

Teachers' Perspectives Toward Smartphone Usage by Students and Resulting Classroom Policies

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ABSTRACT

Currently, 95% of American teenagers own a smartphone device, and smartphone users spend on average about 5.4 hours a day on them. Smartphone ownership, usage, and dependency are higher among teens and young adults than in any other age group. This study addressed a gap in research by examining high school teachers' perspectives on two topics: the impact of smartphone usage on students and classroom smartphone policies. It contributes to a deeper understanding of the social, psychological, and academic effects of smartphone use on students and of the impact of teachers' beliefs surrounding smartphones on the classroom policies they set regarding those devices. In addition, this study aimed to shed light on the need to create effective and equitable smartphone policies and practices to help promote a classroom environment conducive to learning. Survey data from 248 teachers from six high schools in the Southern California region of the United States of America produced results indicating that teachers who have stronger negative beliefs concerning the social, psychological and academic effects of smartphones on students typically set a stricter classroom smartphone policy. Implications include helping students regulate their smartphone usage so that these devices can be effective tools for learning, not a distraction. Based on the findings from this study, an increase in face-to-face social interactions among students is recommended to increase academic achievement and decrease problematic smartphone use.

Keywords: social engagement, problematic smartphone use, academic achievement, high school students, smartphone classroom policy

In the United States, smartphone ownership has risen substantially among all ages, making these devices among the most purchased technologies in recent years (Perrin, 2017). Smartphone ownership among adolescents between the ages of 11 and 18 has increased by 19% over the past 5 years; 53% of 11-year-olds own a smartphone, as do 91% of 18-year-olds (Rideout & Robb, 2019). While ownership of these devices has risen significantly across all groups of Americans, ownership, use, and dependency are higher among teens and young adults than they are in any other age group (Anderson, 2019; Perrin, 2017; Pew Research Center, 2019; Rideout & Robb, 2019; Taylor & Silver, 2019).

Students' smartphone use in schools has become a controversial topic among educators, policy makers, and parents (Kadvany, 2019; McGreevy, 2019). Despite the growing usage of smartphones in the classroom, findings about their impact on student learning have been inconclusive (Berry & Westfall, 2015; Campbell, 2006; End et al., 2009; Shelton et al., 2009). The influence of smartphones on education, academic success, and learning remains uncertain and is an evolving field of study. While some researchers have concluded that these devices do not affect students' academic performance (Elder, 2013), others have found that they do (Campbell, 2006; End et al., 2009; Shelton et al., 2009). In addition, while some researchers have noted that banning or limiting smartphones in the classroom has helped increase academic success, others have found that teachers lift these bans so students can complete assignments (Higgins, 2013).

The purpose of this study was to investigate, through the lens of teachers, how smartphone use impacted high school students socially, psychologically, and academically. Most research on this topic has been conducted in college settings; of the few studies that have taken place in high school settings, most were conducted outside of the United States. In addition, there is scant research on the perspectives of teachers in the United States regarding this topic. These teachers spend about 180 days out of the year and about 7 hours a day with students (National Center on Education and the Economy, 2018). Thus, during the school year, they generally spend more time interacting with students than parents or any other professionals (Wolk, 2008). Because of the extent of teacher-student interactions, teachers can provide unique information about their beliefs regarding smartphones' social, psychological, and academic impacts on students and the influence of these beliefs on their classroom policies. Exploring these policies and teachers' reasons for implementing them will provide a better understanding of the extent to which smartphones impact students, enabling educational leaders and policy makers to develop effective policies and practices to ensure all students do well emotionally, achieve at high levels, and engage in more face-to-face social interactions. The following research questions helped guide this study: (i) What are teachers' perceptions of the social, psychological, and academic effects of smartphone use on high school students? and (ii) Are there differences in teachers' overall perceptions of these effects based on the smartphones policy they have implemented?

LITERATURE REVIEW

The literature review investigated the problem of increasing smartphone usage and its effects on students. The four topics examined in the literature review include the social impacts of smartphone usage among students, the psychological impacts of problematic smartphone use, the academic impacts of smartphone usage among students, and smartphone policies and their effectiveness.

Many researchers agree that face-to-face social interactions among students are essential to their learning, human development, happiness, and well-being (Epley & Schroeder, 2014; Hurst et al., 2013; Sandstrom & Dunn, 2014; Williams et al., 2019). The revolution in technology, however, has influenced how students interact with each other socially (Edwards, 2015). As a result, many researchers have studied the influence of smartphones on face-to-face social interactions among students, concluding that these devices undermine the pleasures of in-person social interactions (Dwyer et al., 2018; Moawad & Ebrahim, 2016; Smith et al., 2018; Weisskirch, 2009). Low-achieving students, who often come from low-income households, benefit most from social interactions with peers (Telhaj, 2018; Williams et al., 2019).

Researchers have recently begun to use the phrase *problematic smartphone use* to describe this new public health problem related to addiction and other psychological impacts of using these devices. For Billieux (2012), this term refers to an individual's inability to regulate their use of smartphones, resulting in negative consequences in their daily life. These negative psychological effects include poor memory, difficulty with concentration and decision making, anxiety, procrastination, and trouble sleeping (van Velthoven et al., 2018). Researchers around the world have been using the Smartphone Addiction Scale Short Version (SAS-SV; Kwon et al., 2013) instrument to measure problematic smartphone use. Among high school students, smartphone addiction was prevalent among 35.9% of Thai students and 12% Japanese students, with females showing higher addiction levels than males in both groups (Tangmunkongvorakul et al., 2020). Among college students in Japan, 22.8% of males and 28% of females screened positive for smartphone addiction suggesting an increase in addiction levels from adolescence to early adulthood (Tateno et al., 2019). As for high school students in the United States, 23% of males and 21% of females screened positive for smartphone addiction, and findings indicated that problematic smartphone use significantly correlates with depression, high stress, low self-esteem, lack of grit, and poor academic performance (Spiratos & Ratanasiripong, 2023). Such results indicate a need for early intervention to prevent problematic smartphone use and the psychological impacts it has on students.

Smartphones have entered classrooms as more students have come to own them, making it easy for teachers to implement policies and plans regarding educational technology (Rideout & Robb, 2019). Many teachers have found it convenient to replace old teaching methods with educational software, and both students and teachers have reported that smartphones, when used for learning, can be helpful and improve students' academic performance (Fernandez, 2018; Poll, 2015; Thomas et al., 2013). On the other hand, studies conducted on college students found that the presence of these devices in the classroom cause disruptions, cheating, and distractions that negatively impacted student learning (Bjornsen & Archer, 2015; Ward et al., 2017; Wood et al., 2012).

Teachers have found value in incorporating these devices into teaching and learning but have also found it difficult to regulate students' usage of them (Kadvany, 2019). For example, students can easily shift from working on an instructional task with their smartphone as a tool to using non-educational applications or texting their friends without their teacher's awareness (Klein, 2019). In addition, research has found that students' cognitive ability and academic achievement can be

impaired when these devices are left in their pockets during instruction (Ward et al., 2017). Considering these challenges, schools and educators have begun to implement various policies to increase classroom learning and academic achievement without the potential for disruptions, distractions, or cheating (Kadvany, 2019; Sweller et al., 1998). Beland and Murphy (2016) found that smartphone bans increased student learning and academic achievement, particularly among students who struggled academically, who tend to be from low-income households. Likewise, Berry and Westfall (2015) and Lancaster (2018) pointed out that promoting increased engagement in the classroom is an effective policy because students become involved in their learning instead of their smartphones.

Theoretical Frameworks

This study is based on two theoretical frameworks. The first is cognitive load theory (CLT; Sweller, 1988), which focuses on instructional design that regulates aspects of learning in a classroom setting or instructional material (Sweller et al., 1998). The idea behind CLT is that working memory, also referred to as short-term memory, has limited capacity, so overworking it can hinder learning. Since the objective of learning is to transfer new information from working memory to long-term memory, extraneous cognitive load should be decreased in favor of germane cognitive load; CLT offers instructional designers empirically based strategies to achieve that objective, enabling new information to be stored in an individual's long-term memory.

Cognitive load theory has been applied to multiple studies on the impact of smartphones on learning. Wood et al. (2012) used CLT to explain that learning becomes less successful when individuals participate in activities not related to the goal of the instructional task at hand. Research has also shown that students' use of these devices in educational settings will increase extraneous cognitive load, reducing academic achievement (Kalyuga, 2011). Extraneous cognitive load is thought to decrease working memory ability, which decreases cognitive abilities and causes a strain on academic achievement (Kalyuga, 2011). Lastly, Ward et al. (2017) researched the impact of smartphones on individuals' limited-capacity cognitive resources. Their research indicates that the mere presence of these devices, even when avoiding usage and focusing on a given task, reduces cognitive capacity. In addition, Ward et al. (2017) showed that cognitive costs are higher in individuals who are more reliant on their devices.

The second theoretical framework guiding this study is the theory of planned behavior (TPB; Ajzen, 1985), derived in 1980 from the theory of reasoned action. TPB is a psychological theory that explains how a person's beliefs connect to their behavior. The model employed by this theory demonstrates that a person's attitude and their perceived control over behavior, combined with society's subjective norms, shapes their intention, ultimately impacting their behavior or action (Ajzen, 1985).

METHOD

This study utilized a quantitative non-experimental design. An online survey was used to gather data because it was the easiest and fastest method to distribute and administer the survey as well as gather, export, and analyze the data (Creswell & Creswell, 2018). This study was designed to investigate how teachers perceive the social, psychological, and academic effects of classroom smartphone use on high school students. Further, it was meant to examine the differences in teachers' perceptions regarding those effects based on teachers' primary classroom policy for smartphones.

The quantitative data was needed to better understand the teachers' classroom policy decisions. The survey included quantitative data on teachers' primary and secondary smartphone policies in their classrooms as well as data from one instrument, the Scale of Teachers' Beliefs Concerning Mobile Devices (Coşkun & Cumaoglu, 2013).

Participant Sample

Purposive and convenience sampling were used to identify participants from six schools in three school districts in Southern California (Creswell & Creswell, 2018). These school districts were purposefully chosen based on their characteristics to provide a wide range of smartphone policies: one public school district with four medium-sized high schools, one public school district with a large comprehensive high school, and one private school district with a large comprehensive high school.

Data Collection

This study was approved by the University Institutional Review Board. A recruitment email and flyer were sent to potential participants. After reading the informed consent, participants who voluntarily agreed to participate in the study were directed to begin an anonymous 10-minute online survey.

Survey Instruments

Primary and Secondary Smartphone Policies in Classroom

Teachers were asked to indicate the primary and secondary smartphone policies they use in their classrooms, choosing among four types of policies. *Primary smartphone policy* is the policy used most often, while *secondary policy* is the policy used if the primary policy is not implemented. Under *Policy A*, students are not allowed to possess smartphones in class; the devices are placed in a designated area separated from the student. Under *Policy B*, students are allowed to possess smartphones but are prohibited from using them. Under *Policy C*, students are allowed to possess smartphones and to use them for academic purposes only. Under *Policy D*, students are allowed to possess smartphones and use them for both academics and leisure.

Scale of Teachers' Beliefs Concerning Mobile Devices

The Scale of Teachers' Beliefs Concerning Mobile Devices, developed by Coşkun and Cumaoglu (2013), assesses teachers' perspectives regarding the effects of smartphone use on students. Specifically, this scale contains three dimensions: a) nine items assessing social effects, b) three items assessing psychological effects, and c) three items assessing effects related to learning. This instrument assesses teacher's agreement level with each of the 15 items using a five-point Likert: *Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree*. Sample statements from this scale included, "I believe that mobile devices isolate students" and "I consider students' interest towards mobile devices is a level of addiction." Because the items in the scale indicated negative perceptions, lower scores indicated that teachers had strong negative beliefs concerning smartphones, while high scores indicated that teachers had strong positive beliefs. For each subscale, scores were calculated as a sum. For this study, the Cronbach's alpha for this instrument was .91.

Data Analysis

IBM SPSS (version 27) was used to analyze the study data, including descriptive statistics and analysis of variance (ANOVAs) with post-hoc tests.

RESULTS

Of the 585 high school teachers invited to participate, 282 (48%) responded to the survey, and 34 respondents were removed due to incomplete data. The final sample consisted of 248 participants (see Table 1). The average age of participants was 42.9 years old, and participants had an average of 15.61 years of teaching experience.

Teachers' Beliefs Concerning Smartphone Devices

For the first research question, *What are teachers' perceptions of social, psychological, and academic effects of smartphone use on high school students?*, data analysis included descriptive statistics such as the total mean score and three sub-scale mean scores of the Teachers' Beliefs Concerning Smartphone Devices Scale. Low mean scores indicate that a teacher has strong negative beliefs concerning smartphones and high scores indicate that a teacher has strong positive beliefs. For this study, the sum results from the social subscale ranged from 9 to 45 points, with an average of 23.28 points. The sum results from the psychological subscale ranged from 3 to 14 points, with an average of 6.23 points. The sum results from the learning subscale ranged from 3 to 13 points, with an average of 8.03 points. Finally, the sum results from the total score of teachers' beliefs concerning smartphone devices ranged from 15 to 71 points, with an average of 37.54 points. Based on the mean scores, teachers were between *undecided* and *agreement* with the social, psychological, and learning negative effects of students' smartphone usage (see Table 2).

Teachers’ Beliefs Concerning Smartphone Devices and Classroom Smartphone Policy

For the second research question, *Are there differences in teachers’ overall perceptions of the social, psychological, and academic effects of smartphone use on high school students based on the classroom smartphone policy they have implemented?*, a one-way ANOVA was used to examine whether overall teachers’ beliefs concerning smartphones differed based on their primary classroom policy regarding the devices. Table 3 shows that the stricter smartphone policies were associated with lower mean scores. The highest average score was for Policy D ($M = 44.2, SD = 10.8, n = 19$) and the

Table 1

Demographic Characteristics of Participants (N = 248)

Characteristic	<i>n</i>	%
Gender		
Male	87	35.1
Female	159	64.1
Race/Ethnic Background		
Asian/Pacific Islander	38	15.3
Black/African American	4	1.6
Latinx/Hispanic	23	9.3
White	152	61.3
More than one race/ethnicity	28	11.3
Age (years)		
20–25	8	3.2
26–35	63	25.4
36–45	65	26.2
46–55	72	29.0
Over 55	31	12.5
Teaching Experience (years)		
1–5	40	16.1
6–10	48	19.4
11–15	31	12.5
16–20	45	18.1
21–25	48	19.4
Over 25	33	13.3
Teaching Department		
STEM: Science, Technology, Engineering, and Math	87	35.1
Humanities: English, Social Science, World Languages, Religious Studies	10	4.1
Electives: Career and Technical Education, Visual Arts, Film, Media, Performing Arts, Physical Education, Sports, Health	34	13.7
Special Education	23	9.3

smallest for Policy A ($M = 34.1$, $SD = 8.8$, $n = 32$). The omnibus ANOVA test was statistically significant, $F(3, 237) = 6.88$, $p < .01$, with a medium effect size, $\eta^2 = 0.08$. Tukey's post hoc procedure indicated that teachers who implemented Policy A or Policy B as their primary policy reported significantly stronger negative beliefs concerning smartphones than teachers whose primary policy was Policy D. Thus, teachers who had stricter smartphone policies that did not allow students to use smartphones in the classroom had greater negative beliefs concerning these devices and their effect on students. That is, teachers with stronger negative beliefs tended to set stricter policies.

Table 2

Average Scores of Teachers' Beliefs Concerning Smartphone Devices (N = 248)

Characteristic	<i>M</i>	<i>SD</i>	Sample Observed Scores	Possible Scale Scores
Social	23.28	6.58	9–45	9–45
Psychological	6.23	2.13	3–14	3–15
Learning	8.03	2.08	5–15	3–15
Total	37.54	9.58	25–65	15–75

Table 3

ANOVA Comparisons of Overall Scores from the Teachers' Beliefs Concerning Smartphone Devices Scales, by Classroom Smartphone Policy

Primary policy	Permissions for smartphones			<i>n</i>	<i>M</i>	<i>SD</i>	Tukey's HSD comparisons (<i>p</i> value)		
	Possession in class	Use					Policy A	Policy B	Policy C
A	No	None		32	34.1	8.8			
B	Yes	None		70	35.3	8.8	.922		
C	Yes	Academic		120	38.7	9.2	.058	.071	
D	Yes	Academic, leisure		19	44.2	10.8	<.001	.001	.073

DISCUSSION

Results from this study indicated that teachers tend to perceive negative social, psychological, and learning effects of students' smartphone usage. Even though research has indicated that there are advantages of using smartphones for learning purposes (Elder, 2013; Hartnell-Young & Vetere, 2008; Smith-Stoner, 2012; Thomas et al., 2013), some teachers that have employed them as instructional tools have found that students get distracted by non-educational applications and lose focus in the task at hand (Kadvany, 2019; Klein, 2019) and that reduced smartphone usage in the classroom increased students' social interactions (Dwyer et al., 2018; Moawad & Ebrahim, 2016; Smith et al., 2018; Weisskirch, 2009), which may influence teacher's perceptions on the benefits of using smartphones in the classroom.

The theory of planned behavior (TPB; Ajzen, 1985) explains how a person's beliefs connect to their behavior. Based on the results from this study, teachers' beliefs about the effects of smartphones are related to the level of restriction in the classroom policies they implement. Specifically, teachers with stronger negative beliefs regarding smartphones and their

effects on students tended to set stricter policies, including prohibiting their use in classrooms. Although some evidence indicates that restrictive classroom policies regarding smartphones improve students' academic achievement, particularly for those below proficiency level (Beland & Murphy, 2016).

Implications and Recommendations

This study provides guidance for teachers and school administrators interested in learning about the relationship between teachers' beliefs about smartphones and the classroom policies they employ. To advance the findings from this study, future research is needed to better understand the benefits and risks of using smartphones for instruction and improve teachers' and school's decision-making around their policies and practices regarding these devices.

The rise in students' smartphone usage affects learning for students across the world (Perrin, 2017). Previous research indicated that students were less likely to use their smartphones in classes that involved frequent active participation, group work, and classroom activities than classes that involved direct instruction (Berry & Westfall, 2015; Lancaster, 2018). Therefore, the first recommendation for teachers is to encourage and promote high face-to-face student engagement, group work, and student-centered activities. Previous studies have also highlighted that classroom engagement is more effective at increasing student achievement than a smartphone ban, since the former engages students in learning instead of in their smartphones (Berry & Westfall, 2015; Lancaster, 2018). These recommendations will help students struggling academically, who tend to be from lower income households, because these students receive the greatest academic benefits from social interactions with peers (Beland & Murphy, 2016; Telhaj, 2018; Williams et al., 2019).

Another recommendation for teachers is to use CLT elements to regulate their classroom learning environments by implementing smartphone practices and policies (Sweller, 1988). For example, if smartphones are not part of the instructional goal, teachers should teach students to put them in their backpacks or a designated area away from their desks so they are not distracted from their learning.

It is imperative that school administrators develop effective and equitable school and classroom smartphone policies that control smartphone interference in students' learning (Pupils: Use of Smartphones, 2019). This policy, however, should not ban students from bringing smartphones to schools entirely, as this will create inequities in schools that serve students from lower income neighborhoods (Zimmerman, 2019). For this school-wide policy to be effective, school administrators should involve all staff members in the development of both school and classroom smartphone policies. The development of such policies can be done through surveys and discussions to collect staff input, knowledge, and perspectives surrounding student smartphone use and policies. Along with this policy, administrators should ensure a Chromebook or iPad is provided to each student and that each classroom has a high-quality internet connection to substitute the need to use smartphones in the classroom for learning. Schools should also be required to revisit their smartphone policy semiannually because of changing trends in technology and students' smartphone usage (Rideout & Robb, 2019; Silver et al., 2019).

CONCLUSION

Issues regarding social interactions, academic achievement, and emotional and mental well-being are related to problematic smartphone use. The problem involving excessive use and the inability for people to control when it is appropriate to use their device is a problem faced globally. It is also a problem that currently receives limited attention. This study highlights the importance of increasing the awareness and knowledge of school personnel about the benefits and potential risks of using smartphones in the classroom so policies that are conducive to having positive social, psychological, and learning effects on students can be employed.

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