or a square, often would leave a large gap in the center of the desks, making the sharing of tools with group members sitting across from each other very difficult. The sharing of tools, I imagined, would be very beneficial to a group working collaboratively on a web audit, but it was a phenomenon I rarely saw and I believe that is strongly owed to the challenge posed by the physical arrangement of the desks. When sharing did happen, it happened between students who were sitting next to each other and could perhaps balance a tool such as a laptop or notebook on the combined surface area of adjacent desktops. The sharing of tools with group members sitting across from one another was extremely rare, and when it did happen, typically disabled the member sharing the tool from using it. For example, if a group member had a laptop on their desk and wanted to turn the laptop to face the other group members so that the student could talk through ideas about page layout or design, that student had to turn it so that it was completely facing away from them. The placement of a laptop in this fashion prevented that student from physically pointing to specific design features or scrolling through the webpage. In essence, the student would have to pull a specific part of the webpage up on their screen, turn their laptop to face other group members, discuss that specific element, turn the laptop so that it was facing them once again, scroll on the webpage, and repeat. To sum up, the necessary physical arrangement of the desks
offered in CNH 204 during group time created significant physical challenges for group work (a major goal and pedagogical feature of the course). The ability to share tools, which Berry and Dieterle (2016) noted is of paramount importance when working in group settings, was severely limited (as was the overall workflow of groups by consequence) because of the physical constraints of CNH 204’s design and furniture.

Movement Mapping

As discussed previously for CHS 3511 and EDG 4410, I focused my mapping on those that were doing the majority of the movement. For Professor Mark’s writing in digital environments class, he was the one doing most of the movement. While students would move to get into their web audit groups, this movement was typically limited to the rotating of their desks. In other words, they continued to occupy the same space in the classroom, but just turned to face a different direction. Professor Mark, on the other hand, would walk to and occupy different locations in the classroom space. As seen in Figure 41 below, these locations tended to
focus predominantly on three main areas: the computer station, the whiteboards, and the student desks.

Figure 41: Berry, L. (2018). Movement mapping CNH 204 - 27 October 2016. [Illustration].

Here we can see that the area occupied most often was behind the computer station.

Professor Mark’s classes emphasized three things in particular: lecture, discussions, and student-group work. All three of these methods could easily be managed from behind the computer desk. In fact, the first two—lectures and discussions—often required the use of the computer station as Professor Mark would use the projector to display Webcourses, the course management system used at the University of Central Florida. From here, he was able to bring up assignment prompts, content pages, and bulleted discussion lists to prompt student engagement. When not
using Webcourses, Professor Mark would use the combination of the computer and projector to pull up sample websites so that he could model how to navigate a web audit.

Because Professor Mark’s class relied heavily on discussion, when he modeled web auditing for his students, it would often take on the form of scrolling to a certain element on the web site and then prompting the students by asking “So what do we think about X?” where “X” could be any specific element found on the site. Students would then respond as part of a large group discussion. Often, their responses would evoke the texts they had read previously in class. Professor Mark would then respond to those students, often by posing another question that would move the discussion along. By using this Socratic Method, Professor Mark was able to model both the logic and thought processes behind navigating a web site when examining it from an auditor’s perspective, and the type of critical thinking that is necessary when performing a web audit. These discussions would often carry him either to the white board located to the right of the computer station where he would use dry erase markers to write down key words or bulleted lists brought up by students, or to the side of the projector screen where he could gesture with his hands toward specific elements found on the website used in discussion.

As discussed previously, crossing the space to gesture toward the projector screen was a technique often used by Dr. Mary in the lecture portion of CHS 3511 in an effort to keep students engaged and to emphasize key points. Here, we can see Professor Mark making similar movements with similar goals in mind. However, while these types of movements were occasionally performed by Professor Mark (as seen in Figure 41 above), the second most common movement he performed—next to occupying the computer station—was moving into
the students’ space to support their group work. Figure 42 below highlights these two main movements.

Figure 42: Berry, L. (2018). Movement mapping CNH 204 - 3 November 2016. [Illustration].

The class day shown in Figure 42 is particularly interesting because it captured Professor Mark only in two positions: behind the computer station and in the students’ space. Because Professor Mark values what he identified as “intellectual independence,” a large portion of his classes were dedicated to group work where the students could work in their web audit groups on that particular major assignment. When I asked Professor Mark to discuss what it means to *employ* knowledge in his discipline, he responded by saying:

… employing knowledge assumes a certain level of intellectual independence. When we employ knowledge, we are working from a more sophisticated level of intellectual
independence that demonstrates that the person employing knowledge is capable of finding and justifying their ideas and research. (Professor Mark, personal communication, January 16, 2017)

For writing in digital environments, then, we can see that part of building a professional-in-training identity involves utilizing key ideas and readings from class in an effort to think and act critically in the form of a professional web audit. Because these web audits were completed in teams, this meant that time spent working in these teams was a major mechanism used by Professor Mark to help students practice this intellectual independence. However, that is not to say that once in these groups or teams Professor Mark left them entirely to their own devices. Just as we saw in CHS 3511, Dr. Mary and Dr. Rosetta would often be present for the lab portions of class, though they would not take an active role in guiding student work. Their mere presence signaled to students that they were there to offer intellectual guidance and disciplinary support. Students would take advantage of their presence by posing specific questions to them or by looking to them for guidance periodically. Here, in Professor Mark’s writing in digital environments class, we can see a similar phenomenon. Though students were asked to get into their web audit groups and work on their projects, Professor Mark still made himself available to answer specific questions posed by individual groups or to offer guidance when needed. In Figure 42 above, we can see that only one group needed Professor Mark’s guidance that day, so when not behind the computer station, he spent time working with them.

In Figure 43 below, we can see Professor Mark employing this same strategy, though on a larger scale. On this particular class day, as the semester began to wind to a close, more groups seemed to have questions or were in need of guidance.
While the previous class session (Figure 42) showed Professor Mark occupying only one location outside of the computer station, this class session saw him occupy three additional locations. As seen in Figure 43, he sat with one group in particular (against the right wall near the computer station) for quite some time. As a reminder, each interval is thirty seconds. Therefore, Professor Mark worked with this particular group for just over twenty minutes. While this map cannot display the nature of that conversation, based on Professor Mark’s responses to my questionnaire, it seems that his role in working so intimately with these groups is to provide feedback as an outside audience member. Professor Mark said this regarding the group web audit assignment:
The rhetorical web audit is a large writing assignment we work on throughout the semester. We develop a methodology for conducting research and writing that assignment that is designed to teach students how to apply and employ the necessary rhetorical decisions needed to complete that assignment. I expect students to use what they've learned about HTML and CSS to think more complexly about design decisions. I expect them to use readings and theories to negotiate those design decisions. I expect them to collaborate with each other and to weigh out the pros and cons of each design as means of using knowledge. I do not want students to follow some existing outline that tells them when and how to make a decision unless that paradigm is something they created themselves to employ knowledge. (Professor Mark, personal communication, January 16, 2017)

What we can glean from this response in conjunction with the movement map is that Professor Mark’s strategy for moving about the classroom space was to provide students with rhetorical and critical thinking guidance. In other words, because Professor Mark values a non-outlined approach, he elects to give students enough space (physically and rhetorically) to work amongst their groups and practice thinking critically about their task at hand. If they face challenges and are in need of instructor feedback, then it seems that he then accepts the students’ invitation into their space and acts as a knowledgeable third party. Just as with his lectures and discussions, we might say, his goal was to provide students with enough agency that they can face challenges and experience making rhetorical and critical decisions together as future practitioners of a discipline.
Student Perceptions

The most apparent and potent discussion that arose during my student focus group for ENC 4416 was the state of the classroom, and in particular, how in the students’ minds it wasn’t up to snuff. What makes this discussion so interesting is that the two participants, Tamir and Pamela, took ENC 4416 to help them reach two very different career goals. Tamir already runs a successful IT business but wants an IT degree in hand to help him progress in his field. Pamela is a content writer for a web business, but is seeking a writing and rhetoric degree as she plans to go into the legal profession where she foresees a knowledge of rhetoric and writing playing a key role for her. When I asked both of them to describe the spaces in which a professional in their field works, Tamir identified two types of spaces that he would potentially encounter. First, he said, would be the spaces where he meets with clients and conducts physical IT work (e.g., on site in the case of a catastrophic failure that couldn’t be handled remotely). Second would be his own private workspace. He currently works in his garage which he converted into an IT workstation that houses tools of the trade such as multiple 4K monitors, computers, and tool boxes. Pamela, similarly, envisioned her legal work taking place in multiple spaces. She identified the need to have a physical office location in which to meet with clients, but also envisioned needing to travel to other locations such as courtrooms or other various sites to meet with clients. Additionally, she envisioned needing to work quite a bit from home, which could be managed via a laptop. What is remarkable to me about these varied responses is that even though Pamela and Tamir have very different career goals in mind, they both had similar grievances with the classroom they occupied for ENC 4416.
First, both Pamela and Tamir identified the importance of collaborative work in digital writing. For them, CNH 204 fell short in supporting this type of work because of the limited surface area offered by its desks. As mentioned previously, the desktops themselves made it challenging for students to juggle multiple tools at once, or even hold a single tool such as a laptop. Tamir and Pamela would have preferred larger tables at which multiple students could sit and spread out their workstations. Pamela even contrasted CNH 204 to other classrooms on campus, in particular those found in the Classroom Building, which houses classrooms that can be used by interdisciplinary studies, but additionally houses the Faculty Center for Teaching and Learning, the Office of Instructional Resources, and the Quality Enhancement Plan. These classrooms contain modular tables that can be connected so that they form an area where a group of six to eight students can sit, providing them each with large amounts of desktop space. For Pamela and Tamir, this type of a structure would have been more ideal for group work because it would both provide the space necessary to set up individual workstations and share those workstations, and it would eliminate the need to constantly move smaller desks back and forth.

Second, both Pamela and Tamir described the “feel” of the classroom as that of a high school classroom. It is important to note that when stating this, they did so with a great distaste in their mouths. For them, a high school classroom represented an “old school” way of teaching and learning. Specifically, for them, this room failed to bring digital elements into a writing in digital environments classroom. They acknowledged that the projector screen was a digital tool, but they wanted more. They wanted tools such as large monitors, laptops, tablets, and smartboards that would better support the digital writing they were being asked to do. Additionally, when envisioning modern, digital workspaces, both Tamir and Pamela pictured open spaces with
plenty of glass, natural light, steel and natural wood. Google, for example, was discussed as being a pinnacle digital space in which to work. Even though Pamela acknowledged that some of the buildings she may find herself in when taking on the role of legal professional might be older buildings, she characterized them as having large, glass windows, and a rustic charm. For both Pamela and Tamir, CNH 204 offered no charm at all.

In addition to CNH 204’s lack of charm and lack of digital tools causing a disconnect between the work being asked of Tamir and Pamela and the work they were able to do given the provided technology, the room itself also imposed on them a sense of disappointment and irritation, especially for Tamir, regarding the cost of tuition at UCF. Both Tamir and Pamela are very career-minded and acknowledged that earning their degrees will play a major role in their ability to achieve their career aspirations. Based on the amount of money they both have to pay to attend UCF, they argued that being asked to occupy a space like CNH 204 isn’t worth the cost. It is here that the “high school” feel of the room caused quite a bit of irritation. The layout (the desks being arranged in rows and columns), the availability of technologies in the room (or the lack thereof), and the lack of desk space all play a role in sponsoring these feelings. To put it simply, they felt that the room should have “…[looked] a little better” (Tamir, personal communication, December 5, 2016). What is so intriguing about this assertion is that Tamir and Pamela have very clear images of what their professional workspaces will look like. Unlike education and forensic science, writing in digital environments seems to fulfill the needs of several career paths, not just ones in writing studies. Pamela and Tamir seem aware of this and therefore do not seem to expect to be presented with tools and spaces that will exactly replicate or even simulate their future career spaces. However, they do have very specific expectations.
about what tools are used by digital writers (and indeed, they both currently hold paid positions as digital writers) and therefore what tools should be included in a class that seeks to teach digital writing. In addition to this, they both have clear expectations of what should constitute a college classrooms space in general, and a writing in digital environments space in particular. That space should include large desks that facilitate group work and allow students to easily set up their own workstations, should contain elements such as glass, metal, and natural wood to make the space feel modern and professional, and should include technologies that allow them to easily perform the work done by digital writers. CNH 204, in their opinion, offered none of these features, which translated into a strong sense of frustration and the opinion that they overpaid for their degrees.

Final Thoughts

One question my examination into Professor Mark’s writing in digital environments class evoked is “What is a writing space?” Perhaps the question can also be phrased as “Where do writers write?” If we take a disciplinary approach to these questions, we may respond by saying that forensic scientists write in labs via lab notebooks, or teacher educators write in classrooms via whiteboards or posters. But when we approach the discipline of writing studies, under which ENC 4416 falls, the answer becomes slightly amorphous. We can certainly look to professions in information technology or law and, as Tamir and Pamela envisioned, identify various types of workplaces in which writing will take place. But what about the practitioners of writing studies in general? Where do they write? Does a “writing studies space” exist and what does it look like? A professor in the philosophy department I once worked with stated (half-jokingly) that philosophers write in their plush studies after donning a smoking jacket and pouring a glass of
brandy. I imagine that similar images have been conjured around writers in general. Of course, students are taught at an early age about the dangers of plagiarism and that they have to complete their own work. The message here is that writing is a solitary activity. One must write alone and isolate oneself to do it. However, those who practice and teach writing studies do not view it this way. In fact, Professor Mark, when responding to my questionnaire, stated very explicitly that the rhetorical web audit was a team-based assignment. In fact, for Professor Mark, what it means to employ knowledge as a digital writer is to:

…read more about digital writing and to think about what we've discussed in the course while writing in digital environments they use on a daily basis. I also expect them to try out new media tools and to think about how those tools work in relation to what we've learned in the course. This class is designed to get students to think about how they use digital writing while away from the course so we can discuss that use in the class with more critical introspection and awareness. (Professor Mark, personal communication, January 16, 2017)

In other words, to employ knowledge is to transcend the classroom and engage in multiple writing spaces on the various media one uses on a daily bases. In this instance, we might think of Facebook as a writing space. We might also think of image-based media or apps such as Instagram as a writing space. To be a professional-in-training in writing in digital environments, therefore, is to be a critical and conscious user of media. But if we return to the university and to the classroom, what bearing does that have on the classroom space assigned to such courses? The answer, I believe, lies in two of Tamir and Pamela’s responses to my focus group questions. First, digital writing classrooms need to make accessible the tools and
technologies that are valued and used by professionals in the field. Just as forensic scientists use microscopes, beakers, and mass spectrometers, students of forensic science at UCF use microscopes, beakers, and mass spectrometers. Just as teacher educators use whiteboards, posters, and paper, students of education methods at UCF use whiteboards, posters, and paper. It makes sense, then, that students of writing in digital environments would benefit from learning and practicing their discipline in a space that facilitates digital writing tool usage. Tamir and Pamela’s suggestion of incorporating smartboards, large screen monitors, computers, laptops, and tablets doesn’t seem out of reach. Building a course around these tools could help students to more deeply engage in their disciplinary work and actively practice transcending the classroom just as Professor Mark desires. In other words, by learning and operating in a space that facilitates digital media tool usage, students can be better prepared to move beyond the classroom and use those technologies more consciously and more critically.

Second, in order to facilitate the use of such tools, digital writing classroom spaces need to offer students enough physical space to easily form teams and enough desktop space to easily arrange and access their tools of the trade. As discussed previously, the desks provided in CNH 204 offered limited amounts of desktop space, which made switching between tools such as laptops, notebooks, and phones challenging. What’s more is that this limited space also inhibited the students’ ability to set up their own creature comforts such as water bottles, tumblers, and food. Having these comforts and using them in classroom spaces is important as they help to establish persistence among students (Pigg, 2014). While they can cause momentary distractions, they can keep students engaged longer. When class times can sometimes reach the three hour mark, this becomes an essential part of managing class. To put it shortly, students need to feel
like they have ownership of the space. Ownership can include having access to comforts just as it
can include having access to the tools that are required to do the work of their discipline. The
less time students have to spend arranging their space or forming groups, or the less energy
wasted on juggling these tools and comforts keeps students engaged in their work and enables
them to build their disciplinary identity over time. To sum it up, a digital writing class doesn’t
need to necessarily simulate a digital writing space like Facebook or a brick and mortar space
like Google to support disciplinary identity growth. It does, however, need to promote
persistence among students by providing them with the space and tools they need to stay
engaged and be mindful of their disciplinary practices.
CONCLUSION

In this dissertation, I sought to answer two questions:

1) Does the design of classroom space/place influence student disciplinary identities?

2) How are students thinking about the relationship between the design of their classroom and their discipline?

To do so, I used a combination of qualitative research methods including observations, movement mapping, student focus groups, and instructor responses. These questions and the methods used to explore their possible answers were derived from a history of research on WAC and learning spaces. Based on my research on and experiences in both WAC and learning space studies, I discovered that current research lacked in two areas: (1) examinations or explorations into student behaviors in/uses of disciplinary classrooms in naturalistic settings, and (2) the agency of disciplinary classrooms in shaping student disciplinary identities. In other words, though research in WAC showed that the writing of disciplinary texts that are grounded in rhetorical purposes and written for authentic audiences support disciplinary learning (Walvoord & McCarthy, 1990; Haas, 1994; Wardle, 2009; Melzer, 2014; Coleman, 2015), and though research on learning spaces made a case for the need to grant students agency over flexible spaces (Lee, Alfano, and Carpenter, 2013; Gierdowski, 2015; Head & Burnett, 2015) and that spaces themselves play an important role in facilitating learning and persistence (Walls, Schopieray, and DeVoss, 2009; Pigg, 2014), little research has been done on the effects of disciplinary spaces/places on student disciplinary identity development and in particular how student agency in those spaces allowed them to move, act, write, and think like future, professional practitioners in their discipline. Though research on higher learning and disciplinary
identity has been done, such as O’Brien and Bates’ (2015) study on the MATES aviation program, which pointed to the effectiveness of positioning students as members of a community of practice, the emphasis has been on the disciplinary community itself, and not necessarily how the spaces/places chosen by or assigned to that community shaped identity development. This, I have argued, is a necessary and worthwhile pursuit because universities across the globe regularly assign classrooms to groups of students with the goal of training them up to be practitioners and professionals in their fields. While this training takes years to complete (two years, four years, ten years and beyond), the standard length of time students spend in one classroom space for one class is a single semester (somewhere around fifteen or sixteen weeks), and there exists little to no research that examines how this process takes shape in those spaces and in that time frame.

Certainly, research has been done on how we might reimagine classroom spaces to facilitate learning. DeVoss et al. (2004) helped us to envision how classrooms could better support learning in literacies that are currently prized by students in an effort to help them engage more critically with them. Beichner et al. (2007) offered up the SCALE-UP model, creating studio classroom spaces for large universities that promote flipped classroom pedagogies and hands-on learning, and arguing that SCALE-UP classrooms have increased conceptual understanding, improved student problem-solving abilities, improved student attitudes, increased class attendance, and drastically decreased failure rates, especially for women and minorities. And Walls, Schopieray, and DeVoss (2009) argued for “hacking” the classroom, wherein instructors identify ways in which their assigned classrooms impede specific types of learning and pedagogies, and then work to dismantle those obstacles using easy-to-
implement activities and room rearrangements. However, we are left with two very important questions: how are students learning and operating in current classroom models, and how can universities and teachers think critically about the classroom models they currently use in an effort to best support student disciplinary identity formation? The goal of this conclusion is to speak to those two main questions.

First, in our examination of CHS 3511, forensic science: trace evidence, we discovered that the two types of spaces occupied over the course of the semester (lecture hall and labs) played very specific, individual roles but were used in a way that promoted the transfer of knowledge into practice. The lecture hall, BA 126, was a stadium-style room that positioned students at long desks that wrapped around a central computer station that was predominantly occupied by one of the two instructors, Dr. Mary or Dr. Rosetta. From this computer station, Drs. Mary or Rosetta could control the projector and the Elmo doc cam, which was used to facilitate lecture, guide student notetaking, and model how to engage with various problems encountered in Forensic science. The students, using the large amount of surface area afforded to them by their desktops, were able to set up individual workstations which included their spiral-bound lab notebooks, pencils, calculators, packets given to them by Drs. Rosetta or Mary, and personal effects such as water bottles, coffee cups, and food. The lab notebooks and pencils served as the predominant, disciplinary tools used during lecture, as they allowed students to take notes and practice problems and then easily carry those notes into a lab setting in an effort to employ disciplinary knowledge (i.e., turn that knowledge into action).

The labs occupied by CHS 3511 were separated based on function. The Microscopy Lab featured computer-assisted microscopes and allowed students to magnify and take pictures of
samples; the Trace Evidence Lab housed specialized tools that analyzed samples and produced data on them; and the Dye Lab served as a multi-purpose lab, allowing students to cut and prepare samples, and run various types of experiments. The division of labor among these labs, and indeed the very design of and tool use in these labs directly mimic professional forensic science labs such as the ones found in the National Center for Forensic Science. The students of CHS 3511 had a keen perception of how the design of their labs and how their own tool use and experimentation within them directly correlated to professional practices, and in doing so, helped them to feel like career-ready professionals.

In our examination of EDG 4410, education methods: classroom management, we saw that students occupied several spaces over the course of the semester that were designed to replicate professional teaching spaces on a small scale. The major assignments required in EDG 4410 made use of these spaces, though the majority of class time was spent in a lecture hall. The lecture hall provided the instructor, Dr. Carol, with the opportunity to model teacherly behavior and classroom management techniques for her students. Each day, as Dr. Carol delivered lecture and led discussions, she would move about the space and engage with students. Dr. Carol modeled various methods of student engagement, namely lightly touching students’ desks, facing students and making eye contact, standing at the back of the room, and even acting out scenarios by enlisting the students as actors. The students of EDG 4410 had an astute awareness of Dr. Carol’s modeling techniques and attempted to put them into practice in both the Microteaching Rooms during the microteaching lesson and in the TeachLivETM room when working with the student avatars. Interestingly, though these spaces severely restricted the students’ movement and consequently their ability to fully act out the techniques Dr. Carol modeled, the students
were mindful of these constraints and even used them as an opportunity to envision how their future selves would navigate full-size classroom spaces and use tools such as whiteboards and posters when working with students. Moreover, these students also imagined the Microteaching Rooms outside of their classroom-simulator context, and envisioned how they could use small spaces in collaborative ways as future educators. In other words, even though the Microteaching Suite was designed to provide students with a simulated teaching space, this group of students also saw the opportunity to imagine how the space could facilitate teacherly goals and actions outside of the act of teaching.

When we examined ENC 4416, writing in digital environments, we saw that students found their classroom space to be less than supportive (to put it nicely) both in regards to writing and digital technologies. The classroom space itself, which has been used by a host of disciplines over the course of its existence—including the music department which outfitted one of the whiteboards with permanently-adhered staff lines—felt generic to the students and reminded them greatly of a high school classroom with high school desks. This, according to the students, undercut the value of their education, making them feel like they paid a great deal of tuition only to receive a cheap and run-down classroom. While the students seemed to share Professor Mark’s understanding of the importance of group work as part of rhetorical, digital practices, they felt that the classroom itself made group work challenging because of the difficulty involved in rearranging their desks. The desks, in particular, made setting up individual workstations challenging because of the limited surface area offered on each desk. Students constantly had to switch between tools such as laptops, notebooks, and smartphones, as well as personal items such as water bottles, tumblers, and food.
One major challenge faced by Professor Mark and indeed the field of writing studies, is defining what a writing space looks like. Both of the student focus group participants had very specific images of what professional spaces await them as they approach their careers. One student, Pamela, interestingly enough, envisioned working in older buildings as either part of a startup or a law firm, and even though Colbourn hall—the location of their classroom—is an older building on campus, because of the limited technology and non-user-friendly furniture, she was unable to view that connection. For both her and Tamir, a self-employed IT specialist, the classroom space in no way connected to the image of themselves as future professionals.

In examining each of these courses, I hoped to discover how spending one semester in one specific classroom might bear on a student’s disciplinary identity. After all, this unit of time, situated within specific locations on campus, is widely-used across universities around the globe. It made sense, then, to organize my research around this unit of time. If we expect students to learn specialized knowledge in one specific course in one specific classroom in one specific semester, then it goes to say that these specific constraints should be analyzed and indeed criticized. However, one of the most palpable insights this dissertation has evoked is that perhaps examining how a student’s experience in one space over the course of one semester is not as important as identifying how a student can be part of entire systems of place over the course of their student career. Again, here I am referring to Tuan’s (1977) use of the terms space and place, where space identifies general geo-locations or structures, and place evokes sentiments of attachment and belonging or homeland and homeness. While each course I observed asked students to work with authentic genres in their respective fields, only EDG 4410 and CHS 3511 were part of systems of place that promote sustainability. In other words, the classrooms and labs
allotted to EDG 4410 and CHS 3511, over the course of several years, acted as framing devices for the authentic work the students were being asked to do and helped them to visualize themselves in the professional roles they hope to occupy. The students of ENC 4416, on the other hand, were placed into a space that neither promoted sustainability or framed the authentic work they were being asked to do.

In addition to this, it is important to note that the places occupied by students of EDG 4410 and CHS 3511 were ones that were available to them in other courses within their major as well. And, to take this notion even deeper, these places are part of entire buildings dedicated to their discipline at large. In other words, the future teacher educators and the future forensic scientists of UCF are nurtured over the course of four years (or longer) as part of a larger, physical system that provides for them not only a set of places that they have access to, but a sense of home and belonging as well (Tuan, 1977). The students of ENC 4416 are not afforded this same experience. While Colbourn Hall houses the Writing and Rhetoric department, it houses several other departments and programs as well. Perhaps this makes it difficult for a building like Colbourn Hall to feel like home. But, perhaps this is fitting. Writing itself comes in a myriad of forms and is performed for a myriad of purposes. However, this diversity seems to seep into the conception of what a writing space can be, and though universities around the globe have adopted varying interpretations of what a writing center or a writing studio can be, there seems to be little consensus regarding classroom design. The benefit of not having a disciplinary standard conception of a writing space is, like Walls, Schopieray, and DeVoss (2009) showed us, that this allows individual universities, departments, and teachers to make spaces flexible enough to support the specific pedagogies valued by those stakeholders. The same can also be said about
writing center or writing studio design. When Carpenter (2014) positioned space design as “a negotiation about how students will compose in certain areas over other options or, in some cases, an agreement as to how the space is intended to perform” (p. 68), he demonstrated how spaces intended to promote multimodal composition can help students feel like the economists of their texts by offering fluid, nonlinear processes in their very design. If this is the case, then it goes to say that such a writing space cannot and indeed should not be standardized. If students are to be economists of their texts, and if varying institutions wish to promote certain types of writing processes or practices, then to standardize a writing space would inhibit that mission.

However, the opposite can also be true. If there is no shared sense of what a writing space is, then students, like those in Professor Mark’s class, can easily identify a space as a non-writing space, and disengage from it. This isn’t to say that writing cannot be performed in spaces not designed to promote writing, but as this dissertation shows, it certainly puts up barriers. If one of the goals of WAC-oriented instruction is to promote disciplinary writing, then to have students disengage from a learning space can strike a fatal blow to their ability to maintain persistence (Pigg, 2014) in that disciplinary writing and in the course overall. Of course, while standardization has been the word I’ve been using in the present discussion, I think it is important to note that standardization does not necessarily create a sense of home and place. In fact, just as writing spaces seem to resist uniformity, that same resistance exists within every discipline. In other words, while the labs offered to the students of CHS 3511 mimic real-world, authentic labs in multiple ways, that is not to say that every lab will look exactly the same or that it is wise to design every lab the same way. Depending on the specific function of a lab, the goals of the stakeholders who designed and maintain the lab, and the goals of the scientists who use the
lab, that design will change drastically. The important question here is: if there is a connection between a sense of home (place) and disciplinary identity—and this dissertation suggests there is—how can institutions, departments, instructors, and students work to create that sense of home in the spaces/places they occupy with the end goal being the development of a stronger sense of disciplinary identity in students? To that end, I offer a few suggestions.

First, instructors can foster and strengthen an alignment between disciplinary, rhetorically-based assignments and spaces/places that facilitate the achieving of those assignments. At the end of the day, the students who seemed to possess the strongest sense of disciplinary identity, the ones that had the clearest picture of their future self as a disciplinary practitioner, were the ones that were most deeply engaged in their learning, and were able to most easily transpose their classroom settings, tools, and assignments to a futuristic, professional setting. When Melzer (2014) argued for “a framework of rhetorical situation, genre, and discourse community that is context-sensitive, focused as much on class and teacher-specific expectations as more generalized genre or discourse community expectations” (pp. 129–130), he issued a call to WAC programs and instructors affiliated with WAC to rhetorically-situate students’ learning and writing. To put it simply, he argued that the students who feel a strong sense of disciplinary and professional purpose in the work they are being asked to do in school will be better prepared for sustained education and performance in the workplace. For Melzer, this framework largely revolved around writing, but when we take into account DeVoss, Cushman, and Grabill’s (2005) examination of the when of infrastructure, we can see a more detailed picture of how the contexts of a particular class, within a particular department, within a particular university, set in a particular time period, shape the learning that takes place in that
class in very real, palpable ways. The physical design of the classroom space, for DeVoss, Cushman, and Grabill, is a key player in that infrastructure, and all too often can inhibit the “decision-making processes and the values and power relationships enacted by those processes” (p. 22), and moreover, can drastically shape culture and identity in both students and instructors. This notion was highlighted for Haas (1994) when Eliza felt more and more like a future professional when she gained experience working in a virology lab and engaging in professional discourse with professional scientists. When juxtaposed to the results of this dissertation, we can see how the physicality of DeVoss, Cushman, and Grabill’s infrastructure, and Melzer’s rhetorical situatedness has a profound impact on student identity. To support the development and growth of this identity, departments and teachers can think critically about the alignment between rhetorically-rich writing assignments and the physical spaces/places that directly support that kind of writing (e.g., having enough desktop space to support the use of laptops, notebooks, etc.) as well as how those physical spaces/places help students picture themselves doing that type of rhetorically-based writing in the kinds of places used by their future profession. The students of CHS 3511 wrote on tall, lipped tables in labs because those are the kinds of tables often used in labs, and consequently were able to envision themselves doing that same work in those same types of places. The students of EDG 4410 wrote on K-12 student-sized desks in simulated K-12 classrooms because those are the kinds of desks used in K-12 classrooms, and consequently were able to envision themselves doing that same work in those same types of places. This group of students were even able to envision doing other types of work in those places because the recognition and rhetorical purposes of that room design were so strong and so easily envisioned. The students of ENC 4416, on the other hand, wrote on desks
clearly designed with economic purposes in mind (cramming as many students into a room as possible without thought of comfort or disciplinary tool use; Walls, Schopieray, DeVoss, 2009; Park and Choi, 2014), but imagined that real-world, professional writing spaces took place on large, wooden desks that are outfitted with cushioned, office chairs in rooms full of glass, wood, and metal. Consequently, these students had a difficult time picturing themselves as professionals in professional writing spaces. That goes to say, the stronger the link between rhetorical purpose and physical location, the clearer that image becomes.

Second, instructors can request, purchase, make use of, and hack (Walls, Schopieray, and DeVoss, 2009) general tools such as desks or tables with large surface areas that support ease of movement in a classroom and natural actions such as eating and drinking, as well as pedagogical actions such as taking notes. As Pigg (2014) noted, an important part of students’ learning processes is the ability to take breaks, engage elsewhere, and then engage once again with their learning. These rituals that students perform, whether they be taking a few sips from a coffee mug or checking their Facebook notifications, can often signal to professors that students are distracted or uninterested in their learning, but in actuality, these rituals help students to engage in their learning long-term. Having desktops, chairs, and isle ways that support these rituals creates persistence, which if fostered over the course of an entire degree in simulated places, can create disciplinary persistence. Of course, Walls, Schopieray, and DeVoss’ use of hacking is relatively a short-term fix. When they describe the complex and massive challenge room scheduling is at their university, many instructors at other universities can immediately commiserate with them. Hacking, therefore, is a way to take what you get and make it work. And while this is a useful strategy in that all instructors will at some point be placed in a room that
does not suit their pedagogical needs, it is not necessarily one that can promote departmental and university-wide change, which should be an important goal for those interested in developing student disciplinary identity. Certainly, as the following strategy will discuss, requesting classrooms that are outfitted with disciplinary tools is also of the utmost importance, but it is important to acknowledge that the results of this dissertation along with the results of research by Walls, Schopieray, and DeVoss, as well as Pigg, point to the ability of students being able to easily arrange their workspaces as the gateway to prolonged and disciplinary learning. If students have agency over their physical surroundings and can manipulate writing tools and personal effects (coffee mugs, water bottles, food, etc.), and can easily move about the space or alter their desk, or even arrange their desk in a different configuration when needed, then they will be better poised to engage in disciplinary learning and practice disciplinary persistence.

Third, universities, departments, and instructors can work toward making spaces into places by looking beyond individual classrooms that are occupied for a single semester and thinking instead about developing and promoting a system of places that students can occupy over the course of their disciplinary, student career. As seen with the students of CHS 3511 and EDG 4410, their prolonged experience in places that are specific to their discipline, and the sanctioning of their use of and placement within those places by the university, helped those students easily to envision their future professional-self performing disciplinary work in professional workplaces. The students of ENC 4416 were not as fortunate in that they, like many other students, only occupied a classroom for a single semester. What aggravated this disconnect even more was that the space signaled to those students that it was not designed for them, it was not designed as a professional place for their discipline, and it was not designed to meet their
technological, disciplinary, and personal needs. If we want students to feel at home, meaning that students recognize a classroom place as an integral part of their discipline and they feel both privileged and sanctioned (by the university) to be there, then students need to feel that they have not been placed into a single classroom for a single semester, but that they have been invited to occupy and use a system of places that have been designed to support their specific, disciplinary learning. This feeling of homeness or homeland can greatly support the ability of those students to envision themselves as future professionals in their discipline.

In addition to this, instructors might also consider the possibility of spreading their classroom learning out across several spaces on campus. As seen with EDG 4410 and CHS 3511, the students taking those courses were allotted multiple classrooms, each of which served very specific disciplinary purposes. We might say that both of these courses were afforded what we might call a second room. For EDG 4410, learning predominantly took place in TA 221, a lecture hall, and then spread out into the Microteaching Suite and the TeachLivE™ Room. For CHS 3511, learning predominantly took place in BA 126, a lecture hall, and then spread out into the Dye Lab, Microscopy Lab, and Trace Evidence Lab. In other words, learning—in the form of lecturing, modeling, and facilitating activities—took place in a primary room and was then employed in a secondary room. If we return to the development of a disciplinary identity as a student’s ability to employ the knowledge and discourse of their discipline, then we can see that having physical spaces available that allow students to employ that disciplinary knowledge and discourse is paramount to their ability to envision themselves as future professionals. ENC 4416 was not allotted a second room, but rather asked its students to employ knowledge in a space that very clearly indicated that it was not designed for them or the work they were being asked to do.
The result of this, as seen before, was that its students felt they were being robbed of their tuition.

Of course, while the labs allotted to CHS 3511 and the Microteaching Suite and TeachLivE™ Room allotted to EDG 4410 have design elements that strongly connect to professional workplaces, a second room perhaps need not necessarily directly mimic professional workplaces to this degree. For example, the students of ENC 4416, like Professor Mark, saw a clear connection between writing in digital environments and working in teams. While group work was a major part of Professor Mark’s class, the physical restrictions of the room made the process of getting into groups and facilitating group work difficult. Tamir and Pamela both indicated that a space that would have offered student desks that possessed greater surface area and could be more easily arranged to promote tool sharing would have much more easily facilitated their work. A second room for ENC 4416, therefore, could have easily been one of the graduate seminar rooms located just two floors above in Colbourn Hall. These types of rooms, which often have conference-style tables and cushioned, rolling chairs, are often found on many college campuses and can be scheduled for entire semesters or for specific class times. Had Professor Mark’s students been able to occupy a room of this nature, they may have had an easier time sharing information and tools within their groups, and, as seen by the students of EDG 4410 and CHS 3511, may have had an easier time envisioning themselves doing similar work in professional spaces, as the features of such a room (conference tables and cushioned, rolling chairs) are features that both Pamela and Tamir pointed out as being key features in the kinds of spaces that support client-consultant relationships and meetings.
While the leveraging of teaching across primary and secondary rooms greatly supported student work in CHS 3511 and EDG 4410, and perhaps would have greatly supported student work in ENC 4416, that model in and of itself creates a dichotomy that this dissertation seeks to critique and even dismantle. That is to say that when teaching and learning are centered around a primary room (in the case of this research, a lecture hall) and then allowed to take place in a second room, the emphasis is inadvertently placed on lecture and lecture hall design. It is important to note that the building of disciplinary identity cannot and should not be constrained within the confines of this age-old design. Certainly, CHS 3511 made great use of its lecture hall as did EDG 4410. The lecture halls allotted to each course allowed students the opportunity to gain knowledge and then employ that knowledge in other places. However, if universities and educators only ever place their emphasis and confidence in this specific space design, then learning will ultimately be confined to a room with four walls, a ceiling, and desks that position a teacher with power and authority over the students that face and listen to him/her. As the results of this dissertation show, learning and disciplinary identity are fluid and dynamic, and are best developed when students are allowed to, and indeed sanctioned by their university to practice their discipline in rhetorically-rich and meaningful ways. The best way to foster rhetorically-rich environments may lie outside the bounds of a lecture hall. Therefore, when this dissertation offers up the suggestion of spreading learning to a second room, it does so with the belief that primary and secondary rooms must always be negotiated by the university, department, instructors, and students. To pigeonhole learning into lecture halls, though they can serve powerful and helpful purposes, is to disregard the rhetorically-rich ways disciplines employ their knowledge.
Though I offer these three strategies as a way for instructors, departments, and universities to foster student disciplinary identities and help prepare them to employ their disciplinary knowledge as professionals, I acknowledge that implementing these strategies is a daunting task. Certainly, as mentioned previously, hacking (Walls, Shopieray, and DeVoss, 2009) can be an effective short-term strategy used by instructors to make their allotted spaces work for them. I highly encourage instructors to continually make use of this strategy as no space or place will likely ever fit the pedagogies and strategies of all instructors. However, in light of the findings discussed in this dissertation, one of my goals is to push for impactful, sustainable change in terms of space/place design and the supporting of student disciplinary identity growth. To facilitate that change, and certainly, to even start that change, I issue a call to WAC programs and instructors affiliated with or that work with WAC programs to begin conversations that go beyond the implementation of rhetorically-rich, discipline-specific writing strategies, and critique the spaces allotted to departments across campus. To facilitate these conversations, I offer the following heuristic which I “hacked” from Walls, Schopieray, and DeVoss (they encourage instructors to take and use this heuristic in ways that will support their pedagogies). Figure 44 below shows the heuristic used by Walls, Schopieray, and DeVoss which they tailored to three pedagogical goals that they recommend for “de-centering the classroom, supporting small group work, and maintaining student interest” (p. 281). Their strategy is to highlight areas in which a classroom space interferes with a taxonomy they proposed specifically for writing classroom pedagogy: “motion, collaboration, senses, leadership, and function” (p. 276).
<table>
<thead>
<tr>
<th>Pedagogical Outcome</th>
<th>Type of restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement</td>
<td>Collaboration</td>
</tr>
<tr>
<td>De-centering classroom</td>
<td>can’t reorient classroom arrangement</td>
</tr>
<tr>
<td>Creating functional small groups</td>
<td>students can’t easily work in small groups—no way to arrange chairs or tables</td>
</tr>
<tr>
<td>Maintaining class focus</td>
<td>students can’t easily move around to see each other</td>
</tr>
</tbody>
</table>

Figure 44: Walls, D. M., Schopieray, S., and DeVoss, D. N. (2009). Classroom design heuristic. [Illustration].

The heuristic I offer, Table 2 below, makes use of their method of identifying interference but instead highlights how a space interferes with the facilitation of disciplinary identity.
Table 2: Disciplinary classroom design heuristic

<table>
<thead>
<tr>
<th>Disciplinary Outcome</th>
<th>Movement</th>
<th>Modeling</th>
<th>Disciplinary behaviors</th>
<th>Disciplinary tools</th>
<th>Sites of action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Writing/space alignment</strong></td>
<td>The classroom does not let students easily transpose writing into disciplinary action</td>
<td>The instructor is unable to model disciplinary writing in front of students</td>
<td>The classroom inhibits students from rhetorically engaging a disciplinary audience or a disciplinary problem</td>
<td>The classroom inhibits the use of tools that are important to the discipline</td>
<td>The classroom does not allow instructors or students easy access to visible sites of action that mimic professional sites of action</td>
</tr>
<tr>
<td><strong>Persistence</strong></td>
<td>Students are unable to perform individual rituals (e.g., balancing a tumbler and notebook on a desktop)</td>
<td>The classroom suggests that instructors should monitor student behavior instead of model disciplinary behavior for students</td>
<td>Students are inhibited from managing a workstation that allows them to switch between disciplinary work and personal rituals</td>
<td>Students are inhibited from momentarily breaking away or disengaging from disciplinary tools</td>
<td>Students are inhibited from momentarily breaking away or disengaging from sites of action</td>
</tr>
<tr>
<td><strong>Space into place</strong></td>
<td>The classroom does not allow students to navigate it as professionals would</td>
<td>The instructor is unable to model professional practices for students in a realistic manner</td>
<td>Students do not have the agency or authority to perform disciplinary work in the classroom</td>
<td>Students do not have the agency or authority to use disciplinary tools in the classroom</td>
<td>The sites of action used in the room do not replicate or rhetorically suggest professional or disciplinary sites</td>
</tr>
</tbody>
</table>
Here, I made use of the coding scheme I used during my research where I sought to identity how students move, act, and write in their classrooms, as well as how instructors are able to rhetorically engage their students through modeling, and what locations within a classroom serve as sites of action (and if those sites facilitate disciplinary functions or purposes). The ultimate goal here is to help instructors, departments, and universities see where the spaces currently offered to students interfere not with learning, but with their students’ ability to develop a disciplinary identity. Certainly, just as Walls, Schopieray, and DeVoss (2009) recommend that individual instructors hack their heuristic to fit their purposes, I recommend the same. However, by focusing specifically on classroom design and disciplinary identity, this heuristic could serve as long-term data that can be leveraged by instructors and departments to allow them to push for change in the designs of their spaces and future spaces, or for the inclusion of second rooms that facilitate very specific disciplinary learning or purposes. By collecting data on the ways in which their spaces inhibit students from thinking, writing, and acting like professionals-in-training, these stakeholders can more clearly articulate the need for learning spaces that 1) become systems of place that help students feel a sense of homeness and a sense of authority as they attempt to engage in the discourse and practices of their discipline, 2) offer tools, workstations, and a layout that supports persistence in student learning and identity building, and 3) strengthen the connections between rhetorically-rich, disciplinary writing and disciplinary practices within disciplinary spaces.

Moreover, heuristics such as this can also be used by WAC programs as they seek to help departments create sustainable writing assignments and practices in an effort to support student learning. Within WAC literature, there already exists a strong connection between rhetorical
purpose and disciplinary identity, but because writing is always spatialized (Ackerman, 2003) and always embodied (Haas and Witte, 2001), it is important for WAC programs to be conscious of the rhetorical strength spaces and places wield. By being mindful of this rhetorical strength, and by helping instructors and departments to be mindful of it as well, WAC programs can also serve as a nexus for design-oriented thinking and writing.

In conclusion, while the results of this dissertation point to a powerful connection between student disciplinary identity and the ways in which students move and act within, and think about their classroom spaces, more research on this subject needs to be done. One area that this dissertation does not cover is the effects of disciplinary identity on recent graduates and newly-hired professionals. What connections are they drawing between their professional spaces/places and their student classrooms? How confident are recent graduates with a clear sense of disciplinary identity versus recent graduates with a lesser sense of disciplinary identity in the work they are being asked to do in professional settings? Moreover, how are recent graduates thinking and speaking about their experiences in classroom spaces/places? Here I offer a call to universities and departments to conduct humanistic, student-focused research in naturalistic settings like what was conducted in this dissertation. By focusing on the experiences and thoughts of students as they navigate their disciplinary classrooms, departments and universities can better assess and possibly redirect their recruiting methods. As seen in this research, especially for the two respondents in ENC 4416, writing in digital environments, the classroom was viewed as incongruent to the amount of tuition being paid. Students may not understand the politics behind the scenes in terms of classroom allotment and scheduling—and as noted by Walls, Schopieray, and DeVoss (2009), those politics can be extremely cumbersome.
and even out-of-reach for many instructors—but they certainly understand their own embodied experiences and are all-too-happy to share those experiences, both positive and negative. At the end of the day, the work of instructors, departments, WAC programs, and universities is student growth. If our mission is to support students as they learn and as they prepare to enter a working world—and certainly, as pointed out by Dr. Carol, as they prepare to enter a very social world where they need to be able to function as adults with civic responsibilities—our aim should be to critique our current practices and ways of enacting this support so that we may evolve into stronger, more efficient support systems. As the research in this dissertation suggests, one avenue for exploring student support is to become more mindful and critical of classroom space design, and to observe how students are currently using and thinking about the classroom spaces we offer them.
APPENDIX A: SURVEY
Greetings! Thank you for agreeing to participate in my study. If you could, please fill out the following survey and return it to me at the end of class. If at any time you would like to withdraw from the study, please verbally indicate so. You may also contact me via email if you would like to withdraw from the study. There is no penalty for withdrawing from the study. If you have any questions at all, please don’t hesitate to contact me at landon.berry@ucf.edu.

Name (a pseudonym will be provided for you when the research is written up):

__________________________________

Email address:

__________________________________

Phone Number:

__________________________________

Major:

__________________________________
Please circle the response that best fits how you feel about your writing:

I consider myself to be a __________ writer in my major.

A. Strong
B. Intermediate
C. Struggling

Finally, you may also be asked to participate in a Focus Group at the end of the semester. The purpose of the Focus Group is to gather your thoughts on the physical space of the classroom. If you are interested in participating in the Focus Group, please indicate below. You may indicate or withdraw your interest to participate in the Focus Group at any point during the semester.

I AM interested: __________ I am NOT interested: __________
APPENDIX B: FOCUS GROUP QUESTIONS
Focus Group Questions:

Can you state your name and your major?

Can you talk about your experience with writing in your discipline/major?

Have you considered any specific career(s) in your major? If so, what career(s) have you considered? If not, why is that?

Can you describe what that career or a career in your major looks like? What do people in those careers do and where do they do them?

Can you describe the space where a practitioner of your major would work?

In what ways do you feel this class has prepared you for a career in your major or for a specific career?

How do you think this classroom connects to your discipline/career?

Do any specific features (design, layout, tools, etc.) of this classroom make you feel like you’re a practitioner of your major or career? Why is that?

Are there any features that you would have liked to have had in this classroom that could have made you feel more like a practitioner of your major/career?

Do you have any other thoughts about the classroom itself?
APPENDIX C: MAPPING TEACHER MOVEMENT PART 1
MAPPING TEACHER MOVEMENT Part I

Include a “rough” seating arrangement. For a class period, carefully observe the teacher and map movement as follows: observe the teacher’s location (approximately every 30–40 seconds). On your drawing, place a dot or mark where the teacher is located at each 30–40 second interval.

After you have done this, answer the guiding questions on the second page.

Grade level _____________ Subject ________________________________

Directions:  Draw and label the classroom in the space below.
1. Explain any situations where the students were affected by the location of the teacher.
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

2. Why do you think s/he chose to move into those locations?
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

3. What locations were more effective? Why?
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
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______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
APPENDIX E: INSTRUCTOR INTERVIEWS
These questions were created based on Walvoord & McCarthy’s (1990) discussion of what it means to be a professional-in-training. Please answer these questions however they make sense to you. If you have any questions, please don’t hesitate to email me at landon.berry@ucf.edu or call/text me at (859) 516-1547. Thank you so much for your time and help this semester!

-Landon

1. What does it mean to employ knowledge in your discipline?

2. What does it mean for a professional in your field to be an informed citizen?

3. What is one major assignment you’ve had your students complete this semester? As your students try to address the issues/problems at hand in this assignment, what does it mean to use and not ignore the knowledge and methodology being taught in your course?

4. What learning outside of the course do you expect students to employ to be successful?

5. What is your understanding of a professional-in-training in your field? What does that role look like? What is required of a student to transition from a professional-in-training to a professional in your field?
APPENDIX F: IRB APPROVAL
Approval of Exempt Human Research

From:  UCF Institutional Review Board #1
       FWA0000351, IRB00001138

To:    Landon K. Berry

Date:  December 13, 2016

Dear Researcher:

On 12/13/2016, the IRB approved the following modifications as human participant research that is exempt from regulation:

Type of Review:   Exempt Determination
Modification Type: Addition of a focus group, total participants changed to 23, timeline changes – changes reflected in protocol and consents.
Project Title:    Learning spaces are WAC: Investigating how classroom spaces facilitate disciplinary writing and student-professional identities
Investigator:     Landon K. Berry
IRB Number:      SBE-16-12499
Funding Agency:  N/A
Grant Title:
Research ID:     N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in IRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Gillian Amy Mary Morien  on 12/13/2016 04:20:47 PM EST

IRB Coordinator
REFERENCES


http://dx.doi.org/10.1080/0158037X.2015.1000848


[http://wac.colostate.edu/books/langer_applebee/](http://wac.colostate.edu/books/langer_applebee/)


