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Teacher Perceptions of Appropriate Norms for Smartphone Use During Class

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Dissertation Submitted in Partial Fulfillment

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Abstract

The increase in smartphone use among U.S. adolescents has become a significant concern. Self-regulating smartphone use is difficult for adolescents, as notifications from social media and entertainment apps provide a sense of instant gratification. Addressing problematic smartphone use has become urgent given that adolescents' physical and mental health has declined, including increased obesity, anxiety and depression, and smartphone addiction. Learning is also impeded when students continuously shift attention between course content and their smartphones, preventing the brain from engaging in the deep thinking necessary for long-term memory storage, retention, and retrieval. However, it is more common to see smartphones present in the classroom as teachers integrate technology to engage students, trusting them to use their devices responsibly with or without the presence of a school-wide electronic device policy. The purpose of this qualitative study was to explore teachers' perceptions of appropriate norms for smartphone use in the classroom. Applying the value-focused thinking framework, semistructured, eight open-ended interviews were conducted with high school teachers. Participants shared their experiences with students' and their own smartphone use during class, revealing discrepancies in beliefs about student versus teacher smartphone use, usefulness of smartphones, picking their battles when enforcing policies, and need for support from administrators, colleagues, and parents. These findings have implications for positive social change as the insights provided can inform school-wide electronic device policies with the potential to enhance student learning otherwise impeded by compulsive classroom smartphone use.

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Chapter 1: Introduction to the Study

The intent of this study was to explore teachers' experience with smartphone use during class. With an increasing number of adolescents having access to a smartphone throughout the day, these devices have become a popular source for information gathering, entertainment, and social connection. Ubiquitous across multiple cultures and age groups, smartphones offer users an infinite selection of videos, games, and apps at the ready that aim to satisfy any personal interest or hobby (Labăr & Ţepordei, 2019; Zhang et al., 2018). Adolescents are especially drawn to their smartphones and receive instant gratification from the constant stream of social media updates, messages from friends and family, and gaming notifications that reinforce the compulsive nature of this vulnerable population (Jeong et al., 2016; Kwon, Kim, et al., 2013; Lopez-Fernandez et al., 2017; Rozgonjuk, Kattago, & Taht, 2018). Smartphone use among adolescents has become so problematic that there is an increase in smartphone dependence, often resulting in depression, anxiety, and stress (Elhai et al., 2017), reshaping the way adolescents access and process information (Anderson & Jiang, 2018; Loh & Kanai, 2016; Rozgonjuk, et al., 2016; van Deursen et al., 2015; Zhang et al., 2018). Not only are smartphones ubiquitous during leisure time they are also becoming more prevalent throughout the school day, even during class (Bolkan & Griffin, 2017; Gao et al., 2017; Mupinga, 2017). However, researchers have suggested that increased attention to one's smartphone during learning activities inhibits the ability to maintain attention, thus negatively affecting academic performance (Baturay & Toker, 2016; Bellur et al., 2015; Carrier et al., 2015; Hsiao et al., 2017; Jiang, 2014; Lepp, Barkley, & Karpinski, 2015;

Rozgonjuk, Saal, & Taht, 2018; Samaha & Hawi, 2016; Stavropoulos et al., 2013). This is due to quick shifts in attention that impair the ability to engage in the deep-thinking patterns necessary for retaining information (Adler & Benbunan-Fich, 2013; Chin & Brown, 2000; Loh & Kanai, 2016; Marton & Saljo, 1976; Rogaten et al., 2013; Rosen et al., 2013).

Smartphones have also become a tool for learning, connecting students to educational games, videos, and articles that increase student interest and interaction with the content, and providing a more enjoyable way to learn (i.e., one reason that smartphones are more prevalent in today's classroom; Bolatli & Korucu, 2020; Scheidet, 2003). However, many teachers choose not to use smartphones in their classrooms and have agreed that these devices are more harmful than beneficial (Elder, 2013; End et al., 2010; Flanigan & Kiewra, 2018; Harman & Sato, 2011; Junco, 2012a). Given that smartphones are, at times, used to enhance learning but have also become a primary source of distraction during the learning process, this study contributed insights into teachers' smartphone experience with the aim of reaching consensus on how smartphones can be used to meet the needs of all involved. Also, results of this study can assist school administrators in understanding how teachers are affected by this behavior, contributing to decisions about whether and/or which electronic device policy to implement.

I begin this chapter with a description of the research problem and its background, providing evidence to support its relevance to educational psychology. Also included are the purpose, research question, theoretical framework, and nature of the study, followed by the study's operational definitions, assumptions, scope and delimitations, and

limitations related to the study's design and methodology. The chapter concludes with the significance of the study as it relates to perceptions of appropriate norms for smartphone use during class and implications for electronic device policies

Background

With an estimated 5 billion users worldwide, smartphones have become an important source of communication, connection, information gathering, and entertainment (Taylor & Silver, 2019). Due to their portability, large screens, and access to the internet at the ready, smartphones continue to increase in popularity and usability as high-tech companies such as Apple and Google compete to create the most user-friendly, functional device with a sleek, lightweight design (Jeong et al., 2016; Samaha & Hawi, 2016). Performing tasks that were once limited to a laptop or desktop computer, advancements in cellphone technology have taken work and school on the go, enabling users to read articles, work on projects, and send/respond to emails at their convenience (H.-T. Chen & Li, 2017; Labăr & Ţepordei, 2019; Lopez-Fernandez et al., 2017; Zhang et al., 2018). Popularity in smartphone use has spread across 76% of the world's most advanced economies and represents a large number of well-educated, high-earner individuals under age 35 (Taylor & Silver, 2019). However, smartphones have become a tool for more than just those who wish to work on-the-go; they have also become a source of entertainment for managing a child's behavior (Gottschalk, 2019; Radesky et al., 2016; Radesky, Silverstein, et al., 2014; Terras & Ramsay, 2016; Wartella et al., 2013). In 2001, the American Academy of Pediatrics Committee on Education raised concerns about the amount of sedentary time children and adolescents were spending on

mobile devices as evidenced by an increase in physically unfit and obese children (Harris et al., 2018). This led to their recommendation for parents to limit their child's screen time to 1 to 2 hours a day (American Academy of Pediatrics, 2013); however, some parents admit they do not monitor screen time and have no knowledge of what their children are doing while online (Chaudron, 2015).

Problematic smartphone use among children and adolescents has led to an increase in smartphone addiction, as researchers have reported adolescents' need to compulsively check the device, and taking away the device creates a sense of panic or a fear of missing out (FoMO; Hartanto & Yang, 2016; Kuss & Griffiths, 2017). This FoMO from social activities leaves adolescents with feelings of irritability, anxiety, a sense of inadequacy, and low self-esteem (Alt & Boniel-Nissim, 2018). Smartphone addiction is related to poor academic outcomes, as students who struggle to limit smartphone use during academic tasks tend to earn a lower cumulative grade point average (GPA; Hawi & Samaha, 2016; Junco & Cotten, 2012; Samaha & Hawi, 2016). This is because diverting one's attention from course content to a smartphone makes the brain shift its attention and interferes with the deep-thinking patterns required for learning (Adler & Benbunan-Fich, 2013; Loh & Kanai, 2016; Rosen et al., 2013). Not only does smartphone addiction increase the likelihood of impaired memory retention, smartphone use at night increases the prevalence of sleep deprivation also negatively affecting academic performance (Wentworth & Middleton, 2014). Students have admitted that their smartphone use is detrimental to their learning (Kelly, 2004; Lepp, Barkley, & Karpinski, 2015); however, their perception of these devices as a source of entertainment

rewards their use and encourages electronic distractions that are hard to resist (Jacobsen & Forste, 2011; Junco & Cotten, 2011, 2012; Karpinski et al., 2013; Kirschner & Karpinski, 2010; Rosen et al., 2013; Wood et al., 2012).

Adolescents' inability to resist these devices persists in the classroom, as both struggling students and high performers multitask with smartphones when they should be engaged in their learning (Ravizza et al., 2014; Seibert, 2019). This is likely because adolescents, especially early adolescents, overestimate their ability to multitask and end up experiencing difficulties with academics (Schlehofer et al., 2010). Not only are students responsible for initiating this off-task behavior, they also having the device within reach when notifications arrive diverts their attention as well, resulting in missed content and weaker test performance (End et al., 2010; I. Kim et al., 2019; McDonald, 2013). Notwithstanding these findings, students are still given the freedom to have smartphones in class, with expectations that they are able to maintain self-control in the presence of a device that is highly addictive to same-age peers (Carcelén et al., 2019).

There is evidence to support the implementation of electronic device policies to prevent smartphone distractions and personal use during class; however, some teachers prefer not to enforce these policies with older students, believing they should be able to regulate their own behavior or learn how to do so with time (Morris & Sarapin, 2020). For policies to be successful, it is important for both teachers and students to become informed of the risks and benefits of permitting smartphone use during class, especially as it pertains to excessive off-task behavior (Burns & Lohenry, 2010; Celikkalp et al., 2020). Policies that are perceived as strict or discouraging to students are

more likely to create negative feelings toward teachers and, as a result, lack compliance (Ledbetter & Finn, 2015). Schneider (2018) argued that banning smartphones during class is not a reasonable solution and suggested that teachers coach students on how to manage their technology use. Whether an electronic device policy exists or not, this study offers insight into the experience of smartphone use during class (i.e., for both learning and nonlearning tasks) as it relates to teachers' perceptions of appropriate norms.

Problem Statement

With an increasing number of adolescents who carry smartphones throughout the school day, use of these mobile devices has become more prevalent during class (Bolkan & Griffin, 2017; Gao et al., 2017; Mupinga, 2017). Given that many researchers have suggested that multitasking impairs learning due to the inability to engage in deep thinking patterns (Adler & Benbunan-Fich, 2013; Chin & Brown, 2000; Loh & Kanai, 2016; Marton & Saljo, 1976; Rogaten et al., 2013; Rosen et al., 2013) and that smartphone use increases multitasking behaviors (Adler & Benbunan-Fich, 2013; Loh & Kanai, 2016; Rosen et al., 2013; Rozgonjuk, Kattago, & Taht, 2018; Rozgonjuk, Saal, & Taht, 2018), the intent of this study was to explore how teachers experience smartphone use during the classroom learning process. This study differs from previous research in that it offers insight into how smartphone use during class, for learning and nonlearning tasks, relates to the values that teachers hold for learning in this context. These insights are necessary to guide school administrators as they develop electronic device policies that align with the values of teachers.

Purpose of the Study

The purpose of this study was to explore teacher perceptions of norms for smartphone use in the classroom. Using a qualitative approach to better understand teachers' experience of smartphone use in this context, semistructured, open-ended interviews were conducted using an interpretive phenomenological qualitative design (IPA). The use of IPA helped capture how these stakeholders give meaning to their experiences of smartphone use during class. A thematic analysis of data revealed similarities and differences in perceptions of classroom norms and yield recommendations for classroom policies (see H.-T. Chen & Li, 2017).

Research Question

Research question (RQ) – Qualitative: What are teachers' perceptions of classroom norms for smartphone use?

Theoretical Framework

To allow teachers the opportunity to share their opinions and viewpoints of smartphone use during class, a value-focused thinking framework guided this study. In decision making, Keeney (1992) suggested focusing first on the values of the decision makers when creating a policy, rather than identifying alternatives to a problem, as the driving force. In doing so, stakeholders are better able to create policies proactively that align with these values to generate more attractive alternatives. Although Selart and Johansen (2011) found that using a value-focused thinking framework results in fewer solutions to the problem, this framework limits the quantity of ideas but increases the creative and innovative quality of those proposed. Therefore, when establishing

appropriate norms for smartphone use during class, the value-focused thinking framework was used to develop the interview questions as well as to determine which values teachers held regarding (a) smartphone use during class (i.e., this may include values related to having or not having access to smartphones) and (b) the implementation and enforcement of a school-wide electronic device policy.

Because identifying stakeholder values is the important first step to the value-focused thinking process, qualitative research is often used and has been successful in developing policies across multiple fields (Bernardo et al., 2018; Dhillon et al., 2018). This is because value-focused thinking is often applied in phases, starting by identifying why the decision needs to be made, specifying stakeholders' values as they relate to the problem, creating desirable alternatives that relate to the identified values, evaluating those alternatives, and selecting the alternative that most closely aligns with stakeholder values and meets strategic objectives (Keeney, 1992; Klimaszewski, 2016). Applying value-focused thinking to the RQ enabled me to systematically identify what teachers considered appropriate smartphone use in the classroom. Results from this study provide insights to educational decision makers on how to implement electronic device policies that align with the values of this stakeholder. A more detailed explanation of value-focused thinking is provided in Chapter 2.

Nature of the Study

The nature of this study was phenomenological, and I used a semistructured, open-ended interview strategy to explore teachers' perceptions of appropriate smartphone use in a high school classroom (see Cuthbertson et al., 2020; Yin, 2003). The context for

this study was the school classroom, which allowed data to be collected from teachers who experience classroom smartphone use and who have a stake in school policies to regulate that use.

Definitions

Academic performance: The extent to which students meet academic expectations and course outcomes as measured by GPA (Karpinski et al., 2013).

Diagnostic and Statistical Manual of Mental Disorders (DSM-5): The 5th revision of the American Psychological Association's manual for diagnosing mental disorders (Lin et al., 2014).

Fear of missing out (FoMO): Feelings of apprehension that one's peers are engaging in a rewarding experience without one (Przybylski et al., 2013).

Multitasking: When one's attention is divided and nonsequential task switching occurs between learning tasks and tasks that are ill-defined (Junco & Cotten, 2012).

School administrator: A trained professional who evaluates the effectiveness of high school faculty and staff and assists with school-wide decisions and policy development.

Smartphone addiction: A form of technological addiction that stems from Griffith's (1996) operational definition of *technological addiction* as a nonchemical behavioral addiction involving the interaction between humans and machines. This is similar to the DSM-5 diagnosis of *internet addiction*, which is considered a *substance related and addictive disorder* (Lin et al., 2014).

Student: An adolescent currently enrolled in high school as a freshman, sophomore, junior, or senior.

Teacher: A trained professional who teaches students at the high school level.

Assumptions

In the development of this study, I assumed that qualitative research was an appropriate methodology for exploring perceptions about smartphone use during class. I assumed that semistructured, open-ended interviews would provide teachers an opportunity to share their experiences and that participants would feel comfortable engaging in this conversation. I also assumed that using IPA would result in rich data and that social media would be an appropriate source for recruiting teachers who would be serious about participating in the study and who would respond honestly. As the researcher and an educator myself, I assumed that I would be able to bracket my subjectivity and objectively analyze and interpret the data.

Scope and Delimitations

This study was limited to high school teachers, although smartphone use during class occurs in middle school as well as college. This sample was chosen over middle school teachers, as students in middle school may not have access to a smartphone or, if they do, may have tighter restrictions in the classroom. In contrast, college teachers were not chosen due to the potential flexibility in electronic device policies, as college students are adults and require less structure compared to high school students. Although value-focused thinking was chosen as the most appropriate framework for this study, theories of motivation such as self-determination theory (Ryan & Deci, 2000) and Maslow's

hierarchy of needs (Maslow, 1943) were not considered. Participants were limited to a 1-hour interview and had access to Zoom due to the COVID-19 pandemic and social-distancing guidelines. Qualitative research does not guarantee transferability; however, IPA involves an in-depth analysis of the data that ensured that this study maintained credibility and validity and can be recreated in other contexts (see Lincoln & Guba, 1985).

Limitations

Because I work with students and teachers and engage in discussions with them about the use of smartphones during class, I bracketed any personal biases prior to starting the study and before analyzing the data. Due to the nature of qualitative research, findings were drawn from a small sample and did not represent the broader population (see Morrow, 2005). IPA research typically includes a sample of two to 25 participants whose in-depth interviews provide a rich, thick analysis of their shared experiences (Alase, 2019). This deep analysis enables other researchers to replicate the study, as findings are transferable to other contexts with different populations. As the only researcher, I limited the number of interviews I conducted but ensured that saturation was achieved to enhance the richness of the data collected (see Lincoln & Guba, 1985).

Due to the current COVID-19 pandemic, all interviews were conducted via Zoom. Virtual lighting and camera angles may have limited my ability to note all the significant, nonverbal reactions for data analysis. Examples of this include (a) participants sitting too close to the computer, limiting the opportunity to detect movements of the hands or shifts of the body and (b) inefficient lighting or sitting in front of a window. To address these

limitations, I asked participants to sit approximately 3-feet away from their computer and asked that they secure a space with adequate lighting. Moreover, conducting interviews via Zoom presented the risk of Wi-Fi connectivity issues that may have caused a delay or pause in the flow of conversation. This may have also reduced the risk of identifying significant, nonverbal reactions or may have limited them from occurring altogether. To minimize the risk of Wi-Fi issues, I connected my computer to an ethernet cable for a more reliable connection. There were no connectivity issues caused by participants' Wi-Fi that resulted in having to reschedule any interviews.

Significance

Using semistructured, open-ended interviews, this research filled a gap in the literature by exploring teacher perceptions of norms for classroom smartphone use. This research was unique in that it provides insight into how smartphone use during class is perceived by teachers, as they are responsible for delivering curriculum while also managing student behavior. With the popularity of smartphone use, along with the developmental immaturity and lack of self-control during adolescence, researchers have argued that allowing students access to a smartphone during class creates distractions that impair the ability to learn the material (Ali, 2018; Bjornsen & Archer, 2015; Carcelén et al., 2019; Hegner & Kommers, 2015; Labăr & Ţepordei, 2019; Schneider, 2018; Siebert, 2019; van Deursen et al., 2015). Adolescents are unable to fully comprehend that distractions from smartphones prevent their brains from engaging in the deep learning processes necessary in critical thinking and forming meaningful connections (Biggs, 1987; Chin & Brown, 2000; Warburton, 2003). Uğur and Koç (2015) have argued that

students will continue to engage with smartphones during class unless they are in a structured setting that removes these distractions altogether, as it is not enough to trust that adolescents can control this behavior on their own.

Insights from this study help school administrators and educational psychologists facilitate stakeholder discussion about smartphone use in the classroom. These insights may, ultimately, help interested parties develop appropriate classroom norms and a direction for school administrators to implement a school-wide electronic device policy that aligns with teachers' values and enhances students' learning (see H.-T. Chen & Li, 2017). Specifically, these findings can strengthen administrators' understanding of the role that smartphones play in the classroom (i.e., whether as an intentional tool for learning or as an unwanted distraction) and the affect they have on the student-teacher relationship when used for nonlearning tasks. Decisions on what to include in an electronic device policy should not be made without considering the values of teachers' as they invest time on planning and delivering curriculum to enhance students' knowledge and problem-solving skills. Otherwise, the policy may not align with teachers' need to effectively educate their students as they compete with the adolescent desire to shift attention away from learning to their smartphones. Findings from this study strengthened that alignment.

It has been recommended that future studies also collect data on students' values related to smartphone use during class, as policies perceived as too strict are likely to create negative feelings and increase noncompliance (Ledbetter & Finn, 2015). Taking into consideration the values of both stakeholders ensures electronic device policies

support teachers' need to deliver curricula while considering the values students place on having access to smartphones at all times.

Summary

Chapter 1 provided details of the background, research problem, and purpose of this study and continued with the RQ, theoretical framework, nature of the study, and operational definitions. This chapter also provided assumptions made as well as the scope and delimitations, limitations related to the research methodology, and significance of this study to the field of educational psychology. Chapter 2 will present the literature review.

Chapter 2: Literature Review

Today, it is inevitable that adolescents will have their smartphones with them during school (Mupinga, 2017). This generation is growing up in an era of technology, where smartphones have become essential to everyday life as a source of social connection, entertainment, and information (Labăr & Ţepordei, 2019; Zhang et al., 2018) for 95% of adolescents (Anderson & Jiang, 2018). Smartphones also offer instant gratification each time they are viewed for updates on social media, messaging, and gaming applications (Jeong et al., 2016; Kwon, Kim, et al., 2013; Rozgonjuk, Kattago, & Taht, 2018). Researchers believe that this psychological gratification reinforces the compulsive nature of adolescents' smartphone use (Lopez-Fernandez et al., 2017; Rozgonjuk, Kattago, & Taht, 2018), as evidenced by the 45% now connected to their smartphones at a near-constant rate (Anderson & Jiang, 2018). Smartphone use has now become so problematic that adolescents, a population too developmentally immature to exhibit self-control, are rapidly developing increased dependence on their devices (Elhai et al., 2017; Rozgonjuk et al., 2016; van Deursen et al., 2015; Zhang et al., 2018).

With attention directed compulsively to the smartphone, students are unable to maintain attention in the classroom. This persistent distraction negatively affects student engagement and, ultimately, academic performance (Baturay &Toker, 2016; Bellur et al., 2015; Carrier et al., 2015; Hsiao et al., 2017; Jiang, 2014; Lepp, Barkley, & Karpinski, 2015; Rozgonjuk, Saal, & Taht, 2018; Samaha & Hawi, 2016; Stavropoulos et al., 2013). Each time adolescents succumb to the attentional demands of their smartphones during class, memory retention is impaired, as quick shifts in attention between devices and

classroom content limit the deep-thinking patterns necessary for learning (Adler & Benbunan-Fich, 2013; Loh & Kanai, 2016; Rosen et al., 2013). Especially concerning is the relationship between smartphone use and prioritization of academics, such that increased focus on one's smartphone means decreased attention on academic performance (Zhang et al., 2018).

Some students have blamed in-class smartphone use on boredom and poor teaching practices (Bolkan & Griffin, 2017); however, many teachers have disagreed with students' reasons for using smartphones during class, and parents have compounded the problem by using their own devices to contact their children during the school day (Hart, 2019). Adding to the confusion are teachers, students, and parents who share similar beliefs that smartphones should be prohibited during class, that electronic device policies created by school administrators are rarely followed, and that these policies should be implemented more effectively (Gao et al., 2017). The differences in how students and teachers perceive school policies suggest a need to acknowledge how each stakeholder is affected; otherwise, it may be difficult to reach consensus, negatively impacting school culture (Chan & Ross, 2014). Insights into each stakeholder group's beliefs about acceptable classroom smartphone use enables policies to be developed that can promote student engagement in their learning.

The purpose of this study was to describe teachers' perceptions of school norms about smartphone use in the classroom. Using a qualitative approach to address this gap, semistructured, open-ended interviews were conducted among high school teachers. A thematic analysis of data within and across groups revealed similarities and differences in

perceptions of classroom norms and yield recommendations for classroom policies (see H.-T. Chen & Li, 2017).

Establishing the Relevance of the Problem

Reshaping the way adolescents access and process information, smartphones have become a ubiquitous tool that, with the simple tap of the screen, immediately connects them to a digital world that holds the answer to any question, access to anyone within their social network, and entertainment at the first sign of boredom (Labăr & Ţepordei, 2019; Zhang et al., 2018). However, there are costs associated with the frequent use of these devices, as researchers have discovered changes in adolescents' cognitive behaviors and processes (Loh & Kanai, 2016). The result of easily accessing and scanning information, without having to contemplate the meaning and connections associated with the content, has shifted learning from practices promoting deep memory retention to a shallow mode of information processing that precludes information storage and later retrieval (Loh & Kanai, 2016). Also associated with frequent smartphone use is an increase in smartphone dependence, resulting in higher levels of depression, anxiety, and stress (Elhai et al., 2017). While smartphone dependence is associated with mental health (e.g., depression) and emotional concerns (e.g., anxiety and stress), limiting the time during which adolescents have access to these devices may result in negative emotions such as a FoMO that also impact students' ability to focus and retain information (Alt & Boniel-Nissim, 2018).

Hartanto and Yang (2016) found that students' anxiety, when separated from their smartphones, has a negative effect on all aspects of executive functioning, including a

direct correlation between anxiety from FoMO and weaker academic performance (Rosen et al., 2018). Couple this with the increased use of technology in the classroom (e.g., podcasts, YouTube), and a paradoxical situation arises whereby the practice of using technology to increase student engagement, motivation, and productivity may not apply to technology in the form of smartphones; this has resulted in conflicting beliefs from stakeholders about appropriate policies for smartphone use in class (Gao et al., 2017). In the interest of students' academic success, stakeholders (i.e., teachers and students) must reach consensus on best practices for in-class smartphone use. In this chapter, I present the literature search strategy and theoretical foundation for the study. The literature review related to key concepts and conclusions will also be provided.

Literature Search Strategies

The literature search was comprised of recent peer-reviewed articles, published within the last 5 years. Broad searches related to the problem of classroom smartphone use were conducted in multidisciplinary databases that consist of academic journals in psychology, educational psychology, and information systems and technology, including all research methodologies. The primary databases researched included Academic Search Complete, Education Source, ERIC, ProQuest Central, and SAGE Journals.

Key search terms used to develop the literature review were *smartphone use, media multitasking, academic engagement, academic performance, classroom norms, electronic device policies,* and *school culture*. Combined searches such as *smartphone use + quality of life, smartphone use + academic engagement/academic performance, media multitasking + academic engagement/academic performance, smartphone use +*

classroom norms + electronic device policies + school culture were also conducted in various psychology databases (i.e., PsycARTICLES, PsycBOOKS, PsycCRITIQUES, PsycEXTRA, and PsycINFO), education databases (i.e., ERIC, Education Source), an information technology database (i.e., Computer Science Database) and in the Thoreau multidatabase. Supporting research was also gathered from the Pew Research Center, National Education Association, and a national survey entitled, "Away for the Day," an initiative developed by the producers of *Screenagers: Growing Up in the Digital Age* (Ruston et al., 2017). To finalize the search, key terms were researched in Google Scholar to identify additional articles related to the research topic.

Theoretical Foundation

When developing policies that affect multiple stakeholders, a value-focused thinking framework was recommended. In education, an environment where every policy decision affects teachers and students, administrators should consider the values of each stakeholder as they relate to the strategic objective of the organization (i.e., value statement); the strategic objective is then used to guide all organizational decisions by providing a stable reference point (Keeney, 1992). In secondary education, some may say that the strategic objective is to provide students with a quality education in preparation for college or a future career. Strategic objects are pursued through policy decisions made within the school, which collectively determine the quality of the school's overall performance as it relates to meeting that objective (Keeney, 1992). For example, the strategic objective of providing students with a quality education in preparation for college or a future career is met by earning the number of credits required to graduate.

Earning these credits is affected by factors such as attendance, avoiding infractions such as plagiarism, and meeting course expectations, each of which contributes to earning these required credits. However, if this strategic objective is not clearly defined and communicated by administrators, policy decisions may not align with the strategic objective, creating confusion among stakeholders about the purpose of those decisions (Keeney, 1992).

Oftentimes, decision makers gravitate toward an alternative-focused thinking approach to problem-solving, allowing their dissatisfaction with a current situation to guide them in making the most expeditious choice among alternative options (Keeney, 1992). These alternatives tend to be well-known, quickly identified, and easily accessible, precluding decision makers from generating new alternatives that may be more desirable (Selart & Johansen, 2011). In this approach, values are considered only after the alternatives are identified and a solution has been determined; however, Keeney (1992) argued for a reverse approach whereby alternatives provide a method of achieving the desired outcome once values are identified.

Value-Focused Thinking

In the value-focused thinking approach to decision making, stakeholders' values are prioritized prior to considering problem-solving options (Keeney, 1992). Values used to "evaluate the actual or potential consequences of action and inaction" include ethical principles, desired traits, priorities, and attitudes toward risk that, when making decisions affecting the organization, should reflect the values of all stakeholders (Keeney, 1992, p. 6). By placing the values of teachers and students at the forefront of the decision making

process, administrators may be more inclined to create an electronic device policy for smartphone use during class that aligns with the norms they consider appropriate. Although using a value-focused thinking framework may result in fewer solutions to the problem, prioritizing stakeholder values increases the creativity and ingenuity of the proposed solutions that tend to be more attractive, productive, long-term, and visionary (Selart & Johansen, 1992).

The first step in successfully applying this framework is defining why the decision needs to be made (e.g., a problem that often has no clear solution; Keeney, 1992). This proactively enables decision makers to specify stakeholders' values, create desirable alternatives based on those values, evaluate the alternatives, and then select the alternative that aligns with those values and moves the organization toward meeting the strategic objective (Klimaszewski, 2016). The primary purpose for thinking about values is illustrated in Figure 1; each quality, identified by Keeney (1992), offers a unique advantage to making values the first step in the decision making process.

Figure 1

Overview of Value-Focused Thinking

Further supporting the importance of making stakeholder values the first order of business in the decision-making process, value-focused thinking has been successful in policy development across multiple fields (Bernardo et al., 2018; Dhillon et al., 2018). For instance, current researchers have investigated the implementation of value-focused thinking on policy decisions made within internet commerce firms, a business with a high risk of privacy loss among users. Although some firms have instituted policies without regard for the privacy concerns of consumers, Dhillon et al. (2018) discussed the importance of first understanding the values that individuals attribute to privacy; the study's purpose was to first identify a set of privacy objectives integral to developing a set of fundamental objectives (i.e., ends objectives) and means objectives (i.e., which

help in meeting those fundamental objectives) for all internet commerce companies to consider.

Dhillon et al.'s (2018) mixed method study was conducted in the following four phases: (a) a qualitative analysis of values identified by 52 executives enrolled in a continuing education program at a large university in the United States who have experience using internet commerce to make personal purchases and have a basic understanding of consumer privacy; (b) a quantitative exploratory factor analysis of survey responses, based on the 194 subobjectives identified in Phase 1, from 207 graduate and undergraduate (i.e., seniors) students attending a large public university; (c) another quantitative exploratory factor analysis, 4 months later, of responses from the same survey but from a different set of graduate and undergraduate students (N = 458) from the same university; (d) and a quantitative confirmatory factor analysis, 6 months later, administered to another set of graduate and undergraduate students (N = 221) from the same university with experience shopping online in the last 6 months. Variables in Phase 1 included privacy wishes, problems, and concerns that were then converted to fundamental objectives (i.e., objectives that are essential in guiding strategic planning) and means objectives (i.e., the means of achieving the fundamental objectives) for Phases 2 to 4 (Dhillon et al., 2018). Resulting from the study is a validated list of fundamental objectives (e.g., maximizing reputation of internet commerce vendor, decreasing spam, maximizing the security of personal information) essential for any internet commerce organization to consider in information privacy (Dhillon et al., 2018). This study was similar to my study in its implementation of a value-focused thinking framework to

understand what is important to stakeholders as the first step in the decision making process (see Keeney, 1994).

In another study aimed at developing an appropriate strategy for rating the energy performance of secondary schools in Portugal, Bernardo et al. (2018) stressed the importance of considering the values of stakeholders in these performance ratings. The purpose of this qualitative study was to develop a list of the primary issues that their stakeholders feel should be considered when conducting a thorough assessment of a school building's energy performance to assist in the development of policies regarding energy efficiency (Bernardo et al., 2018). Having first identified stakeholders' priorities, it was then possible to create a list of fundamental objectives to address their concerns. As a result of the study, six fundamental objectives have been developed and structured into a value hierarchy; within each of those fundamental objectives are subobjectives that identify primary issues to energy performance measurement (Bernardo et al., 2018). Similar to the study by Dhillon et al. (2018), this study was relevant to my study in that stakeholders' values, having first been identified, must drive policy decisions; this is because each stakeholder group has its own level of expertise that contributes fundamental objectives influencing the decision making process (Keeney, 1994).

Value-focused thinking has also been applied to make decisions within the freight transportation system, specifically to address the significant economic impact that occurs when cargo shipments are disrupted by natural disasters and manmade events (Tong et al., 2015). In one study, Tong et al. (2015) used a 10-step value-focused thinking framework to support decision makers in measuring the total value loss when cargo is

disrupted by using a numerical cargo value decreasing rate (CVDR, i.e., the rate at which cargos' value decreases in economic and societal value). Based on the fundamental objective of assessing the value decreasing rate of disrupted cargo, a value hierarchy was created to determine the priorities of the CVDR based on relevant evaluation measures. The final CVDR calculates the scores from these evaluation measures including a value-focused thinking score, enabling decision makers to focus on the most important values when rerouting cargo in the event of a disturbance (Tong et al., 2015). This study was relevant to my study in its emphasis of core values in the decision making process (see Keeney, 1994).

Furthermore, value-focused thinking has been applied to case studies to address issues within a variety of contexts in Brazil (da Silva et al., 2017; Morais et al., 2013). In the qualitative study by Morais et al. (2013), value-focused thinking was applied to solve three problems in Brazil. In the first case study, decision makers in a Brazilian water company were interviewed about their values with the purpose of identifying strategic objectives and a hierarchy of corresponding fundamental objectives. The purpose of the second qualitative case study was to use value-focused thinking to create alternatives for aligning business and information system/information technology (IS/IT) in a Brazilian public energy company (Morais et al., 2013). Two CIOs were interviewed, and the strategic objective (i.e., IS/IT to support business strategies) was used to develop a hierarchy of fundamental objectives. Similar to the first case study, a network of means objectives was created along with alternative solutions for addressing this alignment problem. Lastly, the purpose of the third and final case study was to identify alternative

solutions for adequately disposing of plaster waste generated by civil construction in Brazil. After meetings and discussions with representatives from building site companies and plaster companies, the strategic objective (i.e., maximize the use of plaster on building sites contributing to regional economic development) was used to develop the fundamental values. Similar to the first and second case studies, means objectives were then derived and alternative solutions were generated. Through the use of value-focused thinking, Morais et al. was relevant to my study by providing a systematic way for creating decision making alternatives (see Keeney, 1994).

In a more recent study, da Silva Monte et al. (2017) used value-focused thinking to enrich decision making within a water company in Olinda, Brazil by developing a list of fundamental and means objectives to create alternative solutions. To that end, a representative from the local community and a decision maker at the city's water supply company were interviewed with the aim of generating a list of fundamental objectives related to the problems they had previously identified. After identifying means objectives for each fundamental objective, the study concluded with a list of alternatives designed to enrich the decision-making process within the water supply in Olinda. The application of value-focused thinking to identify stakeholders' priorities used, first, to create a list of fundamental and means objectives to, then, guide the development of alternative solutions (Keeney, 1994), was precisely what the proposed study aimed to do.

Similar to these studies, applying value-focused thinking to the present study ensured a systematic model was used to identify relevant stakeholder priorities (i.e., teachers) as they described appropriate norms for smartphone use in the classroom. Using

value-focused thinking to identify fundamental and means objectives, emerging from the priorities of teachers, helps shape policy for appropriate use of electronic devices in the classroom. Results from the present study serve as a systematic model for educational decision makers to follow as problems arise and effective, long-term policies are developed.

Literature Review Related to Key Variables and/or Concepts

Popularity of Electronic Devices

Electronic devices are now used to perform many of the tasks that were once the exclusive province of desktop and laptop computers. According to Taylor and Silver (2019), electronic devices are continuing to grow in popularity with an estimated 5 billion users worldwide. A majority of these users own smartphones with 76% living in advanced economies, representing a large number of well-educated, high-earner individuals under age 35 (Taylor & Silver, 2019). Smartphones have become more popular due to their portability and constant connection with other smartphone users; these devices are also popular for their large screens and ability to access information and entertainment at the ready (Jeong et al., 2016; Samaha & Hawi, 2016). With the rapid growth in smartphone use, individuals from one nation are now able to connect to the lives of those across the world (Anjomshoa et al., 2017; Demirci, Orhan, et al., 2014; Kwon, Lee, et al., 2013).

Not only are smartphones a source of information but of leisure, increasing life satisfaction of their users (Lepp, Li, et al., 2015). They have become an essential tool, enabling users to make phone calls, send instant messages and photos via text, keep up

with social networking sites, play music, videos, and games, search for directions, read and send emails; track and schedule appointments; browse the internet, and receive timely notifications on breaking news and weather forecasts (Samaha & Hawi, 2016). In other words, smartphones are powerful tools for engaging in any and all activities one might wish to do.

Parental Use and Family Practices

Electronic devices are increasingly popular among parents (Duggan et al., 2015; Hughes & Hans, 2001; Mascheroni & Ólafsson, 2016; Smith, 2012; Terras & Ramsay, 2016; Wellman et al., 2008). In studies comparing parental technology use versus nonparental use, researchers have found that technology use is more popular among households with children (Hughes & Hans, 2001; Smith, 2012; Wellman et al. 2008), and more parents are active on social media than nonparents (Duggan et al., 2015). Parental use of technology influences how often their children use technology, especially smartphones (Terras & Ramsay, 2016). This relationship is influenced by how much parents control/monitor their child's use of technology determined by factors such as age at which the internet was first introduced, how many mobile devices exist in the home, and the amount of usable data on their internet plan (Mascheroni & Ólafsson, 2016). Parents are able to monitor their child's online activity from their own devices, restricting them from accessing content that is not age-appropriate (Devitt & Roker, 2009; Duggan et al., 2015; Hiniker, Schoenebeck, et al., 2016; Livingstone et al., 2015). Parents also find electronic devices useful in managing family life (Radesky, Kistin, et al., 2016) as

well as accessing information on parenting and finding supportive resources (S. Baker et al., 2016; Duggan et al., 2015; Dworkin et al., 2013; Radesky, Kistin, et al., 2016).

With the popularity of smartphones, working parents struggle to maintain a healthy work-life balance given the increased pressure to answer emails and work-related phone calls when they should be engaged with their family (Harmon & Mazmanian, 2013; Radesky, Kistin, et al., 2016; Sharaievska & Stodolska, 2016). However, not only does work become a source of distraction, but the devices themselves are just as distracting for adults as for youth (Hiniker, Sobel, et al., 2015; Radesky, Kistin, et al., 2016), straining relationships within the home (McDaniel & Coyne, 2016). Similar to children, adults experience a sense of social pressure to respond immediately to calls or text messages (Kildare & Middlemiss, 2017). This often results in the child competing for their parent's attention at times when parents and children used to interact (e.g., during play and mealtime; Hiniker, Schoenebeck, et al., 2016; Kildare & Middlemiss, 2017; Qualcomm, 2013; Radesky, Kistin, et al., 2014; Radesky, Kistin, et al., 2016).

Stupica (2016) found that children are negatively impacted by their parents' use of smartphones, reporting that during baseball and softball games, they ran faster around the bases when parents were fully attentive; however, children's speed around the bases decreased and they were more likely to fall when parents were distracted by devices. At the park, 57% of parents choose not to use their phones for fear that it will risk the child's safety with 65% of parents fearing their phones will limit their ability to respond quickly (Hiniker, Sobel, et al., 2015). Unfortunately, not all parents feel that same way. In the same study, Hiniker, Sobel, et al. (2015) argues that some parents believe they can use

devices and monitor their child's safety at the same time yet respond vague or defensively when asked to describe the activity their children were engaged in while distracted by their phones.

Smartphone Use to Control Child Behavior

Parents also use electronic devices to manage their children's behavior. Not only are parents purchasing these devices for their children, they are also enabling their use (Terras & Ramsay, 2016). When busy, parents use devices such as tablets and smartphones to keep their children occupied; however, their risk of developing attention problems, withdrawal tendencies, or lack of impulse control increases as they become more dependent on the reward (i.e., dopamine) they received while interacting with the device (Gottschalk, 2019; Terras & Ramsay, 2016; Wartella et al., 2013). On the other hand, some parents are more likely to offer a device to children who already exhibit these difficulties as a way to keep them occupied and avoid interruptions while working, making dinner, or engaging with their own devices (Radesky et al., 2016; Radesky, Silverstein, et al., 2014). Ultimately, parents model the use of electronic devices for their children, whereby the amount of time parents spend on their own devices determines the amount of screen time for children 0-8 years (Lauricella et al., 2015).

Smartphone Use Among Children and Adolescents

Children under age 5 are quickly drawn to electronic devices as they play with toys that function similar to smartphones and computers, developing a specific interest in the device's touchscreen interface (Marsh et al., 2015; Plowman, Stephen, & McPake, 2010; Plowman, Stevenson, et al., 2012). However, concerns were raised by the

American Academy of Pediatrics Committee on Education in 2001 regarding the amount of screen time young children are permitted, arguing that too much time on these devices results in physically unfit children (Harris et al., 2018). Strasburger et al. (2010) found that children spend more time engaged with electronic devices than attending school with children ages 8-10 on devices up to 8-hours a day and teenagers spending 11-hours per day online (Rideout et al., 2010). Because using an electronic device is a sedentary activity, a relationship exists between the excessive screen time and the increase in childhood obesity (Falbe, Rosner, et al., 2013; Falbe, Willett, et al., 2014). To promote healthy habits, the American Academy of Pediatrics (2013) recommends that parents limit their children's screen time to 1-2 hours a day; however, some parents admit to minimal monitoring of screen time and report having no knowledge of what their children are doing while online (Chaudron, 2015).

Smartphone Addiction

Smartphones are integral to one's quality of life and to that end, individuals have become inseparable from them (Lepp, Li, et al., 2015); users have reported feeling panicked at the prospect of being separated from their smartphones (Hartanto & Yang, 2016). Although the most recent edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) does not identify a specific diagnosis for this behavior, it does provide criteria for diagnosing a nonsubstance addiction (i.e., Gaming Disorder), leading researchers to believe that a diagnosis reflecting excessive smartphone use will be included in the next DSM edition (American Psychiatric Association, 2013; Pontes & Griffiths, 2015; Samaha & Hawi, 2016). The extant literature uses several

interchangeable terms to describe the unhealthy symptoms and behaviors related to frequent smartphone use: problematic smartphone use (Billieux, Maurage, et al., 2015), excessive social media use (Al-Menayes, 2015), proneness to smartphone addiction (D. Kim et al., 2014; Rozgonjuk et al., 2016), smartphone overuse (Inal et al., 2015; H.-K. Lee, Kim, et al., 2017), excessive smartphone use (J. Chen et al., 2016), problematic mobile phone use (Billieux, Van Der Linden, et al., 2007), mobile phone dependence (Nikhita et al., 2015), mobile phone addiction (Chóliz, 2010), internet addiction (Kuss & Griffiths, 2012; Kuss et al., 2013), and smartphone addiction (Kwon, Kim, et al., 2013). Given the number of interchangeable terms used in the literature, *smartphone addiction* was used throughout the study.

Individuals often use their smartphones to engage in multiple activities, most prevalent among them is visiting social networking sites (Jeong et al., 2016; Kuss, & Griffiths, 2017; Kwon, Kim, et al., 2013; Rozgonjuk et al., 2016). First, it is important to distinguish the difference between social networking and social media. According to Kaplan and Haenlein (2010), social media refers to a broad range of programs that enable user-generated content to be shared and for purposes of collaboration with others, including collaborative projects such as *Wikipedia*, virtual gaming worlds, video sharing sites such as YouTube, and social networking sites (Kuss & Griffiths, 2017). On the other hand, social networking includes online communities that enable users to create personal profiles, interact with people they know, and connect with others based on shared interests (Kuss & Griffiths, 2011). Popular social networking sites include Facebook, Twitter, Instagram, and Snapchat along with popular instant messaging services such as

Facebook Messenger, WhatsApp, and WeChat (Statista, 2020). Frequent and habitual checking of both social media and social networking sites, along with viewing entertainment-related content, increase the risk of developing smartphone addiction (Jeong et al., 2016; Kuss et al., 2013; Salehan & Negahban, 2013; Tone et al., 2014).

Psychopathological Symptoms

Depending on the onset of symptoms, it may be difficult to distinguish between frequent and habitual smartphone use and frequent, nonproblematic use (Kuss & Griffiths, 2017). Research suggests that compulsive use of smartphones may increase the risk of developing a psychological disorder as it leads to diminished sleep and a decline in one's health and well-being (Beranuy et al., 2009; Demirci, Akgonul, & Akpinar, 2015; Ha & Hwang, 2014; Y.-K. Lee, Chang, et al., 2014; Thomée et al., 2011). However, this relationship is thought to be reciprocal as factors that increase the risk of smartphone addiction may also increase levels of perceived stress while perceived stress is also found to increase the risk of developing smartphone addiction (Beranuy et al., 2009; Jeong et al., 2016; Samaha & Hawi, 2016; Thomée et al., 2011; Yoo et al., 2014). In fact, those with high levels of stress are more likely to develop an addiction to their smartphones than those experiencing less stress in their daily lives (Jeong et al., 2016; Leung, 2007; D. Li et al., 2010). Researchers have begun to study the phenomenon, *technostress*, which is stress that emerges from feeling overwhelmed by the volume of information and communication as a result of owning a smartphone (Ragu-Nathan et al., 2008).

Smartphone addiction has also been linked to emotional stress and low social self-efficacy (Chiu, 2014). For some, smartphones provide a way to cope with negative feelings or relationships at home, especially when children feel neglected or abused by their parents (Sun et al., 2019). The distress and anxiety experienced as a result of childhood maltreatment is believed to compromise the child emotionally and/or cause them to develop a strong desire to maintain frequent communication with others and receive reassurance (Billieux, Maurage, et al., 2015; Ehrenberg et al., 2008; Liu et al., 2020; Pivetta et al., 2019). There is evidence to show that those addicted to their smartphones prefer to engage in activities on their devices, gradually isolating themselves from physical/offline activities and face-to-face social connections (Jeong et al., 2016; Thomée et al., 2011). This isolation may eventually lead to decreased social support and, as a result, an increase in loneliness (Jeong et al., 2016; Nie & Erbring, 2000).

However, feelings of isolation are not just the result of avoiding in-person social activities, as the preference for and prevalence of smartphone use over face-to-face interaction elicits a sense among users that they are missing out when disconnected from these devices. This FoMO may develop into an impulsive need to check social networking sites; the more one checks social networking sites, the more opportunities missed and/or events to which one was not invited (Kuss & Griffiths, 2017). Alt and Boniel-Nissim (2018) describe FoMO as a source of compulsive anxiety where individuals fear they are missing an opportunity to engage with others or in a desirable event. Also characterized by an overwhelming desire to be in multiple places at once, FoMO not only presents feelings of irritability and anxiety but may also leave individuals

with a sense of inadequacy and low self-esteem, feelings that are significantly heightened by social media use (Abel et al., 2016). Recent research suggests a reciprocal relationship also exists between envy, FoMO, and smartphone addiction among adolescents (Wang et al., 2019).

Smartphone addiction is related to other poor mental health outcomes such as depression, mood changes, dependence, withdrawal, tolerance, and personal or professional functional impairment; these symptoms are often experienced by individuals who struggle with substance-related addictions (Billieux, Maurage, et al., 2015; Elhai et al., 2017; Elhai, Levine, et al., 2016; Ha & Hwang, 2014; Kuss & Griffiths, 2017; Lee, 2015; Oulasvirta et al., 2012; Roh et al., 2018; Yoo et al., 2014). When users develop an addiction to their smartphones, self-control is lost (Jeong et al., 2016; C. Li et al., 2014; Özdemir et al., 2014) and time becomes distorted (Young, 2007).

Not only are the symptoms of smartphone addiction similar to the symptoms of a substance-related addiction, but smartphone addiction may also lead to substance abuse among vulnerable users such as adolescents (Yoo et al., 2014). This may be due to higher levels of sensation seeking (Jeong et al., 2016) as engaging in these addictive behaviors releases the chemical dopamine in the brain (Kuss et al., 2013), potentially altering brain structure (Kuss & Griffiths, 2012). In recent years, studies have investigated the neurological effects on the brain when individuals are addicted to smartphones; much of what is understood today comes from magnetic resonance imaging, electroencephalography, positron emission tomography, and diffusion tensor imaging (Chun et al., 2018; Montag et al., 2016). By examining functional connectivity in various

brain regions, evidence suggests that adolescents with smartphone addiction have lower white matter integrity in subcortical brain structures (Hu et al., 2017) in addition to impaired control of impulsiveness, cognition, reward prediction, and reward responsiveness (Chun et al., 2018; van Duijvenvoorde et al., 2016). Adolescents with more intense withdrawal symptoms are also found to have higher concentrations of cortisol (i.e., stress hormone) than those without symptoms of smartphone addiction (Chun et al., 2018).

Smartphone Addiction and Athletic Performance

Smartphone addiction is related to poor academic outcomes (Hawi & Samaha, 2016; Judd, 2014; Karpinski et al., 2013; Rosen et al., 2013; Samaha & Hawi, 2016; Thomée et al., 2011; Winskel et al., 2019). Although research suggests that students who used smartphones primarily for study-related tasks are less likely to become addicted (Jeong et al., 2016), students who struggle to limit smartphone use while studying, but are distracted by it nonetheless, risk earning a lower cumulative grade point average (G.P.A.; Junco & Cotten, 2012; Samaha & Hawi, 2016). One explanation for this is, when engaging with one's smartphone during academic tasks, the brain quickly shifts its attention between the device and course materials, interfering with the deep-thinking patterns required for learning (Adler & Benbunan-Fich, 2013; Loh & Kanai, 2016; Rosen, Carrier, & Cheever, 2013). This is found to be especially true when multitasking with social media and text messaging (Junco & Cotten, 2012; Karpinski et al., 2013; Rosen, Carrier, & Cheever, 2013). Poor academic performance may also be explained by the relationship that exists between smartphone addiction, low achievement motivation,

and decreased focus when reading academic texts (Bukhori et al., 2019). Even when students approach studying with the intent to learn, when attention is divided between course materials and multitasking with social media and text messaging, information is not stored nor is it available for retrieval (Wentworth & Middleton, 2014).

Impact of Divided Attention on Academic Performance

Smartphones and other electronic devices may produce advantages in the learning environment as they are used to research topics on the internet, take notes, and manage homework schedules (Godwin-Jones, 2011). However, a number of studies show that technology has a negative impact on academic performance (Anand, 2007; Y.-F. Chen & Peng, 2008; Chou, 2001; Kubey et al., 2001; Mayer & Moreno, 2003; Samaha & Hawi, 2016; ul Haq & Chand, 2012; Wentworth & Middleton, 2014). This is due to factors such as sleep deprivation from late night technology use (Wentworth & Middleton, 2014), increased distractions while studying or completing homework (Junco & Cotten, 2011, 2012; Kirschner & Karpinski, 2010), and more time spent with devices than academics (Fox et al., 2009; Kirschner & Karpinski, 2010; Judd, 2014; Junco & Cotten, 2012; Uzun & Kilis, 2019; Wentworth & Middleton, 2014). Self-report studies show that students admit that using electronic devices negatively impacts their GPAs (Kelly, 2004; Lepp, Barkley, & Karpinski, 2015), but their perception of these devices as a source of entertainment rewards their use and encourages electronic distractions that are hard to resist (Jacobsen & Forste, 2011; Junco & Cotten, 2011, 2012; Lepp, Barkley, & Karpinski, 2015; Karpinski et al., 2013; Kirschner & Karpinski, 2010; Rosen, Carrier, & Cheever, 2013; Wood et al., 2012). Evidence of this exists as students who spend more

time engaging with electronics each week have lower GPAs (Wentworth and Middleton, 2014). That said, there are factors other than time spent on electronics that are known to predict academic performance (e.g., gender, class standing, smoking habits, academic self-efficacy, self-efficacy for self-regulated learning, and high school GPA), and when Lepp, Barkley, and Karpinski (2015) controlled for these variables; they found that students who used their electronic devices more often have lower GPAs.

Divided Attention and Cognitive Processing

In earlier research on attention and learning, Posner (1990) identified two types of selective attention: divided attention (i.e., processing two or more stimuli at once) and rapid attention switching (i.e., processing one stimulus but switching between that stimulus and another at a rapid pace). Wood et al. (2012) argues that rapid attention switching takes longer for the brain to process and increases the risk of information being lost before it is stored, supporting Junco and Cotten's (2012) definition of multitasking as the occurrence of task switching that divides attention while performing unrelated tasks.

To better understand how multitasking affects learning, Junco and Cotten (2011, 2012) and Mayer and Moreno (2003) agree that there are different information processing channels necessary for learning (e.g., auditory/verbal and visual/pictorial) and that learners have a limited capacity to effectively process multiple cognitive demands. In the context of multimedia or smartphone use, there are three types of cognitive demands involved in learning: essential processing (i.e., when incoming information is selected, organized, and integrated so the brain can make sense of it), incidental processing (i.e., processing information that is not required for learning the material), and representational

holding (i.e., holding information in one's working memory; Q. Chen & Yan, 2016; Mayer & Moreno, 2003). For example, students use (a) essential processing as they read a text to make sense of the material, (b) representational holding to associate the content with prior knowledge, holding it in their working memory as they transfer the content to their notebooks, and (c) incidental processing when they become distracted by their smartphones (Q. Chen & Yan, 2016). This incidental processing may consume more capacity than the brain can handle, resulting in cognitive overload (Q. Chen & Yan, 2016; Junco, 2012b; Junco & Cotten, 2012; Mayer & Moreno, 2003). When instant messaging, one's attempt to minimize cognitive overload through shortening strategies such as text-speak (i.e., 'ic' instead of 'I see') actually uses more cognitive resources than spelling out each word (Head et al., 2012).

Mayer and Moreno (2003) propose a theory for reducing cognitive load in multimedia learning as examined by five cognitive overload scenarios along with solution(s) for each scenario. Each solution is based on 12 years of research conducted at the University of California, Santa Barbara. Mayer and Moreno's (2013) theory is based on evidence supporting the limited capacity of the visual and auditory channels of the brain, as well as the notion that meaningful learning does not occur when a substantial volume of cognitive information is processed in either or both of these channels at any given time. In multimedia presentations, they identify nine ways to reduce cognitive overload. For example, there is (a) the modality effect (e.g., when on-screen text is present at the bottom of the screen that explains an animation presented at the top, the text should be narrated rather than presenting it on the screen), (b) the segmentation

effect (e.g., when a presentation is rich in both content and visual information, presentations should be segmented and learners should be able to control when to transition to the next screen), (c) the pretraining effect (e.g., when a presentation is rich in both content and visual information, prior instruction should be given to prepare students for what they are about to learn), and (d) the coherence effect (e.g., when a presentation includes material that is both essential and information that is interesting but extraneous, the extraneous material should be excluded to preserve cognitive resources; Mayer & Moreno, 2003). These findings were relevant to the current study in that Mayer and Moreno's (2003) theory for reducing cognitive load supports the notion that visual and auditory distractions increase cognitive load and impair learning.

Researchers disagree on whether it is possible to attend to more than one task at a time (Wentworth & Middleton, 2014). Firat (2013) believes that multitasking often occurs because individuals intend to complete two or more tasks effectively, whereas engaging in continuous partial attention (i.e., maintaining partial attention to multiple sources with the aim of not missing any incoming information) negatively impacts students' ability to focus and retain information. Some researchers believe that multitasking impairs performance but can be overcome when dual-task skills are developed (Meyer & Kieras, 1997; Schumacher et al., 1999); however, Wood et al. (2012) argues that repeated practice of dual-task skills has no positive affect on performance. In a quantitative study, Wood et al. (2012) examined the impact of multitasking through various digital technologies (i.e., laptops for Facebook searches, communicating via email/instant messenger, and smartphones for texting) over the course

of three lectures, measuring how this behavior affects learning outcomes among 145 university students. Performance across groups was compared by a paper-and-pencil control, word-processing notetaking only control, and a natural use control (i.e., allowing students to use technology as they typically would during class), resulting in seven total conditions (i.e., texting, email, instant messaging, Facebook, Natural Technology Use, Word-Processing only, paper-and-pencil (Wood et al., 2012). Results of the study show that (a) students in all distraction groups performed worse on a learning assessment than those without distractions; (b) students in the natural technology use condition who chose not to engage with technology outperformed those who used technology during class; (c) students using Facebook, email, and instant messaging engaged in off-task activities beyond what was assigned in the study, and although the email group engaged in more multitasking than those in the instant messaging group, email was not detrimental to their performance; and (d) increased practice with multitasking (i.e., throughout the three lectures) did not improve performance, suggesting that individuals cannot improve multitasking performance over time (Wood et al., 2012). Relevant to the current study, these findings provided evidence that in-class multitasking with technology impairs academic performance, regardless of whether students practice multitasking behaviors (Cain & Mitroff, 2011; Carrillo & Subrahmanyam, 2014; Marois & Ivanoff, 2005; Mayer & Moreno, 2003; Monsell, 2003; Ophir et al., 2009; Wood et al. 2012) and that multitasking is detrimental to the learning process (Bowman et al., 2010; Burak, 2012; Ellis et al., 2010; Hawi & Samaha, 2016; Samaha & Hawi, 2016; Strayer et al., 2011; Uzun & Kilis, 2019; Wentworth & Middleton, 2014).

More specifically, studies on multitasking have examined the impact that technology has on deep and surface approaches to learning (Rozgonjuk, Saal, & Taht, 2018). According to Marton and Saljo (1976), a deep approach to learning occurs when the learner exhibits control over the learning process. Integral to the deep approach lies an intrinsic interest in learning the material, seeking to find meaning in the content and relating it to prior knowledge (Biggs, 1987). Students who use a deep approach are found to have more advanced skills in organization, critical thinking, independent and creative thinking, identifying causal relationships, and expression of thoughts and ideas (Chin & Brown, 2000; Rogaten et al., 2013; Rozgonjuk, Saal, & Taht, 2018; Warburton, 2003). In contrast, a surface approach to learning occurs when students study only what is necessary to fulfill the minimum requirements (Biggs et al., 2001; Marton & Saljo, 1976). This often includes rote learning of only the material that students will be asked to reproduce; few connections will be made between the content and prior knowledge, resulting in poor academic performance (Biggs et al., 2001; Rogaten et al., 2013).

Rozgonjuk, Saal, and Taht (2018) conducted a quantitative study to examine the relationship between (a) problematic smartphone use and social media use during class and (b) deep and surface approaches to learning, as well as whether social media use during class mediates this relationship among 415 Estonian college students. Variables include general socio-demographics (i.e., age, gender, and native language), the extent to which students engage in deep or surface approaches to learning, frequency of social media use during class, and frequency of smartphone addiction symptoms (i.e., tolerance, positive anticipation, cyberspace-oriented relationships, withdrawal, and physical

symptoms); results show that all variables are interrelated, with (a) higher levels of problematic smartphone use associated with less commitment to deep learning and (b) a positive relationship between frequent social media use during class and surface learning (Rozgonjuk, Saal, & Taht, 2018). These findings were relevant to the current study in that students who engaged in smartphone use during class limited their ability to engage in the deep learning necessary for academic success.

This is supported by Junco and Cotten (2012) who, in their quantitative study, examined the effect that multitasking with information and communication technologies (ICTs; i.e., online search engines unrelated to schoolwork, Facebook, email, instant messaging, text messaging, and talking on smartphones) has on the G.P.A. of 3,866 college students. The study measured frequency of general ICT usage, frequency of multitasking through ICT during school work, internet skills, high school G.P.A., and level of parental education, and produced the following results relevant to the proposed study: (a) frequent use of all ICTs occurred during school work except instant messaging, (b) performing internet searches was the most popular multitasking activity, (c) Facebook and texting during school work had a negative effect on overall G.P.A. (Junco & Cotten, 2012). Similar to the proposed study, these findings suggested that engaging with one's smartphone during schoolwork, specifically through Facebook and text messaging, impeded students' ability to achieve deep, meaningful, learning.

In a quantitative study by Junco and Cotten (2011), self-reports of 4,491 U.S. college students were examined to better understand if instant messaging (i.e., through AOL, MSN, Facebook, etc.) during homework affects homework completion. Variables

included frequency of instant messages sent during schoolwork, engaging in off-task activities on the computer/internet (e.g., playing games, browsing the internet) while instant messaging, and engaging in off-task activities not on the computer/internet (e.g., talking on the phone, watching television) while instant messaging (Junco & Cotten, 2011). Results show that (a) students often use instant messenger to multitask even though they report this behavior is detrimental to their schoolwork and (b) multitasking through instant messenger while completing homework or engaging in noncomputer/noninternet activities impedes homework completion (Junco & Cotten, 2011). These findings were relative to the current study in that students reported engaging in multitasking although they believed it is detrimental to their learning, suggesting they had difficulty regulating this behavior when devices were present. Also, multitasking through instant messenger, which primarily occurs through smartphone and social media apps today, impaired completion of school-related tasks and should not be permitted during class.

Multitasking with electronic devices was also linked to deficits in executive functioning (Martín-Perpiñá et al., 2019). Executive functioning is the brain's ability to plan, organize, and prioritize as well as to develop and complete goals (Lezak, 1982) and are distinguished by three primary functions: working memory (i.e., temporarily storing and manipulating incoming information), cognitive flexibility (i.e., adapting to new cognitive demands and situations), and inhibitory control (i.e., the ability to identify and resist irrelevant information; Badaley, 2003; Diamond, 2013; Miller & Cohen, 2001; Murphy et al., 2017; Ophir et al., 2009; van der Schuur et al., 2015). During early

adolescence, executive functions and self-regulation are still developing, resulting in a weaker ability to resist the urge to multitask (Baumgartner, van der Schuur, et al., 2017). Students who heavily multitask while completing homework are found to have difficulty with planning and making decisions, have weaker response inhibition, are more restless, and have difficulty following social rules (Martín-Perpiñá et al., 2019). Multitasking during homework is also found to result in difficulty staying focused, weaker working memory skills, and increased task switching (Baumgartner, Weeda, et al., 2014; Cain et al., 2016; Gioia et al., 2002).

Impact of Classroom Smartphone Use on Academic Performance

Although there is a robust literature available on how smartphones impair learning, researchers continue to advocate for their use in the classroom as a learning tool (Aljaloud et al., 2019; Bolatli & Korucu, 2020; Boldizsár, 2018; Cabero-Almenara et al., 2019; Dunn et al., 2012; Jiménez-Crespo, 2015; Kenwright, 2009; C.-C. Lee, Hao, et al., 2019; Martínez-Garrido, 2018; Nicolas & El-Aly, 2018; Pinter & Cisar, 2019; Rana & Dwivedi, 2017; Scheidet, 2003; Shadiev et al., 2015). To start, some researchers support the use of smartphone apps during class to make independent learning more enjoyable for students (Burgess & Murray, 2014; Golding et al., 2012; Mifsud et al., 2013). Rather than using index cards to create traditional flashcards, apps such as Flashcards +, Quizlet, and Study Blue enable students to access a deck of flashcards during in-class study sessions or breaks from instructional activities (Burgess & Murray, 2014; Golding, et al., 2012). Students were also found practicing vocabulary, mathematics, and general problem-solving skills through video game apps during small-group breakout sessions (Mifsud et

al., 2013; Sandford & Madill, 2007; Tao et al., 2009). Teachers also used Augmented Reality (AR) in the classroom as a tool for examining 3D visual structures and models in courses such as architecture, engineering, science, and medicine to improve student motivation, engagement, and overall academic performance (Cabero-Almenara et al., 2019; Fonseca et al., 2014; Martin-Gutierrez, 2011). However, although there are many smartphone apps designed for studying, students are not using them as effectively as when studying with traditional methods. For example, flashcard apps are believed to be more convenient than carrying a stack of flashcards, yet they are accessed less frequently because they drain the phones' battery life or students forget the flashcards exist or shift their attention to more entertaining apps when the app is in use (Burgess & Murray, 2014).

Before smartphones became a prevalent tool for learning, teachers used hand-held devices called *clickers* to enable students to immediately answer questions, complete instructor evaluations, and record attendance, thus improving attendance and classroom participation (Kenwright, 2009). Both students and teachers favor clickers for the immediate feedback and active collaboration they provide (Aljaloud et al., 2019; Dunn et al., 2012; Rana & Dwivedi, 2017) as well as the student's ability to answer questions anonymously (Fallon & Forrest, 2011). Today, smartphones are used as modern-day clickers through apps such as *Kahoot!*, also enabling them to answer questions anonymously as the class prepares for an upcoming assessment (C.-C. Lee, Hao, et al., 2019). Smartphones have also replaced clickers in their ability to log attendance through apps such as *B here* (Pinter & Cisar, 2019) and are used to assist students in their

language learning through the ability to translate unfamiliar words at the ready (Jiménez-Crespo, 2015). To reduce the cognitive load, English language learners will use their smartphones during class to understand the meaning of a specific word; this helps them to understand the context of the discussion (Boldizsár, 2018; Nicolas & El-Aly, 2018; Shadiev et al., 2015).

Smartphones are also used by teachers for nontraditional instructional practices such as flipped classrooms and designing web-based curricula (Bolatli & Korucu, 2020; Scheidet, 2003). These practices enable students to access learning material such as videos or interactive games outside of class, providing a more enjoyable way to learn and practice content prior to the next class (Bolatli & Korucu, 2020). These practices increase the likelihood of students achieving mastery as the learning activities are self-directed and customized to each student's level of understanding (Scheidet, 2003).

Smartphones as Distractions During Class

Although smartphones are becoming more prevalent in the classroom, researchers continue to find evidence to suggest that the risk of being distracted during class outweighs the benefit of trying to engaging students through technology (Ali, 2018; Bjornsen & Archer, 2015; Carcelén et al., 2019; Celikkalp et al., 2020; Flanigan & Kiewra, 2018; Glass & Kang, 2019; Gutiérrez-Puertas et al., 2020; Hashmi et al., 2019; Hyland et al., 2015; I. Kim et al., 2019; Labăr & Ţepordei, 2019; McDonald, 2013; Ng & Nicholas, 2009; Pan et al., 2018; Prasad et al., 2017; Safar & AlKhezzi, 2013; Schneider, 2018; Siebert, 2019; Swartzwelder, 2014). Oftentimes, students struggle to pay attention for an extended period of time, resulting in fidgeting, doodling, or speaking out of turn

during lectures (Kercood & Banda, 2012). When the need to move during class is combined with the distracting nature of a smartphone, students are more likely to engage in what Flanigan and Kiewra (2018) call cyberslacking (i.e., using mobile devices to engage in nonlearning activities during class or while completing homework). Although both struggling students and high performers multitask with their smartphones during class, students who struggle the most academically are more likely to engage in cyberslacking, falling even further behind in their learning (Ravizza et al., 2014; Seibert, 2019). This is likely because adolescents, especially early adolescents, overestimate their ability to multitask and experience difficulties with academics (Schlehofer et al., 2010). Although they anticipate receiving lower grades as a result of these distractions (Elder, 2013), in the moment, students still engage in multitasking behavior during class (Duncan et al., 2012).

Not only are students responsible for initiating this off-task behavior, having the device within reach when notifications arrive diverts their attention as well, resulting in missed content and weaker test performance (End et al, 2010; I. Kim et al., 2019; McDonald, 2013). Although some researchers argue that media multitasking does not reduce comprehension of the lecture material, per se, test performance suffers when students are missing content in their notes and unable to retain the information because their attention was divided (Demirbilek & Talan, 2018; Glass & Kang, 2019; Junco, 2012a; Mayer & Moreno, 2003). In fact, multitasking during class is a stronger predictor of low-test scores than a student's intellectual ability (Ravizza et al., 2014) and

negatively impacts test performance regardless of student sex or GPA (Bjornsen & Archer, 2015).

Notwithstanding these findings, students are still given the freedom to have smartphones in class, with expectations that they are able to maintain self-control in the presence of a device that is highly addictive to same-age peers (Carcelén, et al., 2019). Even if technology is encouraged as a learning tool, teachers should be aware that off-task behavior is more likely to occur during class when students have access to their smartphones than when using laptops (McGloin et al., 2017). Current research suggests that students engage with their smartphones for at least 25% of the class, with distractions occurring every three to four minutes for a duration of approximately one minute at a time (I. Kim et al., 2019). Teachers who allow their students to engage with mobile technology during class are not providing the optimum environment for learning that is expected from schools (Demirbilek & Talan, 2018). Unless teachers place regulations on in-class smartphone use or students develop better self-regulation skills, smartphones are going to continue to be a distraction (Wei et al., 2012).

Policies for Regulating Smartphone Use in the Classroom

With evidence to support the integration of technology in the classroom and a robust literature suggesting smartphones impair learning, it is important to consider electronic device policies to prevent distractions and personal use during class (Martín-Perpiñá et al., 2019). For policies to be successful, it is important for all stakeholders to become informed of the risks and benefits of permitting smartphone use during class, especially as it pertains to excessive and off-task behavior (Burns & Lohenry, 2010;

Celikkalp et al., 2020). Teachers recognize the importance of incorporating technology for pedagogical use (i.e., as a tool to engage students and enrich the learning experience) yet become frustrated and express disappointment in students' lack of respect for others when discussing the interference of smartphones in the classroom (Morris & Sarapin, 2020). Unregulated use of smartphones during class has become increasingly problematic, supporting the need for electronic device policies in schools (W. Baker et al., 2012; Burns & Lohenry, 2010; Campbell, 2006; End et al., 2010; Flanigan & Kiewra, 2018; Gutiérrez-Puertas et al., 2020; Karlins et al., 2012; Morris & Sarapin, 2020; Siebert, 2019; Tindell & Bohlander, 2012; Uğur & Koç, 2015). Not surprisingly, many teachers agree that policies are necessary to help students avoid the constant distractions, task-switching, and cyberslacking that occurs when smartphones are present, thus strengthening the students' ability to delay gratification and regulate their behavior (Flanigan & Kiewra, 2018; Morris & Sarapin, 2020; Stephens & Pantoja, 2016). However, policies that are perceived as strict or discouraging to students are more likely to create negative feelings toward teachers and, as a result, students will not comply (Ledbetter & Finn, 2015). Researchers believe this is especially true with electronic device policies, as students tend to be more accepting of smartphone use during class than teachers (W. Baker et al., 2012).

In contrast, when smartphones are used inappropriately and become distracting to one's peers, those who are distracted would like to see teachers enforce stricter penalties (Gutiérrez-Puertas et al., 2020; Roberge & Gagnon, 2014; Stachowski et al., 2020). However, this does not apply to their own distracting behavior as student beliefs about

electronic device policies depend on how often they observe others engage with their devices and not themselves (Cho & Lee, 2016). Sadly, teachers are also guilty of distracting students as they receive incoming text messages or phone calls while they are teaching (Burns & Lohenry, 2010). Perhaps, this explains why some students perceive teachers more favorably when smartphone policies are established (Roberge & Gagnon, 2014), believing the course is more valuable and the teacher is more competent and caring than teachers who permit smartphone use (Finn & Ledbetter, 2013; Lancaster, 2018; Morris & Sarapin, 2020).

Although electronic device polices are effective in preventing academic dishonesty and improving academic performance (Karlins et al., 2012; Morris & Sarapin, 2020; Redner et al., 2020; St. Gerard, 2006), Schneider (2018) argues that banning smartphones during class is not a reasonable solution and suggests that teachers coach students on how to manage their technology use. Even when policies are in place, 80% of students report using smartphones for off-task behavior (i.e., at least once per class) believing that this is acceptable (Morris & Sarapin, 2020). Oftentimes, students perceive smartphone policies as ineffective (Berry & Westfall, 2015), especially when teachers have difficulty enforcing them (Stachowski et al., 2020). Some teachers prefer to not even enforce policies with older students, believing they should be able to regulate their own behavior or learn how to do so with time (Morris & Sarapin, 2020).

What Is at Stake for Stakeholders

Uğur and Koç (2015) argued that students will continue to use their smartphones, even if distracting their peers, until administrators are willing to establish school-wide

policies and ban smartphone use altogether. Morris and Sarapin (2020) found that 77% of teachers surveyed wish to enforce electronic device policies to the extent that 91% created their own without the help of their department or administration; as a result, some of these policies were ambiguous and lacked clarity. Yet, instead of encouraging teachers to ban smartphones (i.e., knowing that they are ubiquitous and will likely be used whether or not a policy is in place), researchers suggest that teachers should help students learn how to use these devices productively as part of the curriculum (Morris & Sarapin, 2020). This would require teachers with little training and/or who are uncomfortable with technology integration to reinvent their teaching practices, a process that will take time and require professional development and support from administration (O'Bannon & Thomas, 2015). However, college professors and employers argue that today's young adults simply cannot resist their smartphones, engaging with them in meetings and job interviews, behaviors that are reinforced when not challenged during school (Kinman, 2015; Not-So-Smartphones, 2015). Parents also play an important role in educating students on how to use technology appropriately, as parents often perceive smartphones as a tool for safety and feel comfortable knowing their children can be reached at any time ("Cell phones," 2005). This is why administrators should consider the role that technology plays in the everyday lives of today's young generation and include teachers and students in the development of policies involving smartphone use during class (Bragdon & Dowler, 2016; Kinman, 2015).

Chapter 3: Research Method

Smartphone use has now become so problematic that adolescents are rapidly developing increased dependence on their devices (Anderson & Jiang, 2018; Elhai et al., 2017; Rozgonjuk et al., 2016; van Deursen et al., 2015; Zhang et al., 2018). Updates on social media, messaging, and entertainment applications instantly attract their attention, reinforcing the compulsive nature of adolescents' smartphone use (Jeong et al., 2016; Kwon, Kim, et al., 2013; Lopez-Fernandez et al., 2017; Rozgonjuk, Kattago, & Taht, 2018). During the school day, increased attention to their smartphones inhibits the ability to maintain attention in the classroom, negatively affecting engagement and overall academic performance (Baturay &Toker, 2016; Bellur et al., 2015; Carrier et al., 2015; Hsiao et al., 2017; Jiang, 2014; Lepp, Barkley, & Karpinski, 2015; Rozgonjuk, Saal, & Taht, 2018; Samaha & Hawi, 2016; Stavropoulos et al., 2013). This is due to rapid shifts in attention between devices and classroom content, limiting the ability of adolescents to learn the material (Adler & Benbunan-Fich, 2013; Loh & Kanai, 2016; Rosen et al., 2013). However, teachers and students do not always agree on what is considered appropriate in-class smartphone use, signaling a need for school administrators to enact and/or enforce electronic device policies (Gao et al., 2017). Because it may be difficult for these administrators to reach a consensus on the most appropriate solution, it is important that they seek feedback from teachers as a primary stakeholder who is affected by smartphone use in the classroom; otherwise, school culture may be negatively affected (Chan & Ross, 2014).

Major sections of this chapter include details of the research design such as the RQ, central concepts of my study, and rationale for using an IPA. Also included are the role of the researcher, the recruitment process, data collection procedures, and plan for analysis. Issues of trustworthiness are also discussed.

Research Design and Rationale

Research Question

RQ – Qualitative: What are teachers' perceptions of classroom norms for smartphone use?

Central Concept of the Study

The central concept of this study was smartphone use during class. It is not uncommon for adolescents to carry smartphones with them throughout the school day and become increasingly distracted by these devices during class (Bolkan & Griffin, 2017; Mupinga, 2017). Although a number of teachers and students have agreed that in-class smartphone use impairs learning (Gao et al., 2017), students continue to engage in this behavior (Rozgonjuk et al., 2016; Zhang et al., 2018). This may be due to the absence of a school-wide electronic device policy, teachers' discomfort or exhaustion with trying to enforce electronic device policies without administrator support, or that teachers simply permit students to access to their smartphones during class (Gao et al., 2017).

Rationale for Use of IPA Design

Yilmaz (2013) suggested that qualitative research is especially effective for educational researchers who wish to understand the meaning of an academic program or

policy from the perspectives of stakeholders. Among the approaches to qualitative research, the most appropriate tradition for this study was IPA. IPA explores topics that are not widely understood through the first-person experiences of participants (i.e., phenomenology), their interpretation of those experiences (i.e., hermeneutics), and how participants make sense of that phenomenon as a result of their interpretations (i.e., idiography; Cuthbertson et al., 2020). IPA enables researchers to collect information that is subjective and driven by conversations with participants (Rudestam & Newton, 2015).

IPA was used to represent how participants understand and give meaning to their beliefs of appropriate smartphone use during class. Among the various qualitative research traditions, grounded theory was not chosen because building a theory inductively from the data collected was not the aim of this study. Likewise, ethnography was inappropriate because the data were not gathered in a participant's or social group's natural environment, and neither narrative inquiry nor case study traditions were appropriate because my aim was to understand the perspectives of teachers rather than deeply examining the life of an individual narrator or the impact of a particular situation or event (see Rudestam & Newton, 2015). According to Engward and Goldspink (2020), the researcher uses IPA to uncover the meaning that participants ascribe to a particular phenomenon.

Role of the Researcher

IPA allows the researcher to maintain an active role throughout the study. This level of engagement is important for gathering, analyzing, and interpreting the stories being told by participants during qualitative research (Engward & Goldspink, 2020). To

ensure my interview questions were valid and aligned with the focus of the study, I requested feedback from content and methodology experts prior to seeking institutional review board (IRB) approval. Once IRB approval was granted, my role was to invite participants to tell their stories about smartphone use during class through unstructured, open-ended interviews. I not only conducted these interviews, I recorded and transcribed them verbatim, documenting significant nonverbal cues such as sighs, laughter, and hesitation. It was my job to follow up with participants to ensure that the transcripts were accurate prior to analyzing their content. After reviewing the data multiple times for emerging themes, I provided a final write-up of my analysis to participants to confirm my interpretation aligned with their stories. As the researcher, I was also responsible for ensuring that all research documents and participant information was secured in a locked cabinet from the start of the study until they are destroyed 5 years later.

Ethical Issues and Biases

To avoid any ethical issues and biases, I secured IRB approval before seeking informed consent from teachers. Participants were recruited via social media from schools other than my workplace to ensure that no personal or professional relationships existed. Because I work with students and teachers and engage in discussions about use of smartphones during class, I bracketed my subjectivity prior to starting the study and before analyzing the data.

Methodology

This section describes the methodology of my study, such as how participants were selected, how interview questions were designed, and details of my plan for data analysis.

Participant Selection Logic

Below is a description of how participants were selected for my study.

Population

The target population consisted of high school teachers in the United States.

Sampling Strategy

To align with IPA's objective to understand the meaning behind participants' lived experiences (Engward & Goldspink, 2020), I purposively selected those who taught high school and had a personal connection to smartphone use in the classroom. Although I had enough teachers agree to participate, I planned to use a snowball strategy to attract more participants through word of mouth, if necessary (see Alase, 2017).

Participant Criteria

I recruited teachers who had a direct experience with smartphone use during class. Participants taught and carried smartphones with them throughout the school day. This direct experience is necessary in IPA research, as the aim is to understand the personal experiences of participants in a given context (Engward & Goldspink, 2020).

Sample Size and Rationale

The sample size of a qualitative study using IPA may include two to 25 participants to provide a deep analysis of their shared experiences related to the study's

focus (Alase, 2019). Creswell (2014) recommended conducting approximately 10 interviews. Because of the small sample size in qualitative research, findings cannot be generalized to the larger population (Alase, 2019).

Procedures for Recruitment

Participants were recruited via social media sites such as Facebook, LinkedIn, and Instagram. My request included a call for participants who taught high school and carried a smartphone with them throughout the day. Teachers who either commented on my post or sent a direct message expressing interest received a private message from me stating that I would contact them directly from my Walden email address; I then emailed them an overview of the study's purpose and procedures along with a copy of the informed consent. When consent was received from teachers, I scheduled a one-hour virtual interview (i.e., via Zoom) with each of them.

Instrumentation

To gain an understanding of participant norms for appropriate smartphone use during class, I conducted semistructured, open-ended interviews. Because the aim of IPA is to use a smaller sample size to provide rich descriptions of participant experiences, reaching saturation relies on the quality of these interview questions (Alase, 2017). Therefore, each open-ended question was written to enable participants to respond with their own words or phrases, a process that may have felt more like a conversation than an interview (see Qualitative, 2020). My committee members (both content and methods experts) verified that the interview questions were sufficient to solicit the desired

participant information. The interviews took place virtually, via Zoom, and consisted of two central questions and five to seven subquestions (see Appendix A).

Interview Guide

1. Describe your experiences with smartphone use during class.
    a. Describe how you interact with your smartphone during class.
    b. Describe how others interact with their smartphones during class.
    c. What feelings arise when you imagine not having access to your smartphone during the school day?
    d. Describe how smartphone use affects learning.
    e. Describe how much teachers compete with smartphones during class.
    f. Describe how smartphone use affects the student-teacher relationship.
2. Describe the electronic device policy at your school. Subquestions included
    a. (If a policy exists) Describe how this policy is enforced at your school. (If no policy exists) Describe how some individuals might try to enforce an electronic device policy at your school.
    b. Describe how this policy (or lack of policy) affects you during class.
    c. Describe how this policy (or lack of policy) affects others during class.
    d. (If a policy exists) Imagine if your school eliminated their electronic device policy. What feelings arise? (If no policy exists) Imagine if your school suddenly had an electronic device policy. What feelings arise?
    e. Describe what you believe to be an effective electronic device policy.

Procedures for Data Collection and Debriefing

Interview questions were designed by me and were written to avoid probing/leading questions or bias. All interviews took about 1 hour. At the start of each interview, I used an interview protocol guide (see Appendix B) suggested by Creswell (2013) to maintain organization throughout the session. After welcoming the participant and providing a brief description of the study and research process, I explained that the interview was designed to be completed in a single session and no follow-up interviews were needed. I also reminded participants that their responses would remain confidential and that they could exit the study at any time without penalty. I asked if I could record the interview and explained that participants would receive a copy of their transcript to review for accuracy and then another after completion of my analysis. Next, I proceeded with the recorded interview, which consisted of semistructured, open-ended questions to guide the conversation. I made note of any significant, nonverbal reactions, such as long pauses, eye rolls, or laughter, for data analysis.

Once the interviews were complete, I thanked interviewees for their participation in the study and provided time for them to make any additional comments they wished to include (i.e., that were forgotten during the interview). I also provided time to answer questions they had about the interview or research process. Before leaving, I reminded participants that they would receive a copy of the transcript upon its completion and then another after I have analyzed their responses.

Data Analysis Plan

After interviews were complete, I transcribed them verbatim and, along with my notes from each interview, immersed myself in the data. However, to ensure the analysis reflected participants' lived experiences, I first bracketed my preconceptions by describing my own experiences working with teachers and students related to smartphone use during class (see Alase, 2017). This was especially important due to my role as a high school educator, as I work with students on developing strategies for avoiding distractions and improving self-regulation skills. Once bracketing was complete, I listened to each recording as I read through its transcript, familiarizing myself with the content (i.e., from the transcript as well as my interview notes) while documenting my initial interpretations along with any contradictions. This first level of analysis involved documenting emerging themes from the transcripts as they related to smartphone use during class. This included repeated words or phrases to narrow the lengthy responses often generated from open-ended questions (see Alase, 2017). An example of a word or phrase related to smartphone use during class is "frequent texting." The second level of analysis involved reading and rereading the transcripts, looking for thematic structures relating to smartphone use during class, and extracting content that was rich in detail or was contradictory. Statements related to smartphone use during class were then organized into categories. Examples of such statements from teachers included "frequently looking at smartphone" or "smartphone use permitted during class." The data were analyzed a third time to identify convergent and divergent themes. This occurred by prioritizing statements directly related to smartphone use during class while also discovering those

that were less relevant. I knew that saturation was reached when no new themes emerged from continued review of the data (see Alase, 2017). Once all themes and interpretations were analyzed, I provided a written analysis to each participant to ensure it accurately reflected their experience. Participants also received a summary of the findings at the completion of the study.

Issues of Trustworthiness

To ensure overall trustworthiness of my study, I developed a plan for maintaining credibility, dependability, confirmability, and ethical procedures.

Credibility

Below is a description of how I planned to ensure credibility throughout my study.

Member Checking and Triangulation

Lincoln and Guba (1985) explained that member checking is a necessary technique for establishing confidence in the truth of a qualitative study's results. Therefore, I followed up with participants to ensure my findings reflected what they had intended, and that no researcher bias influenced the analysis; participants were given a 1- to 2-page summary of the key findings and requested that it be reviewed for accuracy (see Kornbluh, 2015; Morrow, 2005).

Triangulation also ensured internal validity of the study. According to Amankwaa (2016), triangulation occurs when multiple sources corroborate the findings to identify inconsistencies in the data ensuring that the analysis is comprehensive and thorough.

Triangulation occurred when my interpretation of the data was compared to reviews from participants and from a colleague who is a licensed school psychologist.

Validity

In qualitative research, validity is achieved by prolonged contact with participants (Lincoln & Guba, 1985). This prolonged contact helped me provide an accurate account of my participants' experience with smartphone use during class (see Spiers et al., 2018). To achieve this level of contact, I conducted semistructured, face-to-face, virtual interviews due to COVID-19. Although virtual, I was still able to achieve the same goals as if the interviews were conducted in-person.

Transferability

Findings are transferable if they are applicable to other contexts. However, due to the small sample size and subjectivity inherent in qualitative research, generalizations cannot be made (Morrow, 2005). Although transferability was not guaranteed, I provided a thick description of the study's methodology, results, and analysis to encourage other researchers to make their own comparisons and replicate the study if desired.

Dependability and Confirmability

Audit Trails

One way to establish dependability (i.e., reporting consistent findings that can be repeated) and confirmability (i.e., results that reflect the views of the participants and not the researcher) is through an audit trail (Lincoln & Guba, 1985). An audit trail consists of a transparent description of the study's methodology, results, and analysis from start to finish (Amankwaa, 2016). This also includes a detailed explanation of the research design

and how it was implemented, participant recruitment procedures, interview questions and protocol, emerging themes or categories, process for data analysis, and all raw and reported data. As suggested by Lincoln and Guba (1985), an inquiry audit was conducted by an independent to evaluate the process and findings for accuracy and to determine if my interpretations and conclusions reflected the data.

Reflexivity

Reflexivity occurs when researchers maintain objectivity throughout the research process (Lincoln & Guba, 1985). I established reflexivity through a process called bracketing, whereby all researcher assumptions, subjectivity, and biases were noted and placed aside prior to conducting interviews. Reflexivity may also occur during the research process through a reflexive journal, in which researchers reflect on their own values and interests as it relates to the study's methodology, logistics, and decisions that are made (Amankwaa, 2016).

Ethical Procedures

Once IRB approval was granted, I began recruiting participants through social media (i.e., LinkedIn, Facebook, and Instagram). Participation was voluntary and no direct solicitation occurred. To ensure participants' privacy, I asked them to send a private direct message, including their personal email address, if they were interested in participating and wished to receive more information. Those who responded to my social media post expressing interest first received a consent form from my Walden email address outlining the study's purpose and procedures, steps for maintaining confidentiality, a description of the voluntary nature of the study, and any potential risks

and benefits for participating. The consent form clearly explained that participants may withdraw from the study at any time without penalty. I also informed them that, although the interview questions were not intended to be upsetting in any way, I would immediately address any issues that arose along with a list of referrals for support services, if needed.

To ensure that participants remained anonymous, each were assigned an alphanumeric identification code to be used throughout the process. Signatures were not required on consent forms; returning the consent form indicated consent to participate and provided permission for interviews to be recorded. Participants received a transcript of their interview for review to ensure all identifiers had been removed. Hard copies of data were stored in a locked file, and digital copies of data were stored on an external hard drive that was used solely by me. This hard drive was only used for this study and was stored in the same locked file. I used the same password-protected computer to transcribe all interviews and, once the study was complete and findings had been disseminated, the data were stored in the locked file. All data will remain locked in the cabinet for five years and then destroyed.

Summary

Chapter 3 included details of the research design and rationale for using an IPA approach to explore teacher perceptions of appropriate norms for smartphone use during class. The role of the researcher, process for recruiting participants, data collection procedures, and a plan for data analysis were also included. This chapter also discussed

how I addressed issues of trustworthiness throughout the research process. Chapter 4 will present the results of the study, including any themes that emerged during data analysis.

Chapter 4: Results

The purpose of this study was to explore teacher perceptions of appropriate norms for smartphone use during class. High school teachers were asked about their experience with smartphone use in the classroom through semistructured, open-ended interviews, using an IPA research design. To gain insight into teachers' perceptions of classroom norms for smartphone use, I aimed to capture teachers' experience with both student and teacher smartphone use during class. In this chapter, I discuss the setting, demographics, and procedures for data collection and analysis. Adjustments made to achieve trustworthiness are presented as are detailed results. The chapter closes with a final summary of the results and an introduction to Chapter 5.

Setting

The study was conducted in Ohio. All interviews took place via Zoom video conferencing software due to COVID-19 and nationwide social distancing guidelines. These interviews were held in my home or work office with no violations of participants' privacy or rights to confidentiality, as doors were locked, and computer volume kept at a minimum or headphones were used. The use of Zoom enabled participants to select a private location for interviews, and no identifying information was mentioned by me during the interview to maintain participant privacy. Recordings of each interview were stored on my locked, personal computer.

Demographics

The population of interest was high school teachers in the United States who had experience with smartphone use during class. Participants were recruited through social

media, specifically through Facebook and LinkedIn. Eight interviews were conducted with teachers from three U.S. states, including Ohio, Pennsylvania, and North Carolina. Three participants were male and five were female, with representation from five public schools and three private schools. Six participants taught in the humanities, and one taught in the STEM field. An alphanumeric code was assigned to each participant by order of informed consent received.

Brief Summaries of Participants

- P1 was a female social studies teacher from a public school in Ohio.
- P2 was a male social studies teacher from a public school in Ohio.
- P3 was a male English teacher from a public school in Ohio.
- P4 was a male social studies teacher from a public school in Ohio.
- P5 was a female STEM teacher from a public school in Pennsylvania.
- P6 was a female English teacher from a private school in Ohio.
- P7 was a female history teacher from a private school in North Carolina.
- P8 was a female English teacher from a private school in North Carolina.

Data Collection

Data were collected solely by me via face-to-face interviews on Zoom. This videoconferencing software enabled interviews to remain socially distant per COVID-19 protocols. Five participants conducted their interviews at home while three chose to participate from their classrooms. I conducted five interviews in my office at work and three in my home office, each of which was secured for privacy. The interviews took place over an 8-week period, as some participants were on summer vacation during data

collection. Interviews ranged from 30 to 45 minutes and were recorded by Zoom and saved as each participant's ID code. These recordings were then uploaded to a folder in Google Drive for each participant; folders were labeled with participants' ID. I transcribed the recordings into individual Google Docs, removing all identifiers, and then printed each transcription to be proofread against the original recording. During proofreading, errors caused by distortion in the Zoom recording were corrected on the printed transcript and then edited on its corresponding Google Doc. Printed copies of transcriptions were stored in a locked file in my home until editing was complete and then emailed to participants to ensure accuracy. Once approved, all printed copies were destroyed. Digital copies of transcriptions were downloaded into a PDF file and saved to my password-protected laptop. These PDF files were also uploaded into ATLAS.ti for coding. All Google Drive folders and Docs were saved to an external drive and then deleted.

Data Analysis

Data were analyzed using the computer aided qualitative data analysis system, ATLAS.ti. Each transcription was uploaded as a separate document; initial impressions were noted as comments and included as first-cycle codes. Also included as first-cycle codes were key quotations from transcriptions along with corresponding codes using Saldaña's (2021) value coding method to identify participant attitudes, beliefs, and values. According to Saldaña, attitudes describe how participants think or feel about something/someone, beliefs describe what participants personally think or feel to be true, and values describe what participants think or feel is important. Codes identified in each

code group were labeled as A (attitude), B (belief), or V (value) prior to naming the code. Value coding was selected to align with this study's theoretical framework (i.e., value-focused thinking) and to address the RQ (i.e., teachers' perceptions of classroom norms for smartphone use; Keeney, 1992). All codes were entered into ATLAS.ti. Attitudes, beliefs, and values were developed as provisional codes to provide a structure for the remaining codes. The code group electronic device policy/distribution was also created, as one interview question asked about the schools' electronic device policy; some responses were factual and did not fit in the attitude, belief, or value categories (see Figure 2). However, considering the electronic device policy/distribution of devices to students was important in understanding its role in participants' attitudes, beliefs, and values about smartphone use during class.

Code networks were created in ATLAS.ti to visualize the codes/subcodes and to identify redundant codes in need of merging or codes that were assigned in error, which were eliminated. This process resulted in 15 initial codes and 24 subcodes. Once first-cycle coding was complete, a second round of coding condensed data even further until saturation was achieved. To consider the role that electronic device policy/distribution of devices played in participants' attitudes, beliefs, and values, the emerged codes electronic device policy and school distributes device were linked to codes A: Administration support and V: Classroom management to assist with this interpretation (see Figures 3 and 4). A second example of a code linked to another is the code V: Classroom management, which is linked to the codes A: Administrator support, A: Colleague

support, and A: Parent support and are present in the attitudes and values network trees (see Figures 3 and 4). Figure 5 shows the network tree for the beliefs code group.

Figure 2

Electronic Device Policy and Distribution of Devices to All Students

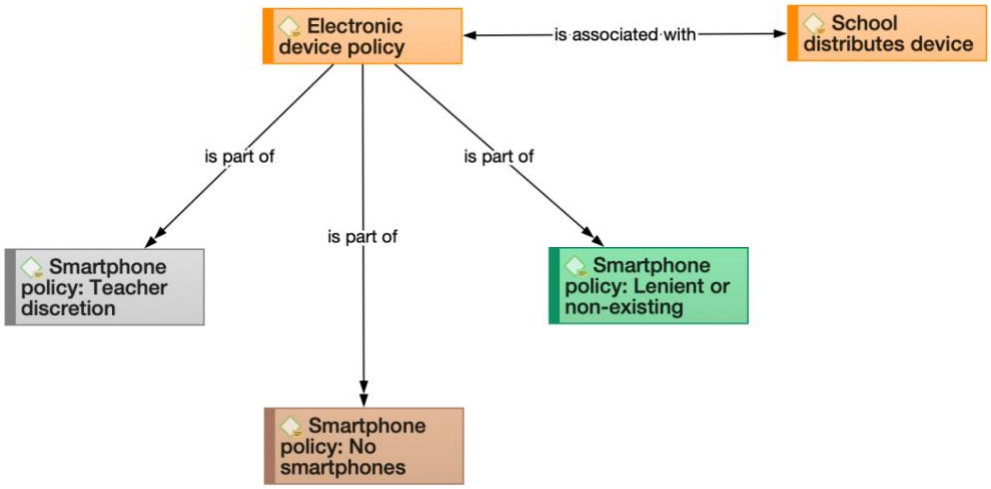


Figure 3

Teacher Attitudes About Smartphone Use During Class

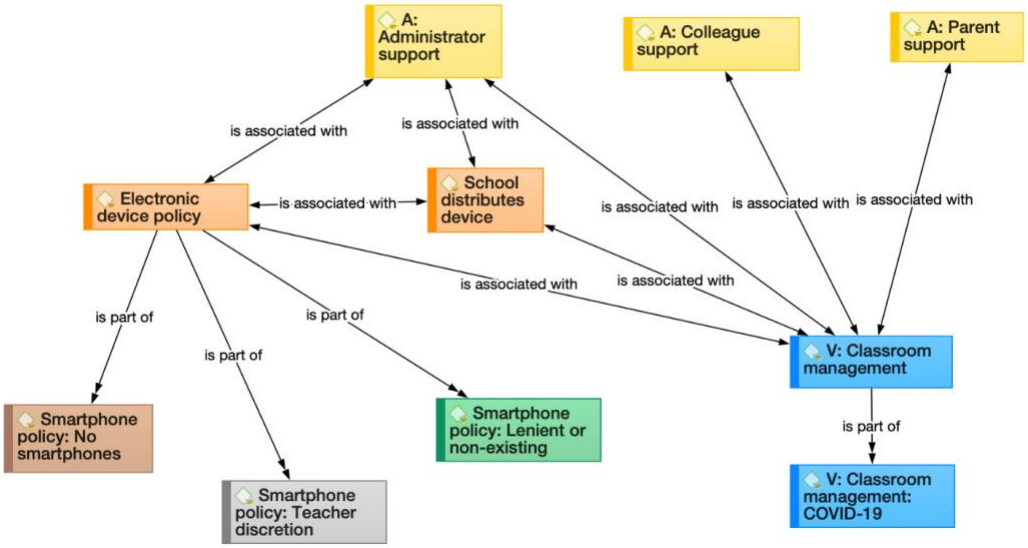


Figure 4

Teacher Values Related to Smartphone Use During Class

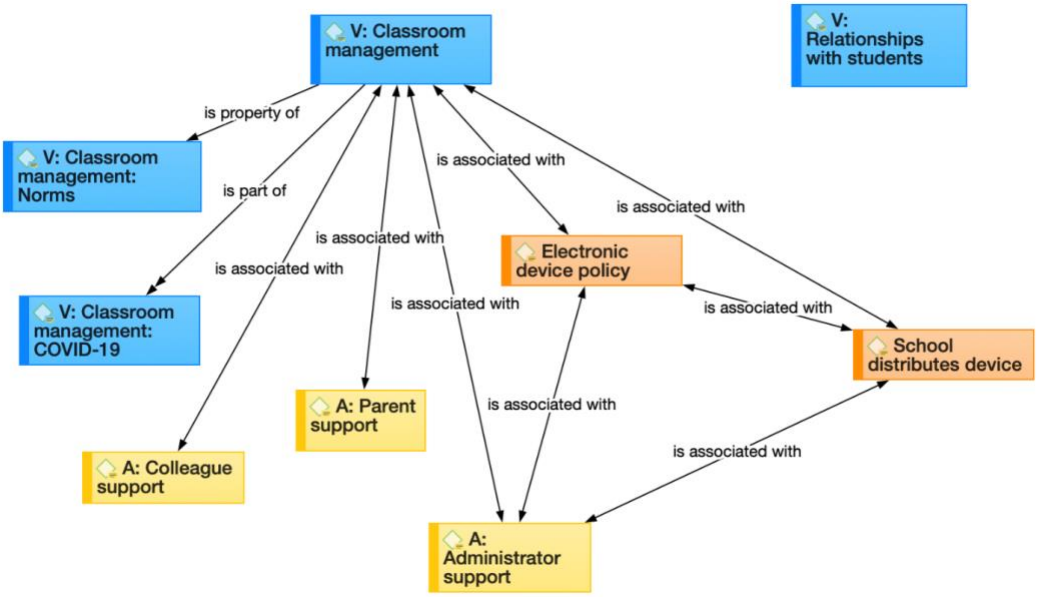
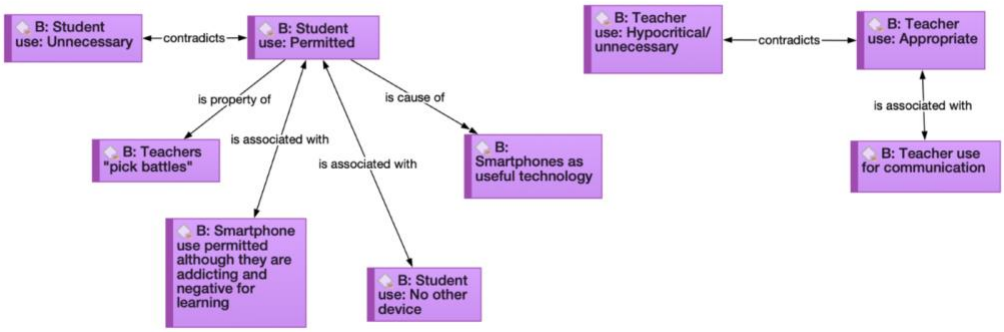


Figure 5

Teacher Beliefs About Smartphone Use During Class



Once network trees were created, I phenomenologically themed the data by interpreting what participants believed smartphone use during class is and what it means (Saldaña, 2021). To draw these interpretations, I analyzed each network tree for patterns and connections. I then explored how the codes and subcodes in the attitudes**,** beliefs, values, and electronic device policy/distribution code groups wove together to determine how they interrelate and work together holistically, thus extracting thematic statements. This process enabled me to make code-woven assertions that captured participants' perceptions of appropriate norms for smartphone use during class. Participants also discussed the influences that make enforcing these norms easier or more difficult; therefore, these influences were also incorporated into the final thematic statements.

Categories

The final list consisted of four code groups: attitudes, beliefs, values, and electronic device policy/distribution. Within these groups were 11 codes: A: administrator support, A: colleague support, A: parent support, B: student use: unnecessary, B: student use: permitted, B: teacher use: hypocritical/unnecessary, B: teacher use: appropriate, V: classroom management, V: relationships with students, electronic device policy, and school distributes device. The following 10 subcodes were also created: within B: student use: permitted were subcodes B: teachers "pick battles," B: smartphone use permitted although they are addicting and negative for learning, B: student use: no other device and B: smartphones as useful technology; within B: teacher use: appropriate was the subcode B: teacher use for communication; within V: classroom management were subcodes V: classroom management: norms and classroom

management: COVID-19 and within electronic device policy were subcodes smartphone policy: teacher discretion, smartphone policy: no smartphones, and smartphone policy: lenient or nonexisting.

Definitions for the codes groups attitudes, beliefs, and values were adopted from Saldaña (2021), while the remaining code group (i.e., electronic device policy/distribution), codes, and subcode definitions were derived from participants' narratives and current knowledge and entered as comments in ATLAS.ti. The final list of code groups, codes, subcodes and definitions were exported as an Excel spreadsheet and formatted for MS Word, as shown in Table 1.

Table 1

Code Groups and Codes

Code group	Code type	Code/Subcode	Definition
Attitudes: How participants think or feel about something/someone relating to smartphone use during class.	Code	A: Administrator support	Teacher thinks/feels that administrators should provide support for teachers when trying to manage smartphone use during class. Ex: "So, a large group of us went to administration last year and asked for a more strict cellular phone policy this year."
	Code	A: Colleague support	Teacher thinks/feels that colleagues should support one another to provide consistency for students, Ex: "…I know that our staff is very inconsistent in enforcing it, and I think that has a lot to do with it as well."
	Code	A: Parent support	Teacher thinks/feels that parent support is needed to enforce policies. Ex: "A lot of times I'll get a ding in my room and I'll be like, "Who is it?" And they'll be like, "I'm sorry." And they'll get their phone out and "Oh, it's my mom."
Beliefs: What participants personally think or feel to be true about their experiences with smartphone use during class.	Code	B: Student use: Unnecessary	Teacher believes student smartphone use is unnecessary during class. Ex: "I think a lot of things I'll hear from kids is I'll say, 'Just because you use your cell phone all the time or you're able to be on your phone and then you're in class listening…', they're always like, 'I'm such a good multitasker. Like, I could do this.' And I'm like, 'No, you really can't. I know I can't. If I'm on my phone, I know for a fact I have no clue what you're saying.'"
	Code	B: Student use: Permitted	Teacher believes that smartphones should be permitted during class. Ex: "And in the beginning, especially because they're seniors, I'm like, "Hey, if you do need to...if your boss calls you or sends you a text or, you know,

		your coaches, whatever, like, that's OK."
Subcode	B: Teachers "pick battles"	Teachers believe they have to "pick their battles" when enforcing student smartphone use during class. Ex: "…I have found that...over the year, like I said, it's just not worth the battle, in my opinion."
Subcode	B: Smartphone use permitted although they are addicting and negative for learning	Teacher permits students to use smartphones, even when acknowledging that smartphones are addicting and have a negative impact on learning. Ex: "But negatively, I feel like it's a distraction a lot of the time. They'll say they're going to hurry up and check this, but it ends up being 10 minutes, 20 minutes, 30 minutes."
Subcode	B: Student use: No other device	Teacher believes that smartphones are helpful when other devices die or are not available. Ex: "So I could see a situation where occasionally a kid would want to check the document on their phone, on Google Drive, if their Google, if their Chromebook was not working or they didn't have their Chromebook. So that would be a place where I wouldn't have any problem with it."
Subcode	B: Smartphones as useful technology	Teacher believes that smartphones are useful when their technology (e.g., apps) enhance student projects and overall learning. Ex: "…we did a big newscast project this past year when students work in small groups and they got to record a news broadcasting segment, each student had a topic that they had to cover and one group got really creative and actually used the TikTok app because it could record in small segments and they could push it all together. And this app edited it for them. And they could use a green screen because I think the app embeds different kinds of backgrounds or other things that you don't get from other free applications on an iPad or on a

			computer. That was really cool. Like it was one of the best presentations I had. Like, “Use TikTok.” And so they couldn’t use their iPads for that. They had to use the phone and it worked perfectly.”
	Code	B: Teacher use: Hypocritical/unnecessary	Teacher believes own smartphone use during class is hypocritical and unnecessary during class. Ex: “I'm not on it when they're in here, because I think that's kind of hypocritical that if they're not supposed to have it out and using it, then I try not to use it.”
	Code	B: Teacher use: Appropriate	Teacher believes there are appropriate times to use own smartphone during class. Ex: “I check it often, I have it on.”
	Subcode	B: Teacher use for communication	Teacher believes own smartphone is useful for communication. Ex: “Now, I will say with COVID, that has been helpful because kids are like, ‘Oh, I'm quarantined, like, I need to go to the office.’ I'm like, ‘Well, I guess that is timely and helpful.’”
Electronic device policy/distribution: Details about schools’ electronic device policy or distribution of electronic devices to students.	Code	Electronic device policy	Details about schools’ electronic device policy. Ex: “My first reaction is, I get kind of nervous because if it's not written down anywhere, like in a handbook or in some type of policy book, we have some very creative students and parents and community members who would kind of abuse that. ‘Where does it say that?’ I know that I would have a couple of kids that would literally be on their cell phones the whole class, period, and they wouldn't pay attention, because ‘Where does it say that I'm not allowed to have a cell phone? It doesn't say that I have to have it in my locker.’ So that, my first reaction is that would make me nervous because there's nothing, there's no guideline for us to go with.”
	Subcode	Smartphone policy: Lenient or nonexisting	Schools’ electronic device policy is lenient or a policy does not exist.

			Ex: “Honestly, I don't even know if there is an explicit policy…”
	Subcode	Smartphone policy: No smartphones	Schools’ electronic device policy does not permit the use of smartphones during class. Ex: “They weren't supposed to have it their person. It was either supposed to stay at home, in their car or in their locker.”
	Subcode	Smartphone policy: Teacher discretion	Schools’ electronic device policy enables teachers to enforce smartphones during class if desired. Ex: “In our school, it is a ‘no cell phone policy unless teachers allow students in the class to use them.’’
	Code	School distributes device	Participants’ school distributes electronic device to all students to use in the classroom. Ex: “I think what our school is doing is pretty positive, especially because our, our district kind of encourages it by handing out Chromebooks to students free of charge.”
Values: What participants think or feel is important relating to smartphone use during class.	Code	V: Classroom management	Participant believes that classroom management is an important value as a teacher. Ex: “I still have students sometimes have them out, and I've also gotten a little older and more confident in my classroom management. And so I think I have a little more confidence in following through on that...on that rule of not having smartphones out.”
	Subcode	V: Classroom management: Norms	Participant believes that setting classroom norms is important when managing student smartphone use during class. Ex: “If you set the norms, you're not competing against them. Make it, if you make it loosy goosy and you say, ‘Hey, you know, I'm only going to say something about your phone if it's a concern’ or ‘You can take your phone out when you're done with your work.’ No, I would never say that. I just think that's a good idea because then I think you are competing. And I don't want to,

		I don't want a kid to hurry through her work because she wants to get her cell phone out."
Subcode	V: Classroom management: COVID-19	Describes classroom management during the COVID-19 pandemic. Ex: "It was just a situation where, I guess COVID had kind of taken over. And as a teacher, you start to like, figure out what you're going to argue about and what not as far as technology, because the technology was just overtaking the class because it was COVID."
Code	V: Relationships with students	Participant believes that the teacher-student relationship is an important value as a teacher. Ex: "I think given your relationship with the students, if it's a strong one, I think it empowers you."

Evidence of Trustworthiness

Trustworthiness was maintained through credibility, dependability, confirmability, and ensuring all procedures followed ethical guidelines as described below.

Credibility

The following explanation describes how credibility was achieved throughout the study.

Member Checking

As stated by Lincoln and Guba (1985), to establish confidence in the accuracy of a qualitative study's results, member checking is necessary to ensure the data reflect only the participants' truth untainted by the researcher's interpretation of their experience. Once interviews were complete, participants were asked if they were comfortable with

their responses and if they had concerns about their responses being included in the study. Participants also received a copy of their transcriptions via email, along with a 1- to 2-page summary of the key findings, to confirm their accurate representation of their experience (Kornbluh, 2015; Morrow, 2005).

Triangulation

Triangulation occurs when multiple sources corroborate the findings to identify inconsistencies in the data, a process that ensures the trustworthiness of findings (Amankwaa, 2016). To gain a deeper understanding of teacher perceptions of smartphone use during class, triangulation was first achieved by interviewing participants from three U.S. states who teach multiple subject areas and represent both public and private high schools. My interpretations of the data were then reviewed by a colleague who is a licensed school psychologist to confirm the accuracy of each analysis.

Validity

To ensure validity in the study, an IPA research design was chosen and semistructured, open-ended interviews were conducted with high school teachers who had experience with smartphone use during class. Transcriptions were recorded and reviewed multiple times throughout the coding process, allowing for an in-depth analysis of the data. This design, methodology, and sample were necessary in accurately answering the RQ.

Transferability

This study explored teacher perceptions of appropriate norms for smartphone use during class. Participants interviewed were high school teachers who taught humanities

or STEM courses in Ohio, Pennsylvania, and North Carolina public and private schools. Data were collected from eight participants, limiting the generalizability of the findings to the same grade levels, subject areas, and locations due to the small sample size and subjectivity inherent in qualitative research (Morrow, 2005).

Dependability and Confirmability

An audit trail, including all transcripts, codes, coding groups, networks, and memos were recorded in ATLAS.ti (ATLAS.ti, 2021). This audit trail is easily accessible through a specific file in ATLAS.ti and is available for review. Also included in the audit trail are recordings from each Zoom interview. These interviews were conducted using the same interview protocol and questions. To bracket researcher bias during the study, personal reactions from interviews were documented on each Interview Protocol Guide (see Appendix B) and in a reflexive journal. This journal also included a list of ways in which participants mentioned smartphones were used during class, transforming the phenomenon from one I have personal experience and views toward to a tool that serves different purposes to different people. Some of these purposes include social interaction, games and entertainment, learning apps/videos, and quick communication for both emergencies and nonemergencies. Contents of the reflexive journal were reviewed prior to each interview, review of the transcripts, and interpretation of the data to remove researcher bias in an attempt to focus, objectively, on practical uses for smartphones during class.

Results

RQ1: What are teachers' perceptions of classroom norms for smartphone use?

Six themes emerged from the data. These themes offered insight into the complexity of what teachers perceive to be appropriate, as factors such as administrative support, classroom management, the student-teacher relationship, to name just three, influenced participants' experiences.

Theme 1: Discrepancy Between Teacher Beliefs About Student vs. Their Own Smartphone Use During Class

A common theme that emerged from the data is teacher/participants' use of their own smartphones during class. Although some said they were hypocritical to use when students cannot use theirs, others felt it was appropriate as parents and responsible adults.

P1 shared,

> I keep it out on my desk, charging only because if, and I know that you don't know the dynamics of my family, but my husband teaches three doors down, and one of my daughters is in fifth grade at my school, and the other is in first grade at my school.

Similarly, P2 explained,

> It's right next to me the whole time. I have it plugged in right next to me the whole time. I probably glance at it maybe once during the class, just to kind of, I don't know, I have two little kids. And I'm always just kind of like, I don't know if it's like the dad side of me that I'm always, like, on alert. Like, nothing's happened to them, right? OK, all right. You know, and if something happens with my wife, I'm nervous about that too. So, I usually check like once during class.

P3 also commented,

> And I'll say this, my kids never, my students never say to me, you're on your phone all the time. I mean, I'm not on it all the time. Or their, or they'll never say, well, how come you can check your text and we can't text or check ours? And, I would just say, well, I'm a dad. That's what I would say.

Moreover, P4 stated,

> But to me, the personal and the professional really blend together like, OK, I'm, doing school stuff outside of my contracted hours, on my own device, on my own internet. But, so I don't feel a whole lot of guilt about, like, sending my wife a text in the middle of the day about, like, who's going to pick up the kids or whatever.

Theme 2: Some Teachers Believe Smartphones Can Be Useful in the Classroom

Although some teachers identified student smartphone use as unnecessary during class, they were still believed to be useful at times. Some participants discussed their use in sharing resources, accessing information at the ready, and as a backup device when other devices were unavailable.

P4 shared,

> Now once again, I think, still some utility. So, I do…some QR code stuff. I do some like photo scavenger hunt stuff. All that's really useful to do with cell phones just because it's a really useful tool. I've had students like record stuff for, like, an interview, so once again trying to get the best utility of it as I can.

Similarly, P5 explained,

> I think that the phones actually would be encouraged under my guidance to be used in the classroom during the instruction, because I think that if we're always

> talking about individualizing education, and this whole generation is the cell phone user, so why not use that technology and get them engaged in the instruction, if that's the means?

P7 also commented,

> P7: So, I also find that, sometimes, it's faster for them because we have iPads, too. Sometimes it's almost faster and easier for them to do quick research on, let's say we're talking about content where...I'm teaching world history and, oftentimes, kids will come across a word or phrase that they're unfamiliar with that wasn't in the reading. I didn't define it in class. It may not be relevant to the historical context of what we're covering, but it is important for them to understand other stuff. I mean, I'd rather them look it up really quickly than ask 15 questions about, like, what does the word process mean? I'm like, go look it up. That's far quicker.

Subtheme: Smartphone Technology Enhances the Learning Process

Smartphone technology, such as apps and recording/conferencing capabilities were some ways in which smartphones enhance student learning and project development.

P2 shared,

> They have the answer to any question they want at their fingertips and I mean, it's happened before…we're talking about something that I don't know the answer to, I'll tell somebody, Hey, Google, what is the minimum price for a gift tax...just stuff like that…and just little things I don't know the answer to, right off the top of

> my head, I just ask one of them to Google it and it's, boom, it's done. We can move on and everybody knows the right answer.

Similarly, P3 explained,

> I'm aware of some survey apps that you can give your kids. You can ask some questions and get some immediate feedback through a number of different survey apps. I try to use those.

P5 also commented,

> And, so, when you wanted to include a student at home in a lab group…and then all of a sudden a bunch of kids would be absent and they would be online that you didn't anticipate would be online. And then you had to spend all this time before the instruction reassigning the groups. And it was not user friendly to make new groups on the fly. It took a long time. So at some point I gave up making the groups and I just allowed them to include their peer if they had an iPhone over FaceTime. So they would have the student right there looking at the experiment as it was being conducted. And they would watch the experiment and the reaction.

Moreover, P7 stated,

> We did a big newscast project this past year when students work in small groups and they got to record a news broadcasting segment, each student had a topic that they had to cover, and one group got really creative and actually used the TikTok app because it could record in small segments, and they could push it all together. And this app edited it for them. And they could use a green screen because I think the app embeds different kinds of backgrounds or other things that you don't get

> from other free applications on an iPad or on a computer. That was really cool. Like it was one of the best presentations I had. Like, use TikTok. And so they couldn't use their iPads for that. They had to use the phone and it worked perfectly.

Subtheme: Smartphones Are Useful When Alternate Devices Lose Power or Are Unavailable

Although some participants do not permit smartphones during class, some do identify these devices as useful when alternate devices are not charged or are left at home. P1 explained, "We had some kids that were doing stuff, like, if the Chromebook had died, they would do their work on their phone."

P2 shared,

> So, if a student's Chromebook is dead or let's say, just, they forgot it somewhere, they are able to access their cell phone to do their assignment. Because everything we do, or everything I do is through....we use the Google Suite just like I'm sure many other schools use Google Suite. So they, if they, obviously most of them, most of the phones have the capability of using Google Docs and Google Slides or something like that. So they can, actually, just not even miss a beat and use their cell phone right in class and follow along with what we're doing, what we're doing, or even submit assignments and everything like that.

Similarly, P3 explained,

> Well, I do like it because, I have to say, you know, the technology this year is Zooming which has been enough, but there have been years where kids will have

> their documents in their Google Drive and they're on their phone, and so I'm an, I'm a language arts teacher. I'm, I constantly have papers that I'm grading or that, or that they have received back from me all through Google classroom. Almost every one of those documents is saved in their Drive. So I could see a situation where occasionally a kid would want to check the document on their phone, on Google Drive, if their Google, if their Chromebook was not working or they didn't have their Chromebook. So that would be a place where I wouldn't have any problem with it.

Finally, P6 shared, "Every now and then I'll have a kid who cannot remember a computer. And so they have to do things on their phone. That's the only time I really allow the phone."

Theme 3: Teachers Believe They Have to "Pick Their Battles" Regarding Smartphone Use During Class

When describing their experiences with managing student smartphone use, teachers have expressed a need to "pick their battles", conflicted on whether enforcing the electronic device policy was part of their job.

P1 shared,

> They had less respect when I was inconsistent with it, then if I would have just been a phone Nazi from the very beginning. But sometimes I feel like, is that really my job? You know, like, in the big scheme of things, if the student comes in and he's not on it and he only has it on his book, on the floor, do I need to make a big deal out of it? So sometimes it's just really hard. It's really hard.

Similarly, P4 explained,

> So, I bought one of those, like, door things, kind of like hang and they are like a phone time out as a way to be like, hey, man, I told you, you don't get it. I try to use, in general, with classroom management…a three strikes and you're out approach. Like a verbal, and a verbal, and then, OK, now we need to have some sort of consequence.

Teachers were also conflicted on whether it was worth enforcing the policy, as doing so disrupts instruction. For example, P1 said,

> I feel like it takes away from the academics, because if I'm policing phones, if I'm lecturing about the Berlin Wall or whatever, and the student's got a cell phone, I got to stop doing what I'm supposed to be doing to tell him to put the phone away. So that takes me away from my primary role, which is to be an educator.

P4 explained, "And I tried to implement that with phones, but it was just so hard because, like, at a certain point I asked myself, how much time am I going to spend sort of trying to police?" In addition, P7 commented, "Over the year, like I said, it's just not worth the battle, in my opinion."

Theme 4: Teachers Feel They Need Support From Administrators, Colleagues, and Parents

Teachers shared the common attitude that support was necessary when enforcing the electronic device policy, including support from administrators, colleagues, and parents.

P1 shared,

> My first reaction is, I get kind of nervous because if it's not written down anywhere, like in a handbook or in some type of policy book, we have some very creative students and parents and community members who would kind of abuse that. Where does it say that? I know that I would have a couple of kids that would literally be on their cell phones the whole class, period, and they wouldn't pay attention, because where does it say that I'm not allowed to have a cell phone? It doesn't say that I have to have it in my locker.

Similarly, P2 explained,

> We could, as a school, just have a blanket policy. So, either I'm going to have to adapt and say, OK, absolutely no cell phones, or the other teacher is going to have to adapt and say, OK, well, I guess you can use your cell phone now, just as long as I don't directly need your attention.

P3 also commented,

> Well, the teachers would have to enforce it in their own classroom and then in the hallway...again, they're all over the hallway now. So, we would have to be told by our administrators that, look, we're cracking down. People have complained, there are issues. We would have to be coached through that with our administrators.

Moreover, P4 stated,

> I think that parents and coaches just text their kids with, or at least some, with no issue of like, oh, I might be interrupting their learning or like, this might distract them.

P8 also explained,

> It’s a rule that, like, sounds black and white and very simple, but I don't think it's enforced that way. And I wish more teachers would be stricter so that I didn't feel quite as much like a lone wolf...and I don't think I'm as much of a lone wolf as they say that I think as far as enforcement.

Subtheme: Teachers Need to Feel Supported by Administrators When Enforcing Smartphone Policy

Support was desired from administrators as the decision makers and developers of school-wide policies. Teachers felt they needed administrators to support them when they enforced the policy in their classrooms.

P2 shared,

> I do know that if the teacher does have a have a strict no cell phone policy, that our administration does back that teacher in, in saying, hey, look, you know, your teacher says no cell phones, you can't have a cell phone.

Similarly, P3 explained,

> I don't think I'd care much what the policy has to be as long as the teacher has some control in his or her classroom. And so as long as if I felt the kid was in violation of my own classroom rules, if I could get the kind of support I needed from the administration, then I'd be OK.

Moreover, P4 stated, “So, I do think if there was better district-level guidance...”

P5 also commented,

> They were hit or miss in supporting the teachers, so in that circumstance, they did back me up because I had stressed that I was a new teacher. I was concerned

> about the actual scene. Talk went throughout my other students in my other classes had heard about the incident. And so everybody was pretty much watching to see what was going to happen, to see if I was just blowing smoke or if I was the real deal. So, I had told the administration, as an older teacher, even though I was a first-year teacher, I insisted that there was some type of consequence for this.

Similarly, P6 shared,

> I would have a conversation with the kid at the end of class and say, here's why I took your phone. Here's what I want you to understand. I'm not doing it just to be a jerk. I'm doing this because you're learning is important to me, et cetera. If it happened again the next day, then I don't feel that I have a support system at my school. So I probably wouldn't do anything, just handle it on my own.

P8 also commented,

> And my policy is, the third strike I take the phone and give it to our dean/assistant principal, and I take it to his office. And depending on this situation...or depending on the time of day, so say it's in the morning I'll tell the student, you can pick this up from the dean at lunch; or if it's the end of the day, I'll ask you to get it after school. And I send him an email.

Subtheme: Teachers Need to Feel Supported by Colleagues and Parents When Enforcing Smartphone Policy

Teachers also identified the need to feel supported by colleagues in their efforts to enforce the electronic device policy and provide consistency for students.

P1 shared,

> It just becomes super inconsistent for the student. And so as a teacher, you're going to get a very inconsistent result from all your students unless you have that, that sort of blanket application of how you're going to use the technology.

Similarly, P2 explained,

> …we have a teacher who gets mad if they can see their cell phone in their pocket. And I'm like, it's in their pocket...why are you picking fights like this? Like you're getting them all mad and then they come to my class angry. Thanks a lot. It's not really helping the general cause out here.

Support was also desired from parents who text their children during the school day. Teachers also desire support from parents when electronic device policies are enforced during class.

P1 shared,

> But then a lot of parents don't seem to understand how distracting it is. A lot of times I'll get a ding in my room, and I'll be like, who is it? And they'll be like, I'm sorry. And they'll get their phone out and, oh, it's my mom. So, one time I even posted something on Facebook saying, parents don't text your kids in class. You know they're not supposed to have a phone. You shouldn't be texting them. Half the time, it's their parents contacting them.

Similarly, P3 explained,

> I know the teachers will say a lot when they threaten to take a phone away or tell the kid to put a phone away. Well, I got a text from my mom. I got a text from my dad. Well, your mom or dad knows where you are, and they also know they

should not be texting. Yeah, so that really doesn't cut a lot of, that doesn't help me out here when they have that excuse. But I'm not sure the answer.

Subtheme: School-Issued Electronic Devices Support Teachers' Efforts in Enforcing Electronic Device Policy During Class

Teachers from schools that distributed devices to all students (i.e., Chromebooks and iPads) felt that these devices made it easier to enforce the electronic device policy in their classrooms.

P2 shared,

> I think what our school is doing is pretty positive, especially because our, our district kind of encourages it by handing out Chromebooks to students free of charge.

Similarly, P3 explained,

> I think that it might be fun if there were things we could do on their cell phone that were academic, but I think in general, we can do all those things on their Chromebook anyway, and so it would just sort of a gimmick.

P7 also commented,

> …the kids are required to have their iPads with them every single day, it is supposed to be charged, it is supposed to be accessible. And really, they're supposed to use that as their main tool of everything. I mean, they were literally encouraged to even write notes and take tests on their iPads to the best of their ability or on another app.

Theme 5: Teachers Value Classroom Management

A common theme discussed during interviews was the importance of classroom management. Although no interview questions addressed classroom management, specifically, it was often expressed as an important value to participants.

P2 shared,

> I've always kind of had a policy, like, in my class where if I am…like, direct teaching…if we're going over a set of notes or if we're having, like, a discussion on something, that I require the cell phones to be put away.

Similarly, P6 explained,

> I would have a conversation with the kid at the end of class and say, here's why I took your phone. Here's what I want you to understand. I'm not doing it just to be a jerk. I'm doing this because you're learning is important to me, et cetera.

P7 also commented,

> I just make a comment at the beginning of the school year that says, hey, guys, like, I'm not going to sit here and take your phones away. However, I'm going to tell you there is an appropriate time to use that. There's inappropriate times. And so, if you'll just give me your attention and give me your respect when I'm up in the front of the room…

Subtheme: Teachers Feel Classroom Management Is Necessary When Enforcing Electronic Device Policy

Classroom management was discussed in terms of enforcing electronic device policies in the classroom. Teachers expressed ways in which they manage student

smartphone use and, collectively, believe classroom management is most effective when enforced consistently.

P1 shared,

> Whereas a teacher across the hall, she was on it, like, all the time, you know? And so they didn't risk it in her class because they knew they were going to get busted in my class. It was kind of like a gamble because they didn't know if I was going to enforce it or not. And that really kind of opened my eyes, too, because I'm just like, yeah, I have to either, I'm either all in or all out, you know?

Similarly, P3 explained,

> If you set the norms, you're not competing against them…if you make it loosy goosy and you say, hey…I'm only going to say something about your phone if it's a concern or you can take your phone out when you're done with your work. No, I would never say that. I just think that's a good idea because then I think you are competing. And I don't want to. I don't want a kid to hurry through her work because she wants to get her cell phone out.

P4 also commented, “But I also try to build in times where they are allowed to use their phone. So, I do like a question of the day to take attendance and sort of build classroom culture and get to know students.”

Moreover, P5 stated,

> I guess it would depend on the teacher's ability to manage the class. If you were a strong...discipline is not an issue in my class. It's just not. I think you build that rapport and you have that respect that's just a given.

P6 shared,

> If you have a clear policy and the kids understand it and they see that it is enforced, they feel safer, they feel like they can just engage in their learning, knowing that none of the other kids...that there's something happening on social media during class that they aren't part of right now.

P8 also stated, “I still have students sometimes have them out, and I've also gotten a little older and more confident in my classroom management.”

Subtheme: Teachers Feel Their Classrooms Are More Difficult to Manage Because of Smartphones

As a result of the popularity of smartphones and number of adolescents who carry them throughout the school day, teachers feel it is now more difficult to manage their classrooms and student use of these devices.

> P1 shared, “And so, we have kids that were doing TikToks in class. We had kids who were watching Netflix in class.”

Similarly, P4 explained,

> But the policing has become really hard…so I bought one of those, like, door things you kind of like hang, and they are like a phone time out as a way to be like, hey, man, I told you, you don't get it. I try to use, in general, with classroom management, sort of like a three strikes and you're out approach. Like a verbal, and a verbal, and then, OK, now we need to have some sort of consequence.

P6 also commented, “I would find kids like having them, you know, under their desks when they think I can't see them or in their laps. When they think I can't see them.”

Moreover, P8 stated, “So, in some ways, it's gotten harder to enforce because they become more of an ingrained part of culture.”

Theme 6: Teachers Value Their Relationships With Students

Building relationships with students was also an important value for teachers. While some participants felt that permitting students to use smartphones was a form of trust that strengthens the student-teacher relationship, others discussed students’ need for boundaries and structure in the classroom.

> P3 shared, “And in the beginning, especially because they're seniors, I'm like, hey, if you do need to...if your boss calls you or sends you a text or, you know, your coaches, whatever, like, that's OK.”

Similarly, P5 explained,

> I think that....if you create boundaries of when it's acceptable and when it's not and you, as a teacher, show that you're trying to incorporate it and meet that generational need into your curriculum, then I think your relationship with the students is much more positive. If you walk in and it's automatic, no cell phone, I don't think it's as positive.

P6 also commented,

> I did do the thing where you make all the kids, like, put their cell phones, you know, on your desk or something during class. And I don't know, I never really was comfortable with that because I just, I don't know, I don't like to do things that imply mistrust unless someone gives me a reason to mistrust them.

Moreover, P7 stated,

> I'll say, you know what, we've got five minutes left of class. Do what you want. I always tell them, I'm like, you're going to have time eventually to respond. Like, just wait it out. You're going to be fine. They're going to be fine. They're in class, too. So, I think for me it really, more than anything, it's very much about that building of the relationship, building the trust and respect between the two parties.

Summary

This study addressed teacher perceptions of appropriate norms for smartphone use during class. Eight high school teachers from Ohio, Pennsylvania, and North Carolina were interviewed. Most participants taught humanities while one taught STEM. Interviews took place via Zoom due to national social distancing guidelines set to mitigate the spread of COVID-19.

Six themes emerged from the data. The first theme identified a discrepancy between how teachers feel about students using their smartphones during class and how they feel they should use their smartphones while teaching. This was often due to being a parent and being able to communicate with one's family during the day to ensure they were safe.

P1 claimed,

> I keep it out on my desk, charging only because if, and I know that you don't know the dynamics of my family, but my husband teaches three doors down, and one of my daughters is in fifth grade at my school, and the other is in first grade at my school.

P2 also commented, “I have it plugged in right next to me the whole time. I probably glance at it maybe once during the class, just to kind of, I don't know, I have two little kids.” P3 would be comfortable sharing with students their reason for using the device if asked: “Or they'll never say, ‘Well, how come you can check your text and we can't text or check ours?’ And, and I would just say, ‘Well, I’m a dad’, that's what I would say,” while P4 believed the amount of time working after hours balances the time spent texting during the workday:

> I'm doing school stuff outside of my contracted hours, right, on my own device, on my own internet. But, so I don't feel a whole lot of guilt about, like, sending my wife a text in the middle of the day about, like, who's going to pick up the kids or whatever.

Participants also believed there were benefits of using smartphones during class to enhance learning. An example of this is the use of a smartphone to quickly answer content-related questions as explained by P2, “They have the answer to any question they want at their fingertips,” while P3 used a smartphone app to quickly collect information from students: “You can ask some questions and get some immediate feedback through a number of different survey apps.” Participants also identified smartphones as helpful when teaching hybrid during COVID-19, with P5 allowing them “to include their peer if they had an iPhone over FaceTime. So, they would have the student right there looking at the experiment as it was being conducted. And they would watch the experiment and the reaction.” Smartphones were also beneficial when other electronic devices were not

charged or were left at home, as P2's students would "not even miss a beat and use their cell phone right in class and follow along with what we're doing."

Participants believed they had to "pick their battles" regarding smartphone use during class, with P1 asking, "Is that really my job?" Or, after trying to implement a shoe rack for students to place phones in at the start of class, P4 shared, "it was just so hard" and asking oneself, "How much time am I going to spend sort of trying to police?" After trying to enforce smartphone use during class, P7 came to the realization that "it's just not worth the battle," with P1 having to stop what they were "doing to tell him to put the phone away. So that takes me away from my primary role, which is to be an educator"

Participants felt they needed support from administrators, colleagues, and parents in enforcing electronic device policies. Regarding support from administration, some participants, like P4, felt they needed "better district-level guidance" with P6 expressing "I don't feel that I have a support system at my school." However, P8 felt supported when enforcing their policy against smartphones and comfortably telling students, "You can pick this up from the dean at lunch." Support from colleagues was also important in enforcing the electronic device policy, as participants, such as P1, worried about getting "very inconsistent results from all your students unless you have that, that sort of blanket application of how you're going to use the technology." Parent support is important when enforcing the electronic device policy as well, as P3 had to explain to students that "…your mom or dad knows where you are, and they also know they should not be texting." However, P7 felt supported when schools issued electronic devices to all students, as it was clear that "they're supposed to use that as their main tool of

everything," reducing the chance that students will try to use their smartphones during class.

A fifth theme that emerged from the data was the value participants placed on classroom management. P6 believed that students benefit from structure by stating, "If you have a clear policy and the kids understand it and they see that it is enforced, they feel safer, they feel like they can just engage in their learning." Other participants, such as P4, tried to "build in times where they are allowed to use their phone," understanding that students are drawn to their phones when told they cannot access them. As some participants get older they become "more confident in my classroom management," as stated by P8, while P3 believed that, at any age, "If you set the norms, you're not competing against them." P4 explained, "As popularity in smartphone use increases, "policing has become really hard," with P8 stating that smartphones have "become more of an ingrained part of culture." Participants also value their relationships with students, with P5 explaining,

> If you create boundaries of when it's acceptable and when it's not and you, as a teacher, show that you're trying to incorporate it and meet that generational need into your curriculum, then I think your relationship with the students is much more positive.

P3 believed that upperclassmen should be given more freedom, "especially because they're seniors" with P6 also explaining they "don't like to do things that imply mistrust unless someone gives me a reason to mistrust them." Moreover, P7 stated, "It's very

much about that building of the relationship, building the trust and respect between the two parties."

Ultimately, there is no simple answer for what teachers perceive to be appropriate norms for smartphone use during class. Regardless, if the electronic device policy is clearly defined and does not permit smartphone use, is determined by the teacher's discretion, or is lenient or nonexistent, teachers need to feel supported by administration and parents and the policy needs to be consistently enforced by colleagues to be effective. Otherwise, the student-teacher relationship may be negatively impacted, and teachers may begin "picking their battles" to regain a trusting relationship.

Chapter 5 addresses interpretations of these results as they relate to the value-focused thinking framework. It will also provide strengths and limitations of this study. Recommendations for future research will also be discussed as a means creating positive social change.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to explore teacher perceptions of appropriate norms for smartphone use during class. The study addressed a gap in the literature by providing insight into how in-class smartphone use is perceived by teachers, as they are responsible for delivering curricula while also managing student behavior. Although researchers have argued that students' access to a smartphone during class creates distractions that impair the ability to learn (Ali, 2018; Carcelén et al., 2019; Labăr & Ţepordei, 2019; Siebert, 2019), the increased popularity of smartphone use, integration of technology in the classroom, and relaxed electronic device policies make smartphone use difficult to enforce (Gutiérrez-Puertas et al., 2020; Morris & Sarapin, 2020).

The choice of qualitative research was appropriate for capturing teachers' experiences with student smartphone use during class along with their own interactions with smartphones while teaching. IPA was used to understand how participants make meaning of their experiences, and data were collected through semistructured, open-ended interviews to explore participants' perceptions of appropriate smartphone use in a high school classroom (see Cuthbertson et al., 2020; Yin, 2003).

Summary of Key Findings

Six themes emerged from the data. First, there was a discrepancy between teacher beliefs about student versus their own smartphone use during class. Although participants who prohibited students from using smartphones during class believed it was hypocritical to engage with their own devices, some who are parents felt the need to have their smartphones handy in case of an emergency. Further, many teachers believed that

smartphone use was unnecessary during class, but felt they were useful for sharing resources, accessing information at the ready, and as backup devices when students' primary devices were unavailable. Most participants reported having to "pick their battles" when managing student smartphone use during class, conflicted as to whether it was worth stopping class to remind students to put their smartphones away and, if they did, risking potential backlash from students and parents. Also, participants wondered if continuously enforcing the electronic device policy should even be a requirement of their jobs or if administration should have stricter policies in place that do not interfere with classroom instruction. Participants believed that support from administrators, colleagues, and parents was necessary in their efforts to manage off-task smartphone use, with those working at schools that issue electronic devices to all students feeling more confident in their ability to enforce electronic device policies. This school-wide program sets a norm for all students, as they are expected to have these devices charged and ready for class and serve as the primary device during instruction. All participants valued classroom management and felt that the increased popularity of smartphones make managing their classrooms more difficult, stating that managing students' smartphone use was most effective when policies were consistently enforced. All participants also valued their relationships with students, with some believing that permitting student smartphone use was a way to provide trust and strengthen the student-teacher relationship, while others discussed building trust by enforcing students' need for boundaries and structure in the classroom.

Interpretation of Findings

Research Question

Teachers' perceptions of classroom norms for smartphone use were explored through participants' firsthand experiences. Using the value-focused thinking framework, both student and teacher smartphone use was explored from the perception of the participant responsible for meeting curricular standards while managing classroom behavior. The interpretation of findings is organized by theme, with the fifth and sixth themes identified as participant values per Keeney's (1992) value-focused thinking framework and Saldaña's (2021) value coding method.

Theme 1: Discrepancy Between Teacher Beliefs About Student vs. Their Own Smartphone Use During Class

Although Burns and Lohenry (2010) argued that teacher smartphone use may distract students during class, participants still felt the need to have their devices available. In this study, participants' classroom smartphone use depended on family dynamics, such that being a parent had an influence on whether their devices were used to communicate during class and/or remained on their desks. Some participants who prohibited student smartphone use felt it was hypocritical to engage with their own devices, exhibiting feelings of discomfort in knowing they should model appropriate classroom behavior. These findings support Burns and Lohenry, who found that teachers are also guilty of responding to incoming text messages or phone calls while teaching. Some participants justified their use as a means of balancing the amount of time spent working after hours. For instance, P4 stated, "I'm doing school stuff outside of my

contracted hours, on my own device, on my own internet…so I don't feel a whole lot of guilt about, like, sending my wife a text in the middle of the day." As suggested by Cho and Lee (2016), these findings may impact whether students comply with electronic device policies after observing the way others engage with their devices. Most participants who are parents felt it was necessary to have access to these devices during class, providing a sense of comfort in knowing their families were safe. P3 explained, "Or they'll never say, 'Well, how come you can check your text and we can't text or check ours?' And I would just say, 'Well, I'm a dad.'" These findings further research by Ruiz-Palmero et al. (2019), who recommended training for teachers on the implications of their own smartphone use during class.

Theme 2: Some Teachers Believe Smartphones Can Be Useful in the Classroom

Although Demirbilek and Talan (2018) argued against the use of mobile technology during class, most participants believed smartphones would enhance student learning. These findings contradict previous researchers who argued that the risk of smartphone distractions outweighed the benefits as even those who did not permit these devices agreed that they can be useful when other devices are not available (Ali, 2018; Carcelén et al., 2019; Celikkalp et al., 2020; Flanigan & Kiewra, 2018; Glass & Kang, 2019; Gutiérrez-Puertas et al., 2020; Hashmi et al., 2019; I. Kim et al., 2019; Labăr & Ţepordei, 2019; Pan et al., 2018; Prasad et al., 2017; Schneider, 2018; Siebert, 2019). Thus, two subthemes also emerged: smartphone technology enhances the learning process and smartphones are useful when alternate devices lose power or are unavailable.

When school-issued devices were left at home or uncharged, participants relied on students' smartphones as a means of following along with the lessons, continuing their research, or completing and submitting assignments. Google Docs and Google Slides were discussed multiple times as useful when students must use their smartphones during class, as work is automatically saved and can be accessed on any electronic device. Consistent with Godwin-Jones (2011), participants in this study discussed the utility of smartphones for sharing course resources, using QR codes to record attendance and restroom breaks, enabling students to access information at the ready, or as a more efficient tool for completing in-class projects. P2, who supported smartphones as a learning tool, believed that "they have the answer to any question they want at their fingertips and…we can move on and everybody knows the right answer." However, these participants' feelings contradicted McGloin et al. (2017), who cautioned teachers about allowing students to use smartphones during class, finding that off-task behavior was more likely to occur with these addictive devices than with laptops.

Notwithstanding studies arguing that smartphones impair learning, findings from this study support researchers who have advocated for their use during class as a learning tool (Aljaloud et al., 2019; Bolatli & Korucu, 2020; Boldizsár, 2018; Cabero-Almenara et al., 2019; Dunn et al., 2012; Jiménez-Crespo, 2015; Kenwright, 2009; C.-C. Lee, Hao, et al., 2019; Martínez-Garrido, 2018; Nicolas & El-Aly, 2018; Pinter & Cisar, 2019; Rana & Dwivedi, 2017; Scheidet, 2003; Shadiev et al., 2015). Many participants engaged students with learning apps and mobile websites, with the aim of increasing student interest and achieving mastery. For example, because TikTok enables students to edit

their work and use a green screen, P7 shared that the group who used TikTok created "one of the best presentations I had." However, some teachers prohibit smartphone use, yet find these devices useful when other devices are unavailable. P6 commented, "Every now and then I'll have a kid who cannot remember a computer. And, so, they have to do things on their phone. That's the only time I really allow the phone." These findings support research by Burgess and Murray (2014), Godwin-Jones (2011), Golding et al. (2012), Mifsud et al. (2013), and Scheidet (2003).

Theme 3: Teachers Believe They Have to Pick Their Battles

Due to the frequency of student smartphone use during class, participants in this study felt they had a difficult time deciding whether to stop instruction to address off-task smartphone behavior. Most participants agreed that multitasking with smartphones impedes learning (see Kelly, 2004; Lepp, Barkley, & Karpinski, 2015), and students have a hard time resisting smartphone distractions (Hawi & Samaha, 2016; Jacobsen & Forste, 2011; Junco & Cotten, 2011, 2012; Lepp, Barkley, & Karpinski, 2015; Karpinski et al., 2013; Kirschner & Karpinski, 2010; Rosen et al., 2013; Thomée et al., 2011; Winskel et al., 2019; Wood et al., 2012). However, some participants wondered to what extent it was their job to frequently address student smartphone use during times they are busy delivering curriculum. P4 explained trying "to implement that with phones, but it was just so hard because, like, at a certain point I asked myself, how much time am I going to spend sort of trying to police?" and when contemplating whether to enforce the smartphone policy P7 decided that "over the year, like I said, it's just not worth the battle, in my opinion." Like previous research, most participants discussed students' inability to

retain information when engaging with smartphones during instruction, with some participants fearing that addressing this behavior may impair the student-teacher relationship and others believing that administration is responsible to impose penalties for students who refuse to follow school-wide policies (see Adler & Benbunan-Fich, 2013; Junco & Cotten, 2012; Karpinski et al., 2013; Loh & Kanai, 2016; Rosen et al., 2013). These remarks supported Morris and Sarapin (2020), who found that while 77% of teachers wished to enforce electronic device policies, 91% of teachers who work in schools that permit smartphone use felt they had to create their own policies without the help of their department or administration.

Theme 4: Teachers Feel They Need Support From Administrators, Colleagues, and Parents

The following three subthemes also emerged: (a) teachers need to feel supported by administrators when enforcing smartphone policy, (b) teachers need to feel supported by colleagues and parents when enforcing smartphone policy, and (c) school-issued electronic devices support teachers' efforts in enforcing electronic device policy during class. Consistent with findings by Flanigan and Kiewra (2018), Morris and Sarapin (2020), and Stephens and Pantoja (2016), most participants in this study tried to enforce the electronic device policy in their classrooms but desired more support from administrators, colleagues, and parents in their efforts to prevent students from succumbing to the constant distractions that occur when smartphones are present. Given the history of research arguing against media multitasking and its detriment to information storage and retrieval, participants who prohibited smartphone use had a

difficult time understanding the lack of support received when enforcing the policy in the classroom (see Cain & Mitroff, 2011; Carrillo & Subrahmanyam, 2014; Marois & Ivanoff, 2005; Mayer & Moreno, 2003; Monsell, 2003; Ophir et al., 2009; Wood et al. 2012), as well as its impairment to learning (Bowman et al., 2010; Burak, 2012; Ellis et al., 2010; Hawi & Samaha, 2016; Samaha & Hawi, 2016; Strayer et al., 2011; Uzun & Kilis, 2019; Wentworth & Middleton, 2014). Participants in the current study expressed frustrations toward administrators' lack of (a) clarity in defining the electronic policy in the handbook, (b) district-level guidance in how to effectively enforce the policy, (c) consistency in supporting their efforts to enforce the policy, or (d) administrative support in general.

Participants in the current study agreed with Uğur and Koç (2015), who argued that student smartphone use during class will continue until administrators are willing to establish school-wide policies and ban smartphone use altogether. Regardless of research suggesting that the simple presence of a smartphone makes its use irresistible to adolescents, some participants still provided students the freedom to practice self-control (see Carcelén et al., 2019). I. Kim et al. (2019) and Wei et al. (2012) also found that students engaged with smartphones for at least part of class time, arguing that these devices will continue to be a distraction unless teachers regulate their use during class. Most participants were employed at schools that issue every student an electronic device, such as an iPad or Chromebook, to be used during class. Participants from these schools felt supported by the presence of these school-issued devices, as they made the electronic

device policy easier to enforce because students were clear about what they should be using during class.

In support of Hart's (2019) findings that parents compound the problem of student smartphone use by contacting their children during the school day, participants also felt that parents exacerbated off-task smartphone behavior. Some participants felt parents had little to no regard of how distracting their communication with students was during class time; however, cellphone contact with their children may have been influenced by parents' perception that smartphones are a tool for communication and safety (see "Cell phones," 2005). Regardless, these parent-driven excuses for students' off-task smartphone use left participants frustrated, expressing difficulty in bringing students' attention back to their learning. Participants also reported the importance of colleague support in enforcing electronic device policies, believing that teachers' inconsistency creates confusion and a lack of structure for students. P1 asserted, "It just becomes super inconsistent for the student" and that "you're going to get a very inconsistent result from all your students unless you have that, that sort of blanket application of how you're going to use the technology." Previous studies also found that teachers believe these policies are useful in minimizing the constant distractions, task-switching, and cyberslacking students experience when having access to their smartphones, strengthening students' ability to delay gratification and regulate their behavior (Flanigan & Kiewra, 2018; Morris & Sarapin, 2020; Stephens & Pantoja, 2016). These findings are also supported by Burns and Lohenry (2010) and Celikkalp et al. (2020), who argued that administrators should inform all stakeholders of the risks and benefits of smartphone use

during class, especially as it pertains to excessive and off-task behavior. Providing an understanding of these risks may encourage administrators to enforce the blanket electronic device policies desired by participants in this study to minimize inconsistencies among colleagues and encourage parents to limit contact with students during class time.

Theme 5: Teachers Value Classroom Management

The fifth and sixth themes were identified as participant values. Saldaña's (2021) value coding method was used to identify these values and aligned with this study's theoretical framework (i.e., value-focused thinking; Keeney, 1992). Interpretations of these findings are organized by theme. There were also two subthemes: Teachers feel classroom management is necessary when enforcing the electronic device policy and teachers feel their classrooms are more difficult to manage because of smartphones.

Although no interview questions addressed classroom management, this was often discussed by participants as a key factor in their effort to minimize off-task smartphone use. Even when enforcing electronic device policies, participants felt that the increased popularity of smartphones added a layer of difficulty when managing their classrooms, as students were often caught using their devices for nonlearning activities, thus supporting the argument that off-task smartphone use during class continues to be increasingly problematic (see Flanigan & Kiewra, 2018; Gutiérrez-Puertas et al., 2020; Morris & Sarapin, 2020; Siebert, 2019). Although participants recognized the value of incorporating technology for pedagogical use, they became frustrated and disappointed in students' lack of respect when engaging with their smartphones during class, findings that were similar to Morris and Sarapin (2020). During instruction, participants

frequently caught students engaging with smartphones under their desks; more overt off-task behavior often took place during independent work time as students watched Netflix or created Snapchats and TikToks. P6 stated, “I would find kids like having them, you know, under their desks when they think I can’t see them or in their laps.” Similarly, P1 commented, “We have kids that were doing TikToks in class. We had kids who were watching Netflix in class.” This frequent engagement with entertainment and social media apps impaired students’ work completion, findings that support the argument that students have difficulty regulating behavior (Junco & Cotton, 2011) and demonstrating effective executive functioning skills (Martín-Perpiñá et al., 2019) in the presence of smartphones.

Understanding that classroom management is difficult to achieve without setting clear expectations at the start of the school year, most participants communicated norms on what they expected, in hope to minimize off-task smartphone behavior.

P7 explained,

> I just make a comment at the beginning of the school year that says…I'm not going to sit here and take your phones away. However, I'm going to tell you there is an appropriate time to use that. There's inappropriate times. And so, if you'll just give me your attention and give me your respect when I'm up in the front of the room.

Although expectations were discussed at the start of the year, participants still had a difficult time managing student smartphone use, inconsistently enforcing the electronic device policy during class. These findings support claims by Berry and Westfall (2015)

and Stachowski et al. (2020) that students perceive policies as ineffective when teachers have difficulty enforcing them.

Some participants also supported Morris and Sarapin (2020) and Schneider's (2018) belief that teachers should coach students on how to effectively manage smartphone use, choosing not to ban these devices from class and use these off-task behaviors as opportunities to help students understand boundaries.

P6 stated,

> If you have a clear policy and the kids understand it and they see that it is enforced, they feel safer, they feel like they can just engage in their learning, knowing that none of the other kids...that there's something happening on social media during class that they aren't part of right now.

However, as Schlehofer et al. (2010) found, participants in this study also witnessed a sense of overconfidence from students in their ability to effectively multitask during class. Thus, some participants thought that a more beneficial method for coaching students on appropriate smartphone use was to set aside specific times for them to check their devices. These built-in smartphone breaks minimized students' off-task smartphone use as well as the tendency to fidget, doodle, or speak out of turn that often occurs when students are forced to pay attention for extended periods of time (Kercood & Banda, 2012). Similar to Morris and Sarapin's (2020) findings, most participants in this study expected older students to regulate their smartphone behavior.

Theme 6: Teachers Value Their Relationships With Students

As with Theme 5, participants were not directly asked to describe the importance of the student-teacher relationship in managing smartphone use during class. However, they frequently discussed the need to build and maintain positive relationships with their students, identified as the second key value. Regardless of the electronic device policy, some participants felt that permitting smartphones during class implied that students were trusted and respected, oftentimes wondering if it was necessary to force students to keep smartphones out of sight if they were practicing self-control. These findings support Carcelén et al. (2019) who found that teachers allowed students to have smartphones in class with the expectation that they would maintain self-control and avoid engaging with these highly addictive devices. Some participants worried that enforcing the policy jeopardized the student-teacher relationship, supporting previous findings indicating that teachers whose policies were perceived as strict or discouraging were viewed disfavorably by students (Ledbetter & Finn, 2015), especially policies that limited use of electronic devices (W. Baker et al., 2012):

> P5 shared,
>
> I think that....if you create boundaries of when it's acceptable and when it's not and you, as a teacher, show that you're trying to incorporate it and meet that generational need into your curriculum, then I think your relationship with the students is much more positive. If you walk in and it's automatic, no cell phone, I don't think it's as positive.

Some participants felt that permitting smartphones during class implied that students were trusted and respected, while those who prohibit their use were trying to build trust by providing structure and boundaries. The latter finding supports Roberge and Gagnon (2014) who found that enforcing smartphone policies results in teachers being perceived as more favorably as they perceive the teacher as caring and their courses as valuable (Finn & Ledbetter, 2013; Lancaster, 2018; Morris & Sarapin, 2020; Roberge & Gagnon, 2014). Other participants shared this belief and prohibited in-class smartphone use to provide structure and help students feel safe and cared for. Providing this structure also supports previous studies that encouraged teachers to enforce stricter electronic device policies to limit distractions for peers of those who inappropriately use smartphones during class (Gutiérrez-Puertas et al., 2020; Roberge & Gagnon, 2014; Stachowski et al., 2020). On the other hand, Morris and Sarapin (2020) found that some participants preferred not to enforce electronic device policies with older students to help them learn how to regulate their behavior. Regardless, these findings suggest a need to acknowledge how teachers, as one stakeholder, are affected by in-class smartphone use prior to developing an electronic device policy and to avoid negatively impacting school culture (Chan & Ross, 2014).

Limitations

This study included several limitations. As with qualitative research, findings do not represent the broader population due to the small sample size (Morrow, 2005). As the only researcher, I was limited in the number of interviews I was able to conduct throughout the duration of this study. COVID-19 limited the ability to interview

participants in person, which made it difficult to determine all significant, nonverbal reactions. Conducting interviews via Zoom also presented some Wi-Fi connectivity issues, which interrupted the flow of the conversation with some participants. It was also impossible to ensure participants chose a private space in which to conduct interviews. Participant demographics, such as age or specific courses taught, were not collected, which would have enriched the data by exploring the experience of classroom smartphone use among participants of different ages teaching a variety of courses.

Recommendations

Findings from this study yield several recommendations for further research. First, it is recommended that this study is recreated using in-person interviews to avoid limitations caused by conducting interviews via Zoom. To generate similarities and differences in values among different stakeholders, similar studies on perceptions of appropriate norms for smartphone use with parents, students, and administrators using the value-focused framework are recommended. These results would serve as a foundation for developing an effective school-wide electronic device policy that aligns with the community's values. Students are an important stakeholder, because policies perceived as too strict are likely to create negative feelings and increase noncompliance (Ledbetter & Finn, 2015). Administrators are an important stakeholder, as it would be beneficial to understand the support provided for teachers as they enforce the school's electronic device policy along with challenges administrators face when there is pushback from parents.

Because parents are also a key stakeholder in supporting school-wide policies, it is recommended that future research explores their expectations when texting children during the school day. For example, it will benefit all stakeholders to understand if parents expect their children to respond immediately to messages or if they expect them to only read and respond during authorized times. Knowing this may lessen the pressure that (a) students feel when parents call or text, (b) teachers feel when students use parents' texts as an excuse to engage with their smartphones, and (c) administrators feel about supporting teachers who enforce electronic device policies during class. Further research is also needed to solicit students' attitudes toward teacher smartphone use during class when these devices are prohibited; this research would enhance understanding of the impact teacher behavior has on students' motivation to abide by electronic device policies. Although participants' justification for using their smartphones was to be available in case of an emergency, these results may inform teachers of the counterproductive effect that their smartphone use has on classroom management and the student-teacher relationship.

Implications

As a result of this study, one implication for positive social change is an understanding that a school's electronic device policy does not alone suffice in the classroom. Teachers have a variety of experiences with student smartphone use, some who appreciate these devices for their utility and others who believe they have no purpose in the classroom. These findings suggest that administrators engage in discussions with teachers to develop norms across faculty, either as a whole group, by

department, or by grade level. Otherwise, teachers may continue to feel a lack of support from their colleagues, negatively impacting the academic environment. If funds are available, providing students with iPads, Chromebooks, or other school-issued devices decreases smartphone use during class and provides more structure and consistency to technology-rich classrooms.

Results from this study can inform parents of the challenges teachers face when they communicate with their children during class, knowledge that would be beneficial for administrators to share at beginning-of-year parent information sessions. These findings also educate administrators on the value that teachers place on classroom management and positive student-teacher relationships, enabling them to develop clear policies that limit ambiguity and decrease teachers' feelings of having to "pick their battles" during instruction. Further, these findings suggest that administrators provide training for teachers on how to coach students to use smartphones appropriately. This training may include classroom activities (e.g., attendance, *question of the day* activities, etc.), that can be incorporated into the class and satisfy students' need to engage with their devices. It may be beneficial for teachers to build in short breaks during class to check devices and satisfy students' compulsion to remain connected. Although this study focused on smartphone use during class, findings are applicable to other policies that relate to classroom management or the student-teacher relationship and should be considered by administrators.

Conclusion

This qualitative study explored high school teachers' perceptions of appropriate norms for in-class smartphone use. Using the value-focused thinking framework, six themes emerged from the data, two of which were identified as participant values. Despite the benefits of having access to smartphones for the purpose of utility and pedagogical use (Morris & Sarapin, 2020), current research warns teachers that the risks of allowing students to engage with their devices outweighs the benefits (Celikkalp et al., 2020; Gutiérrez-Puertas et al., 2020; Hashmi et al., 2019; Labăr & Ţepordei, 2019; Siebert, 2019). Not only do adolescents overestimate their ability to multitask (Schlehofer et al., 2010), they are unable to maintain attention because of the compulsion to check their smartphones during class (Baturay &Toker, 2016; Hsiao et al., 2017; Rozgonjuk, Saal, & Taht, 2018; Samaha & Hawi, 2016).

Regardless of a school's electronic device policy, there is a lack of consistency in how colleagues enforce smartphone use in their own classrooms, leaving those who wish to limit smartphone use worried that the student-teacher relationship will be negatively impacted. Parent communication with students during class compounds this problem, as students are often caught engaging with their devices to respond to a parent phone call or text. However, teachers who are parents share in this desire to communicate with their families, as most of them have their own smartphones at the ready in case of an emergency.

Participants expressed a desire for administrator support through district-wide training on managing smartphones during class, as well as enforcement of a blanket

electronic device policy that is not based on teacher-discretion; however, other participants wished for a policy that enables them to have control of their own classrooms. Participants also expressed a need to feel supported by colleagues in their efforts to manage smartphone use, experiencing increased difficulty when colleagues do not enforce electronic device policies consistently. This may be due to school-wide policies that are based on teacher-discretion or teachers with different philosophies who wish to make classroom policy autonomously. Without this policy written in a student handbook, participants worried that students would push back and, if consequences for continued smartphone use were enforced, teachers fear they would not be supported by administrators. Having a documented policy also provides participants with common language when asking parents not to text students during class time.

The two themes that emerged as participant values, teachers value classroom management and teachers value their relationships with students, were difficult for some to achieve due to the constant pressure to police smartphone use during class, time that is taken away from classroom instruction. In fact, some participants posed questions as to whether it is even their jobs to police smartphone use. Further, participants were nervous about not enforcing these policies, some of which questioned their ability to effectively manage their classrooms. However, participants also know that, by not addressing these behaviors, students will continue to engage in media multitasking which is linked to deficits in executive functioning (Martín-Perpiñá et al., 2019), preventing the deep learning necessary to retain information (Rozgonjuk, Saal, & Taht, 2018). Administrators have an opportunity to support their teachers by engaging in discussions about their

values and developing electronic device policies that not only align with the school's faculty culture but prevent students from becoming distracted by their devices to ensure they receive a quality education.

References

Abel, J. P., Buff, C. L., & Burr, S. A. (2016). Social media and the fear of missing out: Scale development and assessment. *Journal of Business & Economics Research, 14*(1), 33-44. https://doi.org/10.19030/jber.v14i1.9554

Adler, R. F., & Benbunan-Fich, R. (2013). Self-interruptions in discretionary multitasking. *Computers in Human Behavior*, *35*, 64-78. https://doi.org/10.1016/j.chb.2013.01.040

Alase, A. (2017). The interpretative phenomenological analysis (IPA): A guide to a good qualitative research approach. *International Journal of Education and Literacy Studies*, *5*(2), 9–19. https://doi.org/10.7575/aiac.ijels.v.5n.2p.9

Ali, L. (2018). The influence of information technology on student's behavioural nature in the classroom. *Asian Journal of Education and Training*, *4*(2), 102–107. https://doi.org/10.20448/journal.522.2018.42.102.107

Aljaloud, A., Gromik, N., Kwan, P., & Billingsley, W. (2019). Saudi undergraduate students' perceptions of the use of smartphone clicker apps on learning performance. *Australasian Journal of Educational Technology*, *35*(1), 85–99. https://doi.org/10.14742/ajet.3340

Al-Menayes, J. J. (2015). Social media use, engagement, and addiction as predictors of academic performance. *International Journal of Psychological Studies, 7*(4), 86-94. https://dx.doi.org/10.5539/ijps.v7n4p86

Alt, D., & Boniel-Nissim, M. (2018). Links between adolescents' deep and surface learning approaches, problematic internet use, and fear of missing out (FoMO).

Internet Interventions-The Application of Information Technology in Mental and Behavioural Health, 13, 30–39. https://doi.org/10.1016/j.invent.2018.05.002

Amankwaa, L. (2016). Creating protocols for trustworthiness in qualitative research. *Journal of Cultural Diversity*, *23*(3), 121–127.

American Academy of Pediatrics. (2013). Children, adolescents, and the media. *Pediatrics*, *132*, 959–961. https://doi.org/10.2788/00749

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.

Anand, V. (2007). A study of time management: The correlation between video game usage and academic performance markers. *CyberPsychology & Behavior, 10*(4), 552-559. https://doi.org/10.1089/cpb.2007.9991

Anderson, M., & Jiang, J. (2018). *Teens, social media & technology 2018*. Pew Research Center, Washington, D.C. (May 15, 2018). http://www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/

Anjomshoa, F., Aloqaily, M., Kantarci, B., Erol-Kantarci, M., & Schuckers, S. (2017). Social behaviometrics for personalized devices in the internet of things era. *IEEE Access*, *5*, 12199–12213. https://doi.org/10.1109/ACCESS.2017.2719706

ATLAS.ti Scientific Software Development GmbH. (2021). *ATLAS.ti* (9.1.2). Proprietary Software. https://atlasti.com/

Baddeley, A. (2003). Working memory and language: An overview. *Journal of Communication Disorders*, *36*(3), 189–208. https://doi.org/10.1016/S0021-9924(03)00019-4

Baker, S., Sanders, M., & Morawska, A. (2017). Who uses online parenting support? A cross-sectional survey exploring Australian parents' internet use for parenting. *Journal of Child & Family Studies*, *26*(3), 916–927. https://doi.org/10.1007/s10826-016-0608-1

Baker, W., Lusk, E., & Neuhauser, K. (2012). On the use of cell phones and other electronic devices in the classroom: Evidence from a survey of faculty and students. *Journal of Education for Business*, *87*(5), 275-289. https://doi.org/10.1080/08832323.2011.622814

Baturay, M. H., & Toker, S. (2016). Self-esteem shapes the impact of GPA and general health on Facebook addiction: A mediation analysis. *Social Science Computer Review*, *35*(5), 555–575. https://doi.org/10.1177/0894439316656606

Baumgartner, S. E., van der Schuur, W. A., Lemmens, J. S., & Poel, F. te. (2018). The relationship between media multitasking and attention problems in adolescents: Results of two longitudinal studies. *Human Communication Research*, *1*, 3-30. https://doi.org/10.1111/hcre.12111

Baumgartner, S. E., Weeda, W. D., van der Heijden, L. L., & Huizinga, M. (2014). The relationship between media multitasking and executive function in early adolescents. *Journal of Early Adolescence*, *34*(8), 1120–1144. https://doi.org/10.1177/027243161452313

Bellur, S., Nowak, K. L., & Hull, K. S. (2015). Make it our time: In class multitaskers have lower academic performance. *Computers in Human Behavior*, *53*, 63-70. https://doi.org/10.1016/j.chb.2015.06.027

Beranuy, M., Oberst, U., Carbonell, X., & Chamarro, A. (2009). Problematic internet and mobile phone use and clinical symptoms in college students: The role of emotional intelligence. *Computers in Human Behavior*, *25*(5), 1182–1187. https://doi.org/10.1016/j.chb.2009.03.001

Bernardo, H., Gaspar, A., & Antunes, C. H. (2018). A combined Value Focused Thinking-Soft Systems Methodology approach to structure decision support for energy performance assessment of school buildings. *Sustainability, 10*(7), 1-19. https://doi.org/10.3390/su10072295

Berry, M. J., & Westfall, A. (2015). Dial D for distraction: The making and breaking of cell phone policies in the college classroom. *College Teaching*, *63*(2), 62–71. https://doi.org/10.1080/87567555.2015.1005040

Biggs, J. (1987). *Study process questionnaire manua*. *Student approaches to learning and studying.* Australian Council for Educational Research. https://files.eric.ed.gov/fulltext/ED308200.pdf

Biggs, J., Kember, D., & Leung, D. Y. P. (2001). The revised two-factor Study Process Questionnaire: R-SPQ- 2F. *British Journal of Educational Psychology*, *71*(1), 133. https://doi.org/10.1348/000709901158433

Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports, 2,* 156-162. https://doi.org/10.1007/s40429-015-0054-y

Billieux, J., Van Der Linden, M., D'Acremont, M., Ceschi, G., & Zermatten, A. (2007). Does impulsivity relate to perceived dependence on and actual use of the mobile phone? *Applied Cognitive Psychology*, *21*(4), 527–537. https://doi.org/10.1002/acp.1289

Bjornsen, C. A., & Archer, K. J. (2015). Relations between college students' cell phone use during class and grades. *Scholarship of Teaching and Learning in Psychology*, *1*(4), 326–336. https://doi.org/10.1037/stl0000045

Bolatli, Z., & Korucu, A. T. (2020). Determining the academic achievement of students who use flipped classroom method supported by a mobile application and their views on collaborative learning. *Bartin University Journal of Faculty of Education*, *9*(2), 229–251. https://doi.org/10.14686/buefad.631835

Boldizsár, B. (2018). Students' needs for digital devices in Fl classes. *International Journal of Arts & Sciences*, *11*(1), 195–202. http://www.universitypublications.net/ijas/1101/pdf/F8N115.pdf

Bolkan, S., & Griffin, D. J. (2017). Students' use of cell phones in class for off-task behaviors: The indirect impact of instructors' teaching behaviors through boredom and students' attitudes. *Communication Education*, *66*(3), 313–329. http://dx.doi.org/10.1080/03634523.2016.1241888

Bowman, L. L., Levine, L. E., Waite, B. M., & Gendron, M. (2010). Can students really multitask? An experimental study of instant messaging while reading. *Computers & Education*, *54*(4), 927–931. https://doi.org/10.1016/j.compedu.2009.09.024

Bragdon, R. A., & Dowler, K. (2016). College student technology use and academic

performance. *International Journal of Humanities and Social Science, 6* (1), 12-22. http://www.ijhssnet.com/journals/Vol_6_No_1_January_2016/2.pdf

Bukhori, B., Said, H., Wijaya, T., & Nor, F. M. (2019). The effect of smartphone addiction, achievement motivation, and textbook reading intensity on students' academic achievement. *International Journal of Interactive Mobile Technologies, 13*(9), 66–80. https://doi.org/10.3991/ijim.v13i09.9566

Burak, L. (2012). Multitasking in the university classroom. *International Journal for the Scholarship of Teaching and Learning*, *6*(2), 1-12. https://vc.bridgew.edu/cgi/viewcontent.cgi?article=1071&context=mahpls_fac

Burgess, S. R., & Murray, A. B. (2014). Use of traditional and smartphone app flashcards in an introductory psychology class. *Journal of Instructional Pedagogies*, *13*, 1-7. https://files.eric.ed.gov/fulltext/EJ1060082.pdf

Burns, S. M., & Lohenry, K. (2010). Cellular phone use in class: Implications for teaching and learning a pilot study. *College Student Journal*, *44*(3), 805–810. https://files.eric.ed.gov/fulltext/EJ1060082.pdf

Cabero-Almenara, J., Barroso-Osuna, J., Llorente-Cejudo, C., & del Mar Fernández Martínez, M. (2019). Educational uses of Augmented Reality (AR): Experiences in educational science. *Sustainability*, *11*(18), 4990. https://doi.org/10.3390/su11184990

Cain, M. S., Leonard, J. A., Gabrieli, J. D. E., & Finn, A. S. (2016). Media multitasking in adolescence. *Psychonomic Bulletin & Review, 23*(6), 1932–1941. https://doi.org/10.3758/s13423-016-1036-3

Cain, M. S., & Mitroff, S. R. (2011). Distractor filtering in media multitaskers. *Perception*, *40*(10), 1183–1192. https://doi.org/10.1068/p7017

Campbell, S. (2006). Perceptions of mobile phones in college classrooms: Ringing, cheating, and classroom policies. *Communication Education*, *55*(3), 280-294. https://doi.org/10.1080/03634520600748573

Carcelén, S., Mera, M., & Irisarri, J. A. (2019). Mobile phone use by university students in Madrid: A management-based typology during times of learning. *Communication & Society*, *32*(1), 199–211. https://doi.org/10.15581/003.32.1.199-211

Carrier, L. L., Rosen, L. D., Cheever, N. A., & Lim, A. F. (2015). Causes, effects, and practicalities of everyday multitasking. *Developmental Review*, *35*, 64-78. https://doi.org/10.1016/j.dr.2014.12.005

Carrillo, R., & Subrahmanyam, K. (2014). *Mobile phone multitasking and learning*. In: Encyclopedia of Mobile Phone Behavior, 82-92. https://doi.org/10.4018/978-1-4666-8239-9.ch007

Celikkalp, U., Bilgic, S., Temel, M., & Varol, G. (2020). The smartphone addiction levels and the association with communication skills in nursing and medical school students. *Journal of Nursing Research (Lippincott Williams & Wilkins)*, *28*(3), e93. https://doi.org/10.1097/jnr.0000000000000370

Cell phones and PDA's hit K-6. (2005). *Education Digest*, *8*, 52-53. https://eds-a-ebscohost-com.ezp.waldenulibrary.org/eds/pdfviewer/pdfviewer?vid=27&sid=a35f7074-

37f3-45c1-8fbe-62a728d01546%40sessionmgr4007

Chan, E., & Ross, V. (2014). Narrative understandings of a school policy: Intersecting student, teacher, parent and administrator perspectives. *Journal of Curriculum Studies*, *46*(5), 656–675. https://doi.org/10.1080/00220272.2014.911352

Chaudron, S. (2015). *Young Children (0–8) and Digital Technology: A Qualitative Exploratory Study across Seven Countries;* Publications Office of the European Union: Luxembourg

Chen, H.-T. & Li, X. (2017). The contribution of mobile social media to social capital and psychological well-being: Examining the role of communicative use, friending and self-disclosure. *Computers in Human Behavior*, *75*, 958–965. https://doi.org/10.1016/j.chb.2017.06.011

Chen, J., Liang, Y., Mai, C., Zhong, X., & Qu, C. (2016). General deficit in inhibitory control of excessive smartphone users: Evidence from an event-related potential study. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.00511

Chen, Q., & Yan, Z. (2016). Does multitasking with mobile phones affect learning? A review. *Computers in Human Behavior*, *54*, 34–42. https://doi.org/10.1016/j.chb.2015.07.047

Chen, Y.-F., & Peng, S. S. (2008). University students' internet use and its relationships with academic performance, interpersonal relationships, psychosocial adjustment, and self-evaluation. *CyberPsychology & Behavior, 11*(4), 467-469. https://doi.org/10.1089/cpb.2007.0128

Chin, C., & Brown, D. E. (2000). Learning in science: A comparison of deep and surface

approaches. *Journal of Research in Science Teaching, 37*(2), 109-138. https://doi.org/10.1002/(SICI)1098-2736(200002)37:2<109::AID-TEA3>3.0.CO;2-7

Chiu, S.-I. (2014). The relationship between life stress and smartphone addiction on Taiwanese university student: A mediation model of learning self-efficacy and social self-efficacy. *Computers in Human Behavior*, *34*, 49–57. https://doi.org/10.1016/j.chb.2014.01.024

Cho, S., & Lee, E. (2016). Distraction by smartphone use during clinical practice and opinions about smartphone restriction policies: A cross-sectional descriptive study of nursing students. *Nurse Education Today*, *40*, 128–133. https://doi.org/10.1016/j.nedt.2016.02.021

Chóliz, M. (2010). Mobile phone addiction: A point of issue. *Addiction*, *105*(2), 373-375. https://doi.org/10.1111/j.1360-0443.2009.02854.x

Chou, C. (2001). Internet heavy use and addiction among Taiwanese college students: An online interview study. *CyberPsychology & Behavior, 4*(5), 573-585. https://ir.nctu.edu.tw/bitstream/11536/14499/1/000172031100003.pdf

Chun, J.-W., Choi, J., Cho, H., Choi, M.-R., Ahn, K.-J., Choi, J.-S., & Kim, D.-J. (2018). Role of frontostriatal connectivity in adolescents with excessive smartphone use. *Frontiers in Psychiatry*, *9*. https://doi.org/10.3389/fpsyt.2018.00437

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage Publications. https://www.ceil-conicet.gov.ar/wp-content/uploads/2018/04/CRESWELLQualitative-Inquary-and-Research-Design-

Creswell.pdf

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.

Cuthbertson, L. M., Robb, Y. A., & Blair, S. (2020). Theory and application of research principles and philosophical underpinning for a study utilising interpretative phenomenological analysis. *Radiography*, *26*(2), e94–e102. https://doi.org/10.1016/j.radi.2019.11.092

da Silva Monte, M. B., Morais, D. C., & de Farias Gomes, S. (2017). A value-focused consumer's perspective with multiattribute evaluation of the water distribution system of a Brazilian city. *2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC), Systems, Man, and Cybernetics (SMC), 2017 IEEE International Conference On*, 3350–3355. https://doi.org/10.1109/SMC.2017.8123147

Demirbilek, M., & Talan, T. (2018). The effect of social media multitasking on classroom performance. *Active Learning in Higher Education*, *19*(2), 117–129. https://doi.org/10.1177/1469787417721382

Demirci, K., Akgonul, M., & Akpinar, A. (2015). Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *Journal of Behavioral Addictions*, *4*(2), 85–92. https://doi.org/10.1556/2006.4.2015.010

Demirci, K., Orhan, H., Demirdas, A., Akpinar, A., & Sert, H. (2014). Validity and reliability of the Turkish version of the smartphone addiction scale in a younger population. *Klinik Psikofarmakoloji Bulteni-Bulletin of Clinical*

Psychopharmacology, *24*(3), 226–234. https://doi.org/10.5455/bcp.20140710040824

Devitt, K., & Roker, D. (2009). The role of mobile phones in family communication. *Children & Society*, *23*(3), 189–202. https://doi.org/10.1111/j.1099-0860.2008.00166.x

Dhillon, G., Oliveira, T., & Syed, R. (2018). Value-based information privacy objectives for Internet Commerce. *Computers in Human Behavior*, *87*, 292–307. https://doi.org/10.1016/j.chb.2018.05.043

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*, 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Dinsmore, B. (2019). Contested affordances: Teachers and students negotiating the classroom integration of mobile technology. *Information, Communication & Society*, *22*(5), 664–677. https://doi.org/10.1080/1369118X.2019.1568518

Duggan, M., Lenhart, A., Lampe, C., & Ellison, N. (2015). *Parents and social media: Mothers are especially likely to give and receive support on social media.* Pew Internet and American Life Project. https://www.pewresearch.org/internet/2015/07/16/parents-and-social-media/

Duncan, D. K., Hoekstra, A. R., & Wilcox, B. R. (2012). Digital devices, distraction, and student performance: Does in-class cell phone use reduce learning? *Astronomy Education Review*, *11*(1), 1-4. https://doi.org/10.3847/AER2012011

Dunn, P., Richardson, A., McDonald, C., & Oprescu, F. (2012). Instructor perceptions of using a mobile-phone-based free classroom response system in first-year statistics

undergraduate courses. *International Journal of Mathematical Education in Science & Technology*, *43*(8), 1041–1056. https://doi.org/10.1080/0020739X.2012.678896

Dworkin, J., Connell, J., & Doty, J. (2013). A literature review of parents' online behavior. *Cyberpsychology, 7*(2), 1–10. https://doi.org/10.5817/CP2013-2-2

Ehrenberg, A., Juckes, S., White, K., & Walsh, S. (2008). Personality and self-esteem as predictors of young people's technology use. *Cyberpsychology, Behavior, and Social Networking, 11*(6), 739-741. https://eprints.qut.edu.au/16904/9/Ehrenberg_PersonalityAndSelfEsteem.pdf

Elder, A. D. (2013). College students' cell phone use, beliefs, and effects on their learning. *College Student Journal*, *47*(4), 585–592. https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=eue&AN=93813987&site=eds-live&scope=site&custid=s6527200

Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of Affective Disorders, 207*, 251–259. https://doi.org/10.1016/j.jad.2016.08.030

Elhai, J. D., Levine, J. C., Dvorak, R. D., & Hall, B. J. (2016). Fear of missing out, need for touch, anxiety and depression are related to problematic smartphone use. *Computers in Human Behavior, 63*, 509–516. https://doi.org/10.1016/j.chb.2016.05.079

Ellis, Y., Daniels, B., & Jauregui, A. (2010). The effect of multitasking on the grade

performance of business students. *Research in Higher Education Journal, 8*, 1-10. https://www.renevanmaarsseveen.nl/wp-content/uploads/overig2/effect multitasking on students.pdf

End, C. M., Worthman, S., Mathews, M. B., & Wetterau, K. (2010). Costly cell phones: The impact of cell phone rings on academic performance. *Teaching of Psychology*, *37*(1), 55–57. https://doi.org/10.1080/00986280903425912

Engward, H., & Goldspink, S. (2020). Lodgers in the house: Living with the data in interpretive phenomenological analysis research. *Reflective Practice*, *21*(1), 41-53. https://doi.org/10.1080/14623943.2019.1708305

Falbe, J., Rosner, B., Willett, W. C., Sonneville, K. R., Hu, F. B., & Field, A. E. (2013). Adiposity and different types of screen time. *Pediatrics, 132*(6), e1497–e1505. http://dx.doi.org/10.1111/cch.12701

Falbe, J., Willett, W. C., Rosner, B., Gortmaker, S. L., Sonneville, K. R., & Field, A. E. (2014). Longitudinal relations of television, electronic games, and digital versatile discs with changes in diet in adolescents. *American Journal of Clinical Nutrition, 100*(4), 1173–1181. https://doi.org/10.3945/ajcn.114.088500

Fallon, M., & Forrest, S. L. (2011). High-tech versus low-tech instructional strategies: A comparison of clickers and handheld response cards. *Teaching of Psychology*, *38*(3), 194–198. https://doi.org/ 10.1177/0098628311411896

Finn, A., & Ledbetter, A. (2013). Teacher power mediates the effects of technology policies on teacher credibility. *Communication Education*, *62*(1), 26–47. https://doi.org/10.1080/03634523.2012.725132

Firat, M. (2013). Multitasking or continuous partial attention: A critical bottleneck for digital natives. *Turkish Online Journal of Distance Education*, *14*(1), 266–272. https://eds-a-ebscohost-com.ezp.waldenulibrary.org/eds/pdfviewer/pdfviewer?vid=30&sid=17658911-d064-4cc5-8ecb-b5bfc2d8080d%40sessionmgr4008

Flanigan, A. E., & Kiewra, K. A. (2018). What college instructors can do about student cyber-slacking. *Educational Psychology Review*, *30*(2), 585–597. https://doi-org.ezp.waldenulibrary.org/10.1007/s10648-017-9418-2

Fonseca, D., Martí, N., Redondo, E., Navarro, I., & Sánchez, A. (2014). Relationship between student profile, tool use, participation, and academic performance with the use of Augmented Reality technology for visualized architecture models. *Computers in Human Behavior*, *31*, 434–445. https://doi.org/10.1016/j.chb.2013.03.006

Fox, A. B., Rosen, J., & Crawford, M. (2009). Distractions, distractions: Does instant messaging affect college students' performance on a concurrent reading comprehension task? *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, *12*(1), 51-53. http://users.clas.ufl.edu/msscha/PremedCSS/instant_message_student_performance.pdf

Gao, Q., Yan, Z., Wei, C., Liang, Y., & Mo, L. (2017). Three different roles, five different aspects: Differences and similarities in viewing school mobile phone policies among teachers, parents, and students. *Computers & Education, 106*, 13-

25. https://doi.org/10.1016/j.compedu.2016.11.007

Gioia, G. A., Isquith, P. K., Kenworthy, L., & Barton, R. M. (2002). Profiles of everyday executive function in acquired and developmental disorders. *Child Neuropsychology: A Journal on Normal and Abnormal Development in Childhood and Adolescence*, *8*(2), 121–137. https://doi.org/10.1076/chin.8.2.121.8727

Glass, A. L., & Kang, M. (2019). Dividing attention in the classroom reduces exam performance. *Educational Psychology*, *39*(3), 395–408. https://doi.org/10.1080/01443410.2018.1489046

Godwin-Jones, R. (2011). Mobile apps for language learning. *Language, Learning & Technology*, *15*(2), 2-12. https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/7015294d-af5e-480f-ae10-40736e408f04/content

Golding, J. M., Wasarhaley, N. E., & Fletcher, B. (2012). The use of flashcards in an introduction to psychology class. *Teaching of Psychology*, *39*(3), 199–202. https://doi.org/10.1177/0098628312450436

Gottschalk, F. (2019). Impacts of technology use on children: Exploring literature on the brain, cognition and well-being. OECD Education Working Papers, No. 195. In *OECD Publishing*. OECD Publishing. https://doi.org/10.1787/8296464e-en

Griffiths, M. (1996). Gambling on the internet: A brief note. Journal of Gambling Studies 12: 471–473. https://doi.org/10.1007/BF01539190

Griffiths, M. D. (2017). Behavioural addiction and substance addiction should be defined

by their similarities not their dissimilarities. *Addiction, 112,* 1718-1720. https://doi.org/10.1111/add.13828

Gutiérrez-Puertas, L., Márquez-Hernández, V. V., Gutiérrez-Puertas, V., Granados-Gámez, G., & Aguilera-Manrique, G. (2020). The effect of cell phones on attention and learning in nursing students. *Computers, Informatics, Nursing: CIN*. https://doi.org/10.1097/CIN.0000000000000626

Ha, Y.-M., & Hwang, W. (2014). Gender differences in internet addiction associated with psychological health indicators among adolescents using a national web-based survey. *International Journal of Mental Health & Addiction, 12*(5), 660–669. https://doi.org/10.1007/s11469-014-9500-7

Harman, B. A., & Sato, T. (2011). Cell phone use and grade point average among undergraduate university students. *College Student Journal*, *45*(3), 544–549. https://eds.s.ebscohost.com/eds/detail/detail?vid=12&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis&bdata=JkF1dGhUeXBlPXNoaWImc2l0ZT1lZHMtbGl2ZSZzY29wZT1zaXRl#AN=66893531&db=a9h

Harmon, E., & Mazmanian, M. (2013). *Stories of the smartphone in everyday discourse: Conflict, tension & instability.* In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 1051-1060. https://doi.org/10.1145/2470654.2466134

Harris, L., Davis, N., Cunningham, U., de Vocht, L., Macfarlane, S., Gregory, N., Aukuso, S., Taleni, T. O., & Dobson, J. (2018). Exploring the opportunities and

challenges of the digital world for early childhood services with vulnerable children. *International Journal of Environmental Research and Public Health*, *15*(11). https://doi.org/10.3390/ijerph15112407

Hart, K. (2019). Are cell phones the new chewing gum? National Education Association. Retrieved from http://www.nea.org/home/35221.htm

Hartanto, A., & Yang, H. (2016). Is the smartphone a smart choice? The effect of smartphone separation on executive functions. *Computers in Human Behavior*, *64*, 329–336. https://doi.org/10.1016/j.chb.2016.07.002

Hashmi, A. M., Naz, S., Ali, A. A., & Asif, A. (2019). Smart phones and medical students: Pleasant distraction or dangerous addiction? *JPMA. The Journal of the Pakistan Medical Association*, *69*(12), 1891–1895. https://doi.org/10.5455/JPMA.299735

Hawi, N. S., & Samaha, M. (2016). To excel or not to excel: Strong evidence on the adverse effect of smartphone addiction on academic performance. *Computers & Education*, *98*, 81–89. https://doi.org/10.1016/j.compedu.2016.03.007

Head, J., Helton, W., Russell, P., & Neumann, E. (2012). Text-speak processing impairs tactile location. *Acta Psychologica*, *141*(1), 48–53. https://doi.org/10.1016/j.actpsy.2012.07.006

Hiniker, A., Schoenebeck, S. Y., & Kientz, J. A. (2016). *Not at the dinner table: Parents' and children's perspectives on family technology rules.* In Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing, 1376-1389. https://dl.acm.org/doi/pdf/10.1145/2818048.2819940

Hiniker, A., Sobel, K., Suh, H., Sung, Y. C., Lee, C. P., & Kientz, J. A. (2015). *Texting while parenting: How adults use mobile phones while caring for children at the playground.* In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, 727-736. https://depts.washington.edu/csclab/wordpress/wp-content/uploads/Hiniker-Sobel-Suh-Sung-Lee-Kientz-2015.pdf

Hsiao, K.-L., Shu, Y., & Huang, T.-C. (2017). Exploring the effect of compulsive social app usage on technostress and academic performance: Perspectives from personality traits. *Telematics and Informatics*, *34*, 679–690. https://doi.org/10.1016/j.tele.2016.11.001

Hu, Y., Long, X., Lyu, H., Zhou, Y., & Chen, J. (2017). Alterations in white matter integrity in young adults with smartphone dependence. *Frontiers in Human Neuroscience*, *11*. https://doi.org/10.3389/fnhum.2017.00532

Hughes, R., Jr., & Hans, J. D. (2001). Computers, the internet, and families: A review of the role new technology plays in family life. *Journal of Family Issues*, *22*(6), 776–790. https://doi.org/10.1177/019251301022006006

Hyland, M., Layte, R., Lyons, S., McCoy, S., & Silles, M. (2015). Are classroom internet use and academic performance higher after government broadband subsidies to primary schools? *Economic & Social Review*, *46*(3), 399–428. https://www.econstor.eu/bitstream/10419/88520/1/773893784.pdf

Inal, E. E., Demirci, K., Cetinturk, A., Akgonul, M., Savas, S. (2015). Effects of smartphone overuse on hand function, pinch strength, and the median nerve.

Muscle & Nerve, 52, 183-188. https://doi.org/10.1002/mus.24695

Ivanoff, S. D., & Hultberg, J. (2006). Understanding the multiple realities of everyday life: Basic assumptions in focus-group methodology. *Scandinavian Journal of Occupational Therapy*, *13*(2), 125–132. https://doi.org/10.1080/11038120600691082

Jacobsen, W. C., & Forste, R. (2011). The wired generation: Academic and social outcomes of electronic media use among university students. *Cyberpsychology, Behavior, and Social Networking*, *14*, 275-280. https://doi.org/10.1089/cyber.2010.0135

Jeong, S.-H., Kim, H., Yum, J.-Y., & Hwang, Y. (2016). What type of content are smartphone users addicted to?: SNS vs. games. *Computers in Human Behavior*, 10-17. https://doi.org/10.1016/j.chb.2015.07.035

Jiang, Q. (2014). Internet addiction among young people in China : Internet connectedness, online gaming, and academic performance decrement. *Internet Research*, (1), 2-20. https://doi.org/10.1108/IntR-01-2013-0004

Jiménez-Crespo, M. A. (2015). The internet in translation education. *Translation & Interpreting Studies: The Journal of the American Translation & Interpreting Studies Association*, *10*(1), 33–57. https://doi.org/10.1075/tis.10.1.03jim

Judd, T. (2014). Making sense of multitasking: The role of Facebook. *Computers & Education*, *70*, 194–202. https://doi.org/10.1016/j.compedu.2013.08.013

Junco, R. (2012a). In-class multitasking and academic performance. *Computers in Human Behavior*, *6*, 2236-2243. http://dx.doi.org/10.1016/j.chb.2012.06.031

Junco, R. (2012b). Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Computers in Human Behavior*, *28*(1), 187–198. https://doi.org/10.1016/j.chb.2011.08.026

Junco, R., & Cotten, S. R. (2011). Perceived academic effects of instant messaging use. *Computers & Education*, *56*(2), 370–378. https://doi.org/10.1016/j.compedu.2010.08.020

Junco, R., & Cotten, S. R. (2012). No A 4 U: The relationship between multitasking and academic performance. *Computers & Education*, *59*(2), 505–514. https://doi.org/10.1016/j.compedu.2011.12.023

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons*, *53*(1), 59–68. https://doi.org/10.1016/j.bushor.2009.09.003

Karlins, M., Hargis, E., & Balfour, A. (2012). Student ethics in an era of personal entitlement. *Psychological Reports*, *110*(1), 144-148. https://doi.org/10.2466/11.17.PR0.110.1.144-148

Karpinski, A. C., Kirschner, P. A., Ozer, I., Mellott, J. A., & Ochwo, P. (2013). An exploration of social networking site use, multitasking, and academic performance among United States and European university students. *Computers in Human Behavior*, *29*(3), 1182–1192. https://doi.org/10.1016/j.chb.2012.10.011

Keeney, R. L. (1992). *Value-focused thinking: A path to creative decision making [electronic resource]*. Harvard University Press.

Keeney, R. L. (1994). Creativity in Decision-Making with Value-Focused Thinking.

Sloan Management Review, 35, 33–41. https://search.proquest.com/openview/b666bfccf3d0144ee1f36aaa44973b1c/1?pq-origsite=gscholar&cbl=26142

Kelly, W. E. (2004). As achievement sails the river of time: The role of time use efficiency in Grade-Point-Average. *Educational Research Quarterly*, *27*(4), 3–8. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=24&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Kenwright, K. (2009). Clickers in the classroom. *TechTrends: Linking Research and Practice to Improve Learning*, *53*(1), 74–77. https://ebookcentral.proquest.com/lib/waldenu/reader.action?docID=4410189

Kercood, S., & Banda, D. R. (2012). The effects of added physical activity on performance during a listening comprehension task for students with and without attention problems. *International Journal of Applied Educational Studies*, *13*(1), 19–32. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=29&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Kibona, L., & Mgaya, G. (2015). Smartphones' effects on academic performance of higher learning students. *Journal of Multidisciplinary Engineering Science and Technology*, *2*(4), 777-784. http://www.jmest.org/wp-content/uploads/JMESTN42350643.pdf

Kildare, C. A., & Middlemiss, W. (2017). Impact of parents mobile device use on parent-child interaction: A literature review. *Computers in Human Behavior, 75*, 579–

593. https://doi.org/10.1016/j.chb.2017.06.003

Kim, D., Lee, Y., Lee, J., Nam, J. K., & Chung, Y. (2014). Development of Korean Smartphone Addiction Proneness Scale for Youth. *PLoS ONE*, *9*(5), 1–8. https://doi.org/10.1371/journal.pone.0097920

Kim, I., Kim, R., Kim, H., Kim, D., Han, K., Lee, P. H., Mark, G., & Lee, U. (2019). Understanding smartphone usage in college classrooms: A long-term measurement study. *Computers & Education*, *141*. https://doi.org/10.1016/j.compedu.2019.103611

Kinman, G. (2015). *ICT use, work-life balance and wellbeing in academics* [Conference presentation]. Division of Occupational Psychology Annual Conference 2016, Nottingham, United Kingdom. https://alwaysonculture.files.wordpress.com/2015/10/kinman-2016_dop-presentation.pdf

Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior*, *26*(6), 1237–1245. https://doi.org/10.1016/j.chb.2010.03.024

Klimaszewski, S. (2016). Value-focused thinking model to evaluate SHM system alternatives from military end user requirements point of view. *Research Works of Air Force Institute of Technology*, (1), 21. https://doi.org/10.1515/afit-2016-0014

Kornbluh, M. (2015). Combatting challenges to establishing trustworthiness in qualitative research. *Qualitative Research in Psychology*, *12*(4), 397–414. https://doi.org/10.1080/14780887.2015.1021941

Kubey, R. W., Lavin, M. J., & Barrows, J. R. (2001). Internet use and collegiate academic performance decrements: Early findings. *Journal of Communication, 51*(2), 366-382. https://d1wqtxts1xzle7.cloudfront.net/50023949/Internet_use_and_collegiate_academic_per20161101-13052-1litvgt.pdf?1477984661=&response-content-disposition=inline%3B+filename%3DInternet_use_and_collegiate_academic_per.pdf&Expires=1593415930&Signature=N52RxqT03HaFuf7zi9fk6s3sp6~f8D5y6niiG3k38GbB6R43DjijFogOTzqLEowHW-9GuUvK4zrBYIblkCuQ6YNgnztgw7hXM79VRayiBBrBCHLtSd4wvnrmLJF5MoHfmwCIvks8uNcLl2g4OBKq4VFE6clmDcAhWlRy3wBRK3Ma9SK0FjSqMaRdwaalbFwILqsUHj7tFbhQQdaF4jxu744Olp0r3RD5rUzjb8SwhV-r1f0nNu3tYhM-EZJUlU~ve8HUr1~ofxTCi0klyWJFaPf~52bbrS3SQd9oIV8NQOFrnVAqDJj0gj9UDCs6qoSv17u9-RLnAo833atvJ3d~ww__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

Kuss, D. J., & Griffiths, M. D. (2011). Online social networking and addiction—A review of the psychological literature. *International Journal of Environmental Research and Public Health*, *8*(9), 3528–3552. https://doi.org/10.3390/ijerph8093528

Kuss, D. J., & Griffiths, M. D. (2012). Internet gaming addiction: A systematic review of empirical research. *International Journal of Mental Health & Addiction*, *10*(2), 278–296. https://doi.org/10.1007/s11469-011-9318-5

Kuss, D. J., & Griffiths, M. D. (2017). Social networking sites and addiction: Ten lessons learned. *International Journal of Environmental Research and Public Health*, *14*(3). 1-17. https://doi.org/10.3390/ijerph14030311

Kuss, D. J., van Rooij, A. J., Shorter, G. W., Griffiths, M. D., & van de Mheen, D. (2013). Internet addiction in adolescents: Prevalence and risk factors. *Computers in Human Behavior*, *29*(5), 1987–1996. https://doi.org/10.1016/j.chb.2013.04.002

Kwon, M., Kim, D.-L., Cho, H., & Yang, S. (2013). The smartphone addiction scale: Development and validation of a short version for adolescents. *PLoS ONE, 8*(12), 1-7. https://doi.org/10.1371/journal.pone.0083558

Kwon, M., Lee, J-Y., Won, W-Y., Park, J-W., Min, J-A., Hahn, C., Gu, X., Choi, J-H., & Kim, D-J. (2013). Development and validation of a smartphone addiction scale (SAS). *PLoS ONE, 8*(2), e56936. https://doi.org/10.1371/journal.pone.0056936

Labăr, A. V., & Ţepordei, A. M. (2019). The interplay between time perspective, internet use and smart phone in-class multitasking: A mediation analysis. *Computers in Human Behavior*, *93*, 33–39. https://doi.org/10.1016/j.chb.2018.11.050

Lancaster, A. L. (2018). Student learning with permissive and restrictive cell phone policies: A classroom experiment. *International Journal for the Scholarship of Teaching & Learning*, *12*(1), 1–11. https://doi.org/10.20429/ijsotl.2018.120105

Lauricella, A. R., Wartella, E., & Rideout, V. J. (2015). Young children's screen time: The complex role of parent and child factors. *Journal of Applied Developmental Psychology*, *36*, 11–17. https://doi.org/10.1016/j.appdev.2014.12.001

Ledbetter, A., & Finn, A. (2015). Teacher technology policies and online communication

apprehension as predictors of learner empowerment. *Communication Education*, *62*(3), 301–317. https://doi.org/10.1080/03634523.2013.794386

Lee, E. B. (2015). Too much information: Heavy smartphone and Facebook utilization by African American young adults. *Journal of Black Studies*, *46*(1), 44–61. https://doi.org/10.1177/0021934714557034

Lee, C.-C., Hao, Y., Lee, K. S., Sim, S. C., & Huang, C.-C. (2019). Investigation of the effects of an online instant response system on students in a middle school of a rural area. *Computers in Human Behavior*, *95*, 217–223. https://doi.org/10.1016/j.chb.2018.11.034

Lee, H.-K., Kim, J.-H., Fava, M., Mischoulon, D., Park, J.-H., Shim, E.-J., Lee, E.-H., Lee, J. H., & Jeon, H. J. (2017). Development and validation study of the Smartphone Overuse Screening Questionnaire. *Psychiatry Research, 257,* 352–357. https://doi.org/10.1016/j.psychres.2017.07.074

Lee, Y.-K., Chang, C.-T., Lin, Y., & Cheng, Z.-H. (2014). The dark side of smartphone usage: Psychological traits, compulsive behavior and technostress. *Computers in Human Behavior*, *31*, 373–383. https://doi.org/10.1016/j.chb.2013.10.047

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2015). The relationship between cell phone use and academic performance in a sample of U.S. college students. *SAGE Open, 5*(1), 1-9. https://doi.org/10.1177/2158244015573169

Lepp, A., Li, J., Barkley, J. E., & Salehi-Esfahani, S. (2015). Exploring the relationships between college students' cell phone use, personality and leisure. *Computers in Human Behavior*, *43*, 210–219. https://doi.org/10.1016/j.chb.2014.11.006

Leung, L. (2007). Stressful life events, motives for internet use, and social support among digital kids. *CyberPsychology & Behavior, 10*(2), 204-214. https://doi.org/10.1089/cpb.2006.9967

Lezak, M. D. (1982). The problem of assessing executive functions. *International Journal of Psychology, 17*(2/3), 281-297. https://doi.org/10.1080/00207598208247445

Li, C., Dang, J., Zhang, X., Zhang, Q., & Guo, J. (2014). Internet addiction among Chinese adolescents: The effect of parental behavior and self-control. *Computers in Human Behavior*, *41*, 1–7. https://doi.org/10.1016/j.chb.2014.09.001

Li, D., Zhang, W., Li, X., Zhen, S., & Wang, Y. (2010). Stressful life events and problematic internet use by adolescent females and males: A mediated moderation model. *Computers in Human Behavior*, *26*(5), 1199–1207. https://doi.org/10.1016/j.chb.2010.03.031

Lin, Y.-H., Chang, L.-R., Lee, Y.-H., Tseng, H.-W., Kuo, T. B. J., & Chen, S.-H. (2014). Development and validation of the Smartphone Addiction Inventory (SPAI). *PLOS ONE*, *9*(6). https://doi.org/10.1371/journal.pone.0098312

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Sage.

Liu, F., Zhang, Z., & Chen, L. (2020). Mediating effect of neuroticism and negative coping style in relation to childhood psychological maltreatment and smartphone addiction among college students in China. *Child Abuse & Neglect, 106*. https://doi.org/10.1016/j.chiabu.2020.104531

Livingstone, S., Mascheroni, G., Dreier, M., Chaudron, S., and Lagae, K. (2015b). *How*

parents of young children manage digital devices at home: The role of income, education and parental style. London: EU Kids Online. https://www.lse.ac.uk/media@lse/research/EUKidsOnline/EUKidsIV/PDF/Parentalmediation.pdf

Loh, K. K., & Kanai, R. (2016). How has the internet reshaped human cognition? *Neuroscientist*, *22*(5), 506–520. https://doi.org/10.1177/1073858415595005

Lopez-Fernandez, O., Kuss, D. J., Romo, L., Morvan, Y., Kern, L., Graziani, P., … Billieux, J. (2017). Self-reported dependence on mobile phones in young adults: A European cross-cultural empirical survey. *Journal of Behavioral Addictions*, *6*(2), 168–177. https://doi.org/10.1556/2006.6.2017.020

Marois, R., & Ivanoff, J. (2005). Capacity limits of information processing in the brain. *Trends in Cognitive Sciences*, *9*(6), 296–305. https://doi.org/10.1016/j.tics.2005.04.010

Marsh, J., Plowman, L., Yamada-Rice, D., Bishop, J. C., Lahmar, J., Scott, F., et al. (2015). *Exploring Play and Creativity in Pre-Schoolers' Use of Apps: Final Project Report.* Tech and Play. www.techandplay.org [accessed June 12, 2020].

Martin-Gutierrez, J. (2011). Proposal of methodology for learning of standard mechanical elements using augmented reality. *2011 Frontiers in Education Conference (FIE), Frontiers in Education Conference (FIE), 2011*. https://doi.org/10.1109/FIE.2011.6142708

Martín-Perpiñá, M. de las M., Poch, F. V., & Cerrato, S. M. (2019). Media multitasking impact in homework, executive function and academic performance in Spanish

adolescents. *Psicothema*, *31*(1), 81–87. https://doi.org/10.7334/psicothema2018.178

Martínez-Garrido, C. (2018). Impact of the use of technological resources on academic performance. *Innoeduca*, *4*(2), 138–149. https://doi.org/10.24310/innoeduca.2018.v4i2.4956

Marton, F., & Saljo, R. (1976). On qualitative differences in learning: I-outcome and process. *British Journal of Educational Psychology*, *46*(1), 4-11. https://doi.org/10.1111/j.2044-8279.1976.tb02980.x

Mascheroni, G., & Olafsson, K. (2016). The mobile internet: Access, use, opportunities and divides among European children. *New Media & Society*, *18*(8), 1657–1679. https://doi.org/10.1177/1461444814567986

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, *50*(4), 370–396. https://doi.org/10.1037/h0054346

Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist*, *38*(1), 43–52. https://doi.org/10.1207/S15326985EP3801_6

McDaniel, B. T., & Coyne, S. M. (2016). Technology interference in the parenting of young children: Implications for mothers' perceptions of coparenting. *The Social Science Journal*, *53*(4), 435–443. https://doi.org/10.1016/j.soscij.2016.04.010

McDonald, S. E. (2013). The effects and predictor value of in-class texting behavior on final course grades. *College Student Journal*, *47*(1), 34–40. https://eds.s.ebscohost.com/eds/detail/detail?vid=40&sid=ab9a6892-3891-4503-

a413-eff154f8e43d%40redis&bdata=JkF1dGhUeXBlPXNoaWImc2l0ZT1lZHMtbGl2ZSZzY29wZT1zaXRl#AN=92757381&db=eue

McGloin, R., McGillicuddy, K., & Christensen, J. (2017). The impact of goal achievement orientation on student technology usage in the classroom. *Journal of Computing in Higher Education*, *29*(2), 240–266. https://doi.org/10.1007/s12528-017-9134-4

Meyer, D. E., & Kieras, D.E. (1997). A computational theory of executive cognitive processes and multiple-task performance: Part 1. Basic mechanisms. *Psychological Review*, *104*(1), 3-65. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=43&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Mifsud, C. L., Vella, R., & Camilleri, L. (2013). Attitudes towards and effects of the use of video games in classroom learning with specific reference to literacy attainment. *Research in Education*, *90*(1), 32–52. https://doi.org/10.7227/RIE.90.1.3

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*, *24*(1), 167-205. https://doi.org/10.1146/annurev.neuro.24.1.167

Monsell, S. (2003). Task switching. *Trends in Cognitive Sciences*, *7*(3), 134–140. https://doi.org/:10.1016/S1364-6613(03)00028-7

Montag, C., Sindermann, C., Becker, B., & Panksepp, J. (2016). An affective

neuroscience framework for the molecular study of internet addiction. *Frontiers in Psychology*, *7*, 1-13. https://doi.org/10.3389/fpsyq.2016.01906

Morais, D. C., Alencar, L. H., Costa, A. P. C. S., & Keeney, R. L. (2013). Using value-focused thinking in Brazil. *Pesquisa Operacional*, *33*(1), 73-87. https://www.scielo.br/j/pope/a/QHYrB3NhprbJPxhhQZYpvNQ/?format=pdf&lang=en

Morris, P., & Sarapin, S. (2020). Mobile phones in the classroom: Policies and potential pedagogy. *Journal of Media Literacy Education*, *12*(1), 57–69. https://doi.org/10.23860/JMLE-2020-12-1-5

Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology*, *52*(2), 250–260. https://doi.org/10.1037/0022-0167.52.2.250

Mupinga, D. M. (2017). School-wide and classroom policies on the use of mobile technologies: An exploratory study. *Journal of Technology Studies*, *43*(2), 70–79. https://doi.org/10.21061/jots.v43i2.a.2

Murphy, K., McLauchlan, S., & Lee, M. (2017). Is there a link between media-multitasking and the executive functions of filtering and response inhibition? *Computers in Human Behavior*, *75*, 667-677. https://doi.org/10.1016/j.chb.2017.06.001

Ng, W., & Nicholas, H. (2009). Introducing pocket PCs in schools: Attitudes and beliefs in the first year. *Computers & Education*, *52*(2), 470–480. https://doi.org/10.1016/j.compedu.2008.10.001

Nicolas, M. O., & El-Aly, S. (2018). The smartphone as a tool to enrich an English language classroom in an Efl environment. *International Journal of Arts & Sciences*, *11*(1), 441–450. http://www.universitypublications.net/ijas/1101/pdf/R8ME190.pdf

Nie, N. H., & Erbring, I. (2000). Debating the societal effects of the internet: Connecting with the world. *Public Perspective, 11*, 42-43. https://icps.gwu.edu/debating-societal-effects-internet-connecting-world

Nikhita, C. S., Jadhav, P. R., & Ajinkya, S. A. (2015). Prevalence of mobile phone dependence in secondary school adolescents. *Journal of Clinical & Diagnostic Research*, *9*(11), 6–9. https://doi.org/10.7860/JCDR/2015/14396.6803

Not-so-smartphones - Government reviews mobile policy in schools. (2015). *PSYCHOLOGIST*, *28*(11), 872. https://thepsychologist.bps.org.uk/volume-28/november-2015/not-so-smartphones-government-reviews-mobile-policy-schools

O'Bannon, B. W., & Thomas, K. M. (2015). Mobile phones in the classroom: Preservice teachers answer the call. *Computers & Education*, *85*, 110–122. https://doi.org/10.1016/j.compedu.2015.02.010

Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences of the United States*, *106*(37), 15583-15587. https://doi.org/10.1073pnas.0903620106

Oulasvirta, A., Rattenbury, T., Ma, L., & Raita, E. (2012). Habits make smartphone use more pervasive. *Personal & Ubiquitous Computing*, *16*(1), 105–114.

https://doi.org/10.1007/s00779-011-0412-2

Özdemir, Y., Kuzucu, Y., & Ak, Ş. (2014). Depression, loneliness and internet addiction: How important is low self-control? *Computers in Human Behavior*, *34*, 284–290. https://doi.org/10.1016/j.chb.2014.02.009

Pan, C-C., Graham, J. A., & Luyegu, E. (2018). Student profiling, instructor use of mobile devices, and device ownership. *Distance Learning*, *15*(4), 29–37. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=51&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Pinter, R., & Cisar, S. M. (2019). "B here" class attendance tracking system with gamification. *2019 10th IEEE International Conference on Cognitive Infocommunications (CogInfoCom), Cognitive Infocommunications (CogInfoCom), 2019 10th IEEE International Conference On*, 271–276. https://doi.org/10.1109/CogInfoCom47531.2019.9089936

Pivetta, E., Harkin, L., Billieux, J., Kanjo, E., & Kuss, D. J. (2019). Problematic smartphone use: An empirically validated model. *Computers in Human Behavior*, *100*, 105–117. https://doi.org/10.1016/j.chb.2019.06.013

Plowman, L., Stephen, C., & McPake, J. (2010). Supporting young children's learning with technology at home and in preschool. *Research Papers in Education*, *25*(1), 93–113. https://doi.org/10.1080/02671520802584061

Plowman, L., Stevenson, O., Stephen, C., & McPake, J. (2012). Preschool children's learning with technology at home. *Computers & Education*, *59*(1), 30–37. https://doi.org/10.1016/j.compedu.2011.11.014

Pontes, H. M., & Griffiths, M. D. (2015). New concepts, old known issues: The DSM-5 and internet gaming. In J. Bishop (Ed.), *Psychological and Social Implications Surrounding Internet and Gaming Addiction* (pp. 16-30). IGI Global. https://doi.org/10.4018/978-1-4666-8595-6.ch002

Posner, M. L. (1990). Hierarchical distributed networks in the neuropsychology of selective attention. In A. Cramazza (Ed.), *Cognitive Neuropsychology and neurolinguistics* (pp. 187-210). Hillsdale, NJ: Lawrence Erlbaum Associates. https://www.researchgate.net/profile/Michael_Posner/publication/232584528_Hierarchical_distributed_networks_in_the_neuropsychology_of_selective_attention/links/54787ce20cf293e2da2a9a11.pdf

Prasad, M., Patthi, B., Singla, A., Gupta, R., Saha, S., Kumar, J. K., Malhi, R., & Pandita, V. (2017). Nomophobia: A cross-sectional study to assess mobile phone usage among dental students. *Journal of Clinical and Diagnostic Research: JCDR*, *11*(2), ZC34-ZC39. https://doi.org/10.7860/JCDR/2017/20858.9341

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, *29*(4), 1841–1848. https://doi.org/10.1016/j.chb.2013.02.014

Qualcomm. (2013). *TIME mobility poll*. Retrieved from: https://content.time.com/time/interactive/0,31813,2122187,00.html

Qualitative interview techniques and considerations. (2020 September 16). LibreTexts. Retrieved October 10, 2020, from https://socialsci.libretexts.org/Bookshelves/Sociology/Book%3A_Principles_of_S

ociological_Inquiry__Qualitative_and_Quantitative_Methods_(Blackstone)/09%3A_Interviews-_Qualitative_and_Quantitative_Approaches/9.02%3A_Qualitative_Interview_Techniques_and_Con

Radesky, J. S., Kistin, C., Eisenberg, S., Gross, J., Block, G., & Silverstein, M. (2016). Parent perspectives on their mobile technology use: The excitement and exhaustion of parenting while connected. *Journal of Developmental and Behavioral Pediatrics, 37*(9), 694-701. http://dx.doi.org/10.1097/DBP.0000000000000357

Radesky, J. S., Kistin, C. J., Zuckerman, B., Nitzberg, K., Gross, J., Kaplan-Sanoff, M., Augustyn, M., & Silverstein, M. (2014). Patterns of mobile device use by caregivers and children during meals in fast food restaurants. *Pediatrics, 133*(4), 843-850. https://doi.org/10.1542/peds.2013-3703

Radesky, J. S., Peacock-Chambers, E., Zuckerman, B., & Silverstein, M. (2016). Use of mobile technology to calm upset children: Associations with social-emotional development. *JAMA Pediatrics, 170*(4), 397-399. https://doi.org/10.1001/jamapediatrics.2015.4260

Radesky, J. S., Silverstein, M., Zuckerman, B., & Christakis, D. A. (2014). Infant self-regulation and early childhood media exposure. *Pediatrics, 133*(5), 1172-1178. http://dx.doi.org/10.1016/j.acap.2014.10.001

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Qiang Tu. (2008). The consequences of technostress for end users in organizations: Conceptual

development and empirical validation. *Information Systems Research*, *19*(4), 417–433. https://doi.org/10.1287/isre.1070.0165

Rana, N. P., & Dwivedi, Y. K. (2017). Can clicking promote learning?: Measuring student learning performance using clickers in the undergraduate information systems class. *Journal of International Education in Business*, *10*(2), 201–215. https://bradscholars.brad.ac.uk/bitstream/handle/10454/18106/38-29440.pdf?sequence=2&isAllowed=y

Ravizza, S. M., Hambrick, D. Z., & Fenn, K. M. (2014). Non-academic internet use in the classroom is negatively related to classroom learning regardless of intellectual ability. *Computers & Education*, *78*, 109–114. https://doi.org/10.1016/j.compedu.2014.05.007

Redner, R., Lang, L. M., & Brandt, K. P. (2020). Evaluation of an electronics intervention on electronics use in a college classroom. *Behavior Analysis: Research and Practice*, *20*(1), 4–12. https://doi.org/10.1037/bar0000158

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). *Generation M^2: Media in the lives of 8- to 18-year olds.* The Henry J. Kaiser Family Foundation. https://www.kff.org/wp-content/uploads/2013/04/8010.pdf

Roberge, G. D., & Gagnon, L. L. (2014). Impact of technology policy in the higher education classroom: Emerging trends. *JEP: EJournal of Education Policy*, 1–8. https://files.eric.ed.gov/fulltext/EJ1158601.pdf

Robinson, O. (2014). Sampling in interview-based qualitative research: A theoretical and practical guide. *Qualitative Research in Psychology*, *11*(1), 25–41.

https://doi.org/10.1080/14780887.2013.801543

Rogaten, J., Moneta, G. B., & Spada, M. M. (2013). Academic performance as a function of approaches to studying and affect in studying. *Journal of Happiness Studies, 14*(6), 1751–1763. https://doi.org/10.1007/s10902-012-9408-5

Roh, D., Bhang, S.-Y., Choi, J.-S., Kweon, Y. S., Lee, S.-K., & Potenza, M. N. (2018). The validation of Implicit Association Test measures for smartphone and internet addiction in at-risk children and adolescents. *Journal of Behavioral Addictions, 7*(1), 79–87. https://doi.org/10.1556/2006.7.2018.02

Rosen L. D., Carrier L. M., Cheever N.A. (2013). Facebook and texting made me do it: Media-induced task-switching while studying. *Computers in Human Behavior, 29*, 948-958. https://doi.org/10.1016/j.chb.2012.12.001

Rosen, L. D., Carrier, L. M., Pedroza, J. A., Elias, S., O, B. K. M., Lozano, J., … Ruiz, A. (2018). The role of executive functioning and technological anxiety (FOMO) in college course performance as mediated by technology usage and multitasking habits. *Psicologia Educativa*, *24*(1), 14–25. https://doi.org/10.5093/psed2018a3

Rozgonjuk, D., Kattago, M., & Taht, K. (2018). Social media use in lectures mediates the relationship between procrastination and problematic smartphone use. *Computers in Human Behavior*, *89*, 191–198. https://doi.org/10.1016/j.chb.2018.08.003

Rozgonjuk, D., Rosenvald, V., Janno, S., & Taht, K. (2016). Developing a shorter version of the Estonian Smartphone Addiction Proneness Scale (E-SAPS18). *Cyberpsychology-Journal of Psychosocial Research on Cyberspace, 10*(4). https://doi.org/10.5817/CP2016-4-4

Rozgonjuk, D., Saal, K., & Taht, K. (2018). Problematic smartphone use, deep and surface approaches to learning, and social media use in lectures. *International Journal of Environmental Research and Public Health, 15*(1), 1-11. https://doi.org/10.3390/ijerph15010092

Rudestam, K. E., & Newton, R. R. (2015). *Surviving your dissertation: A comprehensive guide to content and process* (4th edition). SAGE Publications, Inc.

Ruiz-Palmero, J., Sánchez-Rivas, E., Gómez-García, M., & Sánchez Vega, E. (2019). Future teachers' smartphone uses and dependence. Education Sciences, 9(194), 1-11. https://doi.org/10.3390/educsci9030194

Ruston, D., Orlebeke, A., Friedman, T., & Tabb, L. (2017). Screenagers' national survey reveals that the majority of U.S. middle schools allow students to carry cell phones throughout the school day. *Away For The Day*. https://awayfortheday.squarespace.com/survey

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Safar, A. H., & AlKhezzi, F. A. (2013). Beyond computer literacy: Technology integration and curriculum transformation. *College Student Journal, 47*(4), 614–626. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=59&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th edition). SAGE

Publications.

Salehan, M., & Negahban, A. (2013). Social networking on smartphones: When mobile phones become addictive. *Computers in Human Behavior*, *29*(6), 2632–2639. https://doi.org/10.1016/j.chb.2013.07.003

Samaha, M., & Hawi, N. S. (2016). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior*, *57*, 321–325. https://doi.org/10.1016/j.chb.2015.12.045

Sanford, K., & Madill, L. (2007). Understanding the power of new literacies through video game play and design. *Canadian Journal of Education*, *30*(2), 432–455. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=61&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Scheidet, R. A. (2003). Improving student achievement by infusing a web-based curriculum into global history. *Journal of Research on Technology in Education*, *36*(1), 77–94. https://doi.org/10.1080/15391523.2003.10782405

Schlehofer, M. M., Thompson, S. C., Ting, S., Ostermann, S., Nierman, A., & Skenderian, J. (2010). Psychological predictors of college students' cell phone use while driving. *Accident Analysis and Prevention*, *42*(4), 1107–1112. https://doi.org/10.1016/j.aap.2009.12.024

Schneider, D. E. (2018). Unstructured personal technology use in the classroom and college student learning: A literature review. *Community College Enterprise*, *24*(2), 10–20. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=65&sid=ab9a6892-

3891-4503-a413-eff154f8e43d%40redis

Schumacher, E. H., & Lauber, E. J., Glass, J. M., Zurbriggen, E. L., Gmeindl, L., Kieras, D. E., & Meyer, D. E. (1999). Concurrent response-selection processes in dual-task performance: Evidence for adaptive executive control of task scheduling. *Journal of Experimental Psychology: Human Perception and Performance*, *25*(3), 791-814. https://eds.s.ebscohost.com/eds/detail/detail?vid=71&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis&bdata=JkF1dGhUeXBlPXNoaWImc2l0ZT1lZHMtbGl2ZSZzY29wZT1zaXRl#AN=edsovi.00004788.199906000.00014&db=edsovi

Selart, M., & Johansen, S. T. (2011). Understanding the role of value-focused thinking in idea management. *Creativity & Innovation Management*, *20*(3), 196–206. https://doi.org/10.1111/j.1467-8691.2011.00602.x

Shadiev, R., Hwang, W.-Y., Huang, Y.-M., & Liu, T.-Y. (2015). The impact of supported and annotated mobile learning on achievement and cognitive load. *Journal of Educational Technology & Society*, *18*(4), 53–69. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=74&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Sharaievska, I., & Stodolska, M. (2017). Family satisfaction and social networking leisure. *Leisure Studies*, *36*(2), 231–243. https://doi.org/10.1080/02614367.2016.1141974

Shaw, M., & Black, D. W. (2008). Internet addiction: definition, assessment, epidemiology and clinical management. *CNS Drugs*, *5*, 353-365.

https://doi.org/10.2165/00023210-200822050-00001

Siebert, M. D. (2019). The silent classroom: The impact of smartphones and a social studies teacher's response. *Social Studies*, *110*(3), 122–130. https://doi.org/10.1080/00377996.2019.1580666

Smith, A. (2012). *The best (and worst) of mobile connectivity*. Pew Internet and American Life Project. Retrieved from: https://www.pewresearch.org/internet/2012/11/30/the-best-and-worst-of-mobile-connectivity/

Spiers, J., Morse, J. M., Olson, K., Mayan, M., & Barrett, M. (2018). Reflection/commentary on a past article: "Verification strategies for establishing reliability and validity in qualitative research." *International Journal of Qualitative Methods, 17, 1-2*. https://doi.org/10.1177/1609406918788237

St. Gerard, V. (2006). Updating policy on latest risks for students with cell phones in the school. *Education Digest, 4*, 43-45. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=79&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Stachowski, A. A., Hamilton, K. L., & Bertram, A. M. (2020). Exploring student and faculty reactions to smartphone policies in the classroom. *International Journal for the Scholarship of Teaching & Learning*, *14*(1), 1–12. https://doi.org/10.20429/ijsotl.2020.140111

Statista. (2020). *Most famous social network sites worldwide as of April 2020, ranked by number of active users.* Retrieved May 2, 2020, from

https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/

Stavropoulos, V., Alexandraki, K., & Motti-Stefanidi, F. (2013). Recognizing internet addiction: Prevalence and relationship to academic achievement in adolescents enrolled in urban and rural Greek high schools. *Journal of Adolescence*, *36*, 565–576. https://doi.org/10.1016/j.adolescence.2013.03.008

Stephens, K. K., & Pantoja, G. E. (2016). Mobile devices in the classroom: Learning motivations predict specific types of multicommunicating behaviors. *Communication Education*, *65*(4), 463–479. https://doi.org/10.1080/03634523.2016.1164876

Strasburger, V. C., Jordan, A. B., & Donnerstein, E. (2010). Health effects of media on children and adolescents. *Pediatrics, 125*(4). 756–767. https://doi.org/10.1542/peds.2009-2563

Strayer, D. L., Watson, J. M., & Drews, F. A. (2011). Cognitive distraction while multitasking in the automobile. *Eighty-First Annual Rocky Mountain Psychological Association Convention, April 14-16, 2011, Salt Lake City, Utah [Abstracts]*, 26. https://doi.org/10.1037/e741382011-014

Stupica, B. (2016). Rounding the bases with a secure base. *Attachment & Human Development*, *18*(4), 373–390. https://doi.org/10.1080/14616734.2016.1170052

Sun, J., Liu, Q., & Yu, S. (2019). Child neglect, psychological abuse and smartphone addiction among Chinese adolescents: The roles of emotional intelligence and coping style. *Computers in Human Behavior*, *90*, 74–83.

https://doi.org/10.1016/j.chb.2018.08.032

Swartzwelder, K. (2014). Examining the effect of texting on students' perceptions of learning. *Nursing Education Perspectives (National League for Nursing)*, *35*(6), 405–407. https://doi.org/10.5480/12-1012.1

Tao, Y.-H., Cheng, C.-J., & Sun, S.-Y. (2009). What influences college students to continue using business simulation games? The Taiwan experience. *Computers & Education*, *53*(3), 929–939. https://doi.org/10.1016/j.compedu.2009.05.009

Taylor, K., & Silver, L. (2019, February 5). *Smartphone ownership is growing rapidly around the world, but not always equally*. Pew Research Center. https://www.pewresearch.org/global/2019/02/05/smartphone-ownership-is-growing-rapidly-around-the-world-but-not-always-equally/

Terras, M. M., & Ramsay, J. (2016). Family Digital Literacy Practices and Children's Mobile Phone Use. *Frontiers in Psychology*, *7*(1957). 1-11. https://doi.org/10.3389/fpsyg.2016.01957

Thomée, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults--A prospective cohort study. *BMC Public Health*, *11*(66). 1-11. https://doi.org/10.1186/1471-2458-11-66

Tindell, D. R., & Bohlander, R. W. (2012). The use and abuse of cell phones and text messaging in the classroom: A survey of college students. *College Teaching*, 60(1), 1-9. http://dx.doi.org/10.1080/87567555.2011.604802

Tone, H.-J., Zhao, H.-R., & Yan, W.-S. (2014). The attraction of online games: An

important factor for internet addiction. *Computers in Human Behavior*, *30*, 321–327. https://doi.org/10.1016/j.chb.2013.09.017

Tong, J., Nachtmann, H., & Pohl, E. A. (2015). Value-focused assessment of cargo value decreasing rates. *Engineering Management Journal*, *27*(2), 73–84. https://doi.org/10.1080/10429247.2015.1035966

Uğur, N. G., & Koç, T. (2015). Mobile phones as distracting tools in the classroom: College students perspective. *Alphanumeric Journal*, *3*(2), 57–64. https://doi.org/10.17093/aj.2015.3.2.5000145549

ul Haq, A., & Chand, S. (2012). Pattern of Facebook usage and its impact on academic performance of university students: A gender based comparison. *Bulletin of Education & Research*, *34*(2), 19-28. https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=85&sid=ab9a6892-3891-4503-a413-eff154f8e43d%40redis

Uzun, A. M., & Kilis, S. (2019). Does persistent involvement in media and technology lead to lower academic performance? Evaluating media and technology use in relation to multitasking, self-regulation and academic performance. *Computers in Human Behavior*, *90*, 196–203. https://doi.org/10.1016/j.chb.2018.08.045

van der Schuur, W. A., Baumgartner, S. E., Sumter, S. R., & Valkenburg, P. M. (2015). The consequences of media multitasking for youth: A review. *Computers in Human Behavior*, *53*, 204–215. https://doi.org/10.1016/j.chb.2015.06.035

van Deursen, A. J. A. M., Bolle, C. L., Hegner, S. M., & Kommers, P. A. M. (2015). Modeling habitual and addictive smartphone behavior. The role of smartphone

usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Computers in Human Behavior*, *45*, 411–420. https://doi.org/10.1016/j.chb.2014.12.039

van Duijvenvoorde, A. C. K., Achterberg, M., Braams, B. R., Peters, S., & Crone, E. A. (2016). Testing a dual-systems model of adolescent brain development using resting-state connectivity analyses. *NeuroImage*, *124*(Part A), 409–420. https://doi.org/10.1016/j.neuroimage.2015.04.069

Wang, P., Wang, X., Nie, J., Zeng, P., Liu, K., Wang, J., Guo, J., & Lei, L. (2019). Envy and problematic smartphone use: The mediating role of fomo and the moderating role of student-student relationship. *Personality and Individual Differences*, *146*, 136–142. https://doi.org/10.1016/j.paid.2019.04.013

Warburton, K. (2003). Deep learning and education for sustainability. *International Journal of Sustainability in Higher Education*, *4*(1), 44–56. https://doi.org/10.1108/14676370310455332

Wartella, E., Rideout, V., Lauricella, A., & Connell, S. (2013). *Parenting in the age of digital technology: A national survey.* Washington, DC: Report of the Center on Media and Human Development, School of Communication, Northwestern University. http://cmhd.northwestern.edu/wp-content/uploads/2015/06/ParentingAgeDigitalTechnology.REVISED.FINAL_.2014.pdf

Wei, F.-Y. F., Wang, Y. K. W., & Klausner, M. (2012). Rethinking college students' self-regulation and sustained attention: Does text messaging during class

influence cognitive learning? *Communication Education*, *61*(3), 185–204. https://doi.org/10.1080/03634523.2012.672755

Wellman, B., Smith, A., Wells, A. T., & Kennedy, T. L. M. (2008). *Networked families*. Pew Internet and American Life Project. https://www.pewresearch.org/internet/2008/10/19/networked-families/

Wentworth, D. K., & Middleton, J. H. (2014). Technology use and academic performance. *Computers & Education*, *78*, 306–311. https://doi.org/10.1016/j.compedu.2014.06.012

Winskel, H., Kim, T-H., Kardash, L., & Belic, I. (2019). Smartphone use and study behavior: A Korean and Australian comparison. *Heliyon*, *5*(7). 1-8. https://doi.org/10.1016/j.heliyon.2019.e02158

Wood, E., Zivcakova, L., Gentile, P., Archer, K., De Pasquale, D., & Nosko, A. (2012). Examining the impact of off-task multi-tasking with technology on real-time classroom learning. *Computers & Education*, *58*(1), 365–374. https://doi.org/10.1016/j.compedu.2011.08.029

Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education*, *48*(2), 311–325. https://doi.org/10.1111/ejed.12014

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Sage.

Yoo, Y. S., Cho, O. H., & Cha, K. S. (2014). Associations between overuse of the internet and mental health in adolescents. *Nursing & Health Sciences*, *16*, 193-200. https://doi.org/10.1111/nhs.12086

Young, K. S. (2007). Cognitive behavior therapy with internet addicts: Treatment outcomes and implications. *CyberPsychology & Behavior, 10*(5), 671-679. https://doi.org/10.1089/cpb.2007.9971

Zhang, Y., Qin, X., Ren, P. (2018). Adolescents' academic engagement mediates the association between internet addiction and academic achievement: The moderating effect of classroom achievement norm. *Computers in Human Behavior, 89,* 299-307. https://doi.org/10.1016/j.chb.2018.08.018

Appendix A: Interview Questions

Interview Guide

1. Describe your experiences with smartphone use during class.
    a. Prompt: Describe how you interact with your smartphone during class.
    b. Prompt: Describe how others interact with their smartphones during class.
    c. Prompt: What feelings arise when you imagine not having access to your smartphone during the school day.
    d. Prompt: Describe how smartphone use affects learning.
    e. Prompt: Describe how much teachers compete with smartphones during class.
    f. Prompt: Describe how smartphone use affects the student-teacher relationship.
2. Describe the electronic device policy at your school.
    a. Prompt: *(If a policy exists)* Describe how this policy is enforced at your school. *(If no policy exists)* Describe how some individuals might try to enforce an electronic device policy at your school.
    b. Prompt: Describe how this policy (or lack of policy) affects you during class.
    c. Prompt: Describe how this policy (or lack of policy) affects others during class.
    d. Prompts: *(If a policy exists)* Imagine if your school eliminated their electronic device policy. What feelings arise? *(If no policy exists)* Imagine

if your school suddenly had an electronic device policy. What feelings arise?

e. Prompt: Describe what you believe to be an effective electronic device policy.

Appendix B: Interview Protocol Guide

Title of Study: *Teacher Perceptions of Appropriate Norms for Smartphone Use During Class*

Date:

Time of Interview:

Place: via Zoom

Interviewer: Tara Morrin

Interviewee:

Position of Interviewee:

Description of Study: The purpose of this study is to better understand teacher perceptions of smartphone use during class.

Pre-Interview Information and Questions:

- This interview is designed to be completed in a single session and no follow-up interviews will be needed.
- Your responses will remain confidential and you may exit the study at any time.
- May I record the interview?
- You will first receive a copy of your transcript to review for accuracy and then another after the completion of my analysis.

Interview Questions:

1. Describe your experiences with smartphone use during class.
    a. Prompt: Describe how you interact with your smartphone during class.
    b. Prompt: Describe how others interact with their smartphones during class.

c. Prompt: What feelings arise when you imagine not having access to your smartphone during the school day.

d. Prompt: Describe how smartphone use affects learning.

e. Prompt: Describe how much teachers compete with smartphones during class.

f. Prompt: Describe how smartphone use affects the student-teacher relationship.

2. Describe the electronic device policy at your school.

   a. Prompt: *(If a policy exists)* Describe how this policy is enforced at your school. *(If no policy exists)* Describe how some individuals might try to enforce an electronic device policy at your school.

   b. Prompt: Describe how this policy (or lack of policy) affects you during class.

   c. Prompt: Describe how this policy (or lack of policy) affects others during class.

   d. Prompts: *(If a policy exists)* Imagine if your school eliminated their electronic device policy. What feelings arise? *(If no policy exists)* Imagine if your school suddenly had an electronic device policy. What feelings arise?

   e. Prompt: Describe what you believe to be an effective electronic device policy.

Post-Interview Information and Questions:

- Thank you for participating in my study! Your participation will help me understand teacher perceptions of smartphone use during class.
- Are there any additional comments that you would like to include (i.e., that were forgotten during the interview)?
- Do you have any final questions?
- As a reminder, you will receive a copy of the transcript upon its completion and then another after I have analyzed the data.