Does the banning of cell phones in high school increase on-task behaviours?

Chris Kennedy, Michelle LaBounty, Sandra-Lynn Shortall

ELPS 800 and ELPS 975

Professors John L Rury and Yong Zhao

May 21, 2019

SECTION ONE: Statement of the Problem

A. Specific Topic

Does the banning of cell phones in high school increase on-task behaviours?

B. Question or problem of focus

The Ericsson Mobility Report MWC published in February 2016 extrapolated that at that time the "Total social networking traffic over the next 6 years [would] be around 12 times that of the last 6 years…The forecast social networking traffic for the next 6 years is comparable to every person on earth using social networks for 35 minutes every day (p.9) Consumers are increasingly participating in and sharing information on multiple social media platforms. With an expected net addition of 3 billion smartphone subscriptions by the end of 2021, many more consumers will have easy access to social networks via apps and web browsers.

Smartphones have become increasingly interlaced with youth within our high schools and as these devices progressively become ubiquitous in our classroom there is an increasing movement to ban their use as to increase on-task behaviors. Schools, jurisdictions and even countries banning cell phones in schools has made major news, and the the tide which may have first started with banning, and then moved to allowing is moving again towards banning. The research advocates of a ban (Brand and Murphy, 2015) suggests that banning phones can increase student grades. There is also research to suggest that even in schools that ban cell phones, students are still using them regularly to support their work (Gao et al., 2014; Humble-Thaden, 2011; Walker, 2013). Further research supports the idea that restricting wireless mobile devices in frequent users can lead to negative psychological consequences including anxiety and stress (Cheever et al., 2014).

If students perceive that mobile devices are valuable tools that can be used to run a wide range of applications in addition to communication and entertainment purposes, they may violate the policies that prohibit their use if they do not agree with them and may secretly use the phone at school (Gao et al., 2018; O'Donnell and Epstein, 2019).

C. Hypothesis

It is our belief that banning cell phones in classes can have the desired immediate effect of limiting cell phone usage however, it does not ensure greater classroom attention and focus for students.

SECTION TWO: Review of Literature

A. Cell phone use in class

There is an abundance of commentary on finding a middle ground between an outright ban and free use of cell phones in classes. In 2012, Charles noted, "Regardless of potential dangers, teachers and students... overwhelmingly felt the need for a reasonable and balanced perspective on the issue of rules for new technologies, especially around mobile devices such as cell phones and smartphones" (p. 15). Given the pros and cons of student mobile phone use and the differing perspectives of students, parents, educators and health professional on their impact, the challenge of the development of appropriate policies of student smartphone use is one that is being faced in classrooms around the globe.

Significant differences exist for both positive and negative impact of mobile phone use amongst school-based stakeholders of students, teachers, and parents; these differences have an impact on the effectiveness of the policies developed to address cell phone use. In most cases, teachers, as policymakers, in an attempt to place greater importance on the need to prevent the distractions and disturbances caused by student cell phone use, chose to ban the devices in the classroom. (Gao et al., 2017). As this perception is generally not shared by the student users, who have a positive perception of the educational applications of cell phone use, they generally chose to continue to bring and use their devices secretly (Cheever et al., 2014; Gao et al., 2017; Judd and Kennedy, 2010; O'Donnell and Epstein, 2019' Walker, 2013).

In a review published in 2019 of 15 studies conducted between 2012 and 2017 that outlined interventions to technological device use, Parry and le Roux established that current interventions fall into three categories: awareness, restriction, and mindfulness. The intention of their study was to determine the which type of intervention was the most effective. One study showed that when one type of online activity was restricted, the time allocated to other online media increased; "Overall, restriction interventions have produced varied results for both behavioural and cognitive outcomes" (p. 322) while "improving metacognition with regards to media multitasking can empower individuals to regulate their behaviour and, as a result, maintain allocation of attention to task-related activities" (p. 321).

The directive of restriction and the developmental nature of adolescence can be a detrimental combination. "If adults try to block the flow of adolescence, it is likely that communication, so important to relationships, will be tainted with tension and disrespect. Disconnection, secrecy, isolation, and many other negative and hurtful social responses can emerge" (Siegel, p. 17, 2015). The balancing act for adolescents and adults alike is one of communication and connection (Zhang et al., 2012). Recognizing the need to seek ways to optimize adolescents' desire for social power

and digital contact in the academic context is critical. Teens have a frantic need to belong, recent "neuroimaging studies show the dramatic sensitivity of adolescents to peers" (Sapolsky, 2017, p.165). Belonging to social networks and digital connections with peers is part of "psychological drive of a teenager toward autonomy and identity" (Shipp, 2018, p. 208). These considerations illuminate the complexity facing school systems as they grapple with the convoluted dimensions of digital policies and the realities of adolescent development.

B. On Anxiety and Stress

"Roughly four-in-ten teenagers said they feel anxious when they leave home without their cell" (Paul, 2018). According to a 2014 study in "Computer in Human Behaviour" heavy smartphone users can't go ten minutes without their phone before suffering from anxiety (Rosen, 2014). A recent study by the Canadian government aligns with the statistics from the United States reinforcing the prevalence of smartphone use in our adolescent population. Health Canada spent $87, 000 in 2018 on national focus groups to find out how teenagers feel about social media. Their research mirrored the American findings and emphasized the connections between time online, stress and anxiety. The report found that Canadian teens described "social media usage as a coping mechanism for social anxiety" (Smith, 2018). The focus group teens reported using smartphones as a escape tool in awkward social situations. "At family events when you don't want to talk to someone, it is easiest just to take out your phone and avoid the awkward conversation" (Smith, 2018). The research findings illuminate the reciprocal usage of cellphones for social connections and social disconnections.

86% of Canadians own a smartphone according to the latest stats from Consumer Technology Association (CTA, 2018). Over 31.5 million people in Canada subscribed to a wireless device in August 2018, with Alberta leading the provincial rates with household smartphone penetration stats of 92%. The lowest Canadian rates of household usage reside in the Atlantic provinces at 74% (Hardy, 2018).

Consumers are increasingly participating in and sharing information on multiple social media platforms. With an expected net addition of 3 billion smartphone subscriptions by the end of 2021, many more consumers will have easy access to social networks via apps and web browsers (Ericsson Mobility Report, 2016). Research has identified links between anxiety and not being able to check in with various technologies and that the use of social media in youth has a major negative impact on mood and predicted increases in the symptoms of anti-personality and compulsive personality disorders (Rosen et al., 2013); there is cause for concern on the potential negative effects that this prevalent access is having.

The omni-presence of mobile devices has led to the widespread expectation that humans are able to access information and connect with others within seconds. This expectation of immediate gratification has conversely resulted in feelings of anxiety when this instant access is interrupted. In a study shared in the Ericsson Mobility Report in 2016 "participants were exposed to a high degree of delays [in connectivity], a medium degree of delays or no delays at all while they completed tasks, allowing a detailed analysis of how the duration and extent of delays affected emotional engagement and stress." When these delays occurred, respondents demonstrated heart rate increases of 38% due to mobile delays and 24% increases in stress due to video buffering. (Ericsson Mobility Report MWC, 2016)

Because of the ubiquitous nature of the Wired Mobile Device, it is important to understand how its use affects people's well-being, and the psychological consequences of having the device taken from frequent users" (Cheever et al., 2014, p. 290). Studies have demonstrated that strong attachments are formed between young adults and their phones and separation anxiety can result from removal from the device (Cheevers et al. 2014; Gao et al., 2014; Konok et al., 2017; O'Donnell and Epstein, 2019; Tams et al., 2018; Trub and Barbot, 2016;), even citing that smartphones are more powerful reinforcers than food (O'Donnell and Epstein, 2019).

Michael Ungar, a researcher in the field of social and psychological resilience at Dalhousie University in Nova Scotia, Canada, states "there is definitely something addictive about the ping of a text and the scrolling counter telling us how much others 'like' us. It has made us all (children and adults) into gamblers, sitting in our bedrooms just like slot players sit in windowless casinos, forgetting the time of day, addicted to the next spin and the possibilities it brings" (Ungar, 2019). Ungar's research accentuates the connection between online addiction and bullying as a significant contributor to the increasing rates of adolescent anxiety in Canada. The Canadian Medical Journal recently reported a study by Quebec research team which "found that among a large sample of teens 59% reported moderate exposure to bullying, and 14% reported chronically high exposure to bullying both in person and online" (Ungar, 2019). This study examined the developmental course of victimization to increasing rates of debilitating depressive-generalized anxiety problems and suicidality. "Adolescents who were most severely victimized by peers (online or in person) had an increased risk of experiencing severe symptoms consistent with health problems" (Geoffroy et al., 2018).

The connections between cyberbullying, student focus, attention, anxiety and stress warrants deeper examination. Alongside the increasing number of suicides directly linked to cyberbullying, other consequences arise for bullying's online victims. Florida Atlantic University's 2017 study stated approximately 64% of students claim that cyberbullying has impacted "both their feelings of safety and ability to learn at school." Cook's 2018 research on cyberbullying notes that while 43% of kids report to have been victims of cyberbullying at least once, 25% have been victimized

more than once, yet there remains a "stunning lack of data" beyond the circumstantial numbers (p. 10-11).

Surprisingly, a study from the National Center for Education Statistics published in 2019 indicated that public schools in the United States that did not allow cell phone use indicated a higher percentage of principal-reported daily/weekly cyberbullying. Coupled with a decrease of public school reporting the prohibition off cell phones from 90.9 % (US Department of Education, 2010) in 2010 to 65.8% in 2016 (Eanes, 2019), this data points to the necessity for further study on the successful uses, interventions, and supports with mobile phone use in educational setting (Olufadi, 2015).

While there is general agreement that "cyberbullying can negatively impact a students' overall success by cutting into their motivation" (Cook, 2018, p.8), the research is still at an infancy stage and lacks depth related to the long-term impact of cyberbullying on human development.

As a result of these distressing statistics many Canadians are now connecting the dots between mental wellness, addictive behaviours and digital technologies. Recently the Toronto District School Board (TDSB) has been the target of mass media hype around a proposed cell phone ban in all of it's public schools effective September 2019. While the TDSB's submission to the Ontario Ministry of Education in December 2018 did not support a system-wide ban on cell phones in schools or classrooms, recent media now states otherwise. Ontario's Education Minister Lisa Thompson recently proclaimed "Students need to be able to focus on their learning - not their cell phones. By banning cellphone use that distracts from learning, we are helping students to focus on acquiring the foundational skills they need, like reading, writing and math" (Jones, 2019). If we consider recent research by the Pew Centre stating 92% of teens are online daily and 88% of twelve to seventeen years old have cell phones, then blanket bans could reinforce a rigid power dichotomy between students and educators. The binary conditions created by blanket cell phone bans in schools could potentially compromise society's ability to address the deeper issues of anxiety and stress related to online distractions and interactions for our youth (Shipp, 2017, p. 208).

C. Effect on academic success and on-task behaviour

The countless studies that warn of of the potential dangers of smartphone accessibility and use on cognitive performance, attention, and anxiety, (Chein et al., 2017) have done little to dissuade or slow the pace of their integration into modern society, with millions of new users every year.

One of the challenges of studies so far (Beland and Murchy, 2015) is that they look at the effect of student achievement on standardized tests. Rather than looking more broadly at projects and

other work associated with the modern classroom, the research is quite focused on traditional measures. The research of Beland and Murphy indicated that cell phone use had no impact on higher performing students but a negative impact on low performing students.

There is also research at the university level that shows the negative connection between cell phone use and GPA (Lepp et al, 2015). The research at Kent State indicated that as cell phone use increased, GPA decreased.

The causation between declining rates of academic success, on-task behaviour and cell phone usage is compromised without exploring the impact of student motivation. Motivation is difficult to measure due to its roots in the affective domain. Considering the fact that "cognition and affect always interact" (Sapolsky, 2017, p. 672), research linking the negative effects of cellphone usage on student achievement can be argued to be inconclusive if consideration is not fused to a students' sense of purpose, attachment and relationships. Teens primarily use technology to connect with friends and peers, the reality is "their cell phone is not a tech device, it's a relational device" (Shipp, p. 208, 2018). The research on academic success, on-task behaviour and cell phone usage falters without the consideration of the behaviours of the adolescent prefrontal cortex. The impact of banning cell phones in schools on adolescent social memory, emotional perspective-taking, impulse control, empathy, ability to work with others and self-regulation is critical and is currently lacking long-term conclusive research.

SECTION THREE: Research Methodology

A. Data to be used

Participants will be recruited from 9th, 10th, 11th, and 12th English classes within three high schools. As all students are required to participate in English Language classes, this will represent a majority representation of students. The cross section of students to be included in the study will include students from a range of cultural and socio-economic backgrounds and will approximately reflect the general West Vancouver population. For the purpose of this study, students with cognitive impairments, delays, or chronic health issues will be excluded from the analyses. Participant age ranges within the study will include students between the ages of 13 and 19. It is anticipated that there will be an equal distribution of gender within the sample, however, it will be dependent on the sample of students that are eligible to participate within the given time frame.

B. Data collection and related issues

Survey of smartphone use will be conducted over the course of the week prior to the survey to determine the average time spent on a device during English classes. The survey will include questions that determine the functions of the smartphone including: sending and receiving text messages, playing video games, visiting websites, using social media apps, listening to music or podcasts, watching television or movies, reading books or magazines, participating in online chats, talking on the phone, reading and responding to email, and talking on the telephone.

Students will randomly be assigned to two groups, those whose smartphones will be surrendered to a separate location out of reach, and those who will be allowed to keep their smartphones, but silence them or access them as they typically would. Students will be seated in alternating between those will access to their smartphones and those who have had access to their smartphones removed. Students will be asked to complete a survey at the end of each class indicating their level of on-task behaviour and their level of anxiety and a list of activities they completed during the period both on and off their phone, which would be seen as off-task.

C. Methods of analysis

Results will be compared between the groups of students who had regular access to their cell phones and those who had no access to their cell phones to see if there are similarities or differences.

SECTION FOUR: Expected Outcomes

A. Hypotheses

Hypothesis 1. Banning smartphones will increase the level of anxiety in students during the period of time that it is taken away.

Hypothesis 2. Banning smartphones will result in students replacing the behaviours normally associated with the device (such as accessing social media, texting, playing video games) with similar activities on another device (tablet, laptop).

Hypothesis 3. Banning smartphones will result in an increase in students hiding, not admitting to having a mobile device, with extreme cases contributing to a decrease in attendance.

Hypothesis 4. Banning smartphones will result in replacement off-task behaviours.

B. Relation to other studies (summary)

The expected outcome is that this study leads to support the notion that instead of banning mobile devices in the classroom, as this may lead to other adverse effects, that strategies to teach good cell phone habits be implemented to mitigate some of the potential negative consequences of their use (Chien, 2017; Rosen, 2017; Sterner, 2015). The reframe of using cell phones within the classroom as pervasive learning tools enable students to become more active participants in their learning through the access to the information afforded to them by the internet (Engel & Green, 2011). And if, "by implementing the use of cell phones in the classroom, some students may feel a higher level of comfort responding through technology rather than in person" (Humble-Thaden, 2011, p.13), could educators be better utilizing the devices for learning?

"Should schools continue to ban students' mobile phone use due to it being a source of disruption or start to take advantage of mobile phones as powerful tools for learning?" (Gao et al., 2017, p. 14). As students generally view mobile devices as important tools for learning and communication with peers rather than mere distractions, more constructive uses of technology where teachers can better utilize the instructional benefits and motivation of their use should be investigated and shared.

Data indicates that in 2018 there were 7.9 billion mobile subscriptions representing a global mobile penetration of 104% (Ericsson, 2018). 45% of teens say they use the use the internet constantly, 95% of teens report they have a smartphone or access to one (Anderson, 2018). As cell phone use globally continues to increase at a rate that is greater than even the rate of population growth, what is evident is that teachers must be better able to model appropriate use to maximize the effectiveness of the devices as tools for learning within the classroom.

References

Anderson, M. & Jiang J. (2018, May 31). Teens, Social Media & Technology 2018. Retrieved from https://www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/

Beland, L. P. and Murphy, R. (2015) Technology, Distraction and Student Performance. The Centre for Economic Performance Publication Unit.

Charles, A. (2012) Cell Phones: Rule-Setting, Rule-Breaking, and Relationships in Classrooms. American Secondary Education, Vol. 40, No. 3 (Summer 2012), pp. 4-16

Cheever, N. A., Rosen, L. D., Carrier, L. M., & Chavez, A. (2014). Out of sight is not out of mind: The impact of restricting wireless mobile device use on anxiety levels among low, moderate, and high users. *Computers in Human Behavior*, *37*, 290-297.

Chein J. M., Wilmer H. H., & Sherman, L. E. (2017). Smartphones and Cognition: A Review of Research Exploring the Links between Mobile Technology Habits and Cognitive Functioning. Frontiers in Psychology, 8, 605.

Chen, Chang, & Wang. (2008). Ubiquitous learning website: Scaffold learners by mobile devices with information-aware techniques. Computers & Education, 50(1), 77-90.

Cook, S. (2018, November 12). Cyberbullying facts and statistics for 2016-2018. Retrieved from https://www.comparitech.com/internet-providers/cyberbullying-statistics/

Crime and Safety Survey. Table 25. Percentage of public schools reporting use of specified school practices: School year 2009–10. (2010). In *U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (NCES), 2009–10 School Survey on Crime and Safety (SSOCS).* . Retrieved from https://nces.ed.gov/surveys/ssocs/tables/all_2010_tab_25.asp?referrer=css

Eanes, S. (2019). Cyberbullying and Cell Phone Policy in US Primary and Secondary Schools. Data Point. NCES 2019-053. National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubs2019/2019053.pdf

Ericsson. *Ericsson mobility report Q4 2018 update*. Retrieved from https://www.ericsson.com/assets/local/mobility-report/documents/2019/emr-q4-update-2018.pdf

Ericsson. *Ericsson mobility report mobile world conference February 2016*. Retrieved from https://mypresswire.com/log/pm_files/file_31840.pdf

Engel, G. & Green, T. (2011). Cell Phones in the Classroom: Are We Dialing up Disaster? TechTrends: Linking Research and Practice to Improve Learning, 55(2), 39-45.

Gao, Yan, Zhao, Pan, & Mo. (2014). To ban or not to ban: Differences in mobile phone policies at elementary, middle, and high schools. Computers in Human Behavior, 38, 25-32.

Geoffroy, M. C., Bolvin, M., Arseneault, L., Renaud, J., Perret L. C., Turecki, G., Michel G., Salla, J., Vitaro F., Brendgen M., Tremblay R. E., Cote, S. M. (2018). Childhood trajectories of

peer victimization and prediction of mental health outcomes in mid-adolescence: a longitudinal population-based study. *Canadian Medical Association Journal*, 190 (2), 37-43.

Gilroy, M. (2004). Invasion of the Classroom Cell Phones. *Education Digest: Essential Readings Condensed for Quick Review, 69*(6), 56-60.

Grant, M. M, Tamim, S., Brown, D. B., Sweeney, J. P., Ferguson, F. K., & Jones, L. B (2015). Teaching and learning with mobile computing devices: Case study in K-12 classrooms. *TechTrends: Linking Research and Practice to Improve Learning*, 59(4), 32-45.

Hardy, I. (2018, November 5). 86 percent of Canadians own a smartphone, says CTA report. Retrieved from https://mobilesyrup.com/2018/11/05/86-percent-of-canadians-own-smartphone/

Humble-Thaden, M. (2011). Student Reflective Perceptions of High School Educational Cell Phone Technology Usage. *The Journal of Technology Studies, 37*(1/2), 10-16.

Jones, A. (2019, March 12). Ontario to ban cellphones in classrooms next school year. Retrieved from https://www.cbc.ca/news/canada/toronto/ontario-school-classroom-cellphone-ban-1.5052564

Judd, Terry, & Kennedy, Gregor. (2011). Measurement and Evidence of Computer-Based Task Switching and Multitasking by "Net Generation" Students. Computers & Education, 56(3), 625-631.

King, Valença, Silva, Baczynski, Carvalho, & Nardi. (2013). Nomophobia: Dependency on virtual environments or social phobia? Computers in Human Behavior, 29(1), 140-144.

Konok, Pogány, & Miklósi. (2017). Mobile attachment: Separation from the mobile phone induces physiological and behavioural stress and attentional bias to separation-related stimuli. Computers in Human Behavior, 71, 228-239.

Lenhart, A. (2015, April 9). Teens, Social Media & Technology Overview 2015. Retrieved from https://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/

Lepp, Andrew, Barkley, Jacob & Karpinski, Aryn. (2015)The Relationship Between Cell Phone Use and Academic Performance in a Sample of U.S. College Students, Sage Journals.

Olufadi, Y. (2015). A configurational approach to the investigation of the multiple paths to success of students through mobile phone use behaviors. Computers & Education, 86, 84-104.

Parry, D. A., & le Roux, D. B. (2019). Media multitasking and cognitive control: A systematic review of interventions. *Computers in Human Behavior*, 92, 316-327.

Paul, K. (2018, August 25). This is what happens when you take phones away from teenagers. Retrieved from https://www.marketwatch.com/story/this-is-what-happens-when-you-take-phones-away-from-teenagers-2018-08-22

Rosen, L. D. (2017). The Distracted Student Mind--Enhancing Its Focus and Attention. Phi Delta Kappan, 99(2), 8-14.

Rosen, L.D., Whaling, K., Rab, S., Carrier, L.M., & Cheever, N.A. (2013). Is Facebook creating "iDisorders"? The link between clinical symptoms of psychiatric disorders and technology use, attitudes and anxiety. Computers in Human Behavior, 29(3), 1243.

Sapolsky, R. M. (2017). *Behave: The Biology of Humans at Our Best and Worst.* New York, NY: Penguin Press.

Siegel, D. J. (2011). *Brainstorm: The Power and Purpose of the Teenage Brain*. New York, N.Y.: Penguin Press.

Shipp, J. (2017). *The Grown-Up's Guide to Teenage Humans*. New York, N.Y.: Harper Collins.

Smith, M. D. (2018, June 14). Government survey confirms that yes, Canadian teens really like their smartphones. Retrieved from https://nationalpost.com/news/politics/government-survey-confirms-that-yes-canadian-teens-really-like-their-smartphones

Sterner, R. (2015). 4 Things You'll Miss by Banning Cell Phones in Your Classroom. The Education Digest, 81(2), 56-58.

Tams, Legoux, & Léger. (2018). Smartphone withdrawal creates stress: A moderated mediation model of nomophobia, social threat, and phone withdrawal context. Computers in Human Behavior, 81, 1-9.

Thomas, K. & Muñoz, M. A. (2016) 'Hold the Phone! High School Students' Perceptions of Mobile Phone Integration in the Classroom', American Secondary Education, vol. 44, no. 3, pp. 19-37.

Trub, & Barbot. (2016). The paradox of phone attachment: Development and validation of the Young Adult Attachment to Phone Scale (YAPS). Computers in Human Behavior, 64, 663-672.

Ungar, M. (2018, January 16). *Teens and Dangerous Levels of Cell Phone Use*. Retrieved from https://www.psychologytoday.com/ca/blog/nurturing-resilience/201801/teens-and-dangerous-levels-cell-phone-use

Walker, R. (2013) “I don't think I would be where I am right now". Pupil perspectives on using mobile devices for learning', Research in Learning Technology, vol. 21, pp. 1-12.

Zhang, Weiyu, & Zhang, Lingzi. (2012). Explicating multitasking with computers: Gratifications and situations. Computers in Human Behavior, 28(5), 1883-1891.