ABSTRACT

Practices around new digital media are altering the ways we communicate, learn, teach, and live. In this scenario of changes, formal education faces the challenge to adapt to a new paradigm. Schools were designed to have the professor at the center of students’ attention. However, information and communication technologies afford new forms of co-presence that favor multi-tasking over deep attention. I approach this problem by asking how students’ attention is negotiated when they attend to academic topics in a technologically-rich environment. I also ask what characterizes students’ uses of technology when studying. I carried out an ethnographic case study in order to answer my two research questions, by observing an English composition classroom during a summer session. Results in this study suggest that both students and schools are immersed in a context in which two sociotechnical and cultural models clash.
Mind the Clash: Attention and Sociotechnical Practices in Formal Learning Settings

by

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To Fernando, Evelin, Susane, Tiago, and Adriane

For your unconditional love and your support
BIOGRAPHY

I am a student in the Master of Science in Communication program at North Carolina State University, where I study about formal learning settings, technology, and attention. I am also a Public Speaking instructor and it pleases me to be involved in teaching and learning activities. As an undergraduate student, I was actively engaged in debates related to education, but my desire to become a professor is recent. I majored in journalism and moved from Brazil to the US with the intention of becoming a public relations professional specializing in intercultural communication. I was presented, however, with new ideas and possibilities that changed my plans. Therefore, I will continue my studies by pursuing a doctoral degree after finishing my master’s program.
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TABLE OF CONTENTS

LIST OF FIGURES ........................................................................................................... x

Chapter 1: Introduction ..................................................................................................... 1

Chapter 2: Literature Review and Conceptual Framework ............................................. 7

  Old School, New Challenges ...................................................................................... 7
  Central Element ........................................................................................................... 12
  Research Questions ..................................................................................................... 16
  Embodied and Extended Attention ............................................................................. 17
  Ritual Model of Communication ................................................................................. 19

Chapter 3: Methods ......................................................................................................... 23

  Methodological Framework ......................................................................................... 23
  Site Description ........................................................................................................... 25
  Researcher Role ........................................................................................................... 26
  Participants .................................................................................................................. 30
  Data Collection ............................................................................................................ 31
  Data Analysis ................................................................................................................. 32

Chapter 4: Results ......................................................................................................... 36

  Overview ....................................................................................................................... 36
  Negotiating Students’ Attention .................................................................................... 37
  Engaging with Course Content and Dynamics ............................................................ 39
  Interesting Class .......................................................................................................... 40
  Relevant Topic ............................................................................................................. 41
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor’s Presence</td>
<td>43</td>
</tr>
<tr>
<td>Engaging with Non-Academic Content and Dynamics</td>
<td>44</td>
</tr>
<tr>
<td>Technology</td>
<td>44</td>
</tr>
<tr>
<td>Speed</td>
<td>45</td>
</tr>
<tr>
<td>Boredom</td>
<td>46</td>
</tr>
<tr>
<td>Tiredness</td>
<td>47</td>
</tr>
<tr>
<td>Other People</td>
<td>48</td>
</tr>
<tr>
<td>Thoughts</td>
<td>49</td>
</tr>
<tr>
<td>Avoiding Gravity Forces</td>
<td>50</td>
</tr>
<tr>
<td>The Right Spot</td>
<td>50</td>
</tr>
<tr>
<td>Limited Interaction</td>
<td>51</td>
</tr>
<tr>
<td>The Right Song</td>
<td>53</td>
</tr>
<tr>
<td>Using Technology</td>
<td>54</td>
</tr>
<tr>
<td>Using Technology According to Unwritten Rules</td>
<td>54</td>
</tr>
<tr>
<td>Using More and Newer Technologies</td>
<td>56</td>
</tr>
<tr>
<td>Conclusion</td>
<td>57</td>
</tr>
<tr>
<td>Chapter 5: Discussion</td>
<td>59</td>
</tr>
<tr>
<td>The Clash</td>
<td>59</td>
</tr>
<tr>
<td>Modern Life and Hyper Life</td>
<td>60</td>
</tr>
<tr>
<td>Agency</td>
<td>65</td>
</tr>
<tr>
<td>Limitations and Future Directions</td>
<td>67</td>
</tr>
<tr>
<td>Chapter 6: Conclusion</td>
<td>69</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>73</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

METHODS

Figure 1. Classroom Diagram (1) ................................................................. 27
Figure 2. Classroom Diagram (2) ................................................................. 28

RESULTS

Figure 1. Conceptual Model ................................................................. 38
Chapter 1: Introduction

My policy [regarding the uses of electronic devices in the classroom] would be that you can do whatever you want as long as it does not distract others. However, if you don’t understand the material or if you don’t hear something, if you don’t hear the assignment, that’s your fault and I will not repeat it to you again (...) I think the advantage [of my policy] is that I don’t have to look for people who might be on Facebook. I don’t have to look for people and if someone is texting, I don’t have to stop the whole class and tell them to stop texting. I don’t have to disrupt the class.

During an interview, I asked an eighteen-year-old freshman student what his policy would be regarding the use of electronic devices in the classroom if he were the instructor. Bruno’s answer undermines the dichotomy between attention and distraction. According to him, attention cannot be characterized as focus on the professor and distraction cannot be defined as engagement with activities beyond the scope of the class. In his account, being on Facebook is not a problematic behavior; however, calling out a student would be a disruptive action. His opinion not only redefines what we would normally characterize as attention and distraction, but also shows a shift in the classroom’s power balance. In this sense, asking for students to pay attention to the class is not framed as a corrective action but as a disruptive practice. Bruno’s answer also reveals that he might not see the classroom as a collective space for learning, where everyone’s presence is important. Therefore, not paying attention to the class is understood as an action that can bring harmful consequences only to the distracted student.

Stories like this are common in classrooms. I faced a similar situation as a first time public speaking instructor last semester. I do not currently have a policy prohibiting the use
of cell phones and laptops, but I always reinforce the expectation of students to participate in class. This strategy usually works, but in one of my classes students were texting too often. I decided to create an explicit rule, with grade penalties, prohibiting cell phone use. In a written and anonymous mid-semester evaluation, a student patiently explained the flaws of my new strategy:

Your new plan of stopping to call people out about cell phone use is much more distracting than just people texting quietly. We are so used to cell phone use that we don't even notice it, but to call people out is taking away from the lecture and shifting the attention away from you much more.

I hear similar stories weekly in my office. One of my colleagues told me that a student answered a phone call during class. The instructor was shocked and asked with his eyes what the student was doing. The student simply made a hand sign indicating that he was talking on the cell phone. I imagine that even Bruno would not tolerate phone calls in class, considering the fact that they can disrupt everyone. However, is there a problem with actions that are performed quietly and do not directly affect other learners in the classroom? As a student, I always have my Google Docs open alongside my email and Facebook account. All of my brightest peers also check their email, Twitter, Facebook, and other social media websites during class.

The challenges that the Internet and the diffusion of mobile technologies impose are more complex than students being distracted by social media websites. Were that the issue, the solution would be to disallow these devices in the classroom or monitor the websites that students visit. However, the “ethic of having a mobile phone is to be not only available to be called, but also to actually maintain a near constant co-presence with select others through
voice and text, which places us experientially in multiple locations at once” (Wise, 2011, p. 162). The current digital revolution enables modes of co-presence and interaction that clash with established schooling practices. Traditional classrooms were created to have the instructor as the center of students’ attention. In this type of setting, they are expected to sustain a concentrated form of focus for long periods of time. The Internet and electronic devices disrupt this model of teaching because they offer numerous stimuli to students and favor hyper over deep attention (Hayles, 2007). This transformation is not limited to the ways we learn; it also influences the ways we work, drive, have fun, etc.

This paradigm shift raises the issue of how schools will fit into this new scenario (Barbero, 2009; Davidson, 2011, Drotner, 2008, Hayles, 2007; Thomas & Brown, 2012). This study proposes an investigation of this issue by asking two questions: first, how is students’ attention negotiated when they attend to academic topics in a technologically-rich environment, and second, what characterizes students’ technology uses inside and outside the classroom when they are studying? These research questions can contribute to debates about school reforms by casting light on students’ technological and attentive while they are studying. Given the rapid diffusion of new mobile media in recent years, scholars in the fields of education and communication have little information about students’ actual practices with technology.

My goal is accomplished in five steps, which I present in the following chapters. In my literature review, I show that the current system of education was created under the circumstances of the Industrial Revolution and the intellectual environment of the Enlightenment (Robinson, 2011). Therefore, the educational system that emerged in the late nineteenth century was shaped by values such as objectivity, standardization, and uniformity.
The current model of education is deeply influenced by practices that were forged at that time. This discussion leads to my next point in the literature review, which focuses on how the digital revolution imposes challenges to current teaching and learning models. In the second part of my literature review, I discuss the fact that attention is a fundamental skill for individuals involved in productive tasks since the late nineteenth century (Crary, 1999). In this sense, the current attention discourses are a continuation of the modern crisis of attentiveness (Terranova, 2012). Current debates about attention are influenced by findings of neuroscience that indicates the neuroplasticity of the brain (Carr, 2011; Hayles, 2012), which are important to this study because they raise issues related to individuals’ agency that I further debate in the second part of my chapter. After presenting my two research questions, I propose a conceptual framework that draws from the work of J. Macgregor Wise, Bruno Latour, and James Carey. This approach understands the subject not as an autonomous being, but a product of sociotechnical practices (Carey, 1989; Latour, 1992; Wise, 2011). In other words, the human-subjects do not constitute themselves alone, but are composed of interactions with the environment, other people, tools, etc. In this framework, attention is not an activity that happens inside an isolated brain, but one that emerges from the interaction between the mind, body, tools, and the environment (Wise, 2011).

In the third chapter, I present my methodological framework, my data collection process, and my approach to data analysis. Given the exploratory nature of this thesis, I chose to conduct qualitative research by performing an ethnographic case study. This methodological choice allowed me to have contact with students’ practices in situ. To accomplish this, I observed a college-level English composition classroom over the summer
of 2012. I also interviewed ten students, the course instructor, and two course tutors, and I collected class materials. My study does not target vulnerable populations, so I only talked to students who were at least eighteen-years-old. In the last part of this chapter, I explain how I conducted an inductive analysis based on the constant comparison method (Glaser, 1965).

This systematic approach resulted in nine themes organized under three central phenomena that answer my first research question and two themes that answer my second one. In the fourth chapter, I present the results of my study. Students engage in an attention movement that it is comprised of three central phenomena – avoiding attraction forces, engaging with classroom dynamics, and engaging with non-academic content and dynamics. Therefore, students are part of a constant attention movement, in which they engage with and disengage from class content and dynamics. This movement is generated by attraction forces (Wise, 2011), such as an interesting classroom, a relevant topic, the professor’s presence, technology, speed, boredom, tiredness, other people, and their own thoughts. Students have to avoid some of these forces in order to keep focused on only one task. The strategy of avoiding selected attraction forces can be challenging, as data analysis shows that students are using more and newer technologies in college. The same tools that assist with school work also offer many possibilities of engaging with content outside the scope of the course. Even though technology offers a myriad of possible appropriations, the use of electronic devices is influenced by unwritten norms that are established locally and by sociocultural expectations. To this effect, students might refrain from letting the professor know that they are on Facebook because this behavior may be perceived as rude. Similarly, they may use headphones when listening to music to avoid disturbing their peers.
In the fifth chapter, I discuss my results. The constant back and forth movement of attention in which students are trapped is the result of a clash between two cultural, sociotechnical, and economic models. On the one hand, there is a pre-digital revolution way of organizing life, in which the boundaries between work and leisure, personal and professional, public and private are clear. On the other hand, there is an always-on society in which different dimensions of our lives are brought together (Turkle, 2006). In the first scenario, a focused form of attention is required to accomplish productive tasks (Crary, 1999). In the second scenario, the technological landscape enables social, cultural and technical practices that require a multitasking mode (Davidson, 2011). Even though all the students interviewed in this study grew up in the Internet era, they have also adopted some discourses and practices from the pre-Internet age. For instance, all of them try to separate their personal life, academic work, and rest time. I end this chapter by discussing some limitations and future directions of my study.

In my last chapter, I highlight the implications of this research and offer my conclusions. Students and schools are embedded in a reality in which pre-digital revolution discourses and practices coexist with discourses and practices from the digital revolution age. It is likely that networked communication and information technologies will become ubiquitous in our lives. Schools can increase students’ agency by helping them to understand how they can not only adapt to the status quo, but can also effect change in the reality around them. In this context, the work of philosophers of education, such as Paulo Freire, is crucial to help educators reflect on the role that schools will have in the twenty-first century. I now turn to the presentation of the literature that guided this study.
Chapter 2: Literature Review and Conceptual Framework

The starting point of this study is the premise that social practices surrounding digital media impose challenges to formal education. Therefore, I begin the chapter explaining that the current model of public education was originated during the Industrial Revolution and that the Internet era requires changes in schools. Next, I display that attention is a fundamental skill for individuals involved in productive tasks since the late nineteenth century. Finally, I present my two research questions and discuss a conceptual framework that draws from the works of J. Macgregor Wise, Bruno Latour and James Carey.

Old School, New Challenges

Issues involving education, technology, and attention can be approached in different ways. This study examines information and communication technologies through the lens of a broad socioeconomic and cultural context in which they are not mere didactic tools assisting instructors, but are instruments influencing the ways individuals communicate, work, and learn. Information networks and telecommunication infrastructure support trading and production relations, influence international politics, and affect popular culture around the world (Wiley, 2004). In this sense, the current technological revolution not only introduces a plethora of new electronic devices in people’s routines, but also alters cultural, social and economic relations and this paradigm shift challenges formal education (Barbero, 2009).

Authors who believe that the current educational system faces a crisis also advocate the necessity for change. Barbero (2009) points out that a gap between students’ experiences inside and outside schools causes them to not see relevance in what they are studying, which leads to rebellious positions against instructors. Hayles (2007) says that educators must
choose between fitting students into formal learning environments or changing these environments to fit the students. Davidson (2011) highlights the fact that this generation grew up searching for information online and that boredom is one of the greatest complaints among high school students: “Kids aren’t failing because school is too hard but because it doesn't interest them” (p. 76). Robinson (2011) suggests that adolescents do not believe that having a degree will guarantee them a job. In synthesis, scholars from diverse fields argue that the technological landscape enables cultural and socioeconomic practices that call for change in schooling traditions.

Some formal education practices are influenced by premises from the late nineteenth century. Robinson (2011) clarifies that the current system of education was originated in the Industrial Revolution and in the intellectual culture of the Enlightenment. The creation of public schools was driven by the economic imperative of that time. Mandatory, compulsory public schooling developed over the course of the last half of the nineteenth century and got its full wind at the turn into the twentieth century as part of the America’s process of industrialization (Davidson, 2011, p. 72). This system of education was also developed in accordance to intellectual assumptions that valued efficiency and objectivity (Davidson, 2011; Robinson, 2011). Anson and Miller-Cochran (2009) point out that objectivist teaching practices involve professors transmitting knowledge to pupils. They also highlight that a great part of higher education inside and outside the United States adopts this approach, in which lecturing predominates among other teaching strategies. Not only teaching practices, but also assessment tools were developed under the values of uniformity, regularity, and standardization. Davidson (2011) says that grades started to be used in the nineteenth century and the first multiple choice test was written by Frederick J. Kelly in 1914, creating “what
one commentator has called the symbol of American education (...) It is estimated that Americans today take over 600 million standardized tests annually” (Davidson, 2011, p. 113). In other words, the current system of education is deeply influenced by premises established in the Industrial Revolution.

Regardless of the fact that schools rely on assumptions and practices from the nineteenth century, it is important to acknowledge that formal education has changed over the last one hundred and fifty years. In the book Teaching Out Loud, Dannels (forthcoming) explains that a variety of theories and philosophers of education influenced schools’ goals, roles, and practices since the early twentieth century. She discusses the contributions of John Dewey, Paulo Freire, Parker Palmer, and bell hooks to the education field. I will highlight the work of Brazilian educator, Paulo Freire, because he explicitly challenged objectivist models of teaching and learning. Freire was opposed to the idea of ‘banking education’ (1970), in which students receive the knowledge imposed by the instructor. Instead, he proposed a problem-posing education that stimulates students to think critically about their own condition in the world: “Problem-posing education bases itself on creativity and stimulates true reflection and action upon reality, thereby responding to the vocation of men as beings who are authentic only when engaged in inquiry and creative transformation” (Freire, 1970, p. 71). Freire’s problem-posing education relies on a horizontal relation between professors and students. This does not, however, mean that they are on the same professional level (Freire, 1994). Instructors have authority assigned by their knowledge, but they do not hold absolute truth. This horizontal relation is necessary because rebellion is fundamental to students’ process of becoming autonomous individuals and instructors must help pupils give productive meaning to their rebellion (Freire, 2001).
Paulo Freire is considered one of the founders of the critical pedagogy movement (Dannels, forthcoming) and his ideas continue to inspire many educators. Nevertheless, he wrote his books before the widespread use of the Internet. Therefore, it is necessary to investigate the opportunities and constraints that the current scenario offers. Rheingold (2012) highlights that research is needed to really understand how sociotechnical practices alter the ways we live; however, he believes that we can benefit by learning the skills of mindful digital media users. In a similar line of reasoning, Drotner (2008) argues that digital practices of the youth enhance competencies that are absolutely vital to their future success in an economic, social, and cultural sense. The changes that we are facing are complex, but their essence can be explained by dynamics that blur some pre-established boundaries, as Davidson (2011) notices:

Fifteen years into the digital revolution, one machine has reconnected the very things – personal life, social life, work life, and even sexual life - that we’d spent the last hundred years putting into neatly separated categories, cordoned off in their separate spaces, with as little overlap as possible, maybe at the annual company picnic. (p. 13)

Some scholars are skeptical and others are enthusiastic about the changes that the digital revolution affords. Sherry Turkle is a representative voice among scholars who are worried about the possible effects that these new sociotechnical practices might have in our lives. In an article published in 2006, she advocates that mobile technologies and the Internet enable new forms of co-presence that undermine some boundaries between personal and professional lives, public and private, work and leisure: “Now always-on/always-on-me technology accompanies people to all these places, undermining the traditional rituals of
separation” (Turkle, 2006, p. 15). Thomas and Brown (2011) also acknowledge that some boundaries are blurred, but unlike Turkle, they adopt an enthusiastic position in relation to the digital revolution affordances. In the book, *A New Culture of Learning*, they suggest that thinking about private and public in opposing terms might not be the best way to frame the discussion. They propose a new way of thinking about these two spheres by combining the ideas of personal and collective. On the one hand, the notion of personal is the basis of our identity and agency and it is not necessarily private. In other words, Thomas and Brown (2011) believe that we shape our identities and the limits of our agency in relation to other people. On the other hand, the concept of collective is different from public because the first is contextual and situated and the second is broad and anonymous:

> Sharing something with a collective, therefore, is very different from taking something private and putting it into the public domain. Collectives are not simply new forms of public space. They are built and structured around participation and therefore carry a different sense of investment for those who engage in them. (Thomas & Brown, 2011, p. 57)

The aforementioned passage suggests that ideas related to collaboration, participation, and cooperation are celebrated among educators nowadays in the same way that words like objectivity, uniformity, regularity, and standardization were popular in the beginning of the twentieth-century. For instance, Davidson (2011) advocates that multiple perspectives on the same topic or task can help groups achieve better results. Thomas and Brown (2011) claim that new media allow peer-to-peer learning to become commonplace: “Peer-to-peer learning is amplified by emerging technologies that shape the collective nature of participation with those new media” (p. 50). Anson and Miller-Cochran (2009) state that collaboration aligned
with digital media can transform graduate education into a space for knowledge construction as well as knowledge transmission. Nevertheless, the results of their case study show that developing a collaborative course can be challenging because individuals have pre-established ideas about formal learning that lead them to resist change.

Even though individuals might resist innovation, the academic debate related to technology and education suggests that the digital revolution imposes the necessity of change in schools. I believe that we will need to respond to these challenges; however, the extent, the depth, and the nature of these changes is still under debate.

**Central element**

In the beginning of this literature review, I showed that the system of public education draws on assumptions and practices from the nineteenth century, but the current technological landscape enables new social, cultural, and economic practices that impose challenges to formal schooling. Therefore, I briefly discussed the new scenario that unfolds from this technological revolution and showed that collaboration is a celebrated trend among educators. Nevertheless, it is essential to understand that attention is a fundamental element in this discussion. On the one hand, twentieth century educational settings and workplace were designed to favor focused form of attention, as Davidson (2011) advocates: “Attention to task is at the heart of industrial labor management, from the assembly line to the modern office, and of educational philosophy, from grade school to graduate school” (p. 6). On the other hand, some authors propose that the ability to enhance and manage our own attention is the key to success in the twenty-first century (Davidson, 2011; Hayles, 2007, Rheingold, 2012).
Even though attention is an important factor in our daily lives, we should not imagine that this skill always had a central role in cultural and socioeconomic relations. Crary (1999) explains how attention became a constitutive part of individuals’ subjectivity in the late nineteenth century due to an emergent economic system that required attentiveness of a subject involved in new productive tasks. In this scenario, inattentive behaviors were considered a social problem: “Inattention, especially within the context of new forms of large-scale industrialized production, began to be treated as a danger and a serious problem, even though it was often the very modernized arrangements of labor that produced inattention” (Crary, 1999, p. 13). We are more than 150 years apart from the period studied by Crary (1999), but attention still remains relevant for Western societies.

Terranova (2012) points out that many current attention discourses are a continuation of the modern crisis of attentiveness, “this time elaborated in terms of the impact of Internet usage on the cognitive architecture of a neuroplastic and mimetic social brain” (p. 1). The premise is that the Internet alongside electronic devices is rewiring our brains. This argument is synthesized by Nicholas Carr’s book, *The Shallows*, which uses Marshall McLuhan introduces the idea that the very use of electronic devices can change our patterns of perception:

> The very way my brain worked seemed to be changing. It was then that I began worrying about my inability to pay attention to one thing more than a couple of minutes. At first I’d figured that the problem was a symptom of middle-age mind rot. But my brain, I realized, wasn’t just drifting. It was hungry. It was demanding to be fed the way the Net fed it – and the more it was fed, the hungrier it became. (Carr, 2011, p. 16)
Numerous studies showing how repeated actions transform our brain’s architecture support Carr’s claims. In this sense, he concludes that: “if you were to set out to invent a medium that would rewire our mental circuits as quickly and thoroughly as possible, you would probably end up designing something that looks like the Internet” (Carr, 2011, p. 66). There are studies aligned with his claims; however, the topic is controversial. In the book *How We Think*, Katherine Hayles suggests that many factors could have skewed the result of these studies. For instance, she explains that brain scanners do not simulate the conditions of web reading because participants need to be shoved into a tight tube that does not allow them to turn over. Moreover, the scanning process generates magnetic fields and radio frequencies that alter the levels of oxygen in the brain. In addition, the neural activity captured by brain scans is subject to interpretive errors. Hayles (2012) explains in great detail the limitations of the studies mentioned by Carr and she proposes that his conclusions should not be taken at face value.

The controversy related to the idea that the Internet is altering our brains does not negate the fact that educators perceive a shift in students’ focus from deep to hyper attention (Hayles, 2007; Hayles, 2012). In other words, instead of focusing on only one activity for a long period of time, they switch from one task to another and have low tolerance for boredom. The same phenomenon is described by other authors as *continuous partial attention* (Stone, 2009; Turkle, 2006). As Stone (2009) suggests, “Another way of saying this is that we want to connect and be connected (...) To be busy, to be connected, is to be alive, to be recognized, and to matter” (para. 2). This shift of attention mode alters classroom dynamics. Traditional forms of authority in schools place instructors at the center of students’ attention, but now they have to compete with electronic devices and agents located outside
the classroom’s boundaries. Striving for students’ attention is not a situation exclusive of the Internet era; however, de Castell and Jenson (2004) advocate that the Internet and the diffusion of electronic devices has increased students access to information and has altered the power balance in school settings:

What is different here is children’s sense of entitlement: whereas under earlier conditions students had to earn, to merit, to ‘‘deserve’’ their teachers’ attention, nowadays increasingly the tables are turning, and it is the teacher who must earn or deserve the attention of her students—or her students will turn it elsewhere. (p. 382)

Educational challenges are broader than students being distracted by their cell phones and laptops. Therefore, the solution is not simply the prohibition of these electronic devices in classrooms. Given that current sociotechnical practices alter the ways we live, learn, and work, some authors advocate that being able to manage our own attention is the key to success in the twenty-first century. Hayles (2007) explains that the cognitive model of deep attention is often celebrated in the Humanities field as being superior to hyper attention. However, she suggests that this comparison cannot be established in abstract terms. For example, an air traffic controller monitoring different screens needs to multitask to successfully achieve his duties. Therefore, Hayles (2007) believes that schools should establish the conditions to conciliate hyper and deep attention. Davidson (2011) proposes that being able to multitask is a fundamental skill to manage the overload of information that the Internet offers: “Multitasking is the ideal mode of the twenty-first century, not just because of our information overload but because our digital age was structured without anything like a central node broadcasting one stream of information” (p. 6). Rheingold (2012) advocates
that learning how to educate our attention is a fundamental form of literacy to thrive in the Internet era. He acknowledges the fact that we are not the final agents deciding how to focus, but he proposes that we can increase our agency with the use of techniques, such as meditation: “Attention processes, like muscles, can be strengthened through exercise, resulting in measurable changes in the brain functions” (p. 62). Rheingold’s (2012) proposition raises questions regarding agency that I will further debate in the second part of this chapter.

It is important to reinforce the idea that attention plays a fundamental role in discussions related to formal schooling in the twenty-first century. Scholars in the education field and communication field know little about students’ practices with technology due to the rapid spread of mobile devices. A better understanding of how students focus and engage with technology is a valuable contribution to the debate about reform of schooling practices. Therefore, my research questions were developed with the intent of exploring how students’ attention is negotiated in technologically-rich settings and how they use these electronic tools when studying:

RQ1: How is students' attention negotiated when they attend to academic topics in a technologically-rich environment?

RQ2: What characterizes students’ use of technologies inside and outside the classroom when attending to academic topics?

I developed a conceptual framework that draws from the works of J. Macgregor Wise, Bruno Latour, and James Carey to explore these questions. Wise (2011) assumes that the mind is not only a property of the brain, but is also a product of the interactions between body, brain, tools and environment. Therefore, attention should not be considered purely
cognitive. Latour’s (1992) perspective, Actor-Network Theory, allows us to account for the agency of non-human actors. Carey (1989) advocates a ritual model of communication in which communicative processes establish communion, participation and membership. Their theoretical perspectives dismantle the limits between individual, social, and technical. In other words, these three dimensions are deeply interconnected in our daily practices.

**Embodied and Extended Attention**

My conceptual framework is supported by ideas that refute a highly celebrated notion that recognizes the brain as an information processing device. In this model, various external stimuli are managed by a central processor and only one input can be dominant at a time. Contrary to the position adopted by many American scholars, Wise (2011) attests that attention is not purely cognitive and is not limited to the perceptual system, since one can attend to a train of thought, for instance. Wise thinks of attention in a continuum comprised of nerves in relation to the environment, tools, physiological processes, and cognitive processes. In this model, each individual has a plane of attention with several gravitational points. This model positions the subject and the environment as co-constructed: (...) I think this is a generative way of thinking about the relation of the subject to the environment, not as an autonomous subject embedded in an environment but as a co-construction of subject and environment. And is a generative way of thinking about attention as plural ( attentions) and distributed across brain, body, and environment. (Wise, 2011, p. 165) The aforementioned passage points out that attention is an embodied practice. Therefore, it not only happens in a disembodied mind, but it is also expressed through body movements and physiology. Moreover, attention is not limited to the boundaries of the human body, but is extended to tools and environment. This idea relates to the “extended mind model” proposed
by Andy Clark (as cited in Hayles, 2006), in which artifacts allow modifications in one’s thoughts that would not otherwise happen. For instance, PowerPoint and Prezi are two types of presentation software; however, the first requires organizing messages in a linear fashion, whereas the second permits conveying thoughts and structuring content in a spatial way. This example illustrates the idea of extended cognition and shows that the ways we think cannot be dissociated from the tools we use.

Extended attention raises agency concerns, as Hayles (2006) puts nicely: “The computer’s capacity to exercise independent agency, which grows more powerful and pervasive every day, makes enrolling it into our cognitive system a dicey proposition. If an agent this smart and powerful is part of us, who really is in control?” (p. 243). Her proposition clashes with attention economy notions that place human-subjects as autonomous agents: “But remember that if attention goes one place, then it can’t go another. As a consumer of information, I have to be very careful about my attention allocation” (Davenport & Beck, 2011, p. 11). Crogan and Kinsley (2012) explain that considering the individual as the final agent is problematic because it hides concerns regarding the commodification of human cognition: “An attention economy is therefore not considered problematic because the strong causal link implied, the rational choice of the economic subject, maintains a semblance of freedom” (p. 13). Therefore, the question of agency is fundamental to attention related issues.

If individuals are not autonomous agents, it is necessary to hold other agents accountable as well. Actor Network Theory is especially well suited to solve this problem because it recognizes the agency of non-human actants. According to Latour (1992), technological artifacts are the ‘missing masses’ that scholars have been neglecting: “To
balance our accounts of society, we simply have to turn our exclusive attention away from humans and look also at nonhumans. Here they are, the hidden and despised social masses who make up our morality” (pp. 152, 153). He believes that socio-technical systems are developed through the negotiation between humans, institutions, organizations and artifacts.

Latour’s ideas corroborate Wise’s assumption that agency is not an exclusive attribute of a conscious mind. The conceptual framework presented so far converges nicely with the ritual model of communication proposed by James Carey (1989) because he believes that thinking is a public and social activity rather than an individual and private one. He also refutes the idea that communication is a purely immaterial practice, which complements the proposed embodied and extended model of attention.

**Ritual Model of Communication**

The definition of communication adopted in this study relies on the Cultural Studies tradition, especially the work of James Carey. According to him, the transmission and the ritual models are the two main approaches to communication in theories of American culture. The first is the most well-known and derives from geographic and transportation metaphors. In this view, communication is understood as the process of message transmission in space. Carey (1989) synthesizes this approach by saying: “The center of this idea of communication is the transmission of signals or messages over distance for the purpose of control” (p. 15).

On the other hand, the ritual view, which is older than the transmission model, is associated with concepts of *communion, participation* and *membership*. According to this perspective, the social order is expressed through material forms such as architecture, news, institutional discourses etc. “A ritual view of communication is directed not towards the extension of
messages in space but toward the maintenance of society in time; not the act of imparting information but the representation of shared beliefs” (Carey, 1989, p. 18).

After comparing and contrasting both models, Carey synthesizes his argument with the idea that transmission and ritual views are not exclusive. In other words, “A ritual view does not exclude the process of information transmission or attitude change. It merely contends that one cannot understand these processes aright except insofar as they are cast within an essentially ritualistic view of communication and social order” (Carey, 1989, pp. 21, 22). Therefore, processes of information transmission are better understood in the light of ritualistic perspectives of communication.

These two perspectives reveal more about the functions of communication and not much of the phenomenon’s definition. For this reason, Carey (1989) provides his readers with a short yet dense definition: “(...) communication is a symbolic process whereby reality is produced, maintained, repaired, and transformed” (p. 23). This rationale implicates some ontological and epistemological shifts. First, common sense understands that there is a reality independent of human beings and their interpretations of it. Carey (1989) highlights that distinctions between “real” and “symbolic” subjugate the symbolic realm as a derivation from objective reality. Even though he does not deny the ontological acceptance of an objective reality, he proposes an inverted approach. In other words, “(r)eality is not given, not humanly existent, independent of language and toward which language stands as a pale refraction. Rather, reality is brought into existence, is produced, by communication - by, in short, the construction, apprehension, and utilization of symbolic forms” (Carey, 1989, p. 25). Thus, reality as we know it emerges from a ‘symbolic web’ and not the opposite.
The concept of a symbolic web is also developed by Geertz: “Believing with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning” (Geertz, 1973, p. 5). To this effect, the dichotomy between virtual and real fades away. Swimming in the ocean is as real as taking an avatar to a virtual beach. Individuals engaging in both activities are performing real tasks. However, they are also engaging in different experiences. The feeling of having water touching the skin is different from being in front of a computer while controlling an avatar. The variables that one deals with in each situation are diverse. The actual swimmer might have redness in her eyes due to the salty water. On the other hand, the virtual player might have to deal with redness in her eyes from looking at the computer’s screen for too long. This online and offline symbolic web of meanings influences not only the human understanding of the world but also her ways of thinking. As Carey (1989) explains: “In our predominantly individualistic tradition, we are accustomed to think of thought as essentially private, an activity that occurs in the head - graphically represented by Rodin’s ‘The Thinker’. I wish to suggest, in contradistinction, that thought is predominantly public and social” (p. 28). Thus, attention is not an innate ability and not an individual practice, but a socially shared one, across bodies and technologies. Davidson (2011) explains that kids are not born knowing how to pay attention, but the contact with the world teaches them what to focus on. She stresses that this process is not only cognitive, but also normative, sensory, behavioral, social, and affective.

Alongside Wise’s (2011) attention model and Latour’s Actor-Network Theory (1994), James Carey’s (1989) ritual model of communication is the last piece of this
conceptual framework used to approach the research questions addressed in this study. Their ideas suggest that the individual’s actions and choices cannot be separated from cultural and sociotechnical dimensions. This framework reflects the main concerns addressed in this research because it considers the human-subject as co-constituted with environmental interactions, social interactions, and technological tools, which raises issues related to agency.
Chapter 3: Methods

In this chapter, I present the methodological and the analytical frameworks adopted in this study. The recent diffusion of mobile technologies enables new social, cultural, and technical practices that scholars in the communication field and in the education field know little about. Therefore, I conducted an ethnographic case study to explore participants’ attention and technical practices when studying. I spent an entire summer session observing an English composition classroom comprised of thirteen freshmen students. I also interviewed students, the course instructor, and the course tutors. In the last part of this chapter, I explain my inductive analysis process that was based on the constant comparison method (Glaser, 1965).

Methodological Framework

In this research, I used qualitative methods to carry out an ethnographic case study committed to exploring questions related to formal learning, technology, and attention. According to Bernard and Ryan (2010), exploratory studies investigate a given phenomenon in order to identify its unique as well as its ordinary elements. I adopted this approach because, due to the recent rapid diffusion of mobile electronic devices, scholars in education and communication know little about the practices of students when studying. For this reason, I used field observation to study participants’ practices in situ. Hammersley and Atkinson (1983) observe that naturalistic forms of inquiry are based on the premise that indigenous behaviors can be understood only through the immersion in participants’ natural settings (as cited in Lindlof, 1995). This is an advantage over other qualitative methods, such as focus groups and experiments, that study individuals outside their daily routines. Lindlof (1995) points out that naturalistic inquiry does not discard other methodological approaches:
“On the contrary, a host of data-gathering techniques is used in the study of social settings, including informant interviews, maps of settings, and artifact analysis” (p. 19). For this reason, I also conducted semi-structured interviews and collected artifacts.

My choice of conducting an ethnographic case study was also justified by the possibility of gaining in-depth understanding of the phenomena that were the focus of my research questions (Patton 1990). Qualitative methods usually deal with a limited population: “Qualitative interpretation result from the intensive analysis of a single case, or perhaps a few cases” (Lindlof, 1995, p. 57). Bernard & Ryan (2010) clarify that ethnographic case studies explore cultural dimensions of a group’s life, yet warn that emergent findings cannot be generalized. As Lindlof (1995) states, it is possible to generalize qualitative accounts; however, it is not possible to make universal claims: “Instead, the richness of the particular elements that are documented and the patterns or themes they exhibit allow the researcher to generalize to other cases of the same problem in the larger culture” (p. 57). Yet, claims established by case studies have to be relativized.

My methodological choices were oriented by other factors as well, primarily the possibility of developing holistic interpretations that do not reduce complex issues to linear cause-effect relations (Patton, 1990). This characteristic allowed me to understand different forces influencing students’ attention. While technology played a role in this process, other elements were held accountable as well. Qualitative methods also take into consideration historical and social contexts (Patton, 1990). In addition, qualitative methods enable one to approach research problems inductively (Lindlof, 1995; Bernard & Ryan, 2010, Patton, 1990). For example, I was able to make sense of data sets without imposing pre-established explanations or hypothesis. As Patton (1990) points out, inductive methods allow categories
and dimensions to emerge from analysis. Nevertheless, it is not possible for the researcher to become entirely free from preconceptions since we “choose topics to study because of some prior interest, and we always have ideas about what we’ll find and about what’s important and unimportant” (Bernard & Ryan, 2010, p. 107). Therefore, I adopted a reflexive position to counterbalance my own preconceptions regarding my investigation topic. I used this strategy (discussed in further detail below) to minimize the interference of my own opinions, interests, and feelings about my performance as a researcher.

The methodological framework selected for this study provided the necessary tools to answer my questions. Even though case studies do not allow me to establish general claims with certainty, they offered me the opportunity to study participants in their natural settings and to understand my research problems in depth. In synthesis, the qualitative approach allowed me to develop inductive and holistic interpretations that accounted for historical and social elements.

**Site Description**

I observed an English composition classroom at a large public university in the southeastern United States. I knew the instructor of this course before conducting my research which I further discuss this topic later in this chapter. I chose this English class because the instructor relied greatly on information and communication technologies in her class and she did not have an explicit rule prohibiting students from using mobile technologies, such as cell phones. Therefore, my research site offered plenty of opportunities to observe students’ interactions with electronic devices while learning.
The classroom had enough space to accommodate approximately twenty students, though there were only thirteen in this class. In the front of the room there was a white board, a projection screen, and a computer station connected to a projector. The projection system was plugged into speakers, making it possible to display not only images from the instructor’s computer, but also audio. We changed classrooms half way through the course because the university’s Office of Information Technology needed to change the old machines for new ones. The physical space in this second room was smaller in comparison to the first, but the electronic devices and furniture were similar. The position of the computers was the biggest difference between the two environments (Figure 1 and Figure 2).

In addition to observing these classes, I participated in two tutoring sessions that took place in a room with a physical structure similar to that of the English classroom. There was a projection system and a computer working station available for the professor. However, there were no computers available to each student, just regular chairs with writing supports attached to them. The classroom was big enough to accommodate approximately 25 students.

Finally, I conducted interviews in the conference room of an academic department and in a study room at the university’s library. These two settings were selected because they were respectively located next to the English classroom and the students’ dorms. Therefore, the conference room was used for interviews conducted right after class and the study room was used for interviews conducted whenever students were available.

**Researcher Role**

My main roles in this research were as participant observer and interviewer. I attended the classes and two tutoring sessions in order to observe how students engaged with
Figure 1. This diagram represents the position of furniture and computers in the first classroom. However, the diagram does not follow the proportions of the actual classroom I observed.
Figure 2. This diagram represents the position of furniture and computers in the second classroom. However, the diagram does not follow the proportions of the actual classroom I observed.
peers, the instructor, tutors, lectures, activities, and artifacts. I took notes regarding class
discussions and, student interactions. I also noted, to the best of my ability, the ways in which
the students focused their attention. I audio recorded some class discussions that were
relevant to my research questions. Additionally, I engaged in informal conversations with the
participants before class and during breaks in order to better understand their classroom
practices and to make them comfortable with my presence.

Qualitative studies account for the presence of the investigator in the field and this
fact requires reflexivity. Denzin and Lincoln (2011) explain that “qualitative research is a
situated activity that locates the observer in the world. Qualitative research consists of a set
of interpretive, material practices that make the world visible. These practices transform the
world” (p. 4). Therefore, it is important to acknowledge that I knew the instructor before
conducting the research because we have a friend in common. This fact made my access to
the field easy because she was welcoming to my presence in her classroom. For instance,
when explaining different research methods to the students, she used me as an example by
acknowledging the fact that I was doing field work. During and following the data collection
process the instructor and I became closer friends. This proximity helped me to produce a
balanced account of my field work, because the instructor reinforced more than once that she
was receptive to criticisms.

The students also took note of my presence in the classroom. It was common to see
them observing what I was doing. Careful qualitative research acknowledges the presence of
the researcher in the field site and Lindlof (1995) points out that “the practice of reflexive
analysis – accounting for the researcher’s own role in social action – sensitizes the researcher
to the different orders of reality in a scene” (p. 19). I observed on different occasions students looking at me after checking their cell phones, which suggests that they were conscious of the fact that their behavior could be interpreted as inappropriate in a classroom. However, the fact that students were aware of my presence did not cause them to refrain from engaging in practices beyond the scope of the class. In fact, I saw them accessing social media sites, playing video-games, and texting during the class time.

Participants

The majority of the participants were undergraduate students enrolled in the English composition course during the second part of the university’s summer session. All the students were incoming freshmen having their first contact with college through a five week class session. The classroom was comprised of thirteen full time freshmen students with high GPAs. Eleven of them were eighteen years old and two were seventeen. My study did not target vulnerable populations, therefore, I could observe all the students but I was allowed to interview only those who were at least eighteen years old. All of the students were born in the USA except one, who was born in the Ukraine but moved to the U.S. when he was twelve years old. The majority were in-state students, though all had to adapt to a new city in their first semester.

In addition to the students, I also interviewed the instructor, who is a PhD student and has been teaching English courses for five years. Finally, I interviewed two tutors, who are both first year master’s students. I assigned pseudonyms to all participants in this study in order to protect their privacy.
Data Collection

The three main sources of data used for this research were classroom field notes from my observations, interviews, and course materials. Given that the classroom was comprised of students with high GPAs, I was particularly interested in understanding how they engaged attentively with class content. A great part of current teaching practices, especially in the Humanities field, are grounded in the idea that it is necessary to concentrate for long periods of time on a single activity in order to perform academic tasks (Hayles, 2007). The access to this group gave me insights about how academically successful students manage their own attention. The rationale supporting my choice of observing this particular group was related to the sampling logic of deviant cases (Patton, 1990), which states that one can learn from unusual manifestations of the phenomenon of interest.

In approaching the participants of my study, I first made informal contact with the instructor of the English composition course through a common friend. Once I received IRB approval, I formally contacted her through an email message. We set up an appointment and I explained the objectives of my research project and my participation in her classroom. I reinforced that her participation in the study was voluntary and confidential. Finally, I asked if it was possible to have access to course materials, such as syllabus, reading lists, and assignments.

During the first day of class, I provided students with a verbal explanation of the research study and asked them to write their emails in my written presentation script should they wish to participate in the interviews. I followed-up with them via email to set up interview dates. Initially, only two male participants agreed to participate in the study. The first believed that he could contribute to the study because he was an avid technology user.
The second told me that he was taking every opportunity to explore the options the university offered, including participating in a research study. During informal conversations, I had the opportunity to clarify my research goals to the students and recruit more participants.

Only individuals over 18 were allowed to contribute to the interviews. Students participated voluntarily and received a $20.00 gift card as compensation. I conducted nineteen semi-structured, individual, face-to-face interviews with 10 students. The first round of interviews occurred in the beginning of the semester, from July sixth to July twelfth. The second round took place at the end of the semester, from July twenty-third to July thirty-first. Only two students were interviewed in a different time frame. I also interviewed the instructor and the two tutors individually. I audio recorded all the interviews, took handwritten notes, and transcribed all the recorded materials.

In addition to conducting classroom observations and interviews, I also collected class materials. Therefore, I had access to the Moodle e-learning platform that included all the course’s resources, such as syllabus, articles, assignment’ prompts, and rubrics. The students as well as the instructor used this virtual environment as a communication tool, since all the assignments were turned in through it or were done directly on it. In addition, the professor would give some of her feedback via Moodle. I also observed Google Docs because it was used by students to complete assignments and collaborative in-class activities.

**Data Analysis**

I conducted an inductive analysis by using the constant comparison method that is assisted by various types of aids such as, memo writing, close reading, and coding (Boeije, 2002). My systematic analysis was comprised of three steps. First, I developed a tag system that helped to organize and to find information on Tams Analyzer, a software program for
managing data. Next, I used the constant comparison method (Glaser, 1965) to discover the themes emerging from the material I collected during the fieldwork. Finally, I conducted axial coding and organized the themes related to the first research question under three central phenomena. Though I used these three steps for my first research question, I used only the first two steps for my second research question.

I began the analysis by entering interviews, field notes, and course materials into Tams Analyzer. Next, I developed a tag system to help me organize my material. After an initial contact with the interview subjects, I noticed that participants always mentioned their own feelings, physical condition, other people, the environment, tools, academic topics and grades. I went over my field notes and realized that my annotations revolved around the same elements. Thus, I created six tags called *themselves, people, environment, technology, topics,* and *grades* and marked parts of the interviews, field notes and course material related to my research questions. The following example illustrates how I used the tag system:

```
{people}{environment}{themselves} Yeah, we had to review each other’s paper for essays, and I realized when we were doing that in class, I didn’t feel comfortable doing this in class, because I was reviewing a guy’s paper who was sitting right next to me, and I didn’t want him to keep looking to see what I was doing on his paper {/people}{/environment}{/themselves}.
```

Generally, I marked the same excerpt of data with more than one tag. The search mechanism in Tams Analyzer allowed me to find all data entries that contained each tag. Therefore, I began the second step of my systematic analysis by doing close reading and memo taking of all such entries. This systematic procedure allowed me to recognize thematic repetitions. For instance, I realized that almost all participants listened to music while
“I usually study with music on, which is why I turn on Pandora and I stay on my side of the room.” Bernard and Ryan (2010) explain that “the more the same concept occurs in a text, the more likely it is a theme. How many repetitions make an important theme, however, is a question only you can answer” (p. 57). Thus, I was able to develop themes by observing repetitions in my data.

During this second stage of my analysis, I followed the procedure proposed by Glaser (1965), who states that it is necessary to compare excerpts of data within a theme and “as the coding continues the constant comparative units change from comparison of incident with incident to incident with properties of the category which resulted from initial comparison of incidents” (p. 440). This technique allowed me to compare participants’ reports, field notes, and course materials. For instance, a student told me that he kept his Internet use to a minimum during class time. However, I saw him playing online games on different occasions while the professor was explaining something. This discrepancy helped me to develop the theme using technology according to unwritten rules. Another example occurred with the theme titled ‘technology’. Initially, I believed that technology could be distracting because students had easy access to different sources of information. However, by observing students and talking to them I could understand their reasons for going online. This realization helped me to dismember the ‘technology’ theme and create new ones. These comparisons not only allowed me to develop my coding scheme, but they also served as a form of triangulation to validate my findings.

In the third step of my analysis, I did axial coding by comparing the emerging themes related to my first research question. I aggregated them under three central phenomena called avoiding attraction forces, engaging with classroom content and dynamics, and engaging
with non-academic content and dynamics. For instance, I realized that three themes - the right song, the right spot, and limited interaction - involved practices of avoiding stimuli in order to concentrate on academic tasks, so I aggregated them under one central phenomenon:

Avoiding attraction forces

_music_I might have a little music in the background. If my roommate is there, she is either sleeping or she is talking to a friend, but I just can tune out if I have music on._/music_

_spot_I have to have total quiet and be by myself and just focus on what I’m doing, and that’s the only way I can learn, study, and remember._/spot_

_lim_inter_I kinda have to be by myself, unless the other person is helping me with what I’m doing. If not, I’m gonna get distracted. If they are my friends, I’ll probably mess with them until they get distracted too. So, I have to be by myself or I’ll not get anything done._/lim_inter_

I organized the three central phenomena in a conceptual model that explains how students’ attention is negotiated when they are studying. Finally, I went back to my literature review in order to compare findings with the academic work related to my topic and to explain the relations I found through data analysis. In the next chapter, I present in greater detail the characteristics of each theme and demonstrate how they answer my research questions. In addition I also explain the conceptual model created to answer my first research question.
Chapter 4: Results

This chapter is divided into four main sections. Initially, I provide an overview of the field site. Next, I present my first research question that investigates how students’ attention is negotiated when they are studying. In this section, I elaborate on the nine themes that answer my question and are organized under three central phenomena. Then, I display my second research question that asks what characterizes students’ use of technologies inside and outside the classroom when attending to academic topics. Finally, I provide a summary of my findings.

Overview

The two classroom settings I observed over the summer of 2012 had layouts that favored non-linear interactions between students and instructor. Unlike a traditional class in which the professor talks and students look at her, in this class students had the option of looking at the professor or checking information on their computers, laptops, and tablets, as well as the projection screen or the white board. Moreover, the electronic devices enabled interactions with agents located outside the classrooms’ physical boundaries and surroundings. On the one hand, all students used computers, laptops, or tablets during class time, so they had multiple resources to do their academic work, such as Moodle, Word, Google Search, Google Docs etc. On the other hand, the Internet and mobile devices attracted their attention to topics unrelated to academic tasks. In short, information and communication technologies allowed interactions with human and non-human agents located both inside and outside the classrooms’ physical boundaries. This overview casts the scene for the results that I present next.
Negotiating Students’ Attention

My first research question asks how students' attention is negotiated when they attend to academic topics in a technologically-rich environment. This negotiation occurs between attraction forces (Wise, 2011) and strategies for avoiding these forces. Three forces: an interesting class, relevant content, and the professor’s presence, can engage students with class content and dynamics. Six forces – technology, speed, boredom, tiredness, other people, and thoughts – can distract their focus from the class. Students are able to avoid attraction forces when they are in an ideal location, listening to the right song, or having limited interactions with other people and electronic devices. In general, students experience a constant back and forth motion in which they engage with and disengage from class content and dynamics. A myriad of gravity forces (Wise, 2011) pull their attention in different directions and they need to block out part of these stimuli in order to keep focused on academic tasks. The aforementioned processes are organized under three central phenomena (see Figure 1). The first, engaging with course content and dynamics, circumscribes the gravitational forces that pull students’ attention towards academic content. The second, engaging with non-academic content and dynamics, delineates the attraction forces that pull students’ attention away from class. The third, avoiding gravity forces, encompasses students’ strategies for shunning attention grabbers that can take their focus away from the task at hand. The simultaneous interplay of these three phenomena shapes what students experience as attention when they attend to academic topics.
Students are able to avoid attraction forces when they are in the right spot, are listening to the right song, or have limited interaction.

Avoiding attraction forces

Engaging with non-academic content and dynamics

Six attraction forces can switch students’ focus from the class:
- Technology
- Speed
- Boredom
- Tiredness
- Other people
- Thoughts

Engaging with class content and dynamics

Three attraction forces make students engage with class content and dynamics:
- Interesting class
- Relevant topic
- Professor’s presence

Figure 1. Conceptual Mode
The conceptual model above displays how students’ attention is organized, but it does not express how they understand their attention. Therefore, the students interviewed talk about attention in opposition to distraction. Few of them view distraction as errors. Some of them characterize distraction in relation to presence, so being distracted means not being present in a given place. Many of them understand distraction as situations or agents that can take their focus away from the task at hand. However, sometimes students get trapped in a back and forth motion in which they are neither engaging with academics, nor shifting their focus. A few students stated that they were able to ignore inside and outside stimuli. For instance, Tiago could lose awareness of his surroundings when writing or programming. In the same light, Clarissa could ignore her surroundings when multitasking. The experiences reported by these two students are exceptions and do not represent their most common attention pattern which is characterized by a dynamic back and forth motion. In this scenario, all students strive to find a balance between personal life, academic work, and rest time. All of them talk about the necessity of planning their academic work in order to find time to socialize with other students and have enough time to rest.

**Engaging with Course Content and Dynamics**

This central phenomenon encompasses these three themes: *interesting classroom*, *relevant topic*, and *professor’s presence*. The first describes characteristics that create an engaging environment for students; the second exemplifies features that highlight a topic’s relevance; the third explicates professor’s attributes that influence students’ focus. In synthesis, each of these themes scrutinizes gravitational forces that attract students’ attention towards course content and dynamics.
**Interesting Class.** A majority of the students find it easier to focus solely on the professor and the class content if they are allowed to participate, whether it be through activities, discussions or demonstrations. In general, students do not like lectures, but they can tolerate them when the professor is fun and funny, as Michael stated:

> You know... When the instructor cracks a joke, has something funny. I mean, it makes me wanna laugh and I focus on that for a little bit because I’m like, “Yeah, that’s funny”, you know? Give us a little of an emotional relief from all the sitting at the computer and working for hours on it.

Even though students can tolerate lectures, the following statement by Fred summarizes participants’ overall dissatisfaction with classes in which professors speak for a long time: “Classroom settings where the professor is just speaking for a really long time and the students don’t really discuss along with whatever the teacher is teaching... Sometimes it can get a little bit dry, unless the professor is just really interesting to listen to”. His statement was corroborated by the instructor’s opinion. When I asked her what students want to pay attention to, she told me that they like to interact with each other: “If a discussion is social enough, if they are interacting enough, if it’s verbal discussion, as long as they are getting attention and interaction and social involvement in a discussion, they will pay attention to the discussion”.

Resources such as movies, visuals, and power point presentations can engage students by breaking the monotonous flow of a lecture and bring aesthetic qualities When commenting on his peers’ presentation, Bruno pointed out that a captivating image can bring his attention to what is being said: “And another thing is again, some [students] had very good visual examples, that everyone looked at, and some just had one page that didn’t
change and it wasn’t as captivating.” Lee compared watching a video in class to the aesthetically pleasing, immersive experience of watching a movie:

Like I said before, whenever students hear a video and they see, they watch a video, I feel they become more engaged. Almost as if it’s like a movie. So, I just feel like students listen more, they actually want to pay attention without being distracted by the surroundings.

Here, it is important to point out that technology is not a decisive factor in captivating students’ attention. Playing a movie, for instance, does not guarantee that they will pay attention, as Maria explained: “I think movies to me are just… Or they can engage your attention or, definitively, you just don’t wanna watch it at all.” Lee was even more assertive: “I think it depends on the activities and what the teacher employs (…) I don’t really think it is much a matter of what technology you have; I think it’s a matter of how you go about teaching your class and making it interesting.” In essence, students put the responsibility of making a class engaging on the professor. They did not see themselves as agents that can positively participate and influence classroom dynamics. Even though some of them strived to concentrate, they did not take the responsibility for creating an interesting class environment.

**Relevant Topic.** My data analysis suggests that students tend to focus when they perceive the topic as relevant to them. Relevance can be established when they see ways to apply what they are learning. Tiago explained the differences between a class that holds his attention and one that does not and explained that it is easier to focus when the information relates to his major:
The main difference would be if it’s going to catch my attention it’s more likely that it will be on my major because, I mean, that is what I’m interested in, and that’s what seems relevant to me. While if it’s not going to catch my attention, it’s probably something I think I won’t ever use it again.

In a similar way, Bill revealed that he was shocked by Google Documents because he was unaware of it previously and was impressed by the simultaneous editing of documents. Towards the end of the semester, I asked him to share three main things he learned in the English course and he disclosed that learning how to use Google Docs was helping him communicate with peers: “I learned how to communicate better through technology (…) like, forming a paper and a group project, we use Google Documents. I did not know how to do this before”.

Grades also influence participants’ perception of a topic’s relevance. Rebecca, for example, classified herself as a grade grabber who pays attention to all information related to assignments:

Possibly only when we go over specifics... Like our projects, the different projects that we have, we talk about it and we get to know what she wants. And my attention will come directly to it because I know I want a strong grade in that, I want an A. I want to make sure I’m paying attention to it. What she specifically wants me to do.

In synthesis, the relevance of a topic is established by both personal interests and exterior influence. Students tend to perceive a topic as significant when it is useful or graded. They can pay attention to a subject that is relevant, but boring, and to one that it is entertaining, but irrelevant.
**Professor’s Presence.** Through field observation, I noticed that the professor’s presence is a powerful attraction force towards class content and dynamics. In particular, moments of silence and explicit requests for attention would reengage students. The instructor told me that to diplomatically gain students’ attention, she calls their names and peeks at their computer screens: “I said to everyone to look away from their screen and look at me. I do think I have everyone’s attention when I say that”. Because the professor has the authority to grade students and establish rules, she becomes a gravity force towards class content and materials. Due to the instructor’s position, Tiago described the importance of developing a good relation with her:

Pay attention in class, ask questions the moment you don’t understand. When the professor says “Ok, you can go”, don’t be the first one to leave. If the professor offers opportunities for office hours or study groups, go to them.

Keep up with everything your professor does and says, so you aren’t left in the dark.

Data indicate that the professor was not the only source of academic knowledge inside and outside the classroom since all students believe that the Internet is also a source. Despite the fact that they relied greatly on the Internet, students also depended on the professor to obtain the information needed. In this sense, the professor was perceived as a source of knowledge to the students. Maria told me that she appreciated office hours because the professor helped her individually with her assignments: “The first thing I learned is how valuable resources are. So, the office hours, I didn’t realized how helpful... like, I didn’t realize that professors offer that much attention to individual students.”
The fact that the professor held a position of authority and was perceived as a source of knowledge did not prevent students from engaging with content unrelated to the course. In this way, they would seek leisure activities if the information presented was perceived as boring or unimportant. However, her presence was a gravity force towards class content.

**Engaging with non-academic content and dynamics**

This central phenomenon is comprised of six themes that delineate the gravitational forces that pull students’ attention away from class content. *Technology* describes the influence of tools on students’ attention. *Speed* expounds on how the classroom rhythm can prevent students from following along with the professor. *Boredom* expresses that tedium can prevent students from focusing on academics. *Tiredness* explains that students face challenges to focus when physically tired. *Other people* scrutinizes how individuals can impact learners’ attention. *Thoughts* highlights the fact that students’ own imaginations can prevent them from focusing.

**Technology.** Students rely on the Internet when studying because it offers easy access to didactic tools. However, it also provides access to non-academic content, as Tiago pointed out: “On my tablet, you probably would see everything, Facebook, Youtube, Gmail, video-games, my notebook for taking notes, calendar. You may see me messing around with the settings in my tablet trying to figure it out. I may have my music playing. Pretty much just distraction while I’m studying”. Chelsea faced the same situation described by Tiago. She shared her thoughts on how students should use technology and reached the conclusion that they would undoubtedly be distracted when studying with their laptops:

If you are working on the computer, you need to learn how to multitask, especially because we are doing so many different stuff for different classes.
and whatever. So, definitely learn how to work on the computer, manage your time, not get distracted with all the stuff, because on the computer everything is basically available to you, including distractions, so.... They will get distracted anyway (laughs).

Similarly, cell phones can catch students’ attention due to their practical and convenient access to other individuals. The screen projector in the classroom was mentioned by two students who reported that when it was turned off, their attention was pulled away from the lecture. This theme focuses only on technology affordances. The various uses that students attribute to technology are further described in the next themes.

**Speed.** The classroom’s rhythm, whether it is perceived as too fast or slow, influences how students pay attention. When the professor explained something that the students already understood, they would do homework or engage in leisure activities. Bruno told me that he would check Facebook when the professor was explaining a familiar subject. Unlike him, Maria used this class time to work on homework:

> Usually, if we are on a discussion and I already heard what she said or she’s trying to explain something that I already know, I’ll move along to the next thing. So, if we are in Google Documents, I’ll be usually looking over myself and trying to write my own paragraph or something, even if we are doing on a group and I already understand. Just to reinforce by myself while they are doing together.

Technology gives students more flexibility to follow their own rhythm. They can simply engage in other activities once they understand the material. As a consequence, Maria always tuned in and out during class time. Unlike her, others were not comfortable
doing other activities during class because they would feel rushed. Chelsea, for example, would never start her homework in the classroom because she feels annoyed by starting a task and not finishing it. Just a few students told me that they would simply daydream when the professor talked too fast.

**Boredom.** Some of the students I interviewed mentioned feeling of bored when studying inside or outside the classroom. When facing boredom, they usually seek leisure, especially through the use of technology. Chelsea told me that she would chat with friends when feeling bored during class time:

> I try to stay active, that’s why I ask a lot of questions because if I don’t, I get bored and distracted and start playing on the computer or might start texting or something (...) Or I just start typing… Like if we are on Google Docs, we have that chat thing (...) We just like “hey” “hey”, then someone just starts quoting songs. Like today, they were singing “Call me maybe” (she laughs), but they were changing words around. It was hilarious! And we were just talking, saying random stuff, and being funny, so you just hear a low rumor of laughter around the room.

The situation reported by Chelsea was also present in some Moodle posts. Even though this virtual environment was set up for the purpose of exchanging academic information and knowledge, the boundaries between work and leisure were blurred. For instance, a student changed the lyrics of a Carly Rae Jepsen’s song:

> Hey, I just met you
> And this is crazy
> I have Alzheimer’s
Hey, I just met you

In addition to seeking leisure, students would also simply daydream or fall asleep when feeling bored during a class.

**Tiredness.** Students can become disengaged when they are tired. In this type of situation, it is not likely that they will use some form of technology to stay awake. They usually zone out, struggle to stay awake, or fall asleep. Bruno reported this experience of feeling tired in the classroom:

> Every class there are moments when my mind might wander. I think today when the students gave presentations, not all the presentations were very interesting, so I think today.... I was also a little tired, so today I kinda zoned out more than usual.

I observed students struggling to stay awake in different classroom situations. Through informal conversations, I discovered that they are accustomed to staying awake late to engage in leisure activities, such as going to the movies or basketball games. However, they would also stay awake to finish school work. Towards the end of the semester, Clarissa told me that she was feeling exhausted:

> It’s like my brain refuses to work lately. I don’t know. I got four hours of sleep over my notes. I took a four-hour nap yesterday, just in the afternoon.

> And I almost feel asleep in my 8 o’clock class this morning.

All students talked about the necessity of finding balance between work, rest, and leisure. When I asked Lee what he learned during his first semester in college, he told me that time management was an important skill to have:
I was up until four last night..... So, definitively time management is critical. You cannot just blow off an assignment if it’s not due for 5 days. You should be periodically working on it.

Like Lee, all students believe that time management is a fundamental skill to succeed in college.

**Other people.** The presence of people can alter the focus of students in three ways. The first way is when someone’s presence prevents a student from accomplishing a task. Clarissa reported feeling uncomfortable while peer reviewing the work of someone who is sitting right next to her. Therefore, she just pretended to work on the assignment:

> We had to review each other’s paper for essays, and I realized when we were doing that in class, I didn’t feel comfortable doing this in class because I was reviewing a guy’s paper who was sitting right next to me, and I didn’t want him to keep looking to see what I was doing on his paper. And so, once I got back to my room, I could do whatever I wanted to fix it. But I was worried he may get upset with me if he had seen all the editing. They weren’t anything bad, it’s just, I don’t know.

The second way other people become an attraction force is when they observe what others are doing. Thus, my own presence in the classroom changed the focus of the students. I noticed several times that students were observing me taking notes. But during informal conversations when I asked how they perceived my presence in the classroom, they told me that they did not even notice that I was. The third way is when they start to interact with each other while engaging in non-academic tasks. Students interacted by using online and offline means. For instance, Fred used to play online games during class breaks and towards the end
of the semester, some of his colleagues started to play the same game. Therefore, some of the students would spend their break in the same room while interacting through the online game and through verbal comments.

**Thoughts.** Through interviews, I learned that students' own thoughts can prevent them from focusing on academics. Tiago, for instance, described to me the daydream process he sometimes faced during class time:

> I guess while I’m looking at the screen I would probably be thinking about a project or, I don’t know, maybe some cartoon I saw last night. And yeah, it more likely would be a cartoon or I would be off to some imaginary world. Sometimes, I would be picking up a game in my head of what I’m going to do when I get back to my room, but pretty much I just won’t be paying attention to what is going on in the lecture.

Rebecca told me that she did not select her major yet. Therefore, she used class time to think about the major she wishes to pursue:

> I’ll have one of these [Internet Windows] open at NC State, the majors that they do have because I’m kind of lost in my major, so sometimes I’ll be researching different majors, and different career jobs that I can look to.

I also observed students trying to find classes to enroll in for the Fall semester and checking the lunch schedule on the dining hall website. Fred told me that around noon, he would start thinking about lunch. In a technologically-rich environment, the ways that students own thoughts can steer their focus away from academics involve not only engaging in daydream processes like the one described by Tiago, but also in connecting with agents...
located outside the classroom, as in the case of Rebecca who spent part of the class time researching which major she would apply for.

**Avoiding gravity forces**

This central phenomenon encompasses three themes called *the right spot, limited interaction,* and *the right song.* The first describes students’ attempts at finding a comfortable place for concentrating on academic tasks. The second acknowledges their efforts to reduce interactions with technology and other people. The third reveals how students use music to block external noise and to put them in the right mood to work. In synthesis, each of the themes describes strategies that students adopt in order to shun gravitational forces.

**The right spot.** The place where participants are physically located can influence the way they concentrate. Therefore, choosing the right spot is part of their attempt to maintain focus on academic tasks, especially when they are studying outside the physical boundaries of a classroom. In this case, their selection criterion were based mainly on sound, as the majority of them prefer a place free of noise to maintain concentration. When describing places she studies, Clarissa said:

> I have to study in quiet areas (...) because even if I try to study in the lounge, in the residence hall, it’s too noisy. I have to have total quiet and be by myself and just focus on what I’m doing, and that’s the only way I can learn, study, and remember.

There are some exceptions. Bill told me that people chatting at a coffee shop did not draw his attention away from his work: “Well, in the coffee shop (...) it’s a constant movement sound of just people interacting, but all kind of comes together to where it doesn’t take away from my attention span, and I focus on my own work.” When describing his
summer dorms, Fred stated that people listening to music did not cause him much disturbance:

Sound wise it is pretty silent other than the white noise coming from the air-conditioner. Occasionally, there will be a kid listening to their music really loud but, even then the music doesn’t bother me as much as I thought it would.

Inside the classroom, the place where students are located also influences how they pay attention. For instance, Chelsea stated that she sat next to the professor to avoid engaging with activities beyond the class' scope:

Because I am in front of the class, I mean... I wanna pay attention, which is why I put myself there, and then, like, with the computers in front of you, it is kind of hard to see the rest of the class, so, it’s like, I kinda forget about them, so someone talks and I: “Oh, yeah, there is another part of the class”. So, that also helps me focus, so I can’t: “Uhu... what is that person doing?” So, that also changes how I focus.... I guess.

In short, when they need to study, participants in this study tend to seek locations that are favorable for focusing on academic tasks.

**Limited interaction.** According to participants’ reports, people and technology are the two biggest attraction forces that can disengage them from academic tasks. Students tend to avoid offline interaction with others when studying outside the classroom. They adopt this strategy because people can be loud and distract them from the task at hand, as Maria explained: “Hum.... Main distractions.... I feel if there’s a lot of people around and they are really loud, that’s the biggest one”. Furthermore, peers can shift students’ attention to non-
academic topics, especially through the use of social media and leisure activities, as Lee highlighted:

Like, if you people get on FB and show you something, then everyone is gonna look at it and everyone will keep doing other stuff and get distracted or as if you’re studying by yourself you’re more focused and it’s really a lot harder to deviate from your work.

Only a few participants studied with other people, but not on a regular basis. Even though the majority of students reported a preference for studying alone, they relied on peers, tutors, and professors to help them with schoolwork. Bruno told me that seeking help was one of the most useful things he learned in his first semester at NC State:

It is ok to ask the teacher for help if you don’t understand something. It is ok to ask the tutor as well. It is ok to ask the tutor to read a paper. It is ok to ask others, even students.

While students can avoid offline interaction with other people and seek help only when they need it, electronic devices are more difficult to manage. Since they use computers and the Internet to study, there are plenty of non-academic options at their fingertips. As Michael effectively states: “Well, say that I’m studying and it’s just getting boring, there’s a temptation to go to iTunes or go online to Facebook, Twitter”. Chelsea provided a more detailed description explaining how the process unfolds:

Well, when I text, when I’m writing my paper, I start texting and 20 minutes go by and I... It’s 20 minutes that I could wrote my paper and then... hummm... Like, if I’m on the internet, I really wanna play this game, but I have to do this, and then I go back and forth with it for 30 minutes and I
realize that didn’t get nothing done on either I wanna do… That is why I focus on just one thing, get out the way and then you can do whatever you wanna do. But it is hard because you want to do that so bad and you don’t wanna do your homework but you have to… so… It’s always a battle!

Chelsea’s report reveals that students struggle when trying to keep work and leisure separated.

**The right song.** Some participants of the study occasionally listened to music while studying. Rebecca told me that noise irritates her; however she can tolerate music: “Noise. People talking… Music sometimes I can handle, but usually talking… That irritates me.” Lee also said that he does not normally mix music and studies: “(…) Sometimes when I’m doing work, sometimes… When it does not require so much thinking, like basic homework assignment…. I listen to music when I’m doing homework.”

As opposed to Rebecca and Lee, other students frequently relied on music to maintain concentration and motivation. Music played a dual role of isolating participants and also putting them in the right mood to continue studying. Maria told me that she could isolate herself from her roommate: “I might have a little music in the background. If my roommate is there, she is either sleeping or she is talking to a friend, but I just can tune out, If I have music on.” Michael had a different reason for listening to music. As he revealed, songs gave him determination to keep working:

(…) I listen to Pop or something electronic, or something dancing. Yeah, in my mind I would be dancing, but I guess it gives me determination to do work still. Or maybe some instrumental music, so that way you don’t get distracted with the lyrics.
In synthesis, students use computers or cell phones to listen to music, so this strategy can also cause them to shift their focus to non-academic topics.

Using technology

While my first research question asks how students’ attention is negotiated when they are studying, my second research question asks what characterizes students’ use of technologies inside and outside the classroom when attending to academic topics. Two themes emerged from my data analysis. The first, using technology according to unwritten rules, reveals that technology uses are constrained by sociocultural norms and expectations. The second, using more and newer technologies, exposes that students rely more on technology because they are now in college.

Using technology according to unwritten rules

Information and communication technologies such as computers and the Internet enable multiple usages and appropriations. However, the ways in which participants use these technologies are related to social and cultural norms. They utilize these tools accordance with unwritten rules that are locally negotiated, but are influenced by sociocultural expectations. For instance, Tiago noticed that using the cell phone during class time can be perceived as rude:

Use all the resources online that the professor tells you about. If can avoid it, don’t use your cellphone for anything. No matter if it is something you deem as good, like checking your college email, it’s still rude to take out your cellphone and start messing with it. Or it can be seen as rude.

The participants of this study are aware of their influence on the attention of others. Therefore, they try not to disturb individuals around them, especially when they are listening
to music, as Fred explained: “I actually purchased a laptop right before coming to this Summer START. I have ear phones in case I need to listen something without bothering anybody”. I observed students using headphones on various occasions. Students say that there is a time and place for everything; however, from my field observation, I noticed that these boundaries are locally established. For example, during an in-class activity, a student used another student’s Google Docs account to write jokes on a shared document. This behavior was discouraged by the instructor and his peers and he did not behave this way again.

There is also a performative aspect that relates to students’ technology use and the focus of their attention. Students believe that it is important to hide from the professor when engaging in practices unrelated with the class, as Chelsea noticed:

   Since I know that the teacher can actually, like, look at what’s on your computer screen, I try not to go on Facebook or Youtube. You know, something that is obvious that I’m definitively not paying attention, so if I am drifting off, it's probably just Google Docs when everyone is signed on and just check, I’m just typing them, messaging them or doing whatever that is.

Half of the students believe that the professor should establish clear rules for technology use inside the classroom and that grades should be used to enforce this policy, as Rebecca stated:

   If I see you on social websites, interacting with other people at other times than the break, because maybe permitting it during the break you can text and you can do whatever you want for 15 minutes, but other than that I just need you to focus on class. And the cell phone, the same (…) If I see you using
during the class period and it is becoming a habit, you will take precautions

(…) Basically, just discounting from participation grade. (Rebecca)

On the other hand, half of the students think that since they are in college, they should decide what to pay attention to and what forms of technology to use. Bill told me that he agrees with a carefree policy:

I think it would be sort of a more carefree policy. Like, it’s up to them whether or not they wanna do because it’s whether or not they wanna learn. And, if they decide to be on the cell phone or on Facebook, then they are just wasting their opportunity. And they would have to deal with the consequences of that in their grade.

Nonetheless, they agree that this freedom should not allow them to disturb their peers. A tutor defined the use of cell phones in the classroom as an “unprofessional practice”.

However, this type of discourse did not appear among students.

Using more and newer technologies

Through observation and interviews, I found out that college students are using more and newer technologies when attending to academic tasks in contrast to their experience in high school. The University observed in this study offered a myriad of electronic devices and many types of software for students’ use. The classrooms were equipped with projectors, computer working stations, and Wi-Fi Internet connection. The library offered laptops, computers, scanners, cameras, and access to databases. Bruno told me that having technology available was helpful in accomplishing school assignments:

We have a class that we need to do a research study on and we need to interview people. And to interview people, we need a video camera. Luckily,
the library provides video cameras that you can rent. So, we rented a video
camera to interview people and then we needed a good laptop and a person
who knows how to use video editing software to actually edit the interviews
that we shot and put them in a nice video.

The English instructor introduced them to new online platforms such as Google Docs
and Prezi. Students perceived many benefits in technology, such as creating a fun and
engaging class, and making its content appealing. However, their explanations of why they
are using technology revolved around the idea that technology makes their work easier. Even
though students struggle with the ways technology can pull their attention away from the
professor, the lecture, the class activity, or homework, they still perceive it as an important
resource. The University's technological environment is also perceived as positive.

Conclusion

In synthesis, this chapter shows that students are involved in three processes while
their attention is being negotiated. They engage with and disengage from academics and they
need to avoid attention grabbers to stay focused on one task. This fluctuation of attention is
fostered by various attraction forces, such as technology, speed, boredom, tiredness, other
people, thoughts, the professor’s presence, a relevant topic, and an engaging class. Students
avoid some of these forces by finding a favorable place to study, by listening to music, and
by avoiding interactions with technology and other people. Being away from electronic
devices is very challenging because students interviewed in this study are using more and
newer technologies to perform their school work. Even though these tools offer multiple
uses, they are appropriated according to unwritten rules that are locally negotiated and
influenced by sociocultural expectations. These results will be discussed in greater detail in the next chapter.
Chapter 5: Discussion

This chapter is organized in five parts. Initially, I demonstrate how my results can be explained by a clash between two ways of organizing life that currently coexist. On the one hand, there is a pre-digital revolution period in which work time is separated from family and leisure activities. On the other hand, there is a post-digital revolution period that enables us to be in constant contact with each other. Next, I describe these two paradigms with examples from my results and discuss them in relation to the literature review. After this section, I discuss human-subjects’ agency in light of my results and the literature review. Finally, I present the limitations and future directions of this research.

The Clash

At the heart of this study was the goal of understanding how students’ attention is negotiated when they attend to academic topics in a technologically-rich environment. The results presented in the previous chapter demonstrate the pull of attention in different directions at the same time. The emerging themes reveal competing forces that shape participants’ attention and create a constant back and forth movement in which they engage with and disengage from classroom content and dynamics. In order to concentrate for long periods of time, the majority of them simply avoid some of the stimuli generated by the environment, technological artifacts, their own thoughts and bodies. This dynamic of often conflicting movement, is the result of a clash between two different ways of organizing life. On the one hand, there is a pre-digital revolution way of life, in which the boundaries between work, leisure, personal, professional, private and public lives are clear. On the other hand, there is a hyper life in which different areas of our routines are blurred by technological artifacts that constantly connect us. The term hyper life is inspired by Katherine Hayles’
(2007) idea of hyper attention that is characterized by a cognitive style in which human-subjects are constantly stimulated by a myriad of stimuli. Sherry Turkle (2006) labels this scenario as an “always-on” society.

Even though all the students interviewed in this study were born in the Internet era, pre-digital revolution notions appear in their discourses on finding balance between personal life, academics, and rest time. Along the same line, it emerges in some of their assumptions related to formal education. These expectations clash with the affordances of a hyper life. Hyper life appears in a student’s report stating that the act of a professor calling out a student can disturb the class dynamic. This account subverts traditional assumptions of power relation and expectations inside the classroom. Traits of hyper life also present themselves as participants’ low tolerance to boredom. In the next section I will describe, in details, pre-digital revolution and hyper lives by showing examples from my results and I will discuss them in relation to the literature review.

**Pre-digital Revolution Life and Hyper Life**

The results chapter highlights the fact that all students strive to find balance between personal life, academics, and rest time. The following anecdote illustrates this situation. I asked one participant, Fred, what his advice would be to help students succeed in college and he answered my question by drawing a diagram he saw on Facebook: “So, there’s a picture of a triangle and there is sleeping, socializing and studying and they tell you to pick two. And you can’t do all three. But I think it is possible. I mean, I haven’t experienced a real\(^1\) semester yet, but if I had to pick, I would probably focus on sleeping and studying. But, I don’t know... Socializing it’s pretty important”. The expectation of separating life into rest,\(^1\) Fred started his undergraduate program during the summer.
leisure, and work-time are typical ideas from the pre-digital revolution age. Davidson (2011) highlights that the Internet and electronic devices reunited dimensions of our life that were neatly separated. However, students try to keep these areas separated when studying, so words like distraction, temptation, and battle, appear in their reports. They attempt to focus only on study or only on leisure, but the Internet brings these two dimensions together and they struggle to keep them separate.

The ways students attempt to organize their lives, as well as their beliefs related to formal education, clash with the possibilities that the digital revolution offers. Students agree that their presence and behavior should not disturb others; however, they do not place themselves as agents responsible for making the classroom an engaging environment. This scenario resembles the concept of banking-education (Freire, 1970), in which the professor is the central figure in the teaching and learning process. Even though students are willing to engage with the instructor and peers in learning activities, they expect the professor to create a stimulating environment. In other words, they place the professor as the responsible agent for making a class engaging. Anson and Miller-Cochran (2009) observe that implementing a collaborative-oriented course can be challenging because individuals have established assumptions about formal education that shape their expectations of learning settings. Therefore, the fact that students engage in peer-learning and cooperation on the Internet does not imply that they will naturally transpose these practices to the classroom.

Traditional premises also appear in some students’ relations to their grades. Davidson (2011) explains that grades started to be used in the nineteenth century and they were not very well accepted at that time: “In fact, quantifying grades was considered fine for evaluating lower-order thinking, but implicitly and explicitly was considered a degraded (so
to speak) form of evaluation” (p. 111). Nevertheless, grades play an important role in current education and my results suggest that students value them. For instance, when the professor explained the guidelines for a graded assignment, most students would sit in silence with their entire bodies facing her. One student mentioned the importance of figuring out the professor’s “grading style”. Another student classified herself as a “grade-grabber” who will do everything to receive an A. Grades attract students’ attention to the class even when the content is perceived as boring or unrelated to their personal interests. As Davidson (2011) states, attention is a learned ability shaped by “what we value, and values are a key part of cultural transmission, one generation to another” (p. 30). In accordance, my results indicate that the act of assigning a numerical valuation to students’ performance is a powerful tool for controlling their attention. However, this practice may result in students spending too much energy trying to please the professor in order to receive a good grade instead of focusing on the content they are learning.

Grades can make a topic relevant, but aesthetic attributes can make it appealing. Aesthetic values, such as beauty, are historically and culturally developed. In this sense, Drotner (2008) proposes that generations who have grown up in the Internet era have developed their own aesthetic sensibility: “children who grow up with a plethora of multimedia forms, and who in many cases create their own digital productions and interactions, are developing aesthetic sensibilities and insights that few ordinary schoolbooks can match” (p. 175). My results suggest that students have aesthetic standards that are influenced by their media consumption and, as Barbero (2009) points out, there is a gap between students’ experiences inside and outside the classroom. The following anecdote exemplifies this situation. During one class session I observed, the professor showed an
institutional video produced by the University, which explained why the writing course is part of the curriculum. The students had to take notes on the fields of study discussed and the differences and similarities in expectation between them. The students did not seem to enjoy the activity, as most of them attested, during interviews, that the video was boring. One student commented on the video’s aesthetics, saying that it was a “typical educational video” with a “weird” introduction.

My results indicate that technologies such as PowerPoint, digital images, and movies, break the monotonous flow of a lecture and help reengage students; however, they do not guarantee that learners will be interested in the topic. A successful example of technology use occurred when the instructor asked the students to utilize Prezi instead of PowerPoint in their final presentations. A great number of them were not familiar with the software, but they were extremely focused on learning it and preparing their presentations. During an interview, Rebecca told me that she liked using Prezi over PowerPoint:

I like the movements that it has and how you can create the shape and just put the shape into it, then create another shape connected together and it does like its own movements (...) You can use animations and transitions, in a whole other spectrum than the PowerPoint offers.

Traits of hyper life appear not only in students’ expectation of being aesthetically stimulated, but also in their low tolerance for boredom. This finding corroborates Hayles’ (2007) assertion that in a state of hyper attention individuals need to be constantly stimulated. In this sense, this study suggests that lectures can discourage students because they feel more stimulated when actively participating in the classroom. However, fun educational environments are not only created by the opportunity for participation, but also by the
blurring of the boundaries between serious work and leisure. This scenario was evident in some of students’ online conversations on Moodle and Google Docs in which they adopted an informal tone and mixed their discussion of class-related content with that of non-related topics.

The power balance in the classroom was the final characteristic of hyper life observed in this study. As de Castell and Jenson (2004) notice, in the past, students had to gain the professors’ attention, but now the power balance is shifting. For example, in the observed classroom, the professor was not the only source of information to the students, nor was she the only focus of attention in the classroom. Students relied on the Internet to find the information they needed when they were studying. For instance, one student would look for pieces of information online during the class time. One day I informally asked him why he sought the information online instead of asking the professor. He replied that the Internet was faster. During interviews, I asked students how much attention they thought they should give to the professor and how much to technology. Some of them answered 60% to the instructor and 40% to technology. Nevertheless, my results suggest that, even though the instructor had to compete with different attention grabbers, she was perceived by all students as a source of authority and knowledge, a status that played a role in shaping the classroom dynamics. For instance, students would stop using their technological artifacts when the professor explicitly requested them to. They would also try to hide when engaging in activities beyond the classroom’s scope. Some of them stated that not paying attention to the professor was rude.

In short, pre-digital revolution practices and expectations clash with practices and expectations form the hyper life and these two periods also favor different attention modes. Though individuals engaged in both hyper and deep attention in both periods, it was easier to
focus independently on leisure, rest, or work time before the development of the Internet and the widespread use of electronic mobile devices. In the same way, students did not have to deal with so many stimuli pulling their attention in different directions while studying. In this sense, Davidson (2011) argues that multitasking is the ideal attention mode for the twenty-first century. Hayles (2007) believes that we will have to learn how to manage both hyper and deep attention in order to thrive in the digital age. The changes advocated by these two authors are valid, but the risk of proposing a new attention model is the stigmatization of those who are unable to adapt to it. The inability to sustain a concentrated form of attention is currently framed as a social problem (Crary, 1999; Davidson, 2011; Hayles, 2007), but it is reasonable to assume that in the near future the ability to multitask will become a fundamental skill for individuals immersed in a technologically-rich landscape. In this future scenario, lack of speed might become a new problem. In other words, it is not absurd to imagine that speed deficit disorder might replace attention deficit disorder. Therefore, developing an attention model more appropriated to the twenty-first century does not guarantee that this model will be less normative than the old one. However, the following discussion regarding agency can help to approach this issue mindfully.

Agency

The power balance between students and instructors is shifting because information and communication technologies increase students’ agency by expanding their access to information resources through the Internet and mobile devices. However, this study suggests that having access to technological artifacts does not mean that learners have unlimited agency. Data analysis showed that participants in this study were not always the final agents in deciding what to focus on. They reported on many occasions that they were unable to
accomplish what they wanted or needed to because they were dealing with many distractions. This situation is evident in Chelsea’s report: “If I’m on the Internet, I really wanna play this game, but I have homework to do, so I go back and forth for 30 minutes and realize that I didn’t get nothing done on either I wanna do”. Chelsea’s statement illustrates that sometimes participants become trapped in a back and forth movement in which they are not really engaging with any task. Crogan and Kinsley (2012) point out that an attention economy is not seen as problematic because it assumes that one has the freedom to make rational choices; “however, once that causality is problematised a range of issues opens up concerning the commodification of cognition as such” (p. 13). Similarly, this study indicates that attention is negotiated in relation to environment, other people, social norms, power relations, technologies, aesthetics, and value judgments and it is important to take all of these aspects into consideration in order to conduct productive debates concerning education. In this sense, collective actions might be needed in order to alter the configuration of attraction forces presented in my conceptual model. For instance, the idea that the professor should be placed at the center of students’ attention was historically developed and can be changed through the cooperation of educators, learners, and policymakers. This type of cooperation has a transformative potential that goes beyond the individual strategies adopted by participants in this study. All of the participants avoid stimuli while concentrating on academics and few of them reported being able to simply ignore distractions. For instance, Tiago said that he could concentrate when writing or programming. Clarissa could lose awareness of her surroundings when she was actively multitasking with her entire body. Their descriptions of these experiences were free from words such as anxiety, struggle, or battle. The conceptual framework adopted in this study assumes that agency emerges from
the interplay between the self, other people, the environments, and tools. In this sense, our choices and actions cannot be separated from these interactions; however, these students’ accounts suggest that the nature of interactions does not determine their experience. In other words, being in an environment with a myriad of stimuli does not necessarily mean that we have to experience conflict. However, this study did not generate enough data to make claims regarding these reported experiences.

**Limitations and Future Directions**

This study adopted a conceptual framework that assumes technical and social practices to be deeply interconnected. This allowed me to go beyond technological deterministic assumptions and human centered discourses. In this sense, the human-subject in this study is understood as a product of social interactions that occur across bodies and tools. This framework also allowed me to go beyond the dichotomy between attention and distraction. The behaviors we define as either attention or distraction vary according to different historical moments. In the first chapter, I showed how students are blurring the lines between attention and distraction by saying that a professor calling out a student in class can be a disruptive action. In the hyper life scenario, distraction is a circumstantial notion. Are electronic mobile devices distracting? This question cannot be answered abstractly. Therefore, the idea of gravitational forces (Wise, 2011) acting upon our attention is a powerful descriptive tool explaining how attention is managed and negotiated. Wise (2011) clarifies that even though attention has a profound cognitive component, it is an embodied practice that goes beyond the sensorial awareness. In my study, I realized how multiple attraction forces influence what the participants experience as attention. However, I could understand how these same attraction forces acted upon their bodies. In order to capture this
type of data, I probably would need to rely on methods such as videotaping students’
classroom practices in order to repeatedly observe their body movements.

Nevertheless, the strengths of my methodological choices rely on the fact that I
observed students’ classroom practices in situ. Therefore, I was able to compare their reports
with my own observations. However, the information about students’ learning practices
outside the classroom was obtained only through interviews and it was not possible to
compare what they said with field observations. The findings of this case study are not
representative and are not transferable to a larger population. Moreover, the period of
fieldwork was short and did not allow for a complete understanding of all the elements
involved in the negotiation of attention. For instance, two students reported experiencing an
attention state in which they were able to focus on a task and ignore inside and outside
stimuli. Even though it is not possible to explain the elements involved in their reports, it is
likely that they can provide insights related to human-subjects’ agency. These students
achieved this state while performing activities related to some of their deepest aspirations in
life. However, it is not possible to establish a direct connection between the tasks they were
performing, their meaning, and the attention pattern. Therefore, more research is necessary to
illuminate this topic. In the next chapter, I will discuss the implication of this study and
present my conclusions.
Chapter 6: Conclusion

The results discussed in the previous chapter show that conflicts related to attention fluctuation emerge mainly from a clash between two ways of organizing life. On the one hand, there is a pre-digital revolution configuration that draws distinctions between work and leisure, private and public, professional and personal. On the other hand, there is a hyper life in which we are constantly connected through electronic devices and the Internet. The challenges that educators face daily in their classrooms do not result from a confrontation between an old paragon of education and learners born in a hyper world. Students and schools are embedded in a technical and socioeconomic configuration in which two conflicting models coexist. This is an important starting point for discussing change in education. All the students in this study were born after the Internet’s diffusion and, though their practices are influenced by the technological landscape surrounding them, their ideas about life and education are not void of concepts and expectations of a pre-Internet era. The results of this case study suggest that this new generation will need to adapt to a new school model the same way that schools will need to adapt to the generation born in the Internet age.

As technology becomes ubiquitous and works its way into our daily routines, it is likely that hyper life traits will become exacerbated. However, the boundaries in this new scenario are not yet established. How do we achieve a balance when technology creates the condition for constant co-presence? An incident that happened during my fieldwork illustrates this concern. During an in-class activity, the instructor asked the students to brainstorm about what they would to change in their University. A student wrote on Google Docs that streaming porn on the University’s Wi-Fi should be allowed. His colleagues took his statement as a joke. Nevertheless, during an interview, as a student was disclosing his
opinions about technology use in the classroom, he proved to be favorable towards a carefree policy. Even though he would allow students to choose what to do during class time, he commented that some limits should be respected and that porn should not be watched inside the classroom. This anecdote raises the assertion that technology use is influenced by sociocultural values. These questions pertain to education debates because schools are spaces in which socialization happens. Modern institutions, such as schools and families, are losing their strength (Barbero, 2009); however, the educational system still has a fundamental role in socializing individuals. In synthesis, schools can play an active role in helping to shape what the future might become.

Schools might have to reengage students’ attention in order to play an active role in shaping the future. This study suggests that the focus of students can be regained through the use of aesthetic elements and collaboration. My results also indicate that grades are powerful tools to maintain students’ attention, but they can make learners focus more on pleasing the professor rather than engaging with the class content. Therefore, educators might consider the possibility of developing other tools to both engage students and evaluate their performance. Nevertheless, the discussion of how to rearrange students’ attention could be linked to debates about education’s mission in order to produce deeper reflections on the role of schools in the twenty-first century. Paulo Freire (1970) believed that education could be transformative and set individuals free from oppression. In an analogous way, is it possible to negotiate students’ attention without imposing an ideal model of how they should focus? In other words, is it possible to create an attention model that is not normative? Freire (1970) assumed that individuals could overcome ideologies imposed by dominant classes in order to become free. He believed this goal could be achieved through conscientização (Freire, 1970)
that it is the process of becoming aware of social, economic, and political contradictions followed by actions taken to overcome them. However, this study is based on different assumptions and advocates that individuals are not autonomous, but co-constituted in relation to the environment and sociotechnical practices (Wise, 2011). Yet, I believe that schools could help to increase learners’ individual and collective agency by stimulating their critical awareness of their presence in the world. As a consequence, the conflicts experienced by the participants in this study could be eased by raising their awareness of the forces acting upon their own attention. My conceptual model scrutinizes attraction forces influencing the attention of a specific group of students. Nevertheless, individuals exposed to different cultural and sociotechnical configurations might have to deal with different attraction forces. Therefore, we should not assume that these attraction forces are pre-determined but that they can be identified through reflective practices such as meditation. In this regard, Daniel Spiegel (as cited in Rheingold, 2012) suggests that we should cultivate “mindful awareness” that allows us to focus attention to our “here-and-now experience”.

Minding the clash that results from the interplay of social and cultural forces shaping attention is a first step but it is necessary to take actions to overcome attention conflicts in formal learning settings. The educational system might have to adapt classroom models in which the professor is placed in the center of students’ attention to allow new forms of cooperation between learners and instructors. In this sense, collaboration could provide greater results if students understand their role as agents inside and outside the classroom. My results suggest that students actively use the Internet and mobile devices, but they do not see themselves as agents responsible for changing classroom dynamics. Therefore, instructors can help students to increase their agency through dialogue that can only be
imparted with love, humility, and faith in humankind (Freire, 1970). This approach can help learners to find their own ways to participate and contribute to cultural, social, and economic dynamics in the Internet era can help them to not only adapt to the status quo, but also execute changes. In conclusion, I want to request three more seconds of your attention to ask: shall we cooperate?
REFERENCES


Presentation script

Please provide your email address below:

Email: ___________________________________________________________

Research Description Script

“Hello, my name is Cristiane Damasceno and I am a graduate student here at NC State. With your instructor’s permission, I will be conducting a research study that will explore students’ classroom practices and self-reports related to attention when attending to academic topics in a technologically rich environment. I will observe your classroom dynamics during the semester. I will not interact with students during classes; however I will observe and takes notes of the interactions that happen inside the classroom. On occasion, with the permission of the instructor, I will record some of the class discussions.

Also, I would like to conduct two interview sessions with each student volunteer. The interviews will take place in a private meeting room and will be tape recorded. Each interview should take no longer than 45 minutes to complete. All data collected will remain confidential. Participation in this research study is not part of your course requirements and is voluntary. All participants must be 18 years of age or older in order to participate in the interview sections. Please, notice that your email will be used just to provide you with more information about this study. It does not mean that you agree to participate in the study. Students who want to participate in the interview sections will have the study explained to them further and will be asked to sign a consent form.”

Thank you very much for the opportunity to discuss my research with you.

___ I want to learn more about participation in the interview sessions
___ I do not want to participate in the interview sessions
Interview Questions

Interview 1 (Students):

1. Could you describe me the typical things you do in a class? Start from the beginning-- you walk in...

Follow up:
2. I want to better understand specifically what you pay attention to during class. So, if I attached a camera to your eyes during classes, what kind of movie would it show me in terms of where you look, what you listen to? (or something)

Follow up:
3. If I could look at your laptop/iPad/tablet screen (I will need to adapt the device according to the participant) during the class time, which internet windows or programs I would see?

Follow up:
4. Don't worry-- remember, none of these answers will get back to your teacher. How would you be using them?

5. Think about a time when your teachers used some form of technology in this course. Can you describe what you focused on when your teacher was using this technology?

6. Think about a time in this class when something happened that caught your attention and made you focus on it. Describe that experience for me.

7. Think about a time in this class when you zoned out and stopped paying attention to what was happening in class. Please describe that experience for me.

8. Now let's talk a bit more broadly beyond that example. As a student, I have already been in classes that make me pay more attention to what the professor is saying and others that make me want to focus my attention in different things. I imagine that as a student you have been in the same situation. Could you tell me the differences between a class that catches your attention from one that it does not?

9. Now I'd like to talk with you about your learning activities/study activities outside of the classroom... Where do you typically study when you are outside the classroom?

Follow up:
10. Could you describe me how is your study environment outside the classroom in terms of physical space, sounds, temperature, available technology?
Follow up:
11. Do you usually study alone or with other people?

Follow up:
12. If I could look at your laptop/iPad/tablet screen (I will need to adapt the device according to the participant) during study time, which internet windows or programs I would see open?

Follow up:
13. How would you be using them?

14. If you compare the ways you use technology to study inside and outside the classroom, what are the differences and similarities?

15. Pretend I am a new student here at NCSU and I have no idea what to pay attention to in classes here. What suggestions would you give me in terms of what to focus on?

16. What suggestions would you give me in terms of how much focus I should give to technology?

*Interview 2 (Students):*

1. This classroom has its own policy regarding the use of cellphones, laptops (I will briefly describe the policy). Now, imagine that you are the instructor for this class and you need to create a policy regarding the use of cell phones/laptops etc. Could you describe me how this policy would be?

Follow up:
2. In your opinion, what are advantages of your policy in comparison with the policy proposed by the instructor?

Follow up:
3. How about the disadvantages?

Follow up:
4. How is this policy similar to or different from the ways in which you use technology when studying outside the classroom?

5. You are almost at the end of the semester. Could point out the 3 main things that you learned in this class? Notice that you do not need to restrict your answer to theoretical or academic content. You can include professional, practical, or life experience that you might developed during this summer course.

Follow up:
6. Which of these lessons do you think will be most useful to you as you leave this class and how will it be useful?
Follow up:
7. Could you give me an example of a type of situation where you would apply each one of these lessons?

8. This is your first semester as a undergraduate student at NCSU and you gained some experience during these weeks. If you could give an advice for students in their first day of class, what would you tell him/her to make them succeed in this classroom?

Follow-up:
9. Thinking more broadly, what would be the advice to make them succeed in college?

Interview (Instructor):

1. How are you planning to structure your classes (lectures, debates, classes activities)?
2. Could you provide me an overview of the assignments that you are planning for this course?
3. How do you intended to incorporate technology in your course?
4. What are the pedagogical purposes of the use of this technology in your classroom?
5. What is your policy regarding the use of cell phones/laptops/etc. in the classroom?
6. Can you think of an experience teaching when you knew you had the classes FULL attention. Describe that.
7. Can you think of an experience teaching when you felt like you lost the attention of the class. Describe that.
8. In your experience teaching, what do you think students want to pay attention to in class?
9. In your ideal classroom, what would students be paying attention to in class?
10. What do you think the role of technology is in getting, maintaining or distracting students' attention?