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Selected Student Characteristics Related to Academic Cell Phone Use

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A dissertation

presented to

the faculty of the Department of Educational Leadership and Policy Analysis

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education in Educational Leadership

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by

David C. Pauley

December 2015

Dr. Pamela Scott, Chair

Dr. Rosalind Gann

Dr. Eric Glover

Dr. Donald Good

Keywords: Student Characteristics, Cell Phone Use, Mobile Learning

ABSTRACT

Selected Student Characteristics Related to Academic Cell Phone Use

by

David C. Pauley

The researcher addressed the need for understanding student perceptions and habits of academic cell phone use within a high school environment in regards to student characteristics. Data were gathered and analyzed in order to answer research questions regarding student perceptions of: (a) the usefulness of cell phones as an academic tool, (b) the use of cell phones within school and outside of school for academic purposes, (c) the encouragement of cell phone use to complete assignments, (d) the potential for distractions within the classroom occurring from cell phone use, and (e) the functionality of cell phones for completion of school work. A quantitative research design was used in this study. Data were collected through the employment of a researcher-designed cross-sectional survey to gather data from one point in time from 175 respondents. Quantitative data were analyzed by frequency distributions and cross tabulations of responses to closed-end survey questions. It was found that students favored the use of cell phones for academic purposes. The implications of this study show the potential for expanded cell phone use as academic tools in high schools as a medium to promote mobile learning.

DEDICATION

I dedicate this work to my parents, Gwen and Michael Pauley, and to my wonderful stepmother, Kriss Pauley, as well as my family, who have been my cheering section throughout this endeavor. They have always supported me in my academic pursuits.

This dissertation is also dedicated to some very important people who have influenced many of my decisions in life. My first inspiration is Mr. Terry Baker, my high school drafting teacher who gave me the academic freedom that inspired me to go into education. Mr. Baker encouraged me to pursue projects beyond what was required, provided direction only when necessary, and supported me with every challenge. My inspiration to pursue educational leadership is in great part dedicated to Dr. Linda Stroud. Dr. Stroud has demonstrated courage and integrity in leadership that has always placed the needs of the student first. Lastly, I dedicate this dissertation to the administration, faculty, and staff of Greeneville High School who remind me every day why I went into education.

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I would like to specifically thank Dr. Scott for being my chair and for never giving up on me. Even though I "took the scenic route" in my pursuit of this degree you never let me forget where I was going and that you were watching. I still remember the paper on mindfulness that you had me complete during my coursework, and no better example of that topic exists than my awareness of my goal and its relationships to all that surrounded me during this journey.

I would also like to thank Dr. Jason Horne, who beat me to the degree and never let me forget it. I will always appreciate your support in slaying this beast.

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CHAPTER 1

INTRODUCTION

We have become an increasingly mobile society. In a recent Pew research report, as of September 2013, cell phone ownership among teens has risen to 78%, led only by adults ages 18-29 with 93% owning a cell phone. The rate of cell phone growth among 12-17 year olds tripled between 2004 and 2010, with 58% of that age group owning a cell phone by the latter year (2010). Increasing integration of personal mobile technology into the school and classroom has led to an increased interest in mobile learning among educators.

Many researchers (Sharples, Traxler, Taylor, for example) have studied this pedagogical phenomenon. However, there is debate with fitting it into the context of education. Defining mobile learning is an evolving process, which ranges from characterizing it as an extension of preexisting electronic learning (elearning) (Brown, 2005; Mostakedemin-Hosseini & Tuimala, 2005; Trifonova & Ronchetti ,2003), to a device-driven or techno-centric phenomenon (Nyiri, 2002, Pinkwart, 2003; Quinn, 2000). The literature indicates that no common definition can be made due to the complex and 'noisy' nature of mobile learning (Traxler, 2007).

Despite the difficulty in defining mobile learning, agreement exists regarding which devices are a part of mobile learning; these include cell phones, iPods, smartphones, handheld game consoles, and handheld computers (Kukulska-Hume & Traxler, 2005; Winters, 2006). The fact that 78% of teens in the United States now own cell phones (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013) indicates the increasing reliance on the use of cell phones as learning tools and provides possibilities for increased student engagement and interaction across many academic realms. Recent innovations in phone software and applications using Web 2.0 technologies (interactive digital architecture such as Facebook and Twitter), have added further

utility to the cell phone. A total of 37% of American youth ages 12-17 own a smart phone as opposed to a standard cell phone, an increase of 23% from 2011 (Lenhart, 2012). Of teens who owned internet capable phones, 74% said they used the Internet through their cell phone, tablet, or other mobile device compared to 55% of adults (Lenhart, 2012).

Statement of the Problem

The purpose of this study is to investigate mobile learning habits of students and their perceptions of mobile learning through the use of cell phones within the school environment. The population of this study is comprised of high school students in a school that allows the use of cell phones and mobile devices as learning tools and the subsequent integration of cell phone use into the school's academic environment. Student use of mobile technologies, along with current student perceptions of mobile learning, contribute to a better understanding of the impact of the current implementation of mobile learning throughout the student population of the school.

Research Questions

The purpose of this study is to investigate mobile learning habits of students and their perceptions of mobile learning within the school selected school environment. The research questions guiding this study were used to ascertain student perceptions of mobile phone use in a high school which allowed cell phone use in the classroom at teacher discretion. Student characteristics within this study were defined as: cell phone ownership, type of cell phone possessed by the student, gender, grade level, qualification for free and reduced lunch, and whether or not students had a working PC at home.

Research Question 1: Is there a significant difference in the perceived usefulness of cell phones as academic tools and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

$Ho1_1$: There is no significant difference in the perceived usefulness of cell phones as academic tools and student characteristics.

Research Question 2: Is there a significant difference in students' use of cell phones as an academic tool and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

$Ho2_1$: There is no significant difference in students' use of cell phones as an academic tool and student characteristics.

Research Question 3: Is there a significant difference in students feeling encouraged to use cell phones to complete academic assignments and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

$Ho3_1$: There is no significant difference in students feeling encouraged to use cell phones to complete academic assignments and student characteristics.

Research Question 4: Is there a significant difference in the perceptions of cell phones posing classroom distractions and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho4$_1$: There is no significant difference in the perceptions of cell phones posing classroom distractions and student characteristics.

Research Question 5: Is there a significant difference in students' perceptions of functionality of their phone to performing school related tasks and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho5$_1$: There is no significant difference in students' perceptions of functionality of their phone to performing school related tasks and student characteristics.

Research Question 6: Is there a significant difference between students' use of cell phones outside of school for school related purposes and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho6$_1$: There is no a significant difference between students' use of cell phones outside of school for school related purposes and student characteristics.

Research Question 7: Is there a significant difference between students' use of cell phone use at school for school related purposes and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho7$_1$: There is no significant difference between students' use of cell phone use at school for school related purposes and student characteristics.

Research Question 8: Is there a significant difference between students' use of cell phones at school for non-school related activities and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho8$_1$: There is no significant difference between students' use of cell phones at school for non-school related activities and student characteristics.

Research Question 9: Is there a significant difference between students' distraction of other students cell phone use in school and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho9$_1$: There is no significant difference between students' distraction of other students cell phone use in school and student characteristics.

Research Question 10: Is there a significant difference between students' distraction of their own cell phone use in school and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho10$_1$: There is no significant difference between students' distraction of their own cell phone use in school and student characteristics.

Limitations and Delimitations of the Study

Certain limitations existed regarding this study. Due to the nature of the population chosen for this study, the participants' age required signed parental consent which may have prohibited the inclusion of all individuals within the study population. The possibility also existed that the survey instrument would not be answered to reflect the individual's actual perceptions toward the subject. Student participation in the study was voluntary.

The survey instrument used was developed specifically for this study and has not been tested in other research. Therefore, there may be unintentional bias or limitations in its wording, semantics or other aspects of the instrument. To reduce the possibility of such limitations, the survey was piloted to a group of teachers at the high school in the study. Improvements and corrections were made based upon their feedback to increase the instrument's validity.

At the time of this study the researcher was employed by and taught within the school system where the research was conducted. As a result, researcher had daily interactions with some of the participants in this study. A drawing among participants to win an iPod Touch was used as an incentive to complete the survey. The give-away was facilitated by the drawing of tickets given to the participant at the time of survey completion. Therefore, results may reflect respondents' motivation to obtain a prize by completing the survey rather than their true perceptions.

Definition of Terms

The following terms are defined according to the literature and their usage within this study.

Bluetooth: A wireless technology enabling short-range communication between two Bluetooth enabled devices. Developed in 1994, it has been built into billions of products providing connectivity of devices.("Bluetooth," 2014).

Electronic Learning: Often abbreviated to e-learning and is defined by teaching and learning activities using electronic media and services (Sharples, O'Malley, Vavoula, & Waycott, 2006).

Mobile Learning: Often referred to as m-learning. Though a complete definition has not been agreed upon within the literature, this study defined it as learning through the use of mobile devices and the organization and interrelatedness of knowledge (Nyiri, 2002; Quinn, 2000; Traxler, 2007; Winters, 2006).

PDA: Abbreviation for personal digital assistant. It is a handheld computer that operates as a personal information manager. Some offer email and Internet services (Nyiri, 2002; Quinn, 2000; Traxler, 2007; Winters, 2006).

Smartphone: For the purpose of this study a smartphone is defined as a cellular phone with the ability to perform many functions of a computer, able to be held in one hand, supports cellular and Wi-Fi connectivity, and is capable of downloading and operating third party applications (Jubien, 2013).

SMS: Abbreviation for short message service and often referred to as texting or text messaging. This term represents the ability of a device to send and receive short (often 160 character) messages (Broinowski, 2006).

Web 2.0: The Internet viewed as a more interactive experience in the form of blogs, wikis, and social web services than simply accessing information (Bobish, 2010).

Significance of the Study

Research determining if mobile learning has a positive impact on student learning is needed. To fully understand mobile learning, it should be studied in the context of current academic device policies, device utility and use, and student perceptions of its implementation. The purpose of this study is to investigate mobile learning habits of students and their perceptions of mobile learning within the school environment.

Data and findings that resulted from this study may provide insight to the mobile learning environment of the study school and broaden the body of literature on mobile learning. Data gathered in this study can be used to gain insight into the student perceptions of mobile use and mobile learning. In addition, other researchers studying perceptions and student use of mobile learning may use the findings provided by this study. Student perceptions of mobile learning provide researchers with an additional approach to their studies in mobile learning or mobile device use.

Organization of Study

This study is organized into five chapters. Chapter One includes the introduction, the statement of the problem, limitations and delimitations, definition of terms, research questions,

and the significance of the study. Chapter Two contains the review of related literature used in this study. The methodology of the study is contained within Chapter Three. Data and findings are reported in Chapter Four. Chapter Five includes the summary of findings, discussions of findings, implications for practice, conclusions, limitations, and recommendations for future study.

CHAPTER 2

LITERATURE REVIEW

Mobile Learning Perspectives

One of the problems in defining mobile learning (m-learning) is the lack of common agreement as to what mobile learning entails. Laouris and Eteokleous attempted to demonstrate the multitude of meanings currently in use for mobile learning during 2005. As part of their research, they conducted a search using the online search engine, Google, using the formula {+mobile learning"+definition} that yielded 1,240 results. The same search was then conducted just six months later using the exact search specifications resulting in 22,700 results. The authors summarized their findings by stating that the meaning of mobile learning is greatly dependent upon the context in which it is taken or the person who is asking (Laouris & Eteokoeous, 2005). El-Hussein and Cronje (2010) also posed the impossibility of attributing a fixed meaning to the concept of mobile learning.

Traxler (2007) stated that the development and conceptualization of a definition of mobile learning is a "noisy" (p.6) phenomenon. Traxler (2007) described the problems encountered in defining mobile learning as often due to personal, contextual, and situational views of mobile learning, making evaluation a difficult phenomenon. Developments in mobile and digital devices focused more on social communication, resulting in fewer people regarding it as a core pedagogical activity (El-Hussein & Cronje, 2010). Other attempts at defining mobile learning focused on technologies and hardware. Some definitions went on to draw comparisons between mobile learning and electronic learning (e-learning) while other definitions in the

literature of mobile learning focused on the learners' experience using mobile devices in an educational setting (Traxler, 2007).

Technocentric Approach

Technocentric definitions are prevalent throughout the literature of mobile learning; these definitions tend to focus directly on student learning using mobile technologies (Nyiri, 2002; Pinkwart, Hoppe, Milrad, & Perez, 2003; Quinn, 2000; Winters, 2006). One definition described mobile technologies in education as providing services that deliver both general and educational content to learners electronically, subsequently allowing learners remote access to content from any location and at any time (Lehner & Nosekabel, 2002). Mobile devices have integrated multiple informational capabilities that include multimedia communications combining voice, text, and pictures (Nyiri, 2002). The ability to integrate these functions into small portable devices, combined with innovations in Web 2.0 software and social networking sites have further added to the utility of mobile devices (Park, 2011; Piotrowski, 2013).

Mobile learning in the technocentric definition centers on the use of mobile or wireless devices enabling learning on the move (Kukulska-Hulme & Traxler, 2005). These mobile devices participate in a network overlaying the same physical space as the learners (Roschelle, 2003). Functionalities of mobile devices often include the integration of a camera, telephone, short messaging service (SMS), multimedia messaging service (MMS), global positioning system (GPS), Internet connectivity, audio players, media players, and various file and calendar organizers (Trinder, 2005). The distinction between the perception of mobile and wireless devices was addressed by Kim, Mims, and Holmes (2006) whereby they described the differences between mobile and wireless devices by simply observing that all mobile technologies are wireless; however, not all wireless technologies are mobile.

Device oriented definitions of mobile learning offer insight into the role of technology and its integration into student learning. Sharma and Kitchens (2004) defined mobile learning in the context of mobile devices supporting learning, in which the ubiquitous nature of the devices and the intelligent user interfaces enabled the learner to have ready access to information. The prevalence of mobile devices and the role they play in the defining of mobile learning is evident in later definitions by Attwell & Savill-Smith (2005). They defined mobile learning as using wireless technological devices that have the ability to be "put in your pocket and [forgotten]" (p.146) but used whenever the device is needed, although the device constantly receives uninterrupted transmission of electronic signals or service. This inference as to the size and habit of carrying mobile devices delivered one of the rising arguments against the use of a technocentric definition of mobile learning. Traxler (2007) wrote that learners habitually and unconsciously carry devices such as iPods, cell phones, and PDAs but will seldom carry Tablet PCs or laptops without having a premeditated purpose as to their use. The ease of use of mobile devices was further observed by Van't Hooft and Vahey (2007) when they premised that highly mobile devices were operable by students by using one hand, carried on the person from location to location, and accessed at any time to solve educational tasks without having had the intent to carry it for that specific purpose.

While providing insight to mobile learning, technocentric definitions are arguably limited by their constrained definition of learning to "technological instantiations" (p. 4) of the device (Traxler, 2007). In another study, Walker (2006) wrote that defining mobile learning went beyond the mere use of portable devices. The mobility of the learner has grown in importance to where the device itself does not constitute mobile learning, but that learning is mediated through the mobile device (Winters, 2006). Traxler (2007) further espoused this idea by describing

educational uses of mobile devices as "parasitic" (p.6), as it is a secondary use of technological devices that are primarily designed, manufactured, and marketed for uses that are more social, corporate, or recreational. Recognizing the varying technocentric definitions of mobile learning provides insight into the challenge of defining mobile learning. The attempt to fit a definition to mobile learning is abstract enough to call for the recognition of the origins of the technology, systems, and infrastructure that made mobile learning possible, yet also call for a focus on the learning that actually takes place because of these technologies (Traxler, 2009).

Characteristics of Mobile Learning

The relationships between the user and the device were noted by Kirschner (2002), in examining the educational affordances of the device and attributed that the characteristics of a device determines if and how learning can take place. These educational affordances can be defined in the properties and characteristics of the learner that enable specific types of learning to occur (Kirschner, 2002). Similarities exist in the examination of the technical aspects of mobile technologies and the examination into the characteristics of mobile learning in that there is no agreed upon standard within the literature concerning mobile learning.

Mobile technology and learning look to bridge human and machine interaction within a social context. Koschman's (1996) analysis of the role of computers divided the interactions of people and machines into three categories: tutor, tutee, and tool. The latter placed the computer in a mediating capacity, as it neither controlled the user nor was the user in control of it (Koschman, 1996). In this bridging of human and machine interaction, the ability to select activities based upon learning opportunities (Leung & Chan, 2003) allows the individual to take initiative of knowledge acquisition (Chen, Kao, Sheu, & Chiang, 2002). Traxler (2005) referred

to this taking of control by the person as an individual and personalized characteristic of mobile learning, meanwhile Keegan (2005) supported that one of the characteristics of mobile learning is that people regard the use of mobile devices as friendly and personal. Combining the user and the mobile device together as opposed to observing the use of the device by the user was also seen as an approach to study mobile learning (Sorensen, 2009).

The merging of machine behavior and mobile technology is the combination of the ability for learners to both consume and create information collectively and individually (Koole, 2009). Individual learning is merged with the input and knowledge of others through mobile learning. The collaborative ability of mobile learning, enabling students to connect with others, allows learners to absorb information and knowledge from one another (Leung & Chan, 2003). Diverse communications systems and data synchronization allows users to stay connected and build learning communities (Pea & Maldonado, 2006).

The widespread distribution and ownership of mobile devices is another important characteristic of mobile learning. Chen et al. (2002) called the urgent necessity of learning by the student a primary characteristic of mobile learning. This urgency demands that the device be available at all times to the learner. Devices must therefore be carried everywhere the learner goes and used consistently in all areas of life and not just for educational means (Keegan, 2005). Keegan's definition closely mirrored Traxler's (2007) insistence that educational use of mobile devices is both parasitic and secondary in nature. Further characteristics attributing to the omnipresence of mobile devices include portability, small screen size (Keegan, 2005; Pea & Maldonado, 2006), light weight and informal (Traxler, 2005).

Mobile Learning (m-learning) and Electronic Learning (e-learning)

Literature referring to the relationship of mobile learning (m-learning) to electronic learning (e-learning) includes arguments describing mobile learning as simply an extension of e-learning, to those that posit mobile learning as a separate and emerging entity. Developments in the implementation of e-learning pose questions in regards to how knowledge is organized and interrelated (Traxler, 2007). This is further divided by two arguments: wireless delivery and wireless devices are predicted to become the dominant delivery system, (evolving e-learning into m-learning without changing the delivered content) and the argument that mobile learning is dependent upon the search for specific knowledge directly influenced by location and situation (Nyiri, 2002).

Trifonova and Ronchetti (2003) stated that there was a common agreement that mobile learning consisted of e-learning through mobile devices, making m-learning part of e-learning. Trifonova and Ronchetti (2003) cited the use of PDAs, cell phones, and any autonomous device carried by a person and used unobtrusively in everyday activities for some form of learning, allowing people to interact, access content, data, and services much like e-learning. Brown (2005) further summarized several definitions and terms related to mobile learning and concluded that they grouped m-learning as an "extension of e-learning" (p.299). Other authors see the progression of mobile learning as a natural evolution of e-learning, with the use of mobile devices in education as simply the continued use of enhanced devices (Mostakhdemin-Hosseini & Tuimala, 2005).

However, opponents of this direct linking of m-learning to e-learning pose several arguments. Winters (2006) argued that many of the e-learning to m-learning definitions do not place emphasis on the unique nature of mobile learning, often creating all-inclusive definitions.

This is in agreement with Traxler's (2005) assessment that these definitions only place m-learning within a portability spectrum of e-learning. Later, Traxler (2007) noted that the shape and geometry of mobile devices could prevent a direct comparison of m-learning to e-learning because mobile devices were not originally intended by their creators to act as electronic learning devices. The learners' experiences, in conjunction with the informal nature of mobile devices and the inherent ownership of these devices, act to set it apart from the stationary and often inaccessible nature of location based e-learning (Traxler, 2007). E-learning provided through personal computers means that computers themselves are not mobile and the availability of those devices is not a constant resource available to the learner because their portability is limited and such devices are often shared. Mobile learning occurs within the context of anywhere and anytime, creating contrast to the static nature of e-learning. In addition, the nomadic and mobile nature of mobile learners is a distinctive feature, straying from the oft-traditional teacher-centered classroom organization and fixed location of learning within the classroom (El-Hussein & Cronje, 2010).

Mobile Learning Theory Development

Growth in research, development, and use of mobile technologies in education created the need to develop a new framework to conceptualize mobile learning. Personal mobile learning distinguishes itself from traditional learning methods, and from previous concepts of the interaction that takes place between a person and mobile technology (Taylor, Sharples, O'Malley, Vavoula, & Waycott, 2006). With these changes arrive the need to recognize the role of mobility and communication within the process of learning, along with the importance of context, and the effect of mobile networks in supporting virtual communities (Sharples, Taylor,

& Vavoula, 2005). Despite the fact that no definitive theory of mobile learning exists in current literature, several authors present research on the development of frameworks to base such a theory (Sharples et al., 2005; Taylor et al., 2006). Although the role of theory is a contested topic, the establishment of a theory of mobile earning would provide a starting point for the development of evaluative methodologies that take into account the unique attributes of mobile learning (Traxler, 2007). The lack of consistency within literature about mobile learning is discussed in the literature and varieties of perspectives emerge. These, in turn, affect the choice of methods employed by researchers to understand user experience. The ability to gather data about mobile technology is complicated by the absence of a fixed environment such as a framework. Instead, researchers need to account for the physical movement of the learner as well as the changing geographical location of the user (Hagen, Robertson, Kan, & Sadler, 2005). The mobile, personal, contextual, and situated nature of mobile learning makes it 'noisy', which makes it problematic to both define and evaluate (Traxler, 2007).

An established framework for the development of a mobile learning theory would enable the assessment, pedagogy, and design of mobile learning applications. Klopher, Squire, and Jenkins (2002) in their study of the virtual context created by handhelds posited the integration of a mobile device's portability, social interactivity, context sensitivity, connectivity, and individuality created unique educational possibilities. Naismith, Londsale, Vavoula, and Sharples (2006) further suggested that in order to fully understand the potential of mobile technologies observations must look further than just the use of the mobile device. They suggest observation of the use of mobile technologies embedded within classroom practice or learning experiences outside of the normal classroom procedures as key to understanding the potential of

mobile technologies. This followed earlier work by Sharples et al., (2005) who proposed standards for examining such a theory. In their work, these researchers suggested five standards:

- Is it significantly different from current theories of classroom, workplace, or lifelong learning?
- Does it account for the mobility of learners?
- Does it cover both formal and informal learning?
- Does it theorize learning as a constructive and social process?
- Does it analyze learning as a personal and situated activity mediated by technology? (Sharples et al., 2005, p. 4).

Behaviorist Theory

The application of a behaviorist theory toward mobile learning is reliant on activities that promote student learning as an observable change of actions. Mobile learning within the behaviorist approach is facilitated through the interaction of the learner with a stimulus and a response (Smith & Ragan, 2005). The presentation of a problem and the resulting contribution of the learner are followed by a form feedback satisfying the stimulus, response, and reinforcement qualifications of the behaviorist model (Naismith et al., 2004). Examples of content delivery within the constructivist focus includes the use of SMS and voice recordings for drill and feedback, quizzes and practice (Keskin & Metcalf, 2011). The use of mobile phones and PDAs for teaching English among Japanese university students showed overall positive interaction with the learning medium as content delivery, student interaction, and feedback were performed through mobile technologies (Thornton & Houser, 2005).

Constructivist Theory

Mobile technologies also align with the constructivist theory of education in that they enable the student to approach learning as an active process; students construct their own ideas and concepts based on their past experiences as well as their current knowledge (Naismith et al., 2004). Mobile devices facilitate a constructivist environment by promoting communication and social skills, requiring the development of dialogue and collaboration amongst participants. Mobile devices are supportive of the constructive principle by allowing each student to possess part of the relevant information needed to complete the educational goal. The active principle is provided by the ability of the mobile device to enable participants to engage in the construction of the answer. Significance in the problem is defined by the educational objective, allowing the mobile device to act as a supportive tool enabling reflexive communication among students (Zurita & Nussbaum, 2004). These qualities are in support of educational theories of social constructivism where emphasis is placed upon the social context as to how the learner constructs their own learning (Vygotsky, 1978). The interactive multimedia aspects of mobile devices, such as the ability of mobile phones to send and receive media via MMS and SMS, enable the collaboration and construction of individual and group learning (Keskin & Metcalf, 2011; Low & O'Connell, 2006).

Situated Learning

Learning addressed through mobile learning is heavily situated, meaning "whenever there is a break in the flow of routine daily performance and the learner reflects on the current situation, resolves to address a problem, to share an idea, or to gain an understanding" (Sharples, 2000, p. 178). Mobile technologies have enabled learning to occur whenever a person has a

problem to solve, or information to share collaboratively regardless of their location. The portability of mobile devices and features enables the learner to move about outside the confines of the classroom and still connect with information and peers. The focus on learning is therefore no longer the acquisition of knowledge but a process of social participation (Brown, Collins, & Duguid, 1989). This creates conditions in which learners meld the ambiguity of learning in the real world into personalized knowledge, providing them with a situated learning context unique to that learner (Low & O'Connell, 2006).

Sociocultural and Activity Theory

Sociocultural and activity theory are closely aligned derivations based on the workings of Vygotsky in his attempt to describe learning as a process or activity through interaction with tools. Vygotsky's examination of tools included both the physical artifacts and semiotic constructs such as language and linguistics (Taylor et al., 2006). The application of activity theory within the context of mobile learning bases itself on the concept of human activity as an "endlessly multifaceted, mobile, and rich in variations of content and form" (Engeström, Miettinen, & Punamäki, 1999, p. 20).

Activity theory's analysis consists of the activity as a whole wherein the activity consists of the interaction of a subject and an objective through the use of a tool (Uden, 2007). Actions of the individual can only be understood in the context of their relationship of the system of activity (Taylor et al., 2006). Activity theory also includes activity shared collectively amongst a group through division of labor and power that indicate the situated social context in which the collective activities are carried out (Udent, 2007).

Activity systems are multi-voiced, a construct of perspectives of the individual or group, traditions, and interests which continually interact and change (Taylor et al., 2006). These differences in history and position within the activity create differing constructs of the objective that can create conflict, which calls for reoccurring demands for analysis and renegotiation within the system. The activity system is therefore heterogeneous and multi-voiced, in which identities, roles, and expectations evolve (Boer, Van Baalen, & Kumar, 2002).

Activity systems are formed over time with current activities being understood through examination through a historical perspective. Previous ideas and practices are reflective of the changes to the system. The contradictions between the learner's understanding and the expectations and opportunities provided by the teacher and peers allow for transformation of the activity as conflicts are resolved, leading to the emergence of new tools, activities, and structure change and are reflective of the dynamic activities within the mobile learning context (Taylor et al., 2006).

Context of Mobile Learning in Education

The role of context is critical in understanding the development of mobile learning. Interactions of the user cannot be understood without context nor can they be isolated from the environment. However, context has varied implications among different theorists and it is arguable from a technological standpoint if context can be isolated and modeled or if it is an emergent aspect of interaction within mobile learning (Sharples, 2005).

Mobile devices play a key part in this process; they are susceptible to contextual changes based on user interaction (Uden, 2007). Cole's (1996) distinction between context as "that which surrounds us" as opposed to context as "that which weaves us together" mirrors

distinctions made by technical literature on pervasive computing. In that distinction the context of technology that surrounds the user as a "shell" and the context of the human interaction between the user and the technology is made. Learning within the environment further creates context through conditional interaction as learners deploy or modify objects to create supportive ad hoc workspaces (Sharples et al., 2005).

Context within mobile learning means that the learner's mobility within their environment enables them to associate information with current relevance of the task. In a mobile environment, the relationship between the learner and the environment are essential because the relationship between teaching and learning changes (Dagger, Wade, & Conlan, 2003). The mobility of the user, having the ability to move anywhere and anytime and still maintain connectivity to their network, enables user applications to adapt their content. Location aware applications have a profound effect in determining current context based on location as their behavior is determined by the mobile device's physical position (Barbosa & Geyer, 2005).

The German philosopher, Martin Heideggar, introduced the concept of zuhander, or ready-to-hand, to describe the interaction of a person with the world using objects of importance to the individual. These mobile objects enable the user to remain engaged with the task rather than to focus their attention on the operation of the device (Heideggar, 1972/1973). Mobile devices such as mobile phones give the user a pervasive identity and provide a contextual layer of interaction with the environment (Voong, 2008). Therefore, mobile technology enables learning by adapting to the context in which it is located, be it in a physical space, the social space of the participant, and the fluid space based upon the learner, relationship of the learning, and the object of learning (Laurillard, 2007).

Mobility

Mobility of the learner is of great importance in exploring the uniqueness of mobile learning. O'Malley et al., (2003) regarded this as any type of learning that happens when the learner utilizes mobile devices and is not in a fixed or predetermined locations. Mobility is centered on increasing the learner's capabilities to move within their own learning environment and be able to take their learning environment with them as they physically move from place to place (Barbosa & Geyer, 2005). The implications of portability, mobility of technical devices, and the learner, can be broken down into three significant areas: the mobility of the technology, mobility of the learner, and the mobility of the learning (El-Hussein & Cronje, 2010).

Mobility of technology where learning is directly linked refers to its capabilities in regards to the physical context and the activities of the learner (El-Hussein & Cronje, 2010). Keegan (2005) included such mobile devices to include PDAs, palmtops, handhelds, smart phones, and mobile phones because the physical capabilities of the devices allow them to be carried by or on a person. Connectivity of these devices is one of the main differences between mobile technologies and personal computers due to their differing ease of mobility. Wireless Application Protocol (WAP), Bluetooth, and Wireless Fidelity (WiFi) allow mobile devices to connect to networks, other devices, and the Internet from greater distances than often location dependent or tethered counterparts. Though mobile devices have areas of disconnection or lack of service, their potential to be 'always on' is of great potential (Trifonova & Ronchetti, 2003).

Mobility of the learner presents another aspect of mobile education. The nature of mobility holds a variety of meanings and connotations for each individual learner. Traxler (2007) further clarified that these meanings could include learning during a variety of learner activities such as traveling or sitting, and may be hands-free or eye-free learning. This makes

mobile learning unique because learners can access information and applications anytime and anywhere (Sharma & Kitchens, 2004).

The combined mobility of devices and the learner enables learning anywhere, anytime by decreasing the dependence on fixed locations to work, study, or to learn in formal and informal settings (Peters, 2007). The learner accesses resources as they move in and out of communication with networks and the Internet, creating a continually changing social environment for the learner (Taylor et al., 2006). The learner is embedded in an act of logistical juggling involving management, negotiation, monitoring, and maintenance of the digital medium. The various technical devices that enable the learner to access information through their mobile devices continually change as the learner moves about in their physical space. Therefore, argued Laouris and Eteokleous (2005), the device must not be what moves with the learner, but the learning environment, leaving only the distribution of information and knowledge applications.

Motivation

Prenksy (2001) coined the term "digital native" to define today's students as those who have grown up speaking the "digital language of computers, video games and the Internet" (p. 3). In contrast, many teachers were considered "digital immigrants", though many have adopted the current technologies such as cell phones, there still existed a communication gap. While immigrants may have adapted to current technology and its use, they were not born into technology as the native was, often leaving traces of older ways of thinking and interacting with current technologies (Prensky, 2001).

Motivation through the enjoyment of interacting with mobile learning was apparent in studies by Jones, Issroff, and Scanlon (2007) where they defined affective forms of motivation through aspects of mobile such as control, ownership, fun, communication, learning in context, and continuity between contexts. Laurillard (2007) further regrouped the motivational factor of fun to include aspects of the learner's ownership of the device, control of the learning process, and communication with peers and ownership to include learning in context, continuity between contexts which reflect the mobile device's ability to make learning easier and effective. The degree in which the mobile device is user friendly, or the usability afforded by the mobile device, also has an influence as to the engagement of the learner with their environment (Kukulska-Hulme & Traxler, 2005). Engagement of communication for educational purposes through mobile devices was shown to increase the relevance of learning to students and thus proved to heighten student motivation (Kukulska-Hume, 2009).

Environment

The size and familiarity of cell phones enable them to be relatively unobtrusive regards to other larger mobile devices which has enabled their use in developing new types of interaction among students and teachers within and across a variety of learning settings (Milrad, 2003). The ability of adolescent cell phone owners to multitask, in effect to merge multiple interactions into one time, has altered the traditional learning environment (Bugeja, 2005). Cell phones have facilitated the growing existence of the individual's presence within an environment at a given time in enabling what can be deemed a multiplicity of existence (Robertson & Hagevik, 2008). An identifiable example of this multiplicity of existence is evident in what Godwin-Jones (2005) defined as the creation of "third spaces" that are regarded as neither home, school, nor work but

are venues where the user exists under a new identity that can reflect either the individual's true identity of an alter ego at their discretion.

Classification of Mobile Devices

Mobile devices are a melding of several technologies and functions that enable educational use (Johnson, Smith, Willis, Levie, & Haywood, 2011). Throughout the 1990s, a parallel development occurred between learning and technology. As the learner-centered pedagogy was becoming further entrenched in education, technologies increasingly became more advanced, personalized, and user friendly (Crompton, 2013). Mobile devices have become so prevalent among students that Yarnell, Cariere, Stanforn, Manning, and Melton (2007) have stated that portable media is now representative of basic social commodities. The convergence of affordable educational technologies include "electronic book readers, annotation tools, applications for creation and composition, and social networking tools" (Johnson et al., 2011, p. 13). Other technologies such as global positioning, accelerometers, motion sensors, and digital capture and editing capabilities for audio, video, and imaging further exemplify the contribution to education that mobile devices provide (Johnson et al., 2011).

The assimilation of these educationally useful technologies vary dependent upon the mobile devices. Prensky (2005) touted the cell phone to be an exemplar of the convergence of mobile technologies. In comparison of the convergence of the mobile phone with the personal computer, Prensky (2005) noted the dual evolution of the two technologies. Mobile phones are developing computer-like capabilities while computers are developing more into the area of communications. While Prensky (2005) predicted an eventual melding of the two nearly a

decade ago, the cell phone has become by far the most prevalent and preferred device among younger people with 78% of those aged 12-17 owning one (Madden, 2013).

Currently no single device holds all the functions of communication, computation, and multimedia; these technologies have yet to converge all potential functions into one. Though many come close, no mobile device has fully replaced the computational power of the laptop or desktop units. Partial convergence of mobile technologies is evident in several devices including cell phones (both "feature" and "smart" phones), wireless capable tablet computers, wireless capable notebook and laptop computers, PDAs, MP3 players and iPods. Brown and Diaz (2010) further classified mobile devices using terms of 'highly mobile', 'very mobile', and 'mobile'. Highly mobile devices refer to devices easily transported in the owner's pocket such as cell phones, smart phones, and other similar devices such as flip cameras. The authors consider mobile devices such as tablets, pads, and netbooks very mobile as their size makes them mobile but not as easy to transport as cell phone sized devices. The mobile term was used to categorize larger portable devices such as laptops (Brown & Diaz, 2010).

The Cell Phone

Prensky (2005) predicted that the cell phone, known as a mobile phone throughout most of the world (Peters, 2007), would become ubiquitous to all students as their capabilities increased and their cost lowered. The ubiquity of cell phones is evident among teens with relatively few differences between subgroups ownership; the one area where differences emerge in ownership is between teens' socioeconomic status. In 2010 59% of teens with annual household incomes less than $30,000 reported owning a cell phone (not necessarily a smart phone), compared to an average of around 78% of those in homes earning $30,000 or more

annually (Lenhart et al., 2010). However, ownership of smart phones among teens does not show a significant difference between income levels with 39% of teens in families making $30,000 or less owning smart phones compared to 43% of teens in the highest earning bracket of more than $75,000 annually (Madden et al., 2013). Teenage males and females are equally likely to own a phone but evidence some gender-specific variations in their usage. Traxler further argued that mobile learning studies would be best suited to pursue the cell phone as a mobile technology that had the greatest ownership (2005). Recent research reports 78% of teens and 93% of adults age 18-23 owned a cell phone (Lenhart, 2012), validating the potential impact that these devices have in mobile learning.

Cell phones are categorized by capabilities and can be grouped into two categories: conventional or feature phones and smart phones (Brown & Diaz, 2010). Cell phones are defined, at their most basic, as having the ability to send and receive both text (SMS) and voice transmissions. Common features of cell phones include Internet access, voice and text messaging service, cameras, and video/audio recording (Chinnery, 2006; Williams & Pence, 2011). Feature cell phones are defined as a device used to place calls and send text messages, but do not provide the full capabilities of smart phones. These basic features are far from robust but still allow educational affordances. Feature phones typically have a basic camera and simple video capturing capabilities. Wireless Bluetooth, extended QWERTY keyboards, memory card storage, simple Web browsing and email support enable users to get some of the utility offered by smart phones (Brown & Diaz, 2010).

The hardware of a feature cell phone impacts mobile learning by dictating what content can be delivered and the meaningfulness of that content (Trifonova & Ronchetti, 2004). Uses of these basic features of cell phones in education include incorporating SMS texting into teaching

practices (Broinowski, 2006) and increasing student interaction (Markett, Arnedillo Sanchez, Webber, & Tangney, 2006). Thorton and Houser (2004) developed several projects incorporating SMS capabilities of cell phones to teach English at a Japanese university. Students were given mini lessons consisting of the introduction of five words per week, vocabulary review, and contextual uses of vocabulary and were compared to students given identical lessons in web based and paper mediums. The results of the study indicated that the students using the mobile phone's SMS feature as a learning medium improved their vocabulary by almost twice as much compared to students who received the same lesson on paper. A similar program was performed by Levy and Kennedy (2008) in Australia with Italian learners which used routine dispersing of vocabulary, idioms, definitions, and example sentences to students.

Smartphones have an imbedded processor and their core architecture has become increasingly sophisticated (Gutierrez et al., 2011). The advanced processing power, combined with their ability to operate third party applications, small size, and reduced cost allows them to "host heterogeneous data such as multimedia, sensor data, communication logs, data created or consumed by applications, etc." (Theoharidou, Mylonas, & Gritzalis, 2012, p. 443). Internet, email capabilities, and continuous connectivity are also of importance in defining the smart phone (Litchfield, 2010). The continued increase in smartphone performance drives higher consumer expectations of multimedia and advanced applications and capabilities, to perform at PC-like performance on their devices (Gutierrez et al., 2011).

The adaptability of smart phones enables a rich diversity of use in the realm of education. Smart phones used as catalysts for professional development showed positive results in the research (Kukulska-Hulme & Pettit, 2007). Evidence of their educational uses is their ability to assist in math (Davis, 2010) and language learning.

Benefits of Cell Phone Use

The cell phone has become a ubiquitous and well integrated part of the daily lives of students. The continuous advancements and the arrival of "smart phones" has transformed the cell phone beyond the basic telephony function. Mobile access to the Internet and Web 2.0 features such as social software has enabled students to participate in the creation, sharing, and proliferation of knowledge and information (Irina, 2012). Social software also enables the construction of learning environments and can be used to support online and face-to-face teaching (Vesisenaho et al., 2010).

The potential of cell phones for educational use has many proponents within the literature. The concept and research of using mobile devices as learning tools is known as mobile learning. In 2005, 1.5 billion people owned a cell phone, meaning they have access to a computer in their pockets and purses (Traxler, 2005). In 2013, a study by the United Nations showed that more people in the world had access to a cellular phone than to a toilet, with 6 billion people owning a phone. In a 2013 study, 91% of American adults were found to own a cell phone (Wang, 2013). Cell phone ownership vastly outnumbered any other type of device individuals carried for supporting mobile learning (Traxler, 2005). As such, Traxler (2005) stated that efforts in mobile learning would be best supported by focusing on cell phones as the center point for learning. The ever-growing commonality of cell phone ownership, and the potential for use of cell phones as education tools has led to an evolving professional discussion as to the benefits, practice, and theory of mobile teaching. Traxler (2007) used the increasing frequency of educational conferences devoted to cell phone use as evidence of the growing importance of mobile learning.

The literature revealed that arguments in favor of the educational use of cell phones are supported by the ever-growing use of cell phones as the primary mode of communication among teens. Rheingold (2002) noted the phenomenon of text messaging revolutionized how people function and communicated as groups. This is evident in a 2012 Pew Research poll that found 63% of teens are more likely to text than use any other form of daily communication. Talking on their cell phone was a mere 39%, followed by face-to-face communication outside of school at 35%. Using social networking sites accounted for 29% and the use of instant messaging services rated 22% while teens using landline telephones accounted for only 19%, with teens emailing people in their lives (Lenhart, 2012). Findings of the Pew study found that the median number of text messages per day sent among teens rose from 50 in 2009 to 60 in 2011. The predominance of text messaging is evident in the number of teens reporting daily phone conversations with their friends by cell phone has decreased by 12% since 2009 (Lenhart, 2012). Further research in 2013 showed that sending and receiving text messages remains the favored feature of cell phone use, with 81% of adult cell phone owners using the SMS function (Duggan, 2013). Mellow (2005) offered insight into the benefits of text messaging and the advantages it provided to the student:

> true flexibility to control the time, place, and pace of their learning, specificity of content, tutor constructed study aides designed for those areas that are 'challenge to learn' concepts, using technology that is engaging and totally comfortable for the student, non-threatening, private availability of on-demand study support (p. 437).

Barriers to Cell Phone Use in Mobile Learning

Ambiguity exists in regards to pedagogical concerns about the use of cell phones in the classroom. There is the need to address learning styles and educational needs of students. Cell phones offer a unique way to create and disseminate knowledge, enabling the bridging of the "digital divide", or those that have access to computers and the internet and those who don't (Averianova, 2011).

In contrast, cell phones are perceived as disruptive by many educators. This perception by teachers was found to be the greatest barrier to the use of cell phones in the classroom (Lenhart, 2012). In a 2010 study, it was found that 25% of teens surveyed had made or received a call in class (Lenhart, Ling, Campbell, & Purcell, 2010). Cell phone calls during class instruction are disruptive to the atmosphere within the classroom as they cause interruption with student concentration on the major task, causing performance on that task to degrade (Baron, 2008). A study conducted by Shelton, Elliot, Lynn, and Exner found that ringing cell phones could negatively impact student performance while taking a test (2011). Another study conducted earlier, however, observed student performance on questions corresponding to ringing occurring during a video. It was found that students performed significantly lower on items that corresponded to the ringing occurrences and that subjects were less likely to include information that was shown during the disruptions (End, Worthman, Mathews, & Wetterau, 2009).

Texting studies vary in perceptions of their impact on academic performance and in regard to the context in which the texting occurred. One study on the distracting effects of texting was performed by Froese et al., (2012) in which students participated in a mock classroom. Students were divided into two groups: one group would receive texts during a PowerPoint presentation and one would not. The team found that scores were 27% lower in the

texting group than those who received none. A previous study performed by Rosen, Lim, Carrier, and Cheever (2011) divided a class into three groups which received none, moderate, and high frequency of texts from instructors. During this study participants reported receiving an average of two additional texts outside of the study. The results found that the group receiving the highest amount of texts performed just under 11% worse than the group who received none from the instructors. The moderate text group performed no worse than the group who received essentially no texts. The impact of texting and student performance in a study by Clason and Haley (2013) showed that even with the negative association of texting and class grade they showed no overall effect on student GPA. This prompted the postulation that "perhaps it is true that the students' perception that they can text and follow a lecture at the same time is accurate" (p. 36). They further stated that with grade inflation and teaching practices such as making notes available and out-of-class assignments that student distraction may not be as much of a problem as previously thought. Such multitasking behaviors were studied by Carrier, Cheever, Rosen, Benitez, and Chang (2009) among three generations: Baby Boomers (born between 1946 and 1964), Gen Xers (born between 1965-1978) and Net Geners (born after 1978). Their study found that multitasking among 66 possible media task combinations increased with the younger generations. The Net Geners group on average had performed 37.5 possible combinations of multitasking, decreasing with the Gen Xers average of 32.4 tasks and lastly the Baby Boomers having on average 23.2 tasks performed.

The predominance of texting in the classroom is evident in a study that found that despite having a ban on cell phones in the classroom, 58% of students reported sending and receiving texts during class (Vecchione, 2010). Clayson and Haley (2013) found that even though the majority of students in their study agreed that they should not text in class, almost half texted

anyway. Of the respondents of the study, 94% received texts while in class and 86% admitted to texting in class. In a study of education majors it was found that even though 73% of the group thought it was unprofessional to text in class, 79% reported that they texted anyway (Williams et al., 2011). This compulsion to multitask is driven by what Wang and Tchernev (2012) consider a behavior motivated by immediate needs. The behavior itself, however, also changes the needs of the individual and can be self-reinforcing. They conclude that multitasking's primary motivator is cognitive needs that are not being gratified by the current behavior.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this study was to investigate mobile learning habits of students and their perceptions of mobile learning within the school environment. The study was conducted using survey methodology in the form of a questionnaire. Questionnaires are generally used within educational research to collect data on information that is not always directly observable (Gall, Borg, & Gall, 1996). A questionnaire was used in an attempt to collect data targeting perceptions of students from the population of the target high school. Analysis of the data through quantitative research methods was used for testing objective theories through examination of the relationships among the variables presented in the survey. This non-experimental design utilized a 5-point Likert-like scale to evaluate the perceptions of mobile learning within the target population.

Research Questions and Null Hypothesis

The use of cell phones in mobile learning has been in effect within the target school for eight years. As such, teaching practices and school policies have been altered to accommodate this new method of learning. The following questions are therefore representative of the desire to attain information on cell phone use as instructional tools from the students' perspective.

Research Question 1: Is there a significant difference in the perceived usefulness of cell phones as academic tools and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho1$_1$: There is no significant difference in the perceived usefulness of cell phones as academic tools and student characteristics.

Research Question 2: Is there a significant difference in students' use of cell phones as an academic tool and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho2$_1$: There is no significant difference in students' use of cell phones as an academic tool and student characteristics.

Research Question 3: Is there a significant difference in students feeling encouraged to use cell phones to complete academic assignments and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho3$_1$: There is no significant difference in students feeling encouraged to use cell phones to complete academic assignments and student characteristics.

Research Question 4: Is there a significant difference in the perceptions of cell phones posing classroom distractions and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho4$_1$: There is no significant difference in the perceptions of cell phones posing classroom distractions and student characteristics.

Research Question 5: Is there a significant difference in students' perceptions of functionality of their phone to performing school related tasks and the following student

characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho5$_1$: There is no significant difference in students' perceptions of functionality of their phone to performing school related tasks and student characteristics.

Research Question 6: Is there a significant difference between students' use of cell phones outside of school for school related purposes and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho6$_1$: There is no a significant difference between students' use of cell phones outside of school for school related purposes and student characteristics.

Research Question 7: Is there a significant difference between students' use of cell phone use at school for school related purposes and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho7$_1$: There is no significant difference between students' use of cell phone use at school for school related purposes and student characteristics.

Research Question 8: Is there a significant difference between students' use of cell phones at school for non-school related activities and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho8$_1$: There is no significant difference between students' use of cell phones at school for non-school related activities and student characteristics.

Research Question 9: Is there a significant difference between students' distraction of other students cell phone use in school and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho9$_1$: There is no significant difference between students' distraction of other students cell phone use in school and student characteristics.

Research Question 10: Is there a significant difference between students' distraction of their own cell phone use in school and the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Ho10$_1$: There is no significant difference between students' distraction of their own cell phone use in school and student characteristics.

Population

The population of this study consisted of 840 students registered to attend the target Title I high school during the 2012-2013 academic year. Students included freshmen, sophomores, juniors, and seniors during the registration process for the upcoming school year. The target high school had a cell phone policy in place for several years that enabled teachers to include the use of cell phones as academic tools. The school's racial composition of students for the 2011-

2012 were 87.9% white, 2% Pacific Islander/Hawaiian, 0.1% Native American, 4% Hispanic, 6.6% Black, 1.1% Asian with 51.9% of the school population male and 48.1% female.

Research Design

This study used a quantitative research design. The instrument for this study was a researcher-designed cross-sectional survey to gather data from one point in time. Survey design is beneficial, according to Creswell (2003), to describe the "trends, attitudes, or opinions of a population by studying a sample" (p. 153) and to "generalize from a sample to a population so that inference can be made about some characteristics, attitudes, or behaviors for this population" (p. 154). Survey design was most appropriate for this study as it provided a mechanism to learn about high school students' perceptions of cell phones as an academic tool. Surveys allowed for reaching a broad audience at low cost and relatively expeditiously.

Instrumentation

The survey instrument used in this study (Student Perceptions of Academic Cell Phone Use) was researcher-designed (See Appendix A). The instrument was designed to measure student perceptions in regards to the use of cell phones as a learning tool, effectiveness of cell phones as a learning tool, the usability of cell phones as a learning tool, and perceptions of cell phones as a school distraction. The survey instrument included 14 survey questions. The research questions were addressed in seven survey questions with an additional six demographic questions. Responses were organized in a combination of a Likert-type scales and selected responses. An additional question concerning cell phone usage was also included in the survey

to be used in discussion in Chapter 5. The survey was developed and administered through an online survey software program known as Survey Monkey.

Validity of the survey was sought by administering the survey to a group of teachers at the target high school. The feedback from the teachers was used in the modification of the survey design and wording to be used in a second pilot class. The original instrument was modified based upon recommendations from the teachers in the pilot group. The survey instrument was then brought before the dissertation committee for acceptance. Feedback from this group was implemented into the final revision of the survey instrument found in Appendix B.

Procedures

Permission to conduct this research was received from the current director of schools for the school system and the principal of the high school studied. In addition to administrative permission, permission to conduct the research was obtained from the Institutional Review Board (IRB) of East Tennessee State University. Because participants were minors, they were required to provide proof of parental consent. Parents or guardians received information detailing the nature of the survey and the measures of confidentiality that would ensure that no student could be individually identified through the study. All information from students participating in the survey was stored within a secure database of Survey Monkey and was not traceable to any individual. This data will be maintained for a period of three years before being destroyed.

The survey was administered during the school's fall 2012 semester. Each teacher at the high school in the study was asked to send a consent form home with students and encourage them to have their parents to complete it. Students were given parental consent forms that

included a letter describing the survey and signature form for consent found in Appendix C. Students did not receive nor see the actual survey until the researcher received the signed parental consent form. Teachers were asked to direct students with signed consent forms to the researcher to receive the survey. Upon completing the survey, students were given the option to enter a drawing for an iPod Touch. Choosing the option to enter the drawing directed students to a separate online form in which they could enter contact information for the drawing. Contact information was independent of survey data and provided no identifying information to survey responses of the individuals. Data were then gathered at the end of the registration period using Survey Monkey software.

Data Analysis

Statistical Package for Social Science (SPSS) Version 20.0 data analysis software was used in the quantitative methodology to analyze data from the researcher-developed, non-experimental survey instrument. Data analyzed included results from the demographics of survey respondents and their scoring of questions based upon a five point Likert-type scale.

The first step in the analysis involved determining the number of respondents and demographic data about those who responded. Data were screened and re-sorted within SPSS to improve readability. Categories asking respondents to indicate phone ownership, phone type, gender, grade, personal computer at home, and eligibility to receive free and reduced lunch were collapsed in SPSS into numeric ranges. Following the screening of the data, frequency counts and descriptive statistics were used to create a snapshot of these respondents.

All research questions were examined using chi-square analysis followed by a Cramer's V for significant results. The use of Cramer's V allowed for assessing the strength of

relationships between the independent variables and the dependent variables. In this study, the independent variables were student characteristics including phone ownership, phone type, gender, grade, person computer, at home, and eligibility to receive free or reduced lunch. Dependent variables were items related to students' perceptions of cell phone use in academic settings.

A .05 level of significance was used in analyzing all data. A complete analysis of the findings is represented in chapter four. A summary and discussion of the findings, implications for practice, conclusions, limitations, and recommendations for future research is located in chapter five.

CHAPTER 4

ANALYSIS OF DATA

The purpose of this study was to investigate mobile learning habits of students and their perceptions of mobile learning within the school environment. In this chapter the results of data analysis are presented and answers to research questions provided.

Student Characteristics

Student characteristics in this study included whether or not a student owned a cell phone, type of cell phone in possession of the student, gender, grade level, whether or not a working PC was in the student's home; and the student's qualification to receive free or reduced lunch.

Table 1 provides the information about respondents' ownership of a cell phone. As evidenced below, an overwhelming 97.1% (n = 170) of those who responded to the survey owned some type of cell phone.

Table 1.

Cell Phone Ownership

Ownership	Frequency	Percent
Yes	170	97.1
No	5	2.9
Total	175	100.0

Table 2 provides information as to what kind of cell phone the 97.1% of respondents owned. A standard cell phone was defined as capable of making phone calls and sending text messages, while a smartphone was defined as equipped with Internet access and having a mobile operating system. Almost two-thirds (63.4%) of respondents indicated they owned a smartphone, while one-third of respondents owned a standard cell phone.

Table 2.

Cell Phone Type

Phone Type	Frequency	Percent
None	5	2.9
Standard	59	33.7
Smartphone	111	63.4
Total	175	100.0

Table 3 provides information about the gender of respondents as compared the gender of the population within the high school. The respondent population was in both instances of male and female comparison, within two percent of that of the entire population. This is indicative that the gender representation of the respondents was reflective of that of the population.

Table 3.

Gender of Respondents Compared to Population

	Respondent *n*	% of respondents	Population *n*	% of population
Male	96	54.9	449	53.6
Female	79	45.1	388	46.4
TOTAL	175	100.00	837	100.00

Table 4 depicts the grade level of respondents as compared to the grade level of students in the population. The largest divide between respondent grade level and grade level of population was between freshmen respondents. Compared to the population, freshmen respondents made up 3.3% more of the respondent population than they do in the overall population. Conversely, the responses representing the sophomore class in the survey were 3.2% less than the overall sophomore representation in the population.

Table 4.

Grade Level of Respondents Compared to Population

	Respondent *n*	% of respondents	Population *n*	% of population
Freshmen	52	29.7	221	26.4
Sophomore	34	19.4	189	22.6
Junior	47	26.9	217	25.9
Senior	42	24.0	210	25.1
Total	175	100.0	837	100.0

Table 5 provides information regarding the respondents answer to whether their home had a working personal computer available. The majority of students had a working personal computer available to them within their home with $n = 160$ (91.4%) indicating yes to the survey question.

Table 5.

Working PC in Home

	Frequency	Percent
Yes	160	91.4
No	15	8.6
Total	175	100.0

Table 6 depicts responses from the final variable for student characteristics, whether or not the respondents qualified to receive free or reduced lunch. More than one-quarter of respondents did qualify to receive free or reduced lunch.

Table 6.

Free or Reduced Lunch

		Yes	No	Missing	Total
Phone Type	None	3	1	0	4
	Standard	20	38	0	58
	Smartphone	23	85	1	109
Total		46	124	1	171

Research Question 1

Is there a significant difference in the degree to which students perceive cell phones are useful as academic tools compared by the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

Table 7 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 5. A series of independent-samples t-tests and a one-way ANOVA were conducted to determine if significant differences existed between the research question and student characteristics.

Respondents were asked to rate the usefulness of their cell phone as an academic tool on a Likert-type scale of 1 to 5: 1 represented "strongly disagree", 5 represented "strongly agree" and 3 was "undecided". As evidenced in Table 7, more than three quarter of respondents chose "agree" or "strongly agree" to reflect their level of agreement with the statement that cell phones were a useful educational tool, while less than 10% of students disagreed or strongly disagreed with the statement.

Table 7.

Usefulness of Personal Cell Phone for Academic Use

		Frequency	Percent
	Strongly Disagree	6	3.4
	Disagree	11	6.3
	Undecided	26	14.9
	Agree	62	35.4
	Strongly Agree	69	39.4
	Total	174	99.4
Missing	System	1	.6
Total		175	100.0

$Ho1_1$: There is no significant difference between students who own standard and smart phones in perceptions of the usefulness of their cell phone for academic use.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones as useful academic tools differ between smart phone ownership and standard phone ownership. The student perceptions of cell phones as academic tools was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was significant, $t(80) = -6.98$, $p < .001$. Therefore the null hypothesis was rejected. Students owning smart phones ($M = 4.45$, $SD = .70$) tended to see cell phones as more useful academic tools than those who owned standard cell phones ($M = 3.27$, $SD = 1.18$). The 95% confidence interval for the difference in means was -1.51 and -.89. The η^2 index was .23, which indicated a large effect size. Owners of smart phones tended to perceive cell phones as useful academic tools more than owners of standard cell phones. Figure 1 shows the distributions for the two groups.

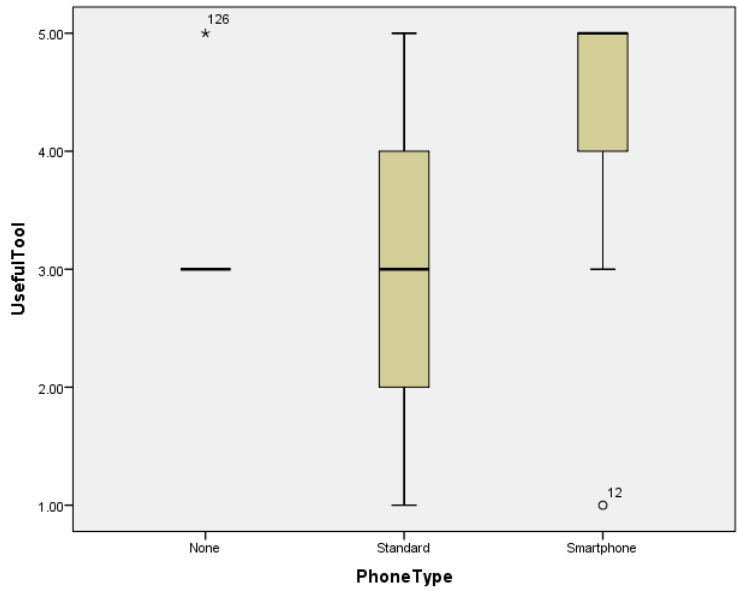

Figure 1. RQ 1 - Distribution of Scores for Smartphone and Standard Cell Phone Groups

$Ho1_2$: There is no significant difference between males and females in perceptions of the usefulness of their cell phone as an academic tool.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones as useful academic tools differ between genders. The student perceptions of cell phones as academic tools was the test variable and the grouping variable was male or female. The test was not significant, t(172) = 1.36, p = .178. Therefore the null hypothesis was retained. The η^2 index was .01 which indicated a small effect size. Students that were male (M = 4.11, SD = 1.01) tended to have the same perceptions of cell phones as academic tools as students that were female (M = 3.89, SD = 1.10). The 95% confidence interval for the difference of means was -.100 to .534. Figure 2 shows the distributions for the two groups.

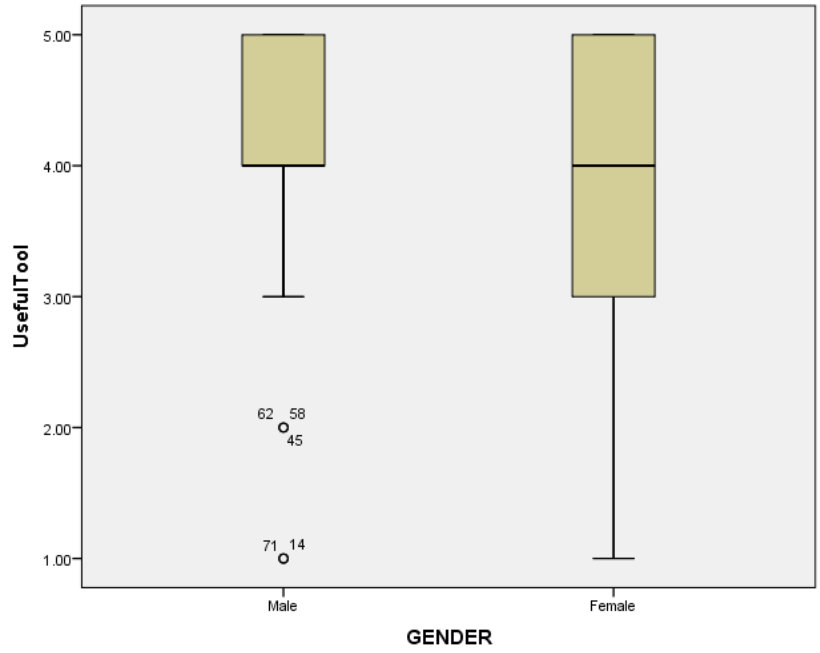

Figure 2. RQ 1- Distribution of Scores for Male and Female Groups

$Ho1_3$: There is no significant difference between the ownership of a working personal computer at home and students' perceptions of the usefulness of their cell phone as an academic tool.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones as useful academic tools differ between students with a working personal computer at home and students without a working personal computer at home. The student perceptions of cell phones as academic tools was the test variable and the grouping variable was the ownership of a working PC at home. The test was not significant, $t(172) = .833$, $p = .406$. Therefore the null hypothesis was retained. The η^2 index was .004 which indicated a small effect size. Students that owned a working personal computer at home ($M = 4.04$, $SD = 1.05$) tended to have the same perceptions of cell phones as academic tools as students that did not have a working personal computer at home ($M = 3.80$, $SD = 1.08$). The 95% confidence interval for the difference of means was -.326 to .801. Figure 3 shows the distributions for the two groups.

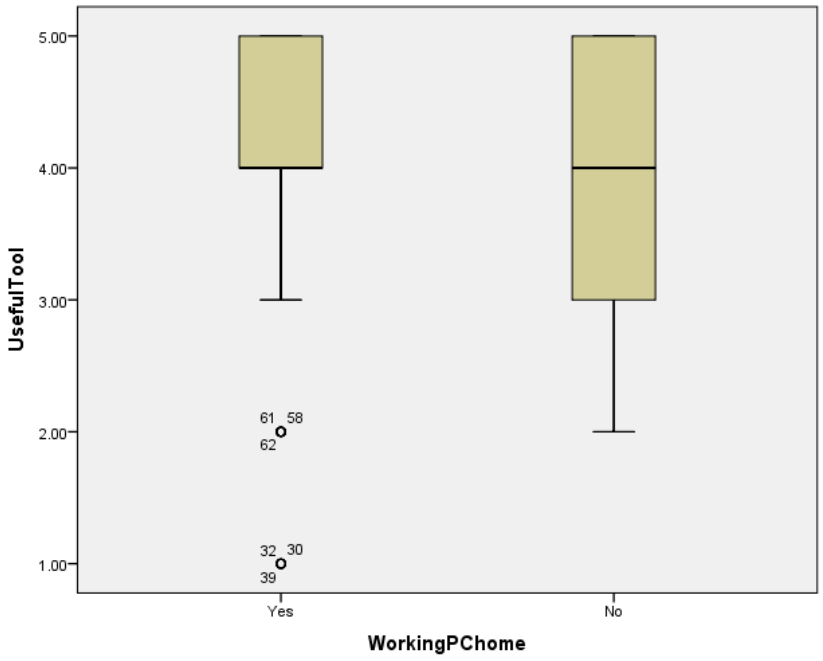

Figure 3. RQ 1 - Distribution of Scores for No Working PC at Home and Working PC at Home

Ho1$_4$: There is no significant difference between the income level of students and their perceptions of the usefulness of their cell phone as an academic tool.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones as useful academic tools differ between socioeconomic statuses of students. The student perceptions of cell phones as academic tools was the test variable and the grouping variable was students who qualified for free/reduced lunch and those who did not. The test was significant, t(167) = -2.06, p = .04. Therefore the null hypothesis was rejected. Students qualifying for free/reduced lunch (M = 3.74, SD = 1.06) tended not to see cell phones as more useful academic tools than those who did not qualify for free/reduced lunch (M = 4.11, SD = 1.05). The 95% confidence interval for the difference in means was -.73 and -.02. The η^2 index was .03, which indicated a small effect size. Students who did not qualify for free/reduced lunch tended to perceive cell phones as useful academic tools more than students who qualified for free/reduced lunch. Figure 4 shows the distributions for the two groups.

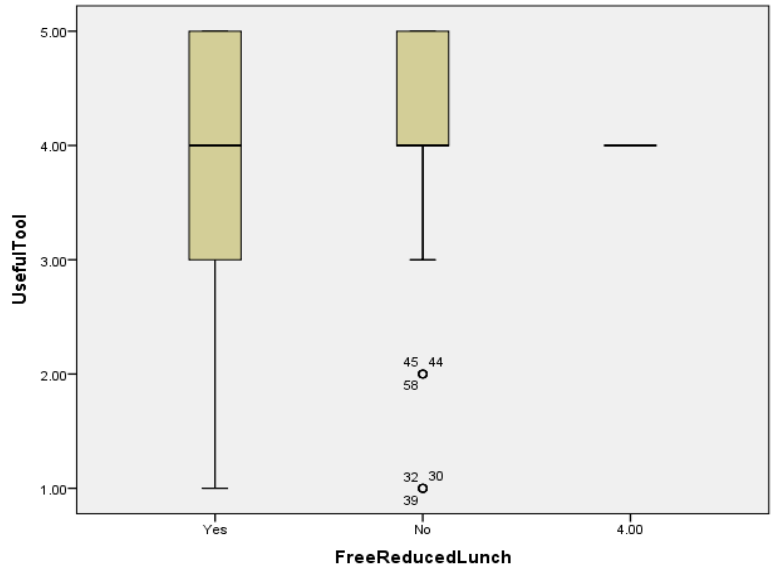

Figure 4. RQ 1 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

$Ho1_5$: There is no significant difference between the grade level of students and their perceptions of the usefulness of their cell phone as an academic tool.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and perceptions of cell phones as useful academic tools. The factor variable, the student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was the perception of cell phones as useful academic tools. The ANOVA was not significant, $F(3,170) = 1.614$, $p = .188$. Therefore, the null hypothesis was retained. The strength of the relationship between student grade level and perceptions of cell phones as useful academic tools, as assessed by η^2, was small (.02). The results indicate that the perceptions of cell phones as a useful academic tool was not significantly affected by student grade level. The means and standard deviations of the student groups are reported in Table 8.

Table 8.

Means and Standard Deviations of Student Grade Levels on RQ-1

Grade Level	N	M	SD
Freshman	51	3.08	1.05
Sophomore	34	3.91	1.14
Junior	47	4.23	.98
Senior	42	4.11	1.04

Research Question 2

Is there a significant difference in the degree to which students perceive cell phones are useful for completing academic assignments compared by the following student characteristics:

gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 9 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 5, and the mode of responses was 4.

Respondents were asked to rate their agreement with the statement "My cell phone helps me complete academic assignments" on a Likert-type scale of 1 to 5: 1 represented "strongly disagree", 5 represented "strongly agree" and 3 was "undecided". Nearly 80% of all students indicated they found their cell phone helpful in completing assignments.

Table 9.

Use of Cell Phone to Complete Assignments

		Frequency	Percent
Valid	Strongly Disagree	12	6.9
	Disagree	14	8.0
	Undecided	13	7.4
	Agree	76	43.4
	Strongly Agree	59	33.7
	Total	174	99.4
Missing	System	1	.6
Total		175	100.0

$Ho2_1$: There is no significant difference between students who own standard and smart phones in the use of their cell phone to complete assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of students who felt their cell phones were useful in completing academic differ between smart phone ownership and standard phone ownership. The student perceptions of cell phones as useful in completing academic assignments was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was significant, $t(79.13) = -6.05$, $p < .001$. Therefore the null hypothesis was rejected. Students owning smart phones ($M = 4.33$, $SD = .77$) tended to see cell phones as more useful in completing academic assignments than those who owned standard cell phones ($M = 3.17$, $SD = 1.36$). The 95% confidence interval for the difference in means was -1.54 and -.78. The η^2 index was .18, which indicated a large effect size. Owners of smart phones tended to perceive cell phones more useful for completing academic assignments than owners of standard cell phones. Figure 5 shows the distributions for the two groups.

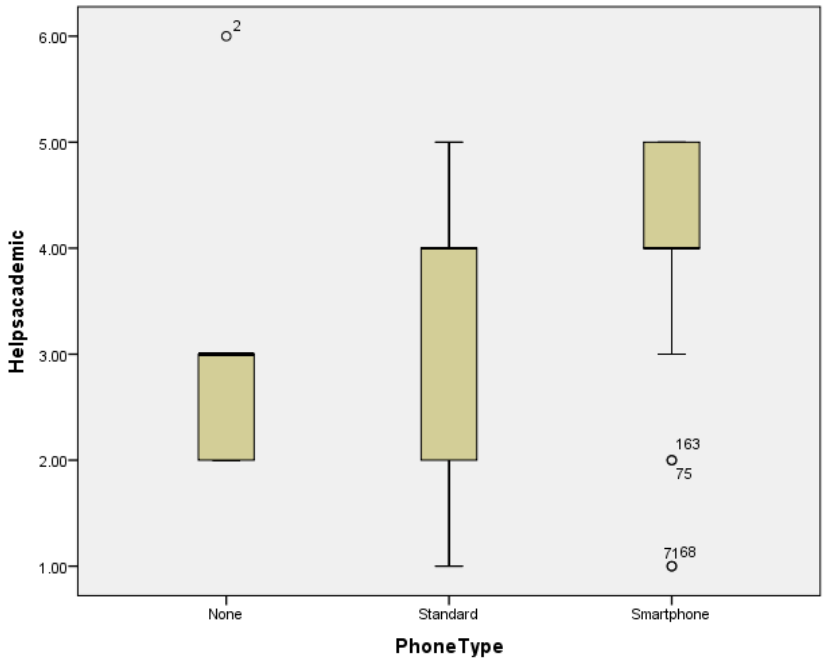

Figure 5. RQ 2 - Distribution of Scores for Type of Cell Phone Owned

Ho2₂: There is no significant difference between male and female students and their use of cell phones to complete assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of the usefulness of their cell phones to complete academic assignments differ between genders. The student perceptions of cell phones as useful in completing academic assignments was the test variable and the grouping variable was male or female. The test was not significant, $t(172) = .829$, $p = .408$. Therefore the null hypothesis was retained. The η^2 index was .003 which indicated a small effect size. Students that were male ($M = 3.97$, $SD = 1.16$) tended to have the same perceptions of the usefulness of their cell phones to complete academic assignments as students that were female ($M = 3.82$, $SD = 1.19$). The 95% confidence interval for the difference of means was -.205 to .501. Figure 6 shows the distributions for the two groups.

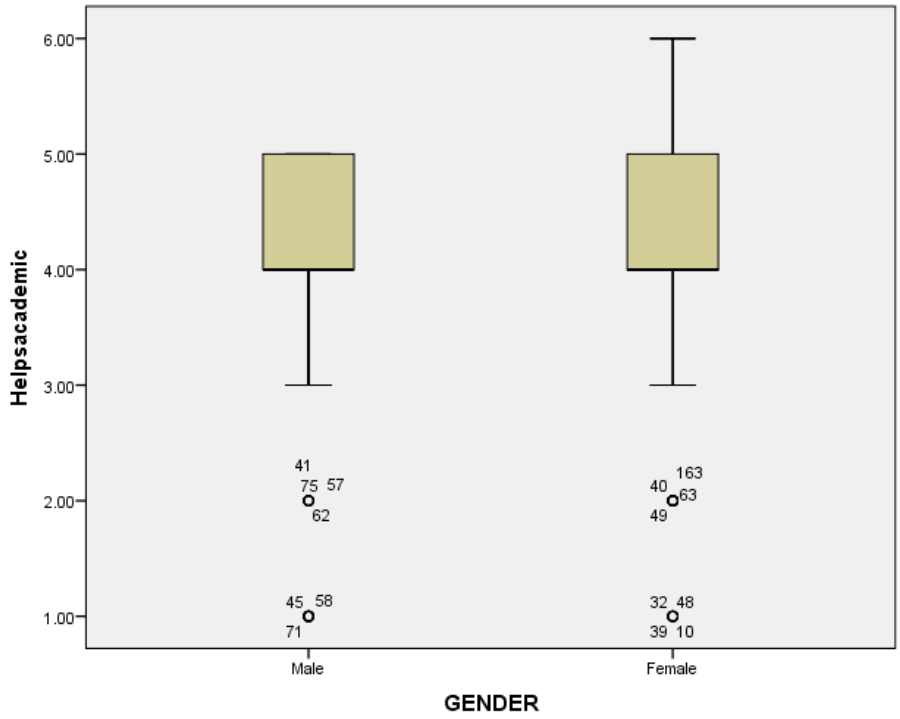

Figure 6. RQ 2 - Distribution of Scores for Gender Groups

Ho2$_3$: There is no significant difference between students who have a working PC at home and those who don't in regards to using cell phones to complete assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of the usefulness of their cell phones to complete academic assignments differ between ownership of a working personal computer at home. The student perceptions of cell phones as useful in completing academic assignments was the test variable and the grouping variable was having a working personal computer at home and not having a working personal computer at home. The test was not significant, $t(172) = .814$, $p = .417$. Therefore the null hypothesis was retained. The η^2 index was .003 which indicated a small effect size. Students that reported having a working personal computer at home ($M = 3.93$, $SD = 1.17$) tended to have the same perceptions of the usefulness of their cell phones to complete academic assignments as students that did not have a working personal computer at home ($M = 3.67$, $SD = 1.18$). The 95% confidence interval for the difference of means was -.367 to .883. Figure 7 shows the distributions for the two groups.

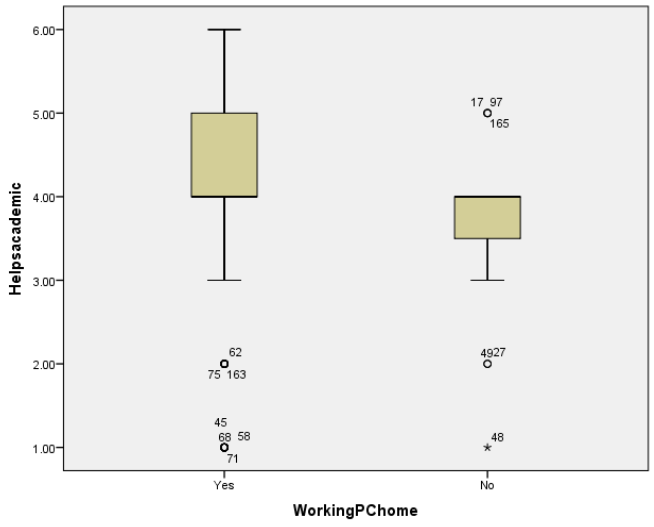

Figure 7. RQ 2 - Distribution of Scores for Having a Working PC at Home

Ho2₄: There is no significant difference between the income level of students and their use of cell phones to complete assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of students who felt their cell phones were useful in completing academic differ between socioeconomic statuses. The student perceptions of cell phones as useful in completing academic assignments was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was significant, $t(167) = -1.99$, $p = .049$. Therefore the null hypothesis was rejected. Students not qualifying for free/reduced lunch ($M = 4.01$, $SD = 1.16$) tended to see cell phones as more useful in completing academic assignments than those who qualified for free/reduced lunch ($M = 3.61$, $SD = 1.16$). The 95% confidence interval for the difference in means was -.796 and -.003. The η^2 index was .02, which indicated a small effect size. Students who did not qualify for free/reduced lunch tended to perceive cell phones more useful for completing academic assignments than students who qualified for free/reduced lunch. Figure 8 shows the distributions for the two groups.

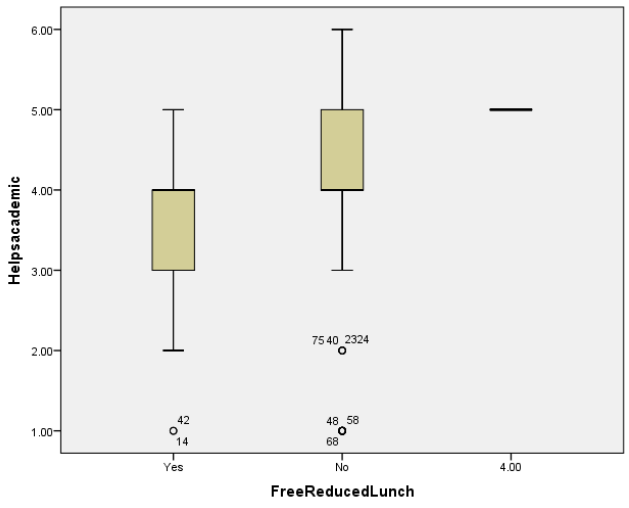

Figure 8. RQ 2 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

$Ho2_5$: There is no significant difference between the grade level of students and their use of cell phones to complete assignments.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and perceptions of cell phones as useful for completing academic assignments. The factor variable, the student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was the perception of cell phones as useful tools in completing academic assignments. The ANOVA was not significant, $F(3,170) = 1.374$, $p = .252$. Therefore, the null hypothesis was retained. The strength of the relationship between student grade level and perceptions of cell phones as useful for completing academic assignments, as assessed by η^2, was small (.02). The results indicate that the perceptions of cell phones as a useful for completing assignments was not significantly affected by student grade level. The means and standard deviations of the student groups are reported in Table 10.

Table 10.

Means and Standard Deviations of Student Grade Levels on RQ-2

Grade Level	N	M	SD
Freshman	52	3.75	1.25
Sophomore	34	3.71	1.34
Junior	46	4.15	.92
Senior	42	3.98	1.16

Research Question 3

Is there a significant difference in the degree to which students perceive they are encouraged to use cell phones to complete academic assignments as compared by the following

student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 11 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 4.

Respondents were asked to rate their agreement with the statement "I feel encouraged to use my cell phone in school to complete academic assignments" on a Likert-type scale of 1 to 5: 1 represented "strongly disagree", 5 represented "strongly agree" and 3 was "undecided". Only slightly more than half (58.3%) of students indicated they agreed with the statement.

Table 11.

Feels Encouraged to Use Cell Phone in School for Academics

		Frequency	Percent
Valid	Strongly Disagree	10	5.7
	Disagree	28	16.0
	Undecided	34	19.4
	Agree	60	34.3
	Strongly Agree	42	24.0

$HO3_1$: There is no significant difference between students who own standard cell phones and smartphones in perceptions that they are encouraged to use cell phones to complete academic assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of feeling encouraged to use their cell phones to complete academic

assignments differ between smart phone ownership and standard phone ownership. The student perceptions of feeling encouraged to use their cell phones to complete academic assignments was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was significant, $t(92.56) = -5.56$, $p < .001$. Therefore the null hypothesis was rejected. Students owning smart phones ($M = 3.93$, $SD = .96$) tended to feel more encouraged to use their phones to complete academic assignments than those who owned standard cell phones ($M = 2.88$, $SD = 1.26$). The 95% confidence interval for the difference in means was -1.42 and -.67. The η^2 index was .16, which indicated a large effect size. Owners of smart phones tended to perceive themselves more encouraged to use their cell phones to complete academic assignments than owners of standard cell phones. Figure 9 shows the distributions for the two groups.

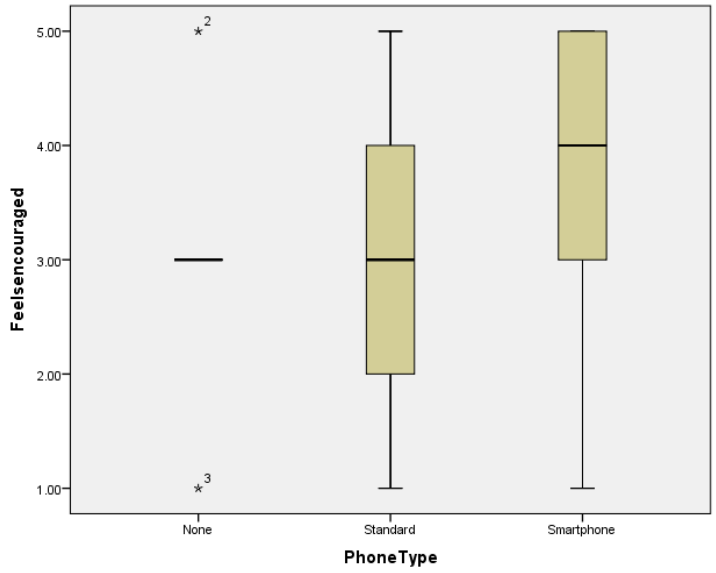

Figure 9. RQ 3 - Distribution of Scores for Type of Cell Phone Owned

$Ho3_2$: There is no significant difference between males and females in perceptions of feeling encouraged to use their cell phones to complete academic assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of feeling encouraged to use their cell phones to complete academic assignments differ between student genders. The student perceptions of feeling encouraged to use their cell phones to complete academic assignments was the test variable and the grouping variables were male and female. The test was not significant, t(172) = .1.10, p = .271. Therefore the null hypothesis was retained. The η^2 index was .007 which indicated a small effect size. Students that were male (M = 3.64, SD = 1.23) tended to have the same perceptions of feeling encouraged to use their cell phones to complete academic assignments as those that were female (M = 3.44, SD = 1.13). The 95% confidence interval for the difference of means was -.157 to .555. Figure 10 shows the distributions for the two groups.

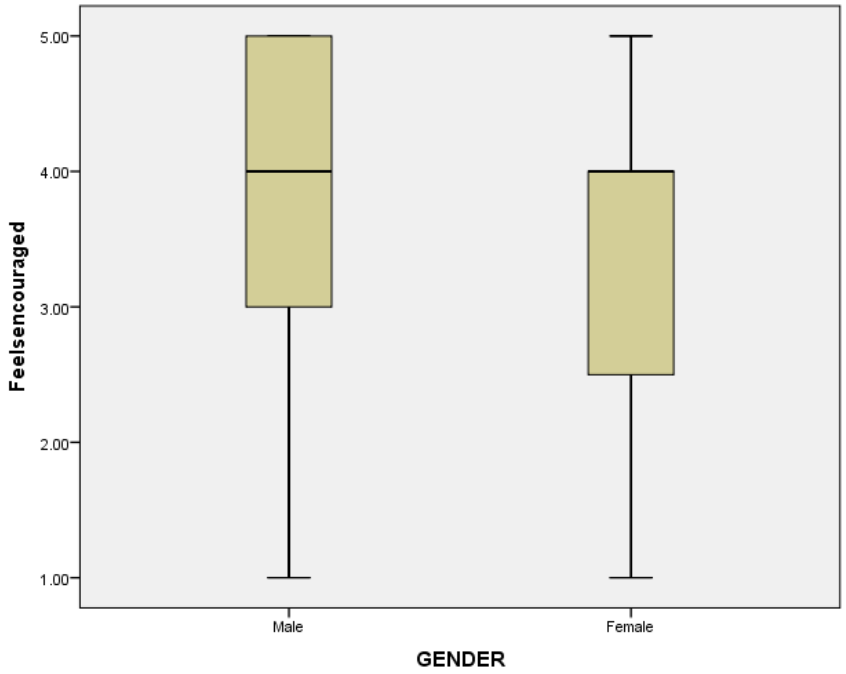

Figure 10. RQ 3 - Distribution of Scores for Gender Groups

Ho3$_3$: There is no significant difference between students who have a working PC at home and those who don't in regards to feeling encouraged to use their cell phones to complete academic assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of feeling encouraged to use cell phones to complete academic assignments differ between students with a working personal computer at home and students without a working personal computer at home. The student perceptions of feeling encouraged to use their cell phone to complete academic assignments was the test variable and the grouping variable the ownership of a working PC at home. The test was not significant, t(172) = -.165, p = .869. Therefore the null hypothesis was retained. The η^2 index was <.001 which indicated a small effect size. Students that owned a working personal computer at home (M = 3.55, SD = 1.19) tended to have the same perceptions of encouragement to use their cell phones to complete academic assignments as students that did not have a working personal computer at home (M = .60, SD = 1.18). The 95% confidence interval for the difference of means was -.687 to .581. Figure 11 shows the distributions for the two groups.

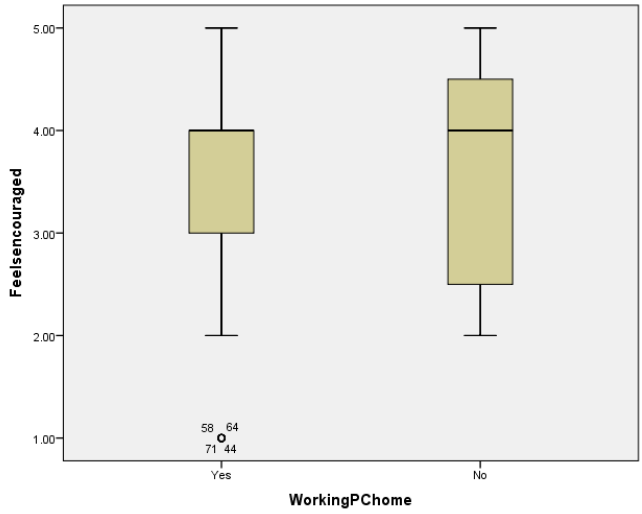

Figure 11. RQ 3 - Distribution of Scores for Having a Working PC at Home

Ho3₄: There is no significant difference between the income level of students and their perceptions of feeling encouraged to use their cell phones to complete assignments.

An independent-samples t-test was conducted to evaluate whether the mean amount of students who felt encouraged to use their cell phones for completing academic tasks differ between socioeconomic statuses. The student perceptions encouraged to use their cell phones to complete academic assignments was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was not significant, $t(167) = -.420$, $p = .675$. Therefore the null hypothesis was retained. Students not qualifying for free/reduced lunch ($M = 3.59$, $SD = 1.16$) tended to be as encouraged to use their cell phones to complete academic assignments as those who qualified for free/reduced lunch ($M = 3.50$, $SD = 1.22$). The 95% confidence interval for the difference in means was -.487 and .316. The η^2 index was .001, which indicated a small effect size. Figure 12 shows the distributions for the two groups.

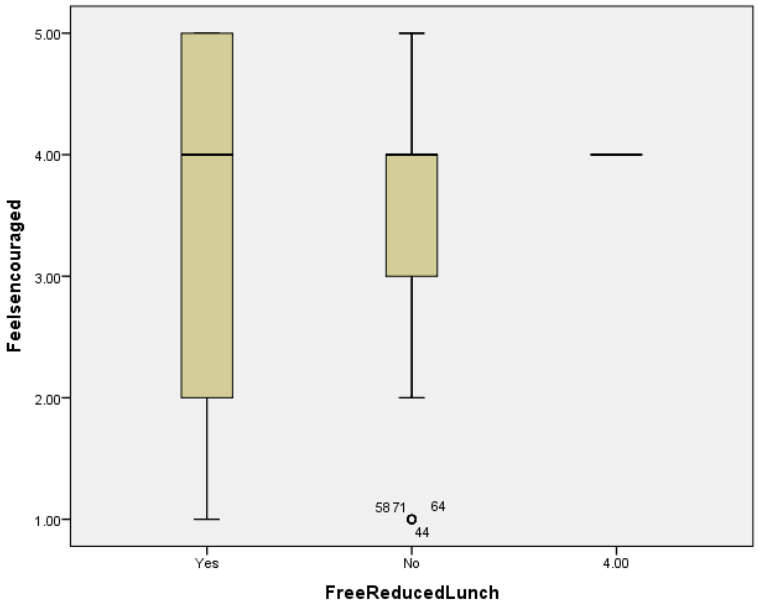

Figure 12. RQ 3 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

Ho3$_5$: There is no significant difference between the grade level of students and their perceptions of feeling encouraged to use their cell phones to complete academic assignments.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and perceptions of feeling encouraged to use their cell phones for completing academic assignments. The factor variable, the student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was the perception of encouragement to use their cell phones to complete academic assignments. The ANOVA was not significant, $F(3,170) = 2.447$, $p = .066$. Therefore, the null hypothesis was retained. The strength of the relationship between student grade level and perceptions of encouragements to use their cell phones to compete academic assignments, as assessed by η^2, was small (.04). The results indicate that the perceptions of encouragements to use cell phones for completing assignments was not significantly affected by student grade level. The means and standard deviations of the student groups are reported in Table 12.

Table 12.

Means and Standard Deviations of Student Grade Levels on RQ-3

Grade Level	N	M	SD
Freshman	52	3.38	1.17
Sophomore	34	3.24	1.13
Junior	46	3.87	1.09
Senior	42	3.67	1.18

Research Question 4

Is there a significant difference in the degree to which students perceive cell phones pose classroom distractions as compared by the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 13 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 2.

Respondents were asked to rate their agreement with the statement "I feel using cell phones in school is a distraction" on a Likert-type scale of 1 to 5: 1 represented "strongly disagree", 5 represented "strongly agree" and 3 was "undecided". Only 16% of respondents felt that cell phones were a distraction in a school setting.

Table 13.

Feels Cell Phones in School are Distracting

		Frequency	Percent
Valid	Strongly Disagree	54	30.9
	Disagree	66	37.7
	Undecided	27	15.4
	Agree	23	13.1
	Strongly Agree	5	2.9
	Total	175	100.0

Ho4$_1$: There is no significant difference between students who own standard and smart phones in perceptions of cell phones posing classroom distractions.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones posing a distraction in the classroom differ between smart phone ownership and standard phone ownership. The student perceptions of cell phones posing a distraction in the classroom was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was significant, t(93.205) = 3.00, p = .003. Therefore the null hypothesis was rejected. Students owning smart phones (M = 1.96, SD = .91) tended to perceive cell phones as less of a distraction than those who owned standard cell phones (M = 2.51, SD = 1.22). The 95% confidence interval for the difference in means was .184 and .905. The η^2 index was .05, which indicated a small effect size. Owners of smart phones tended to perceive cell phones less distracting than owners of standard cell phones. Figure 13 shows the distributions for the two groups.

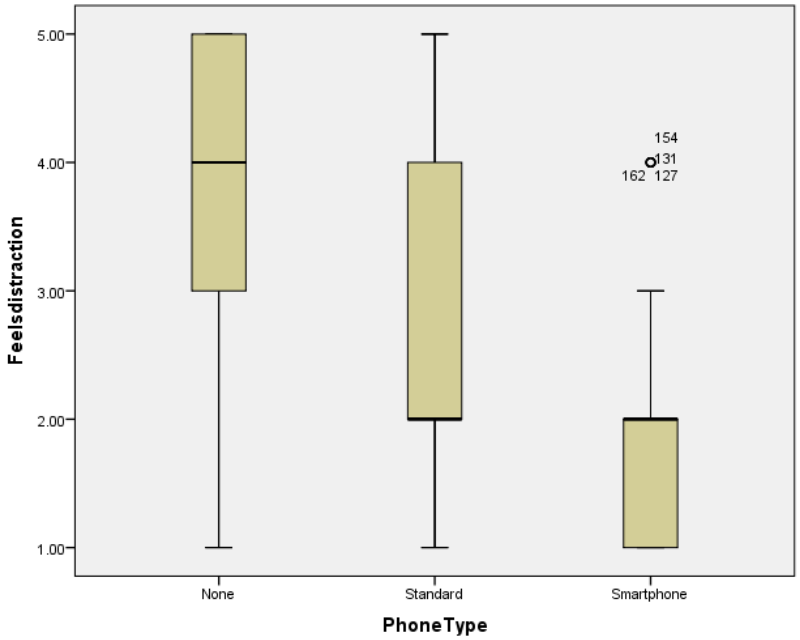

Figure 13. RQ 4 - Distribution of Scores for Type of Cell Phone Owned

Ho4₂: There is no significant difference between males and females in perceptions of cell phones posing classroom distractions.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones being a distraction in the classroom differ between student genders. The student perceptions cell phones posing a distraction in the classroom was the test variable and the grouping variables were male and female. The test was not significant, t(173) = .323, p = .747. Therefore the null hypothesis was retained. The η^2 index was <.001 which indicated a small effect size. Students that were male (M = 2.22, SD = 1.10) tended to have the same perceptions of cell phones posing a distraction in the classroom as students that were female (M = 2.16, SD = 1.11). The 95% confidence interval for the difference of means was -.277 to .386. Figure 14 shows the distributions for the two groups.

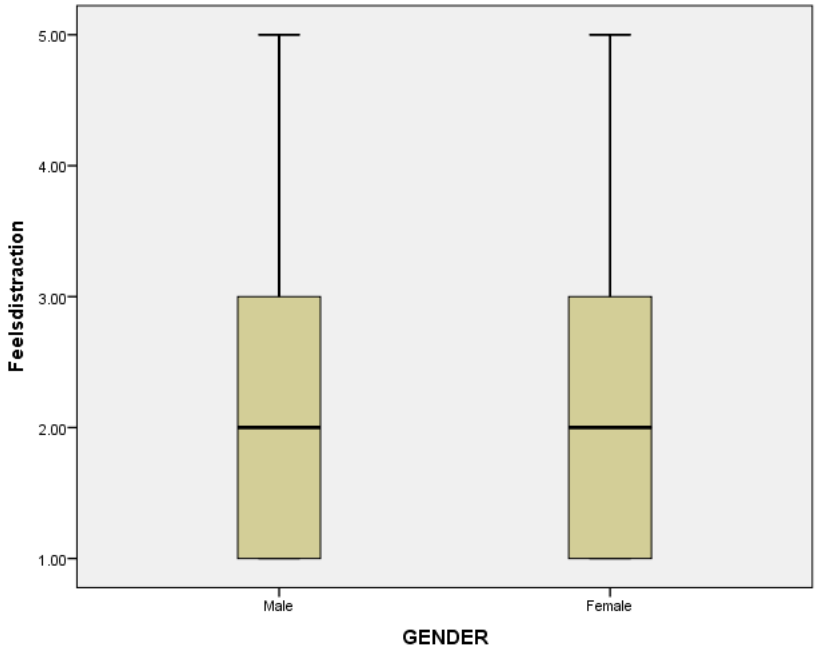

Figure 14. RQ 4 - Distribution of Scores for Gender Groups

Ho4$_3$: There is no significant difference between the ownership of a working personal computer at home and student perceptions of cell phones posing classroom distractions.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones posing classroom distractions differ between students with a working personal computer at home and students without a working personal computer at home. The student perceptions of cell phones posing classroom distractions was the test variable and the grouping variable was the ownership of a working pc at home. The test was not significant, $t(173) = .220$, $p = .824$. Therefore the null hypothesis was retained. The η^2 index was <.001 which indicated a small effect size. Students that had a working personal computer at home (M = 2.20, SD = 1.09) tended to have the same perceptions of cell phones posing classroom distractions as students that did not have a working personal computer at home (M = 2.13, SD = 1.30). The 95% confidence interval for the difference of means was -.522 to .656. Figure 15 shows the distributions for the two groups.

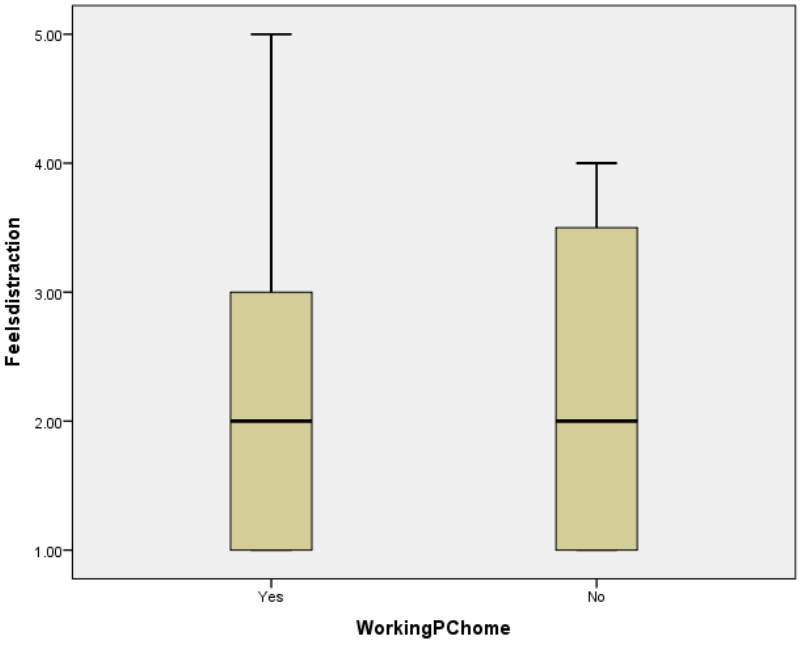

Figure 15. RQ 4 - Distribution of Scores for Having a Working PC at Home

Ho4₄: There is no significant difference between the income level of students and their perceptions of cell phones posing classroom distractions.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions of cell phones posing classroom distractions differ between socioeconomic statuses. The student perceptions of cell phones posing classroom distractions was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was not significant, t(65.99) = 1.16, p = .251. Therefore the null hypothesis was retained. Students not qualifying for free/reduced lunch (M = 2.10, SD = .99) tended to have the same perceptions of cell phones posing classroom distractions as those who qualified for free/reduced lunch (M = 2.35, SD = 1.29). The 95% confidence interval for the difference in means was -.176 and .661. The η^2 index was .007, which indicated a small effect size. Figure 16 shows the distributions for the two groups.

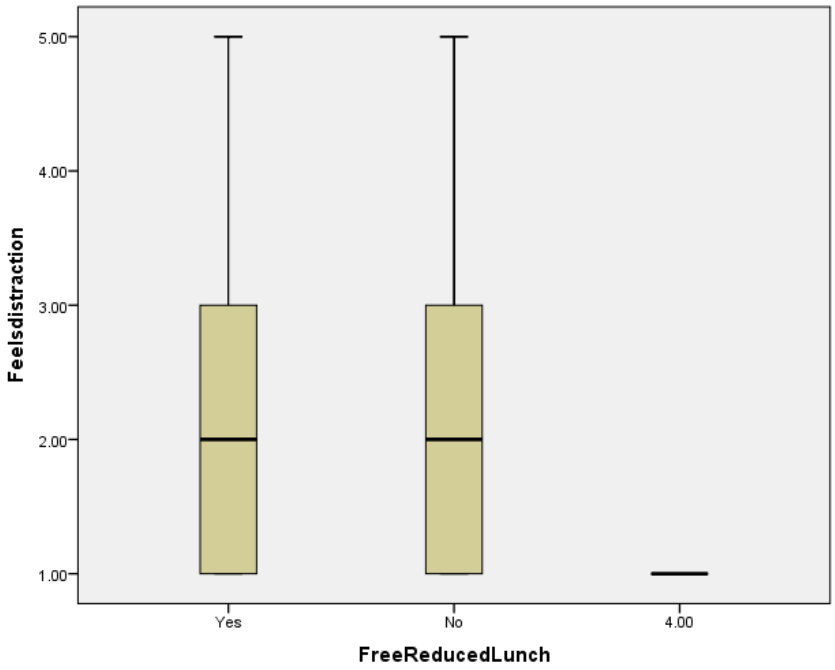

Figure 16. RQ 4 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

$Ho4_5$: There is no significant difference between the grade level of students and their perceptions of cell phones posing classroom distractions.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and student perceptions of cell phones posing classroom distractions. The factor variable, student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was student perceptions of cell phones posing classroom distractions. The ANOVA was significant, $F(3, 171) = 4.85$, $p = .003$. Therefore the null hypothesis was rejected. The strength of the relationship between student grade levels, as assessed by η^2, was small (.02).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted to evaluate pairwise difference among the means of the four groups. A Tukey procedure was selected for the multiple comparisons because equal variances were assumed. There was a significant difference in the means between the Sophomore group and the Senior ($p = .001$) and Sophomore and Freshman group ($p = .045$). However there was not a significant difference between the Junior group and the Freshman group ($p = .946$), Junior and the Sophomore group ($p = .162$), and the Junior and the Senior group ($p = .244$). It appears that perceptions of cell phones posing classroom distractions are less likely among Senior students than Sophomore students while Sophomore students view cell phones as significantly more distracting than Freshmen students. No other significant differences were found. The 95% confidence intervals for the pairwise differences, as well as the means and standard deviations for the student groups, are reported in Table 14.

Table 14.

Means and Standard Deviations of Student Grade Levels on RQ-4

Grade Level	N	M	SD	Freshman	Sophomore	Junior
Freshman	52	2.16	1.11			
Sophomore	34	2.74	1.11	.001 to 1.23		
Junior	47	2.23	1.19	-.439 to .676	-1.22 to 1.12	
Senior	42	1.81	.083	-.880 to .269	-1.56 to -.287	-1.01 to .164

Research Question 5

Is there a significant difference in the degree to which students perceive cell phones are functional to perform school related tasks as compared by the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 15 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 4.

Respondents were asked to rate their agreement with the statement "My cell phone is easy to use in regards to performing school related tasks" on a Likert-type scale of 1 to 5: 1 represented "strongly disagree", 5 represented "strongly agree" and 3 was "undecided". Nearly three-quarters of all respondents (74.3%) agreed that the functionality of their cell phone made school-related tasks easier.

Table 15.

Phone Ease of Use for School Tasks

		Frequency	Percent
Valid	Strongly Disagree	8	4.6
	Disagree	17	9.7
	Undecided	19	10.9
	Agree	73	41.7
	Strongly Agree	57	32.6
	Total	174	99.4
Missing	System	1	.6
Total		175	100.0

$Ho5_1$: There is no significant difference between students who own a standard cell phone and students who own a smart phone in perceptions that cell phones are functional to perform school related tasks.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions that cell phones are functional to perform school related tasks differ between smart phone ownership and standard phone ownership. The student perceptions that cell phones are functional to perform school related tasks was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was significant, t(85.131) = -6.64, p = < 001. Therefore the null hypothesis was rejected. Students owning smart phones (M = 4.31, SD = .798) tended to perceive that cell phones are more functional to perform school related tasks than those who owned standard cell phones (M = 3.14, SD = 1.22). The 95% confidence interval for the difference in means was -1.52 and -.822. The η^2 index was .21,

which indicated a large effect size. Owners of smart phones tended to perceive that cell phones are more functional to perform school related tasks than owners of standard cell phones. Figure 17 shows the distributions for the two groups.

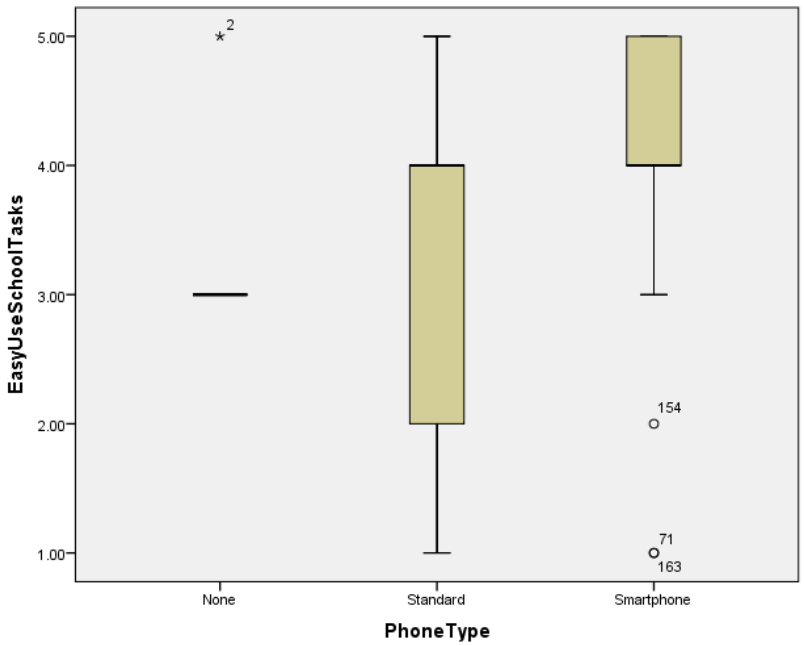

Figure 17. RQ 5 - Distribution of Scores for Type of Cell Phone Owned

Ho5$_2$: There is no significant difference between genders in perceptions that cell phones are functional to perform school related tasks.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions that cell phones are functional to perform school related tasks differ between student genders. The student perceptions that cell phones are functional to perform school related tasks was the test variable and the grouping variables were male and female. The test was not significant, $t(172) = 1.24$, $p = .216$. Therefore the null hypothesis was retained. The η^2 index was <.009 which indicated a small effect size. Students that were male ($M = 3.98$, $SD = 1.10$) tended to have the same perceptions that cell phones are functional to perform school

related tasks as students that were female (M = 3.77, SD = 1.12). The 95% confidence interval for the difference of means was -.124 to .544. Figure 18 shows the distributions for the two groups.

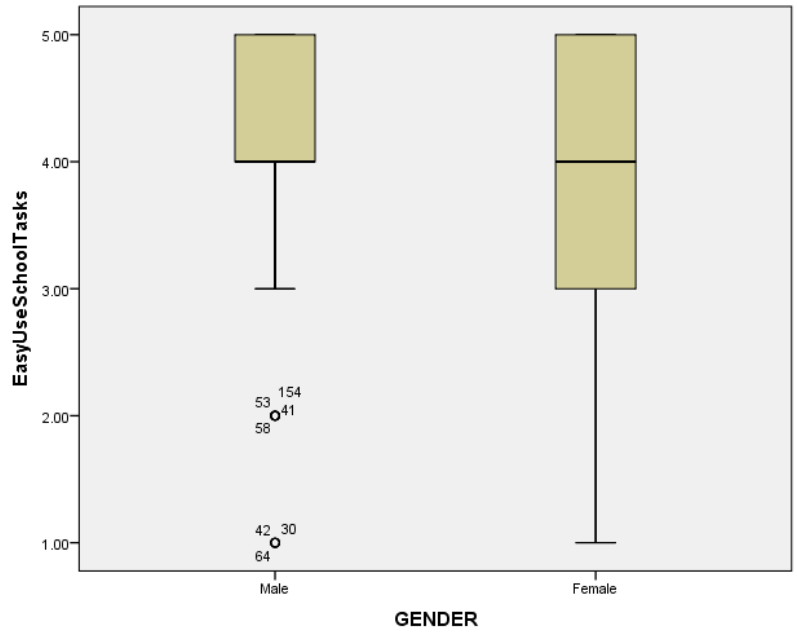

Figure 18. RQ 5 - Distribution of Scores for Gender Groups

Ho5$_3$: There is no significant difference between the ownership of a working personal computer at home and student perceptions that cell phones are functional to perform school related tasks.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions that cell phones are functional to perform school related tasks differ between students with a working personal computer at home and students without a working personal computer at home. The student perceptions that cell phones are functional to perform school related tasks was the test variable and the grouping variable was the ownership of a working PC at home. The test was not significant, t(172) = .067, p = .947. Therefore the null hypothesis was retained. The η^2 index was <.001 which indicated a small effect size. Students that had a

working personal computer at home (M = 3.89, SD = 1.12) tended to have the same perceptions that cell phones are functional to perform school related tasks as students that did not have a working personal computer at home (M = 3.87, SD = .990). The 95% confidence interval for the difference of means was -.574 to .614. Figure 19 shows the distributions for the two groups.

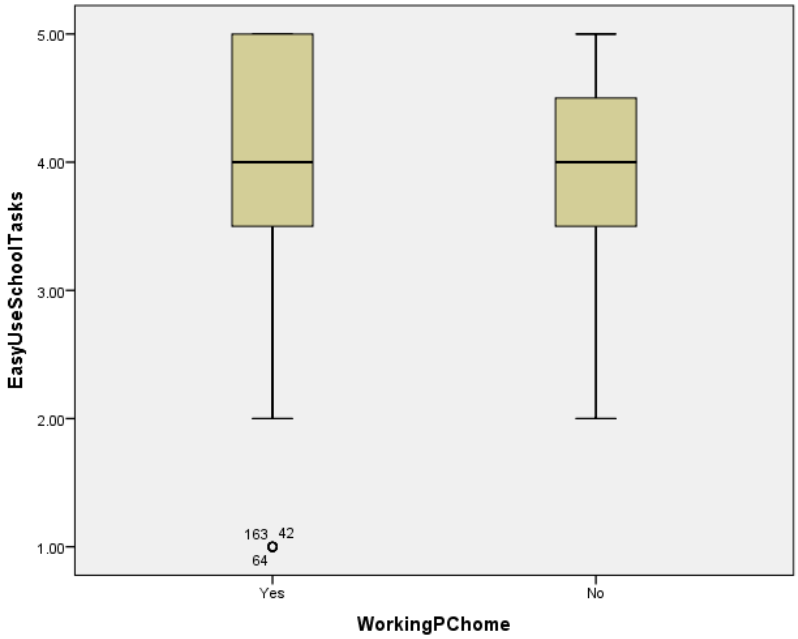

Figure 19. RQ 5 - Distribution of Scores for Having a Working PC at Home

Ho5$_4$: There is no significant difference between the income level of students and their perceptions that cell phones are functional to perform school related tasks.

An independent-samples t-test was conducted to evaluate whether the mean amount of student perceptions that cell phones are functional to perform school related tasks differ between socioeconomic statuses. The student perceptions that cell phones are functional to perform school related tasks was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was significant, t(167) = -2.38, p = .019. Therefore the null hypothesis was rejected. Students who did not receive free/reduced

lunch (M = 4.02, SD = 1.07) tended to perceive that cell phones are more functional to perform school related tasks than those who received free/reduced lunch (M = 3.57, SD = 1.15). The 95% confidence interval for the difference in means was -.826 and -.076. The η^2 index was .03, which indicated a small effect size. Students who did not receive free/reduced lunch tended to perceive that cell phones are more functional to perform school related tasks than students who received free/reduced lunch. Figure 20 shows the distributions for the two groups.

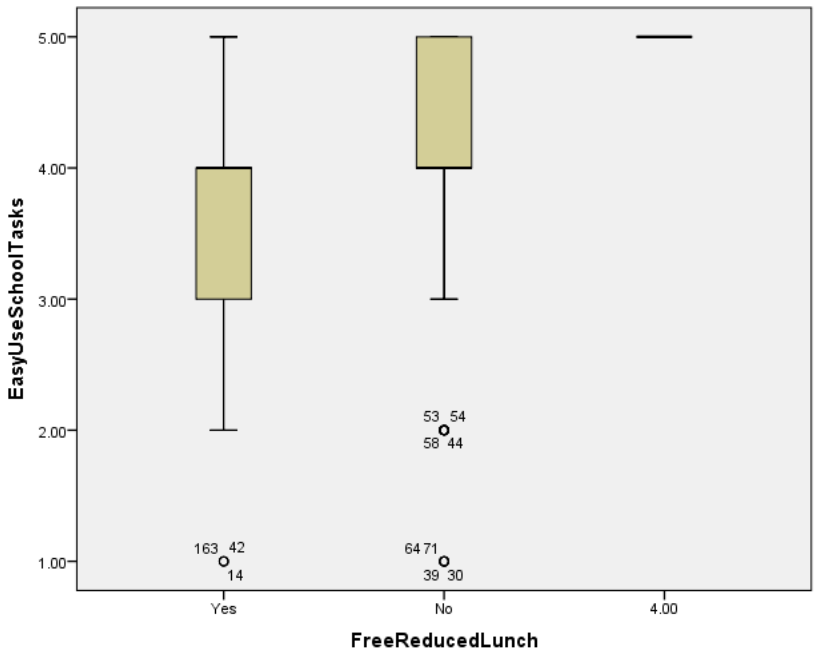

Figure 20. RQ 5 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

Ho5$_5$: There is no significant difference between the grade level of students and their perceptions that cell phones are functional to perform school related tasks.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and student perceptions that cell phones are functional to perform school related tasks. The factor variable, the student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was student perceptions that cell phones

are functional to perform school related tasks. The ANOVA was not significant, $F(3,170) = 1.304$, $p = .275$. Therefore, the null hypothesis was retained. The strength of the relationship between student grade level and student perceptions that cell phones are functional to perform school related tasks, as assessed by η^2, was small (.02). The results indicate that the perceptions that cell phones are functional to perform school related tasks was not significantly affected by student grade level. The means and standard deviations of the student groups are reported in Table 16.

Table 16.

Means and Standard Deviations of Student Grade Levels on RQ-5

Grade Level	N	M	SD
Freshman	51	3.76	1.74
Sophomore	34	3.74	1.08
Junior	47	4.115	.91
Senior	42	3.86	1.16

Research Question 6

Is there a significance in the degree to which students report using cell phones outside of school for school related purposes as compared by the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 17 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 3.

Respondents were asked to rate the frequency of their behavior with the statement "I use my cell phone outside of school for school related purposes" on a Likert-type scale of 1 to 5: 1 represented "never"; 2 was "rarely", 3 was "sometimes", 4 was "very often" and 5 represented "always". Respondents indicated that more than 80% of them used their phone at least sometimes for school purposes while outside of the school environment.

Table 17.

Use of Cell Outside of School for School Purposes

	Frequency	Percent
Never	19	10.9
Rarely	19	10.9
Sometimes	66	37.7
Very Often	54	30.9
Always	17	9.7
Total	175	100.0

$Ho6_1$: There is no significant difference between students who own a standard cell phone and students who own a smart phone in students reporting using cell phones outside of school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones outside of school for school related purposes differ between smart phone ownership and standard phone ownership. The students reporting using cell phones outside of school for school related purposes was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was significant, $t(168) = -6.82$, $p = < 001$. Therefore the null hypothesis was rejected. Students owning smart phones (M =

3.59, SD = .879) tended to report using cell phones outside of school for school related purposes more than those who owned standard cell phones (M = 2.54, SD = 1.06). The 95% confidence interval for the difference in means was -1.34 and -.743. The η^2 index was .22, which indicated a large effect size. Owners of smart phones tended to report using cell phones outside of school for school related purposes more than owners of standard cell phones. Figure 21 shows the distributions for the two groups.

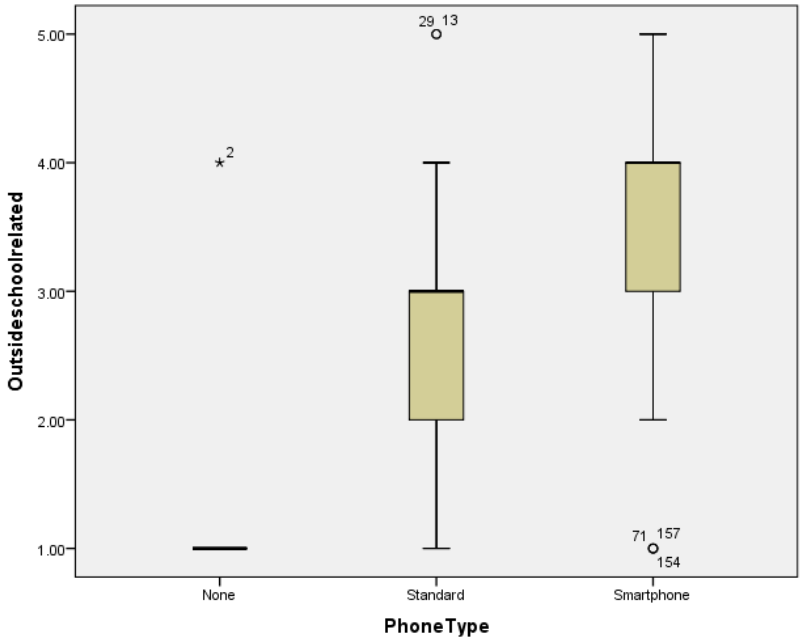

Figure 21. RQ 6 - Distribution of Scores for Type of Cell Phone Owned

Ho6$_2$: There is no significant difference between genders in students reporting using cell phones outside of school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones outside of school for school related purposes differ between student genders. The students reporting using cell phones outside of school for school related purposes was the test variable and the grouping variables were male and female. The test was

not significant, t(173) = -.001, p = .999. Therefore the null hypothesis was retained. The η^2 index was <.001 which indicated a small effect size. Students that were male (M = 3.18, SD = 1.17) tended to have the same reporting of using cell phones outside of school for school related purposes as students that were female (M = 3.18, SD = 1.02). The 95% confidence interval for the difference of means was -.332 to .331. Figure 22 shows the distributions for the two groups.

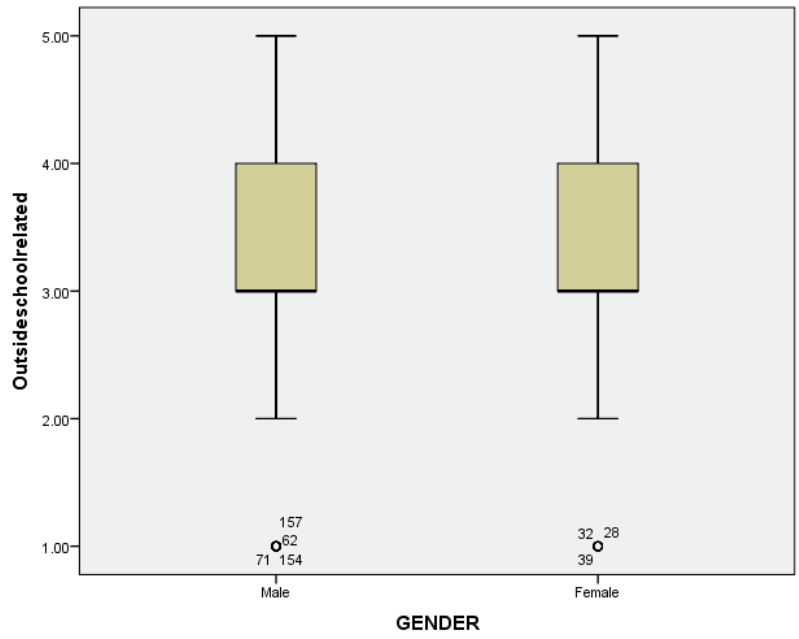

Figure 22. RQ 6 - Distribution of Scores for Gender Groups

$Ho6_3$: There is no significant difference between the ownership of a working personal computer at home and students reporting using cell phones outside of school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones outside of school for school related purposes differ between students with a working personal computer at home and students without a working personal computer at home. The students reporting using cell phones outside of school for school related purposes was the test variable and the grouping variable was the ownership of a working pc at

home. The test was not significant, t(173) = -.573, p = .568. Therefore the null hypothesis was retained. The η^2 index was = .002 which indicated a small effect size. Students that had a working personal computer at home (M = 3.16, SD = 1.13) tended to have the same reporting of using cell phones outside of school for school related purposes as students that did not have a working personal computer at home (M = 3.33, SD = .724). The 95% confidence interval for the difference of means was -.760 to .418. Figure 23 shows the distributions for the two groups.

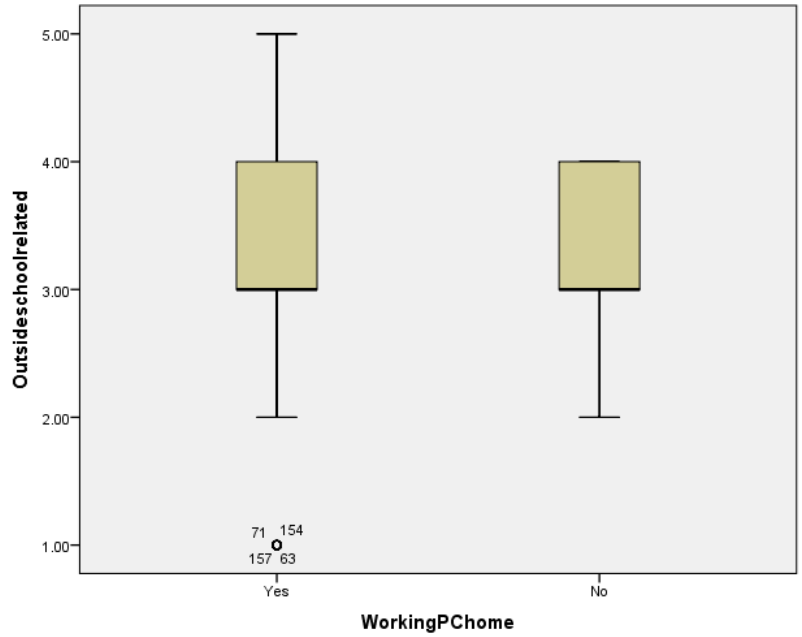

Figure 23. RQ 6 - Distribution of Scores for Having a Working PC at Home

Ho6$_4$: There is no significant difference between the income level of students and their reporting using cell phones outside of school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones outside of school for school related purposes differ between socioeconomic statuses. The students reporting using cell phones outside of school for school related purposes was the test variable and the grouping variable was students who qualified for

free/reduced lunch and students who did not. The test was significant, t(168) = -2.33, p = .021. Therefore the null hypothesis was rejected. Students who did not receive free/reduced lunch (M = 3.30, SD = 1.00) tended to report using cell phones outside of school for school related purposes more than those who received free/reduced lunch (M = 2.87, SD = 1.22). The 95% confidence interval for the difference in means was -.792 and -.065. The η^2 index was .03, which indicated a small effect size. Students who did not receive free/reduced lunch tended to report using cell phones outside of school for school related purposes more than students who received free/reduced lunch. Figure 24 shows the distributions for the two groups.

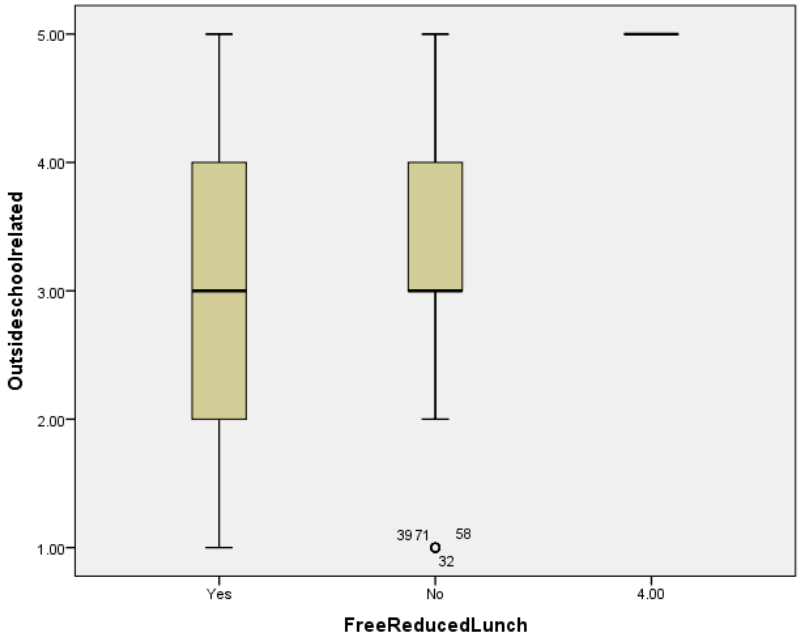

Figure 24. RQ 6 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

Ho6$_5$: There is no significant difference between the grade level of students and their reporting of using cell phones outside of school for school related purposes.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and students reporting using cell phones outside of school for school related

purposes. The factor variable, the student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was students reporting using cell phones outside of school for school related purposes. The ANOVA was not significant, $F(3,171) = 1.813$, $p = .147$. Therefore, the null hypothesis was retained. The strength of the relationship between student grade level and students reporting using cell phones outside of school for school related purposes, as assessed by η^2, was small (.02). The results indicate that the students reporting using cell phones outside of school for school related purposes was not significantly affected by student grade level. The means and standard deviations of the student groups are reported in Table 18.

Table 18.

Means and Standard Deviations of Student Grade Levels of RQ-6

Grade Level	N	M	SD
Freshman	52	3.04	1.08
Sophomore	34	2.91	.933
Junior	47	3.32	1.18
Senior	42	3.18	.174

Research Question 7

Is there a significant difference in the degree to which students report using cell phones at school for school related purposes as compared by the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 19 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 3.

Respondents were asked to rate the frequency of their behavior with the statement "I use my cell phone at school for school related purposes" on a Likert-type scale of 1 to 5: 1 represented "never"; 2 was "rarely", 3 was "sometimes", 4 was "very often" and 5 represented "always". Respondents indicated that more than 70% of students used their phone at least sometimes for school purposes while inside of the school environment.

Table 19.

Use of Cell at School for School Purposes

	Frequency	Percent
Never	25	14.3
Rarely	27	15.4
Sometimes	56	32.0
Very Often	43	24.6
Always	24	13.7
Total	175	100.0

$Ho7_1$: There is no significant difference between students who own a standard cell phone and students who own a smart phone in students report using cell phones at school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones at school for school related purposes differ between smart

phone ownership and standard phone ownership. The students reporting using cell phones at school for school related purposes was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was significant, $t(168) = -6.42$, $p < 001$. Therefore the null hypothesis was rejected. Students owning smart phones ($M = 3.51$, $SD = 1.06$) tended to report using cell phones at school for school related purposes more than those who owned standard cell phones ($M = 2.39$, $SD = 1.13$). The 95% confidence interval for the difference in means was -1.47 and -.779. The η^2 index was .20, which indicated a large effect size. Owners of smart phones tended to report using cell phones at school for school related purposes more than owners of standard cell phones. Figure 25 shows the distributions for the two groups.

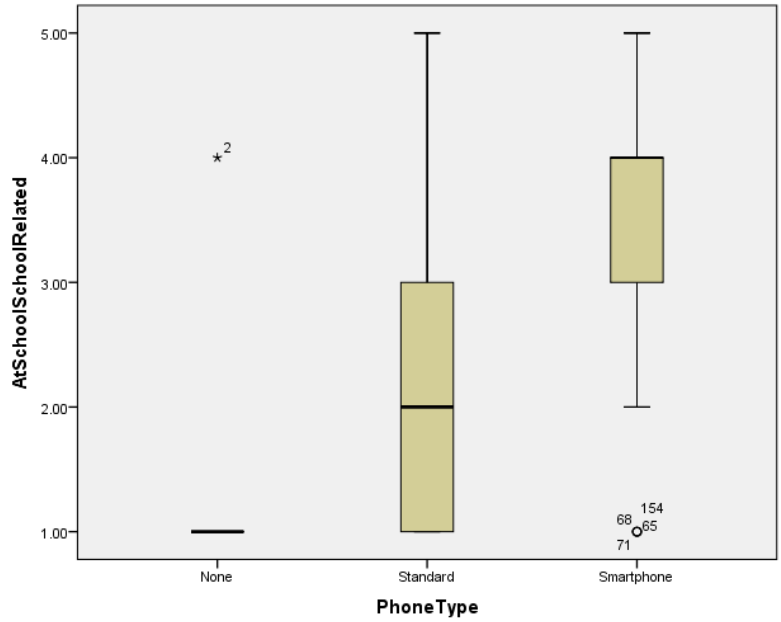

Figure 25. RQ 7 - Distribution of Scores for Type of Cell Phone Owned

$Ho7_2$: There is no significant difference between genders in students reporting using cell phones at school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones at school for school related purposes differ between student genders. The students reporting using cell phones at school for school related purposes was the test variable and the grouping variables were male and female. The test was not significant, $t(173) = .285$, $p = .776$. Therefore the null hypothesis was retained. The η^2 index was <.001 which indicated a small effect size. Students that were male (M = 3.10, SD = 1.30) tended to have the same reporting of using cell phones at school for school related purposes as students that were female (M = 3.05, SD = 1.15). The 95% confidence interval for the difference of means was -.317 to .424. Figure 26 shows the distributions for the two groups.

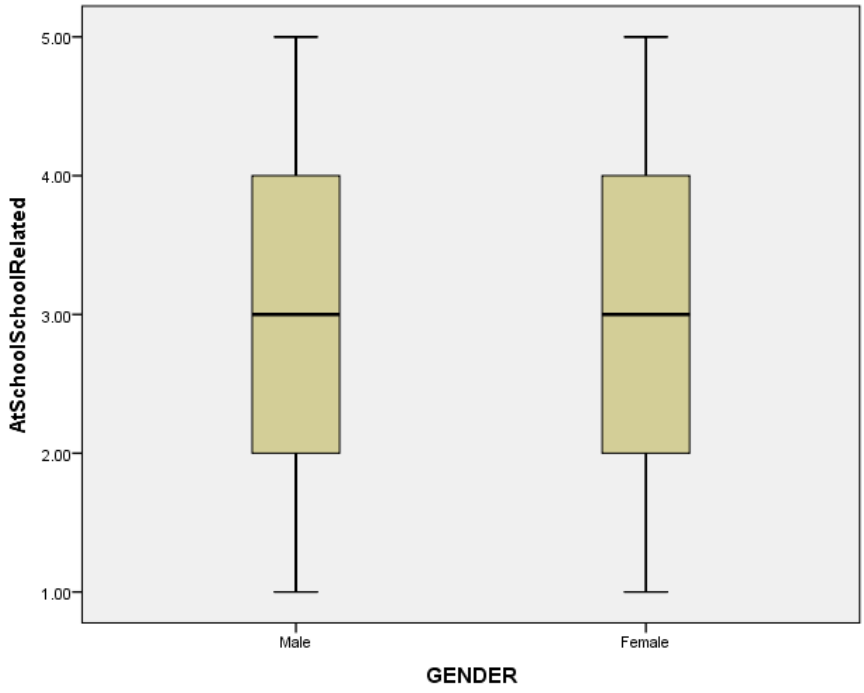

Figure 26. RQ 7 - Distribution of Scores for Gender Groups

$Ho7_3$: There is no significant difference between the ownership of a working personal computer at home and students reporting using cell phones at school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones at school for school related purposes differ between students with a working personal computer at home and students without a working personal computer at home. Students reporting using cell phones at school for school related purposes was the test variable and the grouping variable was the ownership of a working PC at home. The test was not significant, t(173) = .262, p = .794. Therefore the null hypothesis was retained. The η^2 index was < .001 which indicated a small effect size. Students that had a working personal computer at home (M = 3.08, SD = 1.26) tended to have the same reporting of using cell phones at school for school related purposes as students that did not have a working personal computer at home (M = 3.00, SD = 1.00). The 95% confidence interval for the difference of means was -.572 to .746. Figure 27 shows the distributions for the two groups.

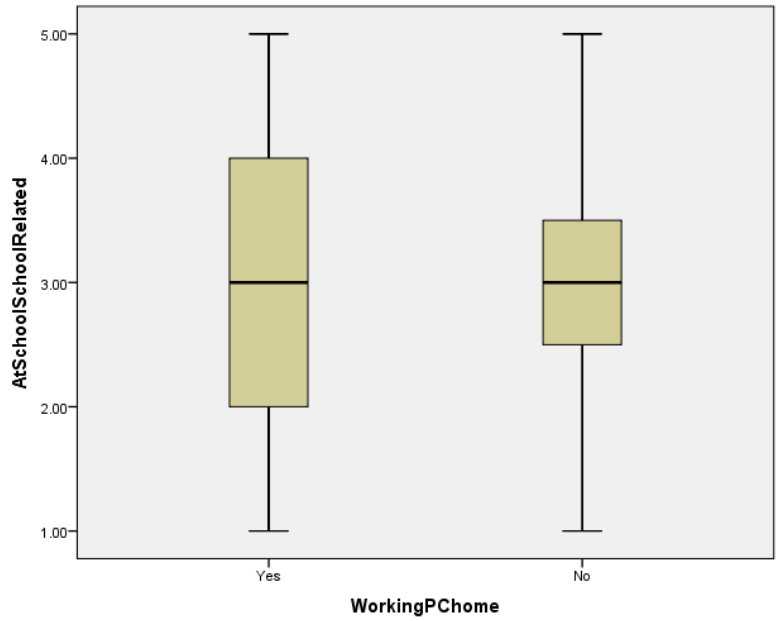

Figure 27. RQ 7 - Distribution of Scores for Having a Working PC at Home

Ho7₄: There is no significant difference between the income level of students and their reporting using cell phones at school for school related purposes.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones at school for school related purposes differ between socioeconomic statuses. The students reporting using cell phones at school for school related purposes was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was not significant, t(168) = -1.695, p = .092. Therefore the null hypothesis was retained. The η^2 index was = .02 which indicated a small effect size. Students who did not receive free/reduced lunch (M = 3.16, SD = 1.16) tended to have the same reporting of using cell phones at school for school related purposes as students who received free/reduced lunch (M = 2.80, SD = 1.36). The 95% confidence interval for the difference of means was -.773 to .059. Figure 28 shows the distributions for the two groups.

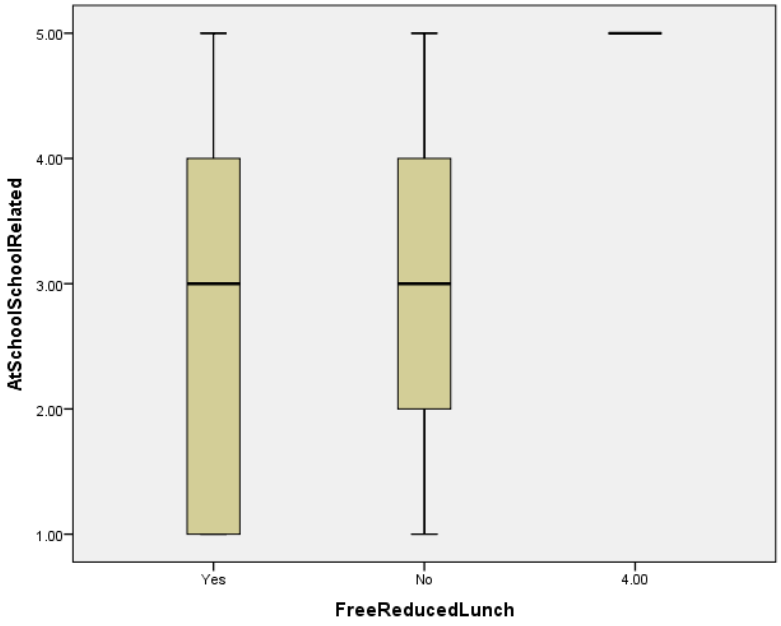

Figure 28. RQ 7 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

Ho7$_5$: There is no significant difference between the grade level of students and their *reporting of using cell phones at school for school related purposes.*

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and students reporting of using cell phones at school for school related purposes. The factor variable, student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was student reporting of using cell phones at school for school related purposes. The ANOVA was significant, $F(3, 171) = 4.89$, $p = .003$. Therefore the null hypothesis was rejected. The strength of the relationship between student grade levels, as assessed by η^2, was small (.02).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted to evaluate pairwise difference among the means of the four groups. A Tukey procedure was selected for the multiple comparisons because equal variances were assumed. There was a significant difference in the means between the Senior group and the Sophomore group ($p = .020$), the Senior and Freshmen group ($p = .040$), and a significant difference between the Junior group and the Sophomore group ($p = .034$). However there was not a significant difference between the Senior and Junior groups ($p= .993$), the Junior and Freshman groups ($p= .068$), and the Freshman and Sophomore groups ($p= .950$). It appears that students reporting of using cell phones at school for school related purposes are significantly more likely among Senior students than Sophomore and Freshmen students as well Juniors being significantly more likely to use their phones in such manner as Sophomore students. No other significant differences were found. The 95% confidence intervals for the pairwise differences, as well as the means and standard deviations for the student groups, are reported in Table 20.

Table 20.

Means and Standard Deviations of Student Grade Levels on RQ-7

Grade Level	N	M	SD	Freshman	Sophomore	Junior
Freshman	52	2.79	1.16			
Sophomore	34	2.65	1.04	-.825 to .542		
Junior	47	3.38	1.29	-.029 to 1.22	.038 to 1.43	
Senior	42	3.45	1.23	.021 to 1.31	.090 to 1.52	-.589 to .727

Research Question 8

Is there a significant difference between the degrees to which students report using cell phones for non-school related purposes at school as compared by the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 21 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 3.

Respondents were asked to rate the frequency of their behavior with the statement "I use my cell phone at school for performing non-school related purposes" on a Likert-type scale of 1 to 5: 1 represented "never"; 2 was "rarely", 3 was "sometimes", 4 was "very often" and 5 represented "always". Three-quarters (74.3%) of respondents indicated they at least sometimes used their phone at school for non-school related purposes.

Table 21.

Use of Cell at School for Non-School Tasks

	Frequency	Percent
Never	14	8.0
Rarely	31	17.7
Sometimes	54	30.9
Very Often	49	28.0
Always	27	15.4
Total	175	100.0

$Ho8_1$: There is no significant difference between students who own a standard cell phone and students who own a smart phone in students reporting using cell phones for non-school related purposes at school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones for non-school related purposes at school differ between smart phone ownership and standard phone ownership. The students reporting using cell phones for non-school related purposes at school was the test variable and the grouping variables were ownership of either a smart phone or a standard phone. The test was not significant, $t(169) = -.253$, $p = .801$. Therefore the null hypothesis was retained. The η^2 index was <.001 which indicated a small effect size. Students owning smart phones ($M = 3.33$, $SD = 1.08$) tended to have the same reporting of using cell phones for non-school related purposes at school as those who owned standard cell phones ($M = 3.29$, $SD = 1.16$). The 95% confidence interval for the difference of means was -.398 to .307. Figure 29 shows the distributions for the two groups.

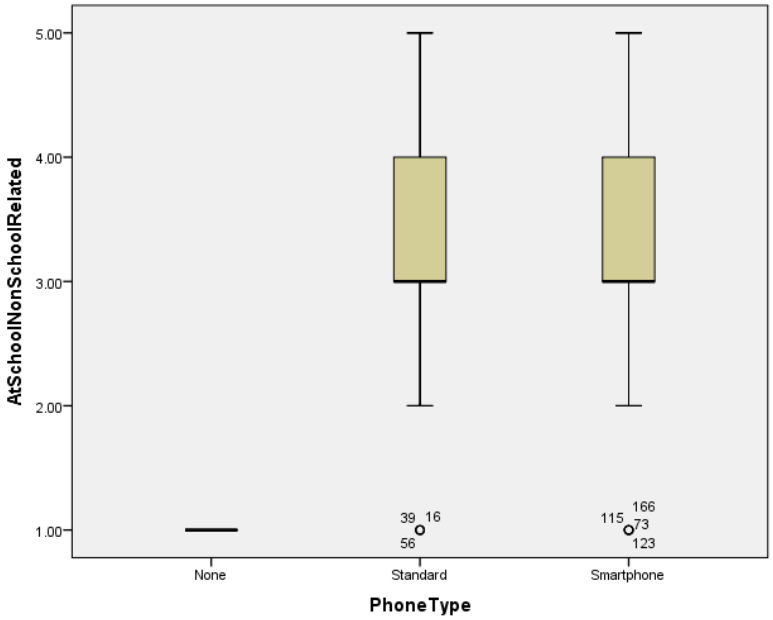

Figure 29. RQ 8 - Distribution of Scores for Type of Cell Phone Owned

Ho8$_2$: There is no significant difference between genders in students reporting using cell phones for non-school related purposes at school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones for non-school related purposes at school differ between student genders. The students reporting using cell phones for non-school related purposes at school was the test variable and the grouping variables were male and female. The test was not significant, t(173) = -.937, p = .350. Therefore the null hypothesis was retained. The η^2 index was = .005 which indicated a small effect size. Students that were male (M = 3.18, SD = 1.51) tended to have the same reporting using cell phones for non-school related purposes at school as students that were female (M = 3.34, SD = 1.16). The 95% confidence interval for the difference of means was -.512 to .182. Figure 30 shows the distributions for the two groups.

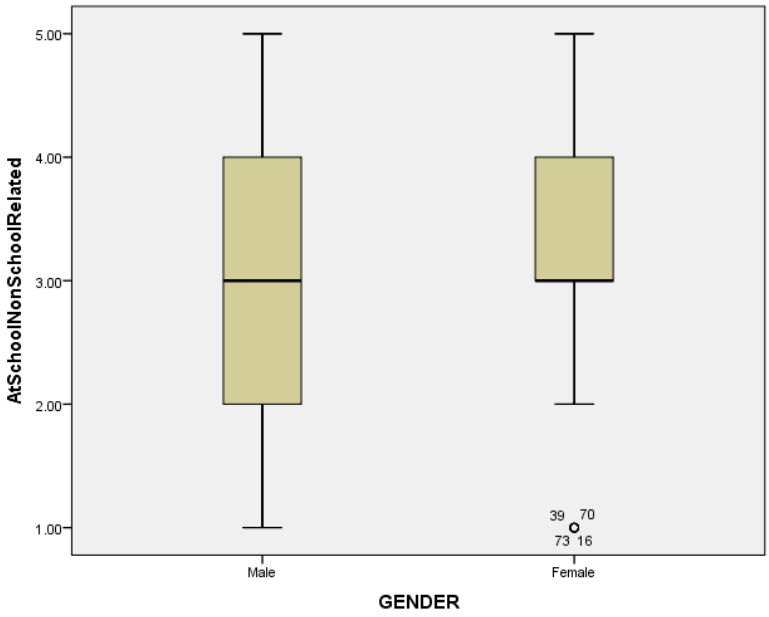

Figure 30. RQ 8 - Distribution of Scores for Gender Groups

Ho8$_3$: There is no significant difference between the ownership of a working personal computer at home and students reporting using cell phones for non-school related purposes at school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones for non-school related purposes at school differ between students with a working personal computer at home and students without a working personal computer at home. Students reporting using cell phones for non-school related purposes at school was the test variable and the grouping variable was the ownership of a working pc at home. The test was not significant, t(173) = -.053, p = .313. Therefore the null hypothesis was retained. The η^2 index was < .001 which indicated a small effect size. Students that had a working personal computer at home (M = 3.25, SD = 1.16) tended to have the same reporting of using cell phones for non-school related purposes at school as students that did not have a working personal computer at home (M = 3.27, SD = 1.10). The 95% confidence interval for the difference of means was -.635 to .602. Figure 31 shows the distributions for the two groups.

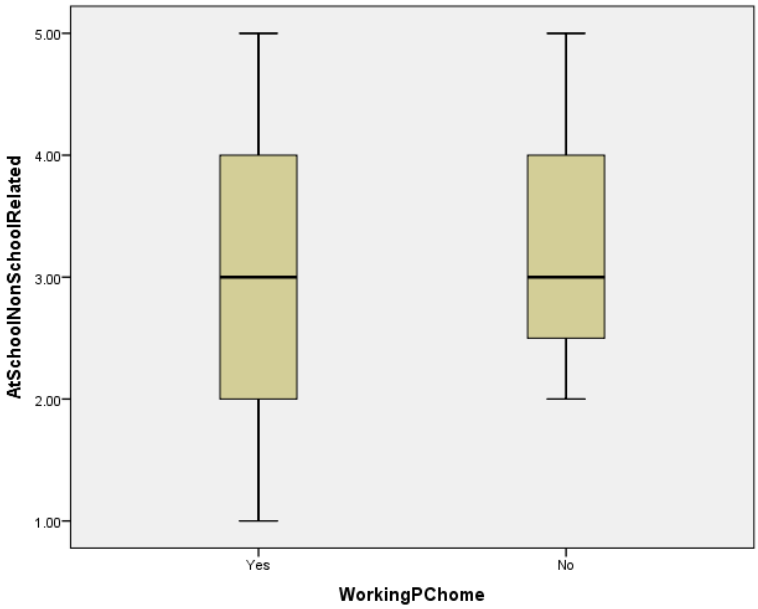

Figure 31. RQ 8 - Distribution of Scores for Having a Working PC at Home

Ho8₄: There is no significant difference between the income level of students and their reporting using cell phones for non-school related purposes at school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting using cell phones for non-school related purposes at school differ between socioeconomic statuses. The students reporting using cell phones for non-school related purposes at school was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was not significant, $t(168) = .411$, $p = .682$. Therefore the null hypothesis was retained. The η^2 index was = .001 which indicated a small effect size. Students who did not receive free/reduced lunch ($M = 3.27$, $SD = 1.13$) tended to have the same reporting of using cell phones for non-school related purposes at school as students who received free/reduced lunch ($M = 3.35$, $SD = 1.20$). The 95% confidence interval for the difference of means was -.311 to .474. Figure 32 shows the distributions for the two groups.

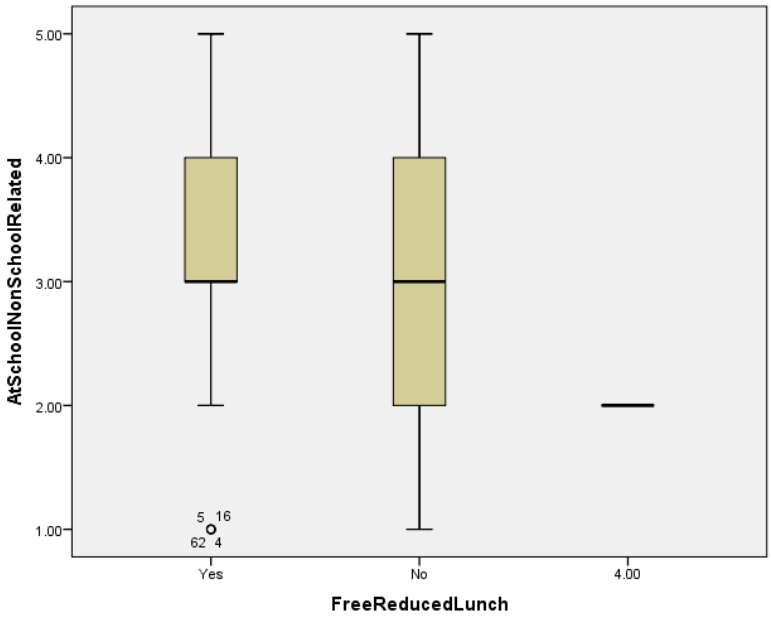

Figure 32. RQ 8 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

Ho8$_5$: There is no significant difference between the grade level of students and reporting using cell phones for non-school related purposes at school.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and students reporting using cell phones for non-school related purposes at school. The factor variable, student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was student reporting using cell phones for non-school related purposes at school. The ANOVA was significant, $F(3, 171) = 4.14$, $p = .007$. Therefore the null hypothesis was rejected. The strength of the relationship between student grade levels, as assessed by η^2, was small (.02).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted to evaluate pairwise difference among the means of the four groups. A Tukey procedure was selected for the multiple comparisons because equal variances were assumed. There was a significant difference in the means between the Senior group and the Freshmen group ($p = .004$).

However there was not a significant difference between any other group. It appears that students reporting using cell phones for non-school related purposes at school are significantly more likely among Senior students than Freshmen students. No other significant differences were found. The 95% confidence intervals for the pairwise differences, as well as the means and standard deviations for the student groups, are reported in Table 22.

Table 22.

Means and Standard Deviations of Student Grade Levels on RQ-8

Grade Level	N	M	SD	Freshman	Sophomore	Junior
Freshman	52	2.87	.990			
Sophomore	34	3.18	1.27	-.334 to .956		
Junior	47	3.36	1.15	-.092 to 1.08	-.473 to .844	
Senior	42	3.67	1.14	.195 to 1.41	-.184 to 1.16	-.316 to .926

Research Question 9

Is there a significant difference between the degrees to which students reporting being distracted by other students' cell phone use in school as compared to the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 23 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 1.

Respondents were asked to rate the frequency of their behavior with the statement "I am distracted by cell phone use of other students in school" on a Likert-type scale of 1 to 5: 1

represented “never”; 2 was “rarely”, 3 was “sometimes”, 4 was “very often” and 5 represented “always”. Only 14.3% of those who responded indicated they were even sometimes distracted by others use of cell phones while at school.

Table 23.

Distraction by Others Use of Cell Phones in School

		Frequency	Percent
	Never	102	58.3
	Rarely	47	26.9
	Sometimes	18	10.3
	Very Often	5	2.9
	Always	2	1.1
	Total	174	99.4
Missing	System	1	.6
Total		175	100.0

$Ho9_1$: There is no significant difference between students who own a standard cell phone and students who own a smart phone in students reporting being distracted by other students' cell phone use in school.

An independent-samples t-test was conducted to evaluate whether the mean amount of student reporting being distracted by other students' cell phone use in school differ between smart phone ownership and standard phone ownership. The student reporting being distracted by other students' cell phone use in school was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was not significant, $t(167) = .621$, $p = .536$. Therefore the null hypothesis was retained. The η^2 index was .002 which

indicated a small effect size. Students owning smart phones (M = 1.55, SD = .774) tended to have the same reporting of being distracted by other students' cell phone use in school as those who owned standard cell phones (M = 1.62, SD = .889). The 95% confidence interval for the difference of means was -.178 to .341. Figure 33 shows the distributions for the two groups.

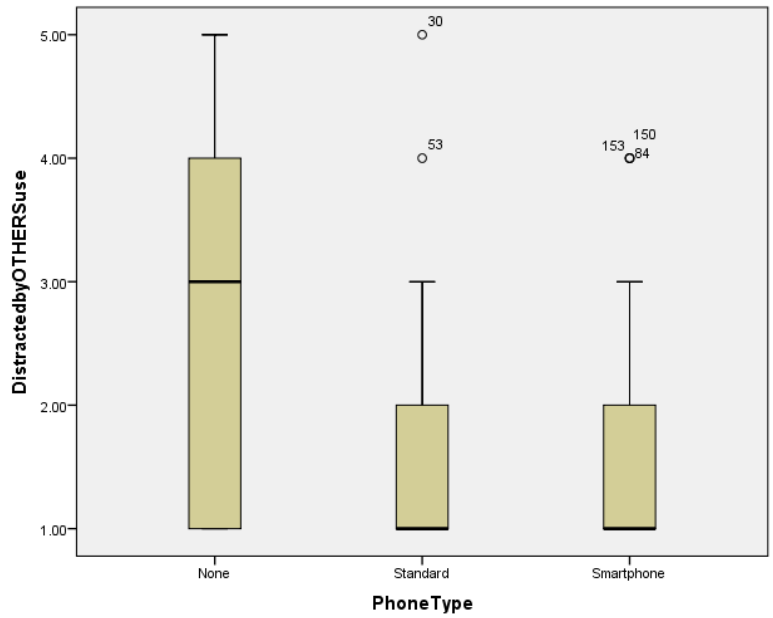

Figure 33. RQ 9 - Distribution of Scores for Type of Cell Phone Owned

Ho9$_2$: There is no significant difference between genders in students reporting of being distracted by other students' cell phone use in school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting of being distracted by other students' cell phone use in school differ between student genders. The students reporting of being distracted by other students' cell phone use in school was the test variable and the grouping variables were male and female. The test was not significant, t(172) = -1.14, p = .258. Therefore the null hypothesis was retained. The η^2 index was = .007 which indicated a small effect size. Students that were male (M = 1.54, SD = .869) tended to have the same reporting of being distracted by other students' cell phone use in school

as students that were female (M = 1.69, SD = .872). The 95% confidence interval for the difference of means was -.413 to .111. Figure 34 shows the distributions for the two groups.

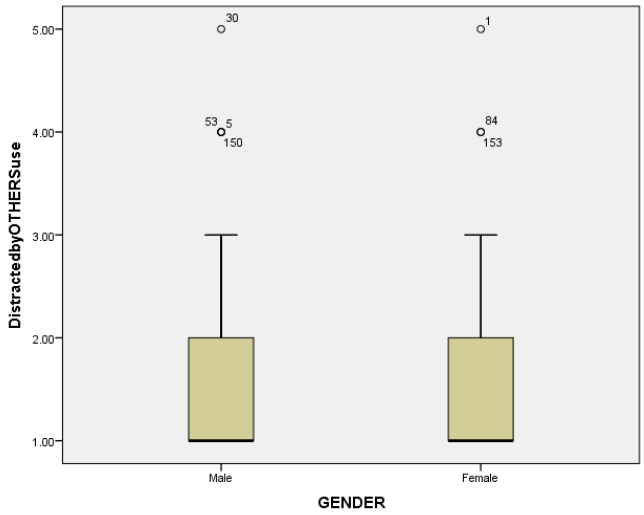

Figure 34. RQ 9 - Distribution of Scores for Gender Groups

Ho9$_3$: There is no significant difference between the ownership of a working personal computer at home and students reporting of being distracted by other students' cell phone use in school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting being distracted by other students' cell phone use in school differ between students with a working personal computer at home and students without a working personal computer at home. Students reporting being distracted by other students' cell phone use in school was the test variable and the grouping variable was the ownership of a working PC at home. The test was not significant, t(173) = .043, p = .996. Therefore, the null hypothesis was retained. The η^2 index was < .001 which indicated a small effect size. Students that had a working personal computer at home (M = 1.61, SD = .856) tended to have the same reporting of being distracted by other students' cell phone use in school as students that did not have a

working personal computer at home (M = 1.60, SD = 1.06). The 95% confidence interval for the difference of means was -.456 to .476. Figure 35 shows the distributions for the two groups.

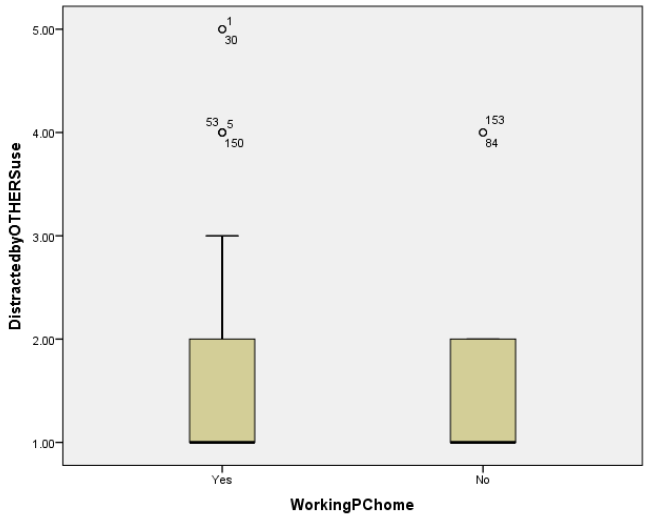

Figure 35. RQ 9 - Distribution of Scores for Having a Working PC at Home

Ho9$_4$: There is no significant difference between the income level of students and their reporting of being distracted by other students' cell phone use in school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting of being distracted by other students' cell phone use in school differ between socioeconomic statuses. The reporting of being distracted by other students' cell phone use in school was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was not significant, t(167) = .157, p = .875. Therefore the null hypothesis was retained. The η^2 index was < .001 which indicated a small effect size. Students who did not receive free/reduced lunch (M = 1.56, SD = .819) tended to have the same reporting of being distracted by other students' cell phone use in school as students who received free/reduced lunch (M = 1.61, SD = .954). The 95% confidence interval

for the difference of means was -.269 to .316. Figure 36 shows the distributions for the two groups.

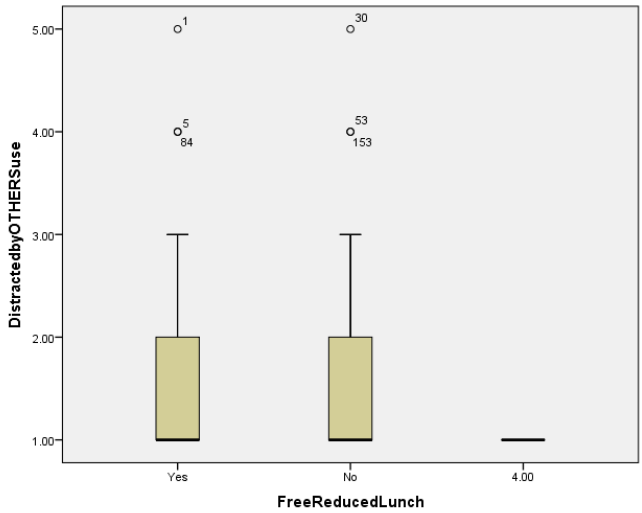

Figure 36. RQ 9 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

Ho9$_5$: There is no significant difference between the grade level of students and their reporting of being distracted by other students' cell phone use in school.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and students reporting of being distracted by other students' cell phone use in school. The factor variable, the student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was reporting of being distracted by other students' cell phone use in school. The ANOVA was not significant, $F(3,170) = 1.813$, $p = .354$. Therefore, the null hypothesis was retained. The strength of the relationship between student grade level and reporting of being distracted by other students' cell phone use in school, as assessed by η^2, was small (.02). The results indicate that the students reporting using cell phones outside of school for school related purposes was not significantly affected by student grade level. The means and standard deviations of the student groups are reported in Table 24.

Table 24.

Means and Standard Deviations of Student Grade Levels on RQ-9

Grade Level	N	M	SD
Freshman	52	1.69	.919
Sophomore	34	1.73	.994
Junior	47	1.42	.872
Senior	41	1.61	.737

Research Question 10

Is there as significant difference between the degrees to which students report being distracted by their own cell phone use in school as compared by the following student characteristics: gender, type of cell phone owned, socioeconomic status, having a working personal computer at home, and grade level?

In this section, descriptive statistics, mode, and range for this research question are provided. Table 25 provides information regarding frequency of responses. A range of 1-5 was possible, the obtained range was 4, and the mode of responses was 1.

Respondents were asked to rate the frequency of their behavior with the statement "I am distracted by cell phone use of other students in school" on a Likert-type scale of 1 to 5: 1 represented "never"; 2 was "rarely", 3 was "sometimes", 4 was "very often" and 5 represented "always". Only 13.8% of students indicated they found their own use of cell phones in school distracting even sometimes.

Table 25.

Distraction by Own Use of Cell Phone in School

		Frequency	Percent
	Never	97	55.4
	Rarely	53	30.3
	Sometimes	22	12.6
	Very Often	1	.6
	Always	1	.6
	Total	174	99.4
Missing	System	1	.6
Total		175	100.0

$Ho10_1$: There is no significant difference between students who own a standard cell phone and students who own a smart phone in students report being distracted by their own cell phone use in school.

An independent-samples t-test was conducted to evaluate whether the mean amount of student reporting being distracted by their own cell phone use in school differ between smart phone ownership and standard phone ownership. The student reporting being distracted by their own cell phone use in school was the test variable and the grouping variable was ownership of either a smart phone or a standard phone. The test was not significant, $t(91.69) = .821$, $p = .414$. Therefore the null hypothesis was retained. The η^2 index was .007 which indicated a small effect size. Students owning smart phones ($M = 1.58$, $SD = .695$) tended to have the same reporting being distracted by their own cell phone use in school as those who owned standard cell phones

(M = 1.69, SD = .921). The 95% confidence interval for the difference of means was -.161 to .387. Figure 37 shows the distributions for the two groups.

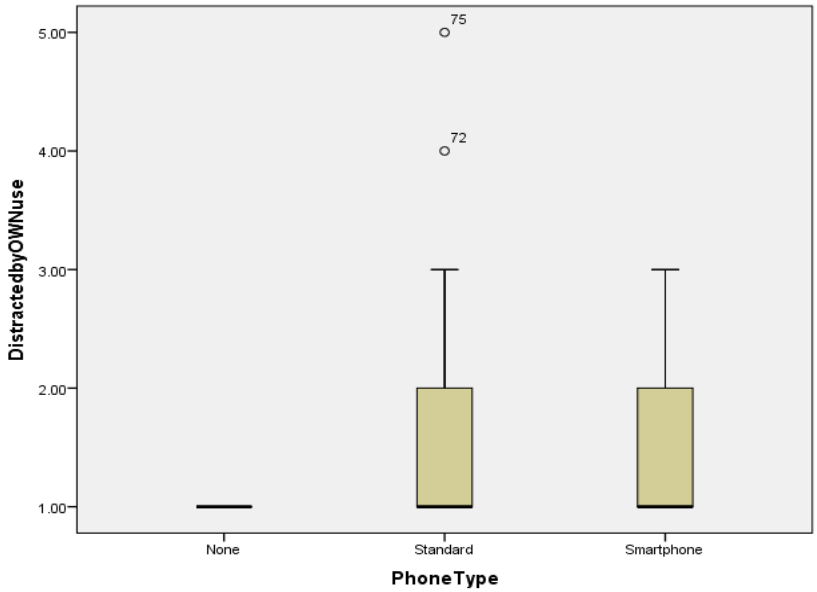

Figure 37. RQ 10 - Distribution of Scores for Type of Cell Phone Owned

Ho10$_2$: There is no significant difference between genders in reporting being distracted by their own cell phone use in school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting being distracted by their own cell phone use in school differ between student genders. The students reporting of being distracted by other students' cell phone use in school was the test variable and the grouping variables were male and female. The test was significant, t(141.40) = -2.40, p = .017. Therefore the null hypothesis was rejected. The η^2 index was = .04 which indicated a small effect size. Students that were male (M = 1.47, SD = .664) tended to have fewer reporting being distracted by their own cell phone use in school as students that were female (M = 1.76, SD = .871). The 95% confidence interval for the difference of means was -.524 to .051. Figure 38 shows the distributions for the two groups.

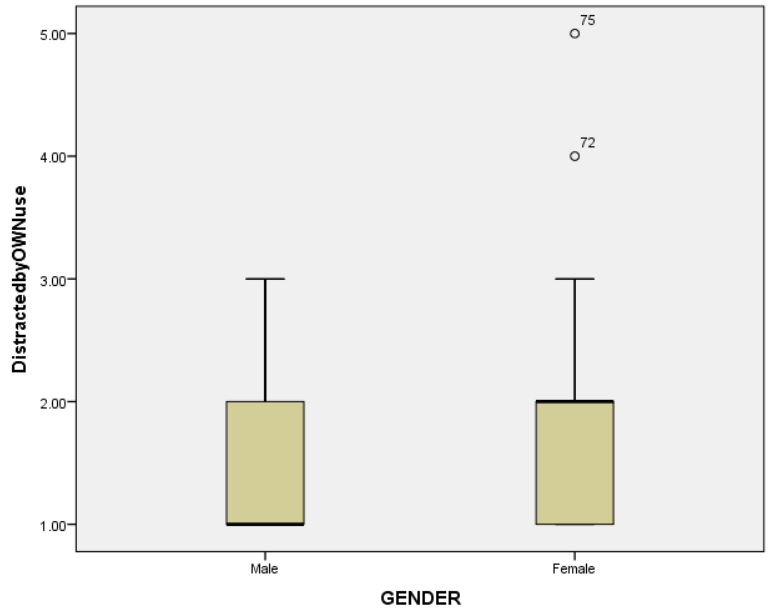

Figure 38. RQ 10 - Distribution of Score for Gender Groups

Ho10$_3$: There is no significant difference between the ownership of a working personal computer at home and students reporting being distracted by their own cell phone use in school.

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting being distracted by their own cell phone use in school differ between students with a working personal computer at home and students without a working personal computer at home. Students reporting being distracted by their own cell phone use in school was the test variable and the grouping variable was the ownership of a working pc at home. The test was not significant, $t(172) = -.012$, $p = .990$. Therefore the null hypothesis was retained. The η^2 index was < .001 which indicated a small effect size. Students that had a working personal computer at home (M = 1.60, SD = .756) tended to have the same reporting of being distracted by their own cell phone use in school as students that did not have a working personal computer at home (M =

1.60, SD = 1.60). The 95% confidence interval for the difference of means was -.417 to .411. Figure 39 shows the distributions for the two groups.

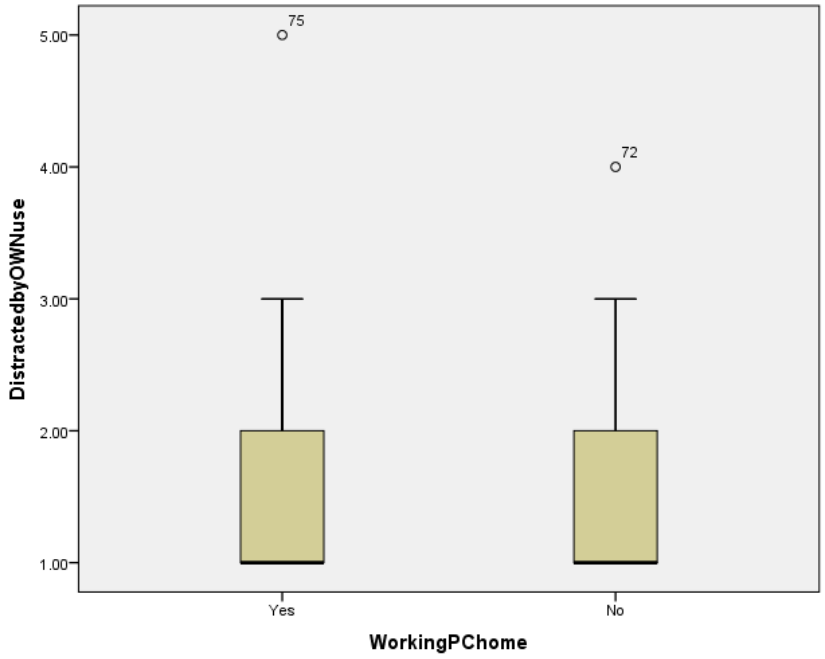

Figure 39. RQ 10 - Distribution of Scores for Having a Working PC at Home

Ho10$_4$: There is no significant difference between the income level of students and their reporting being distracted by their own cell phone use in school

An independent-samples t-test was conducted to evaluate whether the mean amount of students reporting being distracted by their own cell phone use in school differ between socioeconomic statuses. The reporting being distracted by their own cell phone use in school was the test variable and the grouping variable was students who qualified for free/reduced lunch and students who did not. The test was not significant, t(167) = -.437, p = .663. Therefore, the null hypothesis was retained. The η^2 index was = .001 which indicated a small effect size. Students who did not receive free/reduced lunch (M = 1.60, SD = .780) tended to have the same

reporting of being distracted by their own cell phone use in school as students who received free/reduced lunch (M = 1.54, SD = .912). The 95% confidence interval for the difference of means was -.321 to .204. Figure 40 shows the distributions for the two groups.

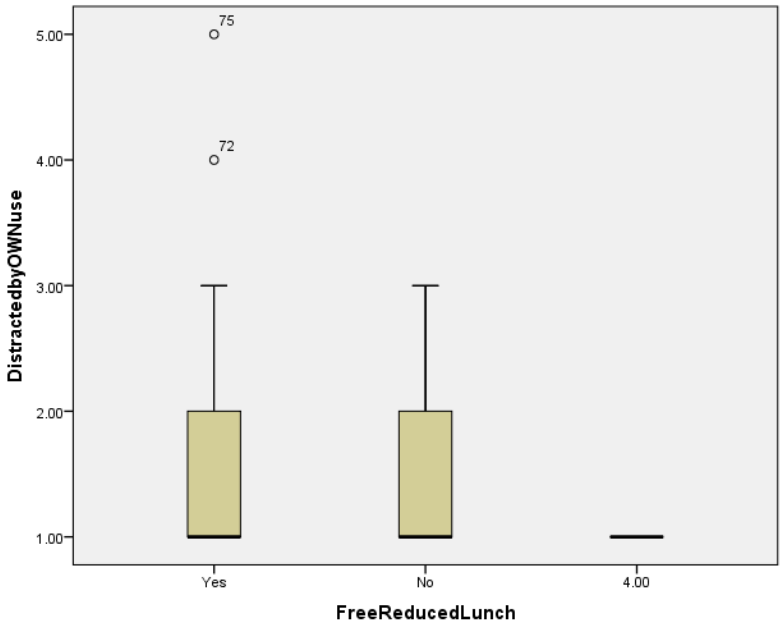

Figure 40. RQ 10 - Distribution of Scores for Students Who Qualify for Free/Reduced Lunch

$Ho10_5$: There is no significant difference between the grade level of students and their reporting of being distracted by their own cell phone use in school.

A one-way analysis of variance was conducted to evaluate the relationship between student grade levels and students reporting of being distracted by their own cell phone use in school. The factor variable, the student grade level, included four levels: Freshman, Sophomore, Junior, and Senior. The dependent variable was reporting of being distracted by their own cell phone use in school. The ANOVA was not significant, $F(3,170) = 1.259$, $p = .290$. Therefore, the null hypothesis was retained. The strength of the relationship between student grade level

and reporting of being distracted by their own cell phone use in school, as assessed by η^2, was small (.022). The results indicate that the students reporting of being distracted by their own cell phone use in school was not significantly affected by student grade level. The means and standard deviations of the student groups are reported in Table 26.

Table 26.

Means and Standard Deviations of Student Grade Levels on RQ-10

Grade Level	N	M	SD
Freshman	52	156	.752
Sophomore	34	1.62	.697
Junior	47	1.47	.620
Senior	41	1.78	.988

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter contains a summary of the findings, conclusions, and recommendations. The purpose of this study was to investigate student perceptions of academic cell phone use. Specifically, this researcher assessed the perceptions of cell phone use within the high school setting and for academic use outside of the school setting based on a school with a cell phone policy enabling teachers to utilize cell phones within the classroom at their discretion. Students at the high school are allowed to access their phone freely before classes start, between classes, and during lunch periods. The study was conducted using data collected through a survey of high school students attending the target school.

Summary

The statistical analysis reported in the study was based on ten research questions presented in chapter 3. Each research question had five null hypotheses based on the following student characteristics: type of cell phone owned, gender, ownership of a working personal computer at home, socioeconomic status determined by students receiving free/reduced lunch, and grade level. Of the 840 student population at the Title I high school with a cell phone policy enabling teachers to determine the use of cell phones by students within their classrooms, 175 responded to the survey. Of those 175 respondents, 52 were freshmen, 34 were sophomores, 47 were juniors, and 42 were seniors.

Conclusions

The purpose of this study was to investigate student perceptions of academic cell phone use. Specifically, this researcher assessed the perceptions of cell phone use within the high school setting and for academic use outside of the school setting based on a school with a cell phone policy enabling teachers to utilize cell phones within the classroom at their discretion. The following conclusions were based on the findings from the data in this study:

1. Of the 97.1% of the surveyed population that owned cell phones, 63.4% were owners of smartphones. The dominance of the smartphone as a preferred device in considering cell phones as academic tools is evident in several of the survey questions. When considering the usefulness of cell phones, owners of smartphones (M = 4.45) had higher perceptions as to the usefulness of their devices compared to the owners of standard cell phones (M = 3.27). The functionality and usefulness of smartphones in combination with their integration of Web 2.0 software, Internet connectivity, and social networking capabilities have increasingly added to the utility they offer within the educational realm (Park, 2011; Piotrowski, 2013). Results of this study further support researcher findings as to the smartphone's utility with the smartphone being the device of choice between the two in students' use to complete academic work, their perceptions of feeling encouraged to use smartphones to complete academic work, perceptions of functionality, and the use of smartphones both outside of school and within the school setting for academic purposes. The only area in which the standard cell phone scored higher than the smartphone was in student perceptions of the device being a classroom distraction.

2. Gender was only a significant factor within this study based on students' perceptions of them being distracted in school by the use of their own cell phone with females having a mean score of 1.76 reporting being more distracted by their own cell phone use than male students with a mean score of 1.47. The η^2 index was =.04 which indicated a small effect size.

3. Having a working personal computer at home had no significance in any of the research.

4. Students who received free/ reduced lunch (M = 3.74) were found to be less favorable in their perceptions of cell phones as a useful academic tool than students who did not qualify or receive free/reduced lunch (M = 4.11). This disparity was also evident in their use of cell phones to complete academic tasks with students qualifying for free/reduced lunch (M = 3.61) being less likely to than students who did not receive free/reduced lunch (M = 4.01). Further, students qualifying for free/reduced lunch (M = 3.57) viewed cell phones as less functional than students who did not qualify for free/reduced lunch (M = 4.02) nor did they report using them outside of school for school related purposes (M = 2.87) as opposed to students not receiving free/reduced lunch (M = 3.03). Smartphone ownership among the surveyed population was found to be 53% among those qualifying for free/reduced lunch as opposed to 69% not qualifying for free/reduced lunch. Though a recent poll found that teens in families earning $30,000 or less had about 39% smartphone ownership as opposed to 43% of teens in families earning $75,000 or more (Madden et al., 2013), this study's results show a much larger gap in smartphone ownership which combined with the dominance of student perceptions of smartphones as useful academic tools may result in the disparity between the two socioeconomic groups.

5. Student grade levels were significant in finding differences in perceptions of cell phones posing as distractions within the classroom with Seniors (M = 1.81), finding cell phones less of a distraction than Sophomores (M = 2.74). Further, Sophomores (M = 2.74) were found to view cell phones as more distracting than Freshmen (M = 2.16). In addition, grade levels of the studied population resulted in significant differences in student use of cell phones within the school with upper class populations reporting more use of cell phones within the school for school related purposes as Seniors with a mean score of 3.45 were more likely to use their phones in such manner than Sophomores (M = 2.65) and Freshmen (M = 2.79). Juniors (M = 3.38) were also more likely to use their cell phones for school related purposes than Sophomores (M = 2.65).

Recommendations for Practice

The findings and conclusions of this research have enabled me to identify the following recommendations for practice in implementing cell phones as academic tools:

1. The potential for cell phones as a learning tool within the classroom is credible due to the pervasiveness of the device among the student population. The ubiquity of the cell phone enables students to have ready access to information (Sharma & Kitchens, 2004). Unlike many mobile devises and school materials, in which students carry by having a premeditated purpose, cell phones are carried habitually by students without having a premeditated educational purpose (Traxler, 2007).

2. Integration into the classroom should be left to the teacher. Whereas a school or system policy enabling the use of such devices can enable all teachers and students access to the usefulness of the devices, teachers ultimately should determine if such resources are

compatible with their current practices and to what extent the devices should be utilized. The perception among teachers as to the disruptiveness of cell phones is one of the largest barriers to their implementation (Lenhart, 2012). Such disruptions have shown negative impacts on student performance (End et al., 2009). However, evidence of the increased ability of today's students to multitask (Carrier et al., 2009) has also shown that what teachers perceive as distraction is not as severe a distraction nor as negative to student performance (Rosen et al., 2011). This compulsion to multitask by students, and thus the perception by teachers as to the disruptiveness of cell phones, is driven by the motivation of the student's immediate needs, of which the primary motivator for such multitasking has been found to be driven by the student's cognitive needs not being gratified (Wand & Tchernev, 2012).

3. Incorporating cell phones into the classroom is not a one size fits all. Student perceptions of smart phones and standard cell phones are evident in this study. While common features of the standard cell phone include many educationally useful tools such as text, video, audio, and camera features (Chinnery, 2006; Williams & Pence, 2011), the ability of smartphones to incorporate mobile access to the Internet, Web 2.0 services, and email (Irina, 2012) has created a more positive perception as to the device's role in meeting their educational needs. The differences in capabilities of devices needs to be understood on at least a general level by teachers, thus enabling them to assess how best to utilize the devices within their classroom and lessons. Also an understanding of the extent of smartphone ownership should be considered in creating learning opportunities for students.

Recommendations for Future Research

Results of this study indicate that there are divisions in the perceptions of cell phones among students based upon device ownership and among socioeconomic status. In addition, student perceptions of cell phones as a distraction differ from much research (Baron, 2008; Carrier et al., 2009; End et al., 2009; Lenhart, 2012). Additional research needs to be conducted to assess student performance in normal classroom conditions to compare results from deliberate experiments. Research comparing student performance in schools adopting integrating cell phone polices before and after the policy's effect would also be beneficial in determining academic performance effects of cell phone use in the classroom. This study could be expanded to gain student insight as to specific device abilities and drawbacks and how they affect student perceptions of cell phones as academic tools.

Further research into specific variances in student perceptions of cell phone use among grade levels is necessary with student maturity, student freedom, and teacher policy as factors to consider. Also, research into multi-tasking and perceptions of what students and teachers consider "distractions" warrants further research with consideration to possible social implications for interaction.

Additionally, research should be performed to determine student distraction brought about with the implementation of cell phone policies in comparison to teacher perceptions. Investigating the occurrences and frequency along with classroom policy and management would also offer insight as to the root causes of perceived distraction between the groups. Furthermore, this study should be replicated in other schools with similar cell phone policies and to compare means with schools that have different cell phone policies in place.

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APPENDICES

APPENDIX A: Student Assent Form

Student Perceptions of Academic Cell Phone Use

Assent Form

My name is David Pauley. I am trying to learn about how students perceive cell phone use in the classroom for academic purposes. If you would like, you can be in my study.

If you decide you want to be in my study, you must have a parent or guardian complete the parental consent form and sign this assent form. Once that is completed I ask that you take a few minutes to complete the short survey attached in this packet. Once all three items are complete, please return them to your first period teacher to be collected. Once you hand in your packet, you are eligible to have your name placed in a drawing for a free iPod Touch. This is done by giving you half of a raffle ticket which you must keep in order to claim your prize. If your number is announced as a winner, you may come by the main office of the school to collect your prize.

There are no perceived risks involved in participating in this study in that all data is kept separate from your parental/guardian consent and your assent forms. Once your packet is turned in the survey will be separated from these documents and there will be no direct link between your responses and your identity. All survey information is solely for the purpose of this research, which may be used in further research. Other people will not know your responses and your answers will be included into all the collected responses from the survey. When I tell other people about my research, I will be referring to the collected responses and not the individual responses. No one will know if you participated in the study nor will your name ever be used. Again, I simply want your perceptions of academic cell phone use.

Your parents or guardian have to say it is OK for you to be in this study. After they decide, you get to choose if you want to do it too. If you don't want to be in the study, no one will be mad at you. If you want to be in the study now and change your mind later, that's OK. You can stop at any time.

If you have any questions about this study, you may contact the school at (423)787-8030 and leave a callback message for me. I will be glad to answer any questions you have about this study.

I will give you a copy of this form in case you want to ask questions later.

Agreement

I have decided to be in the study even though I know I don't have to do it. David Pauley has answered all of my questions about this study.

_____ _____

Signature of Study Participant Date

_____ _____

Signature of Researcher Date

APPENDIX B: Parental Consent Form

East Tennessee State University
Parent Consent Form

Dear Parent or Guardian,

My name is David Pauley and I am a doctoral student of the Educational Leadership and Policy Analysis program at East Tennessee State University. Your child is invited to be in a research study about student perceptions of academic cell phone use. We are asking that your child take part because your child is in the age group we want to study. We ask that you read this form and ask any questions you may have before agreeing to allow your child to take part in this study.

The study: The purpose of this study is to find out how students view the use of cell phones in the classroom for school related purposes and their perceived benefits and disruptions. Your student will be asked to take a short survey totaling no more than 20 questions. The length of time to complete this survey is approximately 8-10 minutes.

Risks and benefits: The risks associated with taking this survey are minimal in that the questions pertain to student's perceptions of cell phone use and basic cell phone tasks. No responses can be directly linked to the individual student and all data is pooled to ensure anonymity.

Compensation: Each participating student will be eligible for a drawing of an iPod Touch. Upon returning a signed parental consent and assent form the student will receive a survey. Once the student returns the survey they will receive a raffle ticket for the IPod drawing.

Confidentiality: The records of this study will be kept confidential, to the extent permitted by law. The survey will ask only for gender and grade, free or reduced eligibility, and will not include your child's name. It will not be possible to figure out your child's answers nor link your child's responses to the consent and assent forms as they are separated as soon as they are turned in. Survey data will be kept securely for five (5) years after this study ends in a locked cabinet and office.

Voluntary Participation: Your child's participation in this study is completely voluntary. Your child may skip any questions he or she doesn't feel comfortable answering. Your decision whether or not to allow your child to take part will not affect your current or future relationship with East Tennessee State University, the Greeneville City School system, or with your child's school. If you decide to allow your child to take part, your child is free to not do the survey, skip any questions, or stop at any time. You are free to withdraw your child at any time without affecting your relationship with East Tennessee State University, the Greeneville City School system, or with your child's school.

The researcher for this study is David Pauley. You may reach him at (423)787-8030, or pauleyd@gcschools.net. Please feel free to ask any questions you have now, or at any point in the future. If you have any questions or concerns about your child's rights as a research subject, you may contact the ETSU Institutional Review Board (IRB) at (423)439-6053 or you may access their website at http://www.etsu.edu/irb/index.html. You will be given a copy of this consent form for your records.

If you have any questions or concerns about the research and want to talk to someone independent of the research team or you can't reach the study staff, you may call an IRB Coordinator at 423.439.6055 or 423.439.6002.

Please enter your child's name and sign below if you give consent for your child to participate in this study.

Your child's name: _____

Your signature _____ Date _____

APPENDIX C: Survey Instrument

1. Do you own a cell phone?

- Yes
- No

2. What type of cell phone do you have?

- None
- Standard cell phone or feature phone (may include limited features such as Internet and email but no mobile operating system)
- Smartphone (has mobile operating system such as iPhone iOS, Windows Mobile, Android, Blackberry, etc.)

3. In your opinion, indicate your level of agreement with the following statements:
My cell phone is a useful educational tool.

Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree

4. My cell phone helps me complete academic assignments (ex. homework, studying, and projects).

Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree

5. I feel encouraged to use my cell phone in school to complete academic assignments (ex. homework, studying, and projects).

Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree

6. I feel that using cell phones in school is a distraction.

Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree

7. My cell phone is easy to use (functionality) in regards to performing school related tasks.

Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree

8. For the following statements please select a response that best fits how often you do the following:
I use my cell phone outside of school for school related purposes (ex. homework, studying, and projects).

Never | Rarely | Sometimes | Very Often | Always

9. I use my cell phone at school for school related purposes (ex. homework, studying, and projects)?

Never | Rarely | Sometimes | Very Often | Always

10. I use my cell phone at school performing non-school related activities (ex. texting friends, games, etc.)?

Never Rarely Sometimes Very Often Always

11. I am assigned class activities in which I am encouraged to use my cell phone?

Never Rarely Sometimes Very Often Always

12. I am distracted by cell phone use of other students in school.

Never Rarely Sometimes Very Often Always

13. I am distracted by my cell phone use in school.

Never Rarely Sometimes Very Often Always

14. Please indicate your gender below.

Male

Female

15. I am in the following grade:

Freshman

Sophomore

Junior

Senior

16. I have a working PC with Internet access at home?

Yes

No

17. I engage in the following cell phone activities:

	Never	Very Rarely	Rarely	Occasionally	Frequently	Very Frequently
Call or receive calls:						
Send or receive emails:						
Send or receive pictures:						
Send or receive text messages:						
Play music:						
Play video:						
Access the Internet:						
Play games:						
Record video:						
Access a social networking site (ex. Facebook):						
Use reminders / calendar functions:						
Use alarm clock:						

18. Do you receive or qualify for "free and reduced lunch"?

- Yes
- No

VITA

DAVID CHARLES PAULEY

Personal Information:	Date of birth: April 10, 1977 Place of birth: Omaha, NE
Education:	Ed.D., Educational Leadership East Tennessee State University, Johnson City, TN 2015
	M.S., Industrial Arts/Technology Education East Tennessee State University, Johnson City, TN 2002
	B.S., Engineering Technology / Teacher Education East Tennessee State University, Johnson City, TN 2000
Professional Experience:	Pre Engineering Teacher Greeneville City Schools 2002 – Current
Presentations:	Greeneville City School System, TN 2004-2015
	North Indiana Educational Service Center, 2009 and 2011
	Niswonger Symposium, Greeneville, TN 2008-2012
Honors and Awards:	Technology Award, Greeneville City Schools, 2007