

# **Smartphones in High Schools: Dumb Idea?**

**by**

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## **Abstract**

In public high schools, “appropriately” managing smartphones is an ongoing topic of debate. There are not only evident trade-offs but also significant primary research gaps with respect to academic and developmental impacts, divergent pedagogical paradigms, and varied stakeholder opinions within each school community. Smartphones provide promise as educational tools as they can address aspects of school’s digital and print resource constraints while offering access to both a variety of online platforms and software pertinent to an educational context. However, the devices also pose risks to students’ holistic well-being and the overall learning environment, placing an additional burden on teachers and administrators with their management. This study examines the motivations and effects of three different smartphone policies and provides a multi-criteria analysis using a literature review, conducted interviews, and a cross-jurisdictional scan of case studies. The study concludes with a recommended policy option and the key considerations behind its implementation.

**Keywords:** smartphones; cell phones; secondary schools; high school; ban; technology

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## List of Acronyms

|             |   |
|-------------|---|
| BC          | British Columbia (B.C.)   |
| BCTF        | British Columbia Teachers' Federation   |
| BYOD        | Bring your own device (policies)  |
| GUD         | Growing Up Digital in Alberta research project  |
| NGO         | Non-Government Organization   |
| NSW         | New South Wales (state in Australia)  |
| NY/NYC      | New York City, often "New York" is understood to refer to the city as opposed to the US state.  |
| NZPF        | New Zealand Principals' Federation  |
| PDA         | Personal digital assistant  |
| SFU         | Simon Fraser University   |
| SNPDEN-UNSA | Syndicat national des personnels de direction de l'Éducation nationale (National Union of National Education Executive Staff) - l'Union nationale des syndicats autonomes (National Union of Autonomous Trade Unions) |
| SPANZ       | Secondary Principals' Association of New Zealand  |
| TDSB        | Toronto District School Board   |
| UK          | United Kingdom  |
| US          | United States (of America)  |

## Executive Summary

The contentious debate around the trade-offs of smartphones in high schools has resulted in a wide variety of approaches. In Canada, all of the provinces have required digital literacy to be a component of educational curricula while leaving the specifics up to school districts, which have often allowed individual schools and teachers to determine their own policy approaches (Chidley-Hill, 2015). While most schools have general restrictions under electronic device policies that cover privacy and legal concerns, there is remarkable variation in the specifics that pertain to smartphone management in individual schools and especially across their classrooms.

The policies around digital device use in secondary public schools vary from outright bans on school grounds to bring-your-own-device (BYOD) approaches that regularly incorporate personal laptops, tablets, and cellular (cell) phones into the classroom as learning tools to facilitate discussion, access online resources, and teach digital citizenship.

Policy variation specific to smartphones ranges from a prohibition on school grounds to classroom-specific policies, which may actively incorporate them, restrict them completely, or permit certain uses at each teacher's discretion. As well, there is the middle-ground policy of a "partial ban," which uniformly limits classroom use without teacher permission. This latter approach may also incorporate further restrictions outside the classroom during the school day.

The principal research aim of this project is to identify and articulate the trade-offs between three different school-wide policy approaches to managing smartphones. Thus, the policy analysis is meant to inform decision-making in public high schools subject to their existing financial and resource constraints. The research provides an assessment of the three approaches using a literature review, cross-jurisdictional case studies, and interviews with informed educators. Specifically, policy options are assessed against six criteria. The impact on student development as it relates to self-control, cognition, and critical thinking skills is the preeminent criterion. Furthermore, the effects on students' holistic well-being and the separate degrees of acceptance amongst parents and educators are considered. Lastly, there are two administrative

considerations, the anticipated cost to school personnel of enforcing the policy as well as the policy's complexity as it relates to design and implementation.

The recommended policy is a *Partial Ban* without additional school-wide restrictions. Key aspects of a Partial Ban include consistent implementation, preserving a degree of teacher autonomy, fostering self-regulation among students, and building consensus within the school community (students, parents, educators, school administrators) through consultations. It is recommended that the policy be designed and implemented with direction from school districts in terms of enforcement responsibilities and procedures. One of the principal challenges of this approach is that educators and administrators must establish agreement on consistent rules based on a wide-variety of considerations following open dialogue with the school community. While the alternative policy options offer certain benefits, the recommended policy option is best able to balance the trade-offs of smartphone policies in consideration of the circumstances that pertain to each school community and the key policy objectives.

# Chapter 1.

## Introduction

### 1.1. Overview

British Columbia's (BC) Ministry of Education, like each provincial education ministry in Canada, has included digital literacy in its curricula. However, each province allows its school districts to determine the specifics of their digital device policies, which are often further left with individual schools and teachers' classrooms (Chidley-Hill, 2015). The tentative exception is Ontario, which has announced that a government directive banning cellular (cell) phones in all public school classrooms will be issued for the 2019-2020 school year (Jones, 2019). Despite the top-down policy, educational exceptions alongside enforcement will continue to be at the discretion of each school district, school, and individual teacher (CBC News, 2019). The policies around device use in secondary public schools vary from outright bans on school grounds to bring-your-own-device (BYOD) approaches that regularly incorporate personal laptops, tablets, and cellular (cell) phones into the classroom as learning tools to facilitate discussion, access online resources, and teach digital citizenship.

Smartphone policies in secondary public schools present unique problems relative to primary schools. For example, there is much broader acknowledgement by academics, experts, and stakeholders (students, parents, teachers, and administrative officials) that bans are the most appropriate in primary schools and middle schools (Carr-Gregg, Third, & McLean, 2018; Sahlberg, 2018). Further, the impacts of smartphones on secondary students are either understudied, prohibitively difficult to ascertain, or inconclusive, often relying on indirect research from tertiary education (Beland & Murphy, 2015; Carr-Gregg et al., 2018; Dion-Viens, 2017; Griffiths & Williams, 2018; UNICEF, 2017). There are also lesser concerns with security (e.g., unwanted online contact with strangers) and greater difficulties with compliance and enforcement, especially because a given high school student may have as many as eight different teachers. Lastly, secondary schools play a significant role in facilitating the transition in autonomy and self-regulation required for adulthood.

Relatedly, smartphones create separate issues in an educational context than other digital devices, such as tablets and laptops, for several reasons (2018; Daniel Tetrault, personal communication, January 31, 2019; Karine Ng, personal communication, March 3, 2019). First, smartphones are more discrete (smaller in size). Second, they have the built-in capacity for mobile texting, calling, and non-Wi-Fi internet connections (network data plans) that tablets and laptops lack without access to the internet (Wi-Fi). Third, among adolescents, more have access to their own smartphone than a tablet. Specifically, 77 per cent of 14 to 15 year-olds have a smartphone compared to 52 per cent having their own tablet and 51 per cent having their own desktop or laptop computer (Brisson-Boivin, 2018). Fourth, the incredible functionality and prevalence of smartphones in secondary students' lives interacts with diverse policies and considerations within the school system, including:

- Provincial government education mandates, especially on digital literacy
- School district education priorities and digital-based curricula
- “Acceptable electronic device use” and codes of conduct at the district and school level
- Legal considerations (privacy and liability)
- Teacher autonomy over their classroom and the use of technology within it.
- Socioeconomics and school digital/print resource constraints
- Screen time
- Smartphone addiction
- Student safety and emergency contact
- Social media

In Canada, the *ad hoc* approach that has been employed to determine the “appropriate” role of smartphones in an educational setting has resulted in a diversity of policies developed without clear guidelines towards best practices (Sophia, personal communication, February 3, 2019; Daniel Tetrault, personal communication, January 31, 2019; Karine Ng, personal communication, March 3, 2019; VL, personal communication, January 26, 2019; McQuigge, 2017). Furthermore, this issue is not unique to Canada. The December 2018, *Review into the non-educational use of mobile devices in NSW*

*Schools* (hereafter referred to as “NSW review”), conducted in the state of New South Wales (NSW), Australia, produced similar findings:

The most surprising finding from the review was the lack of evidence on the risks and benefits of the various models [cell phone policy approaches] utilised by secondary schools and, in the absence of peer-reviewed evidence to support one model over the other, the review team called for more research. (Carr-Gregg et al., 2018, p. 50)

Due to the variety of practices employed to manage smartphones in a given high school, some teachers may ban the devices outright while others are content to manage them. The inconsistency can both emotionally and effectively frustrate some teachers’ management practices (Carr-Gregg et al., 2018; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019; Sophia, personal communication, February 3, 2019). Furthermore, this frustration can be pervasive because of the inherent differences in perspectives on digital devices within the school community and how these translate into different practices from classroom to classroom. As such, most stakeholders appreciate the need for consistent practices throughout the school (Ibid.).

Teachers who make enforcing restrictions a priority in their classroom are forced to create disruptions at the expense of class time (Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019; Sophia, personal communication, February 3, 2019). Meanwhile, others who incorporate smartphones more readily may facilitate their use as digital learning tools while avoiding “policing issues” at the risk of permitting non-educational uses. Ultimately, this dynamic complicates enforcement for teachers with more restrictive policies as they are perceived as unfair leading to disputes (Ibid.). In addition, a third group of teachers may feel powerless and ambivalent about allowing smartphone use, especially because they may use the devices themselves. When combined with the perception of insurmountable difficulties in management, this third group may try to avoid having to teach and manage smartphones simultaneously (Karine Ng, personal communication, March 3, 2019).

Another dynamic was illuminated in the NSW review that applies to the Canadian policy context:

While students tended to have a clear understanding of school policy, they had an even firmer grasp of what was tolerated by school, and by specific teachers. . . . Teachers were often critical that their school's policy was not sufficiently clear to teachers, students and parents, and that it was often inadequately articulated and enforced by the school leadership team.<sup>1</sup> Some teachers do not feel sufficiently supported by existing policies and reported this allows students to take advantage of them. *Consistent implementation and enforcement of existing school mobile device policies was also a cause for concern among both students and teachers. Students were frustrated that the rules were not applied consistently, yet at the same time leveraged this to their advantage. Teachers found enforcement difficult when the policy was not being consistently applied by colleagues.* (Carr-Gregg et al., 2018, p. 37, emphasis added)

Further, interviewees indicated that there are competing pedagogical narratives around the use of digital devices in classrooms, with some advocating for innovation while others emphasize their negative impacts and moderating them (Daniel Tetrault, personal communication, January 31, 2019; Karine Ng, personal communication, March 3, 2019).

## **1.2. Policy problem and research objective**

Smartphones have the potential to negatively affect developmental, health, and educational outcomes in high schools, yet they are ubiquitous and, in the right circumstances, may contribute positively. The objective of this research is to inform secondary public school decision-making on smartphone policies by outlining the trade-offs of the main approaches.

## **1.3. Outline**

This paper is organized as follows: Chapter 2 provides contextual information on cell phone policies with respect to the literature and institutional policy environment. Chapter 3 covers the research methodology. Chapter 4 discusses case studies and research insights that inform analytical comparisons of the policy options. Chapters 5 through 7 are comprised of an articulation of the policy options and analysis. Lastly, Chapter 8 provides the recommended policy and a discussion of key considerations.

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<sup>1</sup> School leadership teams in NSW are composed of school heads (principals) and administrative staff and educators (e.g., deputy principals, directors, subsidiary school heads, and business managers) that support school planning and annual reporting processes (McKenzie, Mulford, & Anderson, 2007; NSW Department of Education, 2018b).



## **Chapter 2.**

### **Background**

#### **2.1. Overview**

The ubiquitous nature of digital technology (tech), especially the smartphone, has been characterized as both a blessing and a curse within secondary public education. Statistics Canada's 2016 General Social Survey, "Canadians at Work and Home," illustrates the prevalence of cell phones in Canada, indicating that 94 per cent of 15-to 34-year-olds own a smartphone (2017). More targeted research has found that as of 2018, 55 per cent of children between the ages of 10 and 13 have a smartphone, rising to 77% among those aged 14 to 15, with household income and education levels being positively associated with increased access to digital devices of all kinds (Brisson-Boivin, 2018).

The impact of cell phones in universities and colleges is a burgeoning field of research. However, secondary schools are remarkably lacking in research, especially in terms of the impacts of mobile devices on student well-being (Griffiths & Williams, 2018). Given the knowledge gaps, empirical evaluation of the impact of smartphones on students will not be conclusive until more systematic, longitudinal, and representative research has been conducted on this phenomenon (Beland & Murphy, 2015; Rosen, Carrier, & Cheever, 2013; UNICEF, 2017). Thus far, researchers have focused on: academic performance; assessments of well-being; the perspectives of students, parents, and educators on policy approaches; specific or experimental applications of technologies in the classroom; and the nature of student digital device use. The research (Bennett, 2018; Carr-Gregg et al., 2018; Griffiths & Williams, 2018; The Room 241 Team, 2012) has helped inform the debate around smartphones in an educational context, which weighs several trade-offs, as shown in Table 2-1.

**Table 2-1 Trade-offs of Smartphones in an Educational Context**

| Potential Benefits  | Potential Risks  |
|---|--|
| Increased student engagement and motivation               | Distractions   |
| Instant access to information                             | Smartphone-separation anxiety (students' fear of being "disconnected" from their online lives) |
| Closing school's digital/print resource gaps              | Screen/Device/Smartphone addiction   |
| Online social learning                                    | Inequity of access to devices  |
| Enhanced teacher-student and teacher-parent communication | Infringement of privacy  |
| Fostering self-regulation if managed successfully         | Conflicts surrounding misuse and confiscation  |
| Adaptable and diverse digital learning resources          | Cheating and plagiarism  |
| Access to additional self-help and support services       | Cyberbullying  |
| Emergency communication                                   |  |

In addition, there are outcomes that are both positive and negative vis-à-vis smartphones. For example, in the case of socialization, smartphones may limit face-to-face communication, understanding of body language, listening attentiveness, and group physical activity, while simultaneously facilitating digital interpersonal communication, online networking, and remote group work (Ibid.; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019; Sophia, personal communication, February 3, 2019).

## 2.2. Institutional Information

In Canada, jurisdiction over education resides with the provinces.<sup>2</sup> However, in the case of smartphone policies, decision-making generally belongs to individual schools and teachers (Daniel Tetrault, personal communication, Jan 31, 2019; Chidley-Hill, 2015). The policy variation on smartphones in public secondary schools can be categorized into three types, with the current approach in Vancouver's Lower Mainland, BC, most accurately summarized as the third listing below, "Classroom Autonomy":

1. **Complete Ban:** Cell phones are either not allowed on school grounds entirely or are strictly not allowed to be used during school hours.
2. **Partial Ban:** Students are not permitted to use smartphones during class time, unless specifically required for educational purposes at the discretion of the teacher. Additionally, students often have permission

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<sup>2</sup> *The Constitution Act, 1867* (UK), 30 & 31 Victoria, c 3, s 93.

to use devices on school grounds during specific periods such as lunch or breaks, which may or may not be limited to certain functions.

3. **Classroom Autonomy:** A classroom-specific cell phone policy is determined by each teacher. This may vary by classroom within the school. This policy is flexible in that it may range from actively encouraged use of the devices in the curriculum to complete prohibition of devices or even the absence of a policy. Generally, however, the policy approach is a specific set of restrictions on use—that may include specific exemptions for certain tasks or functions—decided upon by the teacher with or without their students' input.

Policy approaches to smartphones are often shaped by both school districts district in the form of rules that outline the “acceptable uses” of technology in an educational setting through a code of conduct or comparable guidelines (PEEL District School Board, 2019; Toronto District School Board, 2014; Vancouver School Board, 2016; Daniel Tetrault, personal communication, January 31). Schools adopt these rules—or principals and staff design their own in accordance—and individual teachers are then given autonomy over determining how they will pertain to specific devices in their classrooms, especially smartphones (Ibid.).

Smartphone policies then specify the procedures (e.g., when not explicitly incorporated into the class the devices must be stored in a bin/sleeve or out-of-sight in a backpack or locker), the nature of an infraction (e.g., off-task device use, such as social media when only music or internet research is permitted), and penalties (e.g., escalating penalties starting with a written warning, then temporary confiscation by principal's office, and then confiscation such that it will only be released once a parent/guardian is contacted and comes to retrieve it) (VL, personal communication, January 26, 2019; Daniel Tetrault, personal communication, January 31, 2019; Sophia, personal communication, February 3, 2019).

Legal concerns can be influential in policy design, compliance, and enforcement (Sophia, personal communication, February 3, 2019; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019). The NSW review corroborated the impact of legal considerations, with liability for loss or theft being paramount: “Decisions about the absence or presence of devices in the classroom were often shaped by the pragmatic issue of what to do with them when they are not in the possession of the student who owns them” (Carr-Gregg et al., 2018, p. 36).

## 2.3. Literature review

### Outline

The literature review covered secondary data from academic literature, news articles, government and NGO reports, and targeted jurisdictions. It is foundational to the case study analysis in terms of informing policy objectives, criteria and measures, and identifying knowledge gaps. Below are summaries of the findings from academic literature in relation to smartphones and digital technologies in an educational context. Appendix H provides a summary of the academic literature on the impact of texting in class.

### Limitations

Existing research on the impacts of smartphones is rarely targeted towards the educational contexts of school-aged children and adolescents (Carr-Gregg et al., 2018). Furthermore, interpreting the findings of research on the impacts of smartphones in high schools is problematic because it lacks consistency in a few respects (Griffiths & Williams, 2018). First, in terms of the distinguishing between the types of mobile digital devices being used and their respective impacts. Second, whether the examined impacts of devices were from educational or non-educational use. Third, research often does not distinguish between impacts from use at school as opposed to use outside of school.

A related point is that one cannot generalize reliably about the impacts of social media, online interactions, or incremental screen time; it is more about *what* is being done rather than how much of it. Furthermore, what is happening online is often reinforcing what is otherwise happening offline, be it positive or negative (Carr-Gregg et al., 2018; George & Odgers, 2015). Similarly, in extending insights from research on tertiary education to secondary schools, problems arise from how research is conducted. Most research designs use only a few lectures, simulated academic settings, or impose experimental modifications on the real classroom that may not be valid otherwise, let alone applicable to secondary schools (Ravizza, Hambrick, & Fenn, 2014).

Due to the recency of smartphones and their rapid development, empirical research and longitudinal studies are lacking (Beland & Murphy, 2015; Rosen et al., 2013; UNICEF, 2017). Consequently, most findings in academic research, such as the association between smartphones and cognitive functioning, should be assessed as preliminary (Wilmer, Sherman, & Chein, 2017). As well, there is a notable gap in the research on the potential positive benefits gained from incorporating devices, which are often limited to narrow applications of certain educational uses of technology and/or software. This gap is pronounced with software designed to help manage and incorporate smartphones in the classroom, such as Tophat™, Flipd™, and Mobile Guardian™ as well those that serve more administrative purposes, such as Google Classroom™ and Classroom Dojo™. It also applies to educational technologies, such as the game-based learning platform Kahoot!™.

Therefore, many of the associations between negative and positive outcomes from smartphone use, even those arguably less tenuous, are weakened by a variety of issues: lack of relevant scope (to high schools and their students), arguable applicability (to smartphones and from types of uses examined), rapid foundational changes in technology, lack of scientific replication of studies, the presence of potentially confounding variables, a reliance on self-reported data, unrealistic research designs, and the possibility of reverse causation (e.g. whether weaker academic performance is caused by excessive smartphone use or low-achievement causes excessive smartphone use). The need for more research abounds in virtually all aspects relating to the impacts of smartphones in the secondary educational context (Carr-Gregg et al., 2018; Gao, Yan, Wei, Liang, & Mo, 2017; Selwyn, Nemorin, Bulfin, & Johnson, 2017).

### **2.3.1. Academic performance**

One of the most frequently cited works on the topic of cell phone policies in education is a report published by the Centre for Economic Performance at the London School of Economics, “Ill Communication: Technology, Distraction, & Student Performance.” The predominance of this work reflects its quality and rigor, but also its rare scoping to analysis on cell phone use in secondary education, in combination with a large sample size and analysis conducted both before and after bans were introduced in the cities of Birmingham, London, Leicester, and Manchester in England. Their findings indicate that when cell phone use has been restricted, standardized test scores

improved by 6.41 per cent of a standard deviation, with the most disadvantaged students driving the overall effect (14.23 per cent of a standard deviation in lowest quartile), while those most advantaged (highest quartile) were no better or worse off (Beland & Murphy, 2015). An obvious caveat to their findings is that it relies upon assessments from standardized examinations, which is not a complete measure of academic performance—though in England they are quite influential in the transition out of secondary school. The authors draw three key conclusions from their analysis:

- i) Compliance with the ban is central to achieving significant gains;
- ii) The cell phone ban effectively provides an additional school-week;
- iii) The negative externalities from cell phones in the school setting are inversely related to prior academic performance (lowest achieving affected the most)

The most frequently cited finding from their research, however, is that the educational gains from a ban may help close the education gap among disadvantaged students that otherwise prevents them from attaining the test scores of more advantaged students.

The popularity of the above article also stems from its both significant and unequivocally substantive findings—at least insofar as standardized examinations are concerned—as this is frequently not the case for other rigorous statistical or meta-analyses conducted in this field. The findings of Kates et al. (2018), which used a meta-analysis of research on the relationship between mobile phone use and academic performance over the period 2008 to 2017, indicate the summary effect of cell phone use after controlling for known predictors on academic achievement is  $r = -0.162$  (Kates, Wu, & Coryn, 2018). While the summary effect is statistically significant, it is quite small substantively. The results from this meta-analysis are comparable to that of other researchers who have performed similar statistical analyses. For example, a study that conducted a survey of over 500 graduate students to assess the relationship between cell phone use and college grade-point average (GPA) found that cell phone use was significantly and negatively related to GPA, though weak substantively ( $\beta = -.164$ ), after controlling for a wide range of other significant variables, such as self-efficacy measures and high school GPA (Lepp, Barkley, & Karpinski, 2015). Similarly, Lepp et al. (2014) performed a survey-based study in 2014 incorporating the variables of anxiety, texting, and satisfaction with life (SWL) as measured by the SWL Scale under two different

models. They found that cell phone use was negatively related to GPA and positively related to anxiety. As well, there was with a negative, though statistically insignificant relationship, between cell phone use and SWL (Lepp, Barkley, & Karpinski, 2014). Fundamentally, however, all these studies stress the importance of interpreting their results with caution, especially with respect to drawing conclusions on causation and the role of potential mediating variables in the relationships between cell phone use and academic performance (or SWL).

The research covered so far largely relied upon self-reported measures of cell phone use, which brings their validity into question. Alternatively, Felisoni & Godoi (2018), offer an experimental approach that corrects for any discrepancies in self-reporting, albeit at the expense of a small sample size. Specifically, the authors incorporated applications that precisely measure cell phone activity on student participant's cell phones into their research design. The regression they perform on their sample of 43 students from a business school in Brazil demonstrates a substantive, significant negative relationship between total time spent using smartphones and academic performance after controlling for known predictors. Their findings indicate that every 10 minutes spent using the device on an average day corresponded to a change in that student's school ranking (a somewhat convoluted measure of cumulative GPA) of  $-0.63$ , which is almost doubled when the smartphone is used in class to  $-1.2$  (Felisoni & Godoi, 2018).

Evidently, there are trade-offs when incorporating digital technologies into the classroom. A 2015 survey conducted by the "Growing Up Digital (GUD) in Alberta" research project (hereafter referred to as the "GUD project") on 2,272 randomly selected participants from Alberta's K–12 education system (over 1,800 teachers and over 400 principals from rural, small urban/suburban, and large urban schools), exemplifies these trade-offs. The GUD project, found that: "71% of teachers say 'educational technology enhances inquiry-based learning,'" and they often use them to "provide access to a variety of learning resources," "enable communication with parents," and "determine teaching resources and materials for students who have a variety of learning needs." However, 67 per cent indicated that "the number of students who are negatively distracted by digital technologies in the classroom is growing," 75 per cent "believe students' ability to focus on educational tasks has decreased," and "more than half of Alberta teachers feel that digital technologies are a negative distraction in their own

lives” (The GUD Project, 2015, p. 1). Furthermore, each interviewee noted that the overall impact of smartphones on high students’ cognitive skills has been generally negative, especially in terms of critical thinking and related skills, problem-solving attention, and memory (Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019; Sophia, personal communication, February 3, 2019).

### **2.3.2. Multi-tasking**

Multi-tasking is prevalent among adolescents and young adults when using digital media (Chen & Yan, 2016). The GUD project’s 2015 survey of Alberta educators and principals indicated that “76% of teachers frequently or very frequently observe students multi-tasking with technology” (The GUD Project, 2015, p. 1). May and Elder’s literature review of media multitasking in relation to academic performance indicates that 90 per cent of university students multi-task when using media, with more than half of their time on media spent multi-tasking (Hwang, Kim, & Jeong, 2014, as cited in May & Elder, 2018). The authors found that research on the topic of media multi-tasking demonstrates negative impacts on attention, memory, GPA, comprehension, note-taking, self-regulation, and efficiency (May & Elder, 2018). Wood et al. compared the impact of off-task multi-tasking with technology relative to control groups not multi-tasking with and without digital devices over three lectures. The authors found that the control groups performed better, especially those not using technology—even relative to those practiced with off-task multi-tasking—which is in accordance with other research findings demonstrating negative academic impacts from multi-tasking (Bellur, Nowak, & Hull, 2015; Wood et al., 2012).

In terms of the types of classroom learning affected by multi-tasking, research by Waite et al., under a single lecture experimental design with a control group not at the presentation and two experimental groups, one texting and the other taking notes, the researchers found that only lower-order information (knowledge and understanding) was significantly different, while higher level thinking (critical thinking, synthesis, and analysis) was unaffected (Waite, Lindberg, Ernst, Bowman, & Levine, 2018). Leading them to conclude that only lower-order information is limited by texting during the presentation. Relatedly, research published in 2018 by Szumowska et al. on multi-tasking in adults, found that frequent media multi-tasking is not always related to poor



multi-tasking performance; rather, it depends on the ability to self-regulate as well as external factors. For example, those that multi-task frequently and have low self-regulations skills performed worse in the task when they were able to freely switch between different tasks, but the effect was not significant when they were required to perform the tasks in sequence without being able to return to a previous task (Szumowska, Popławska-Boruc, Kuś, Osowiecka, & Kramarczyk, 2018). The authors noted that other research that focused on the creativity of solutions instead of their accuracy found that freedom to switch between tasks improved creativity, though at the expense of accuracy (Adler & Benbunan-Fich, 2012, as cited in Szumowska, et al., 2018).

### **2.3.3. Cognition, health, and screen time**

A conclusive understanding of smartphones' impact on brain development, mental capacity, and overall health is fundamentally constrained by a lack of empirical research (Wilmer et al., 2017). That said, the GUD project's 2015 survey of Alberta teachers and principals provides several key findings with respect to the impact of digital technologies on students' health (p. 2):

- “66% of Alberta teachers are observing students coming to school tired, and their ability to focus has declined.”
- “62% of teachers say that students' ability to bounce back from adversity has decreased.”
- “56% of teachers say that the number of students who have discussed being cyberbullied has increased.”
- Over the last three to five years:
  - “90% of teachers say that the number of students with emotional challenges has increased.”
  - “86% of teachers say that the number of students with social challenges has increased.”
  - “85% of teachers say that the number of students who need behaviour support has increased.”
  - “3 out of 4 teachers say that the number of students with cognitive challenges has increased”

- 85 per cent (anxiety disorder) and 73 per cent (depression) of teachers reported an increase in diagnosed disorders in their student population.

Although the field of academic research on the topic is growing, contradictions and uncertainty abound. The impact of cellular phones on cognition is a new area of research, and the gold standard for empirical research is longitudinal studies, which can only be started at this point in the case of smartphones given the rapid rate of technological change (Griffiths & Williams, 2018; Wilmer et al., 2017). A closer look at the literature from this field of research demonstrates the empirical limitations Wilmer et al. (2017) notes, with occasionally conflicting results, clearly stated knowledge gaps, conditional conclusions, and plans for extensive future research being commonplace (Griffiths & Williams, 2018). While it is a new and burgeoning field, it may be the first to shed light on concerns we cannot yet prove. A research review on the effects of mobile technologies, such as smartphones, on adolescents' well-being in terms of safety, social development, cognitive performance, and sleep suggests that offline behaviours and circumstances are largely predictive of online experiences and effects—except for technologies creating new platforms for bullying, interfering with sleep, and providing effectively permanent digital archives of misdeeds or embarrassing moments (George & Odgers, 2015). Essentially, smartphones seem to provide a “positive feedback loop” relative to the offline life experiences such that technologies reinforce positive or negative circumstances offline. The authors further note that the effects on adolescent development are far from uniform, with some experiencing these positive feedback loops while others, such as shy adolescents, can network and build social skills through online interactions (2015).

One of the foremost research concerns is the impact on cognitive capacity resulting from the presence of a smartphone. Researchers found that, despite not impeding completion of a basic experimental task or significantly affecting attention, simply the presence of a smartphone may occupy cognitive resources. In follow-up research, more complex tasks have been shown to adversely affected, a finding that was positively related to how dependent the subject is on their smartphone (Thornton, Faires, Robbins, & Rollins, 2014; Ward, Duke, Gneezy, & Bos, 2017). In addition, researchers have found that cell phone notifications alone, the inability to answer a phone call, and the combination of smartphone visibility with notifications, create considerable physical and mental stress, though not always such that it negatively

impacts performance on the test relative to a control (Clayton, Leshner, & Almond, 2015; Johannes, Veling, Verwijmeren, & Buijzen, 2018; Stothart, Mitchum, & Yehnert, 2015).

There are also cognitive issues relating to impulse control and evaluating delayed rewards (intertemporal preferences) vis-à-vis smartphone use. Research on a group of 91 undergraduate students in the US found that “a significant relationship exists between the degree of technology engagement and intertemporal preference . . . the present research provides evidence that broader aspects of technology use are also related to individual differences in intertemporal preference” (Wilmer & Chein, 2016, p. 1612). The authors are clear that correlation does not speak to causation but note that there is a significant negative relationship ( $r = -.234$ ) between technology engagement (phone-based social media use, phone-checking behaviour, and frequency of public status updating) and impulse control. In other words, their findings “are consistent with the common conception that frequent smartphone use goes hand in hand with impatience and impulsivity” (2016, p. 1613).

Psychological and medical research on the topic of screen time also informs the debate around the appropriate use of digital technology in an educational context. One of the predominant concerns among parents is how much screen time their children are getting. The Canadian Pediatric Society recommends in its healthy active living guidelines that children (5- to 11-years-old) and youth (12- to 17-years-old) should limit recreational screen time to no more than two hours per day, with lower levels being associated with additional health benefits (Lipnowski & LeBlanc, 2012). In addition, although the research requires duplication and further analysis, an association was found between autism and screen time: “Among adolescents followed up over two years, there was a statistically significant but modest association between higher frequency of digital media use and subsequent symptoms of ADHD [Attention-Deficit/Hyperactivity Disorder]. Further research is needed to determine whether this association is causal” (Ra et al., 2018, p. 262). Other research has found that there is a negative association between screen time and lower scores in measures of psychological well-being in nationally representative yearly surveys including on US 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> graders (Twenge, Martin, & Campbell, 2018). Further, the trends present in the data suggest that the Great Recession (of 2008) and the concurrent decline in psychological well-being may be associated with the rapid proliferation of smartphones and the ensuing changes in screen time more than effects of the recession. However, these conclusions are

contested by other findings. Rigorous statistical research on the relationship between well-being and screen time using large-scale social datasets from the United Kingdom (UK) and the US (total sample size of 355,358!) demonstrated that the impact of technology, while statistically significant and negative, is substantively minimal, accounting for a 0.4% of the variation in well-being (Orben & Przybylski, 2019). Similarly, research on large-scale datasets in the UK involving over 120,000 English 15-year-olds indicated that for both sexes the impact of screen time was negative and significant, but the substantive impact of screen time was low, finding that sleep and eating behaviours were the most strongly associated with well-being (Gireesh, Das, & Viner, 2018).

#### **2.3.4. Smartphone addiction**

Research in the field of neuroradiology on the relationship between subjects with internet or smartphone addiction and their executive functioning found that there is a significant negative correlation in terms of attention and self-control (Seo et al., 2017a, 2017b). However, the study has not been replicated and relied upon a remarkably small sample of 19 Korean teenagers diagnosed with internet or smartphone addiction. Notably, twelve weeks of cognitive behavioural therapy normalized unusual brain chemistry (neurochemical imbalances). Smartphone and internet addiction have also been significantly associated with behavioural and emotional problems in middle-school students in Korea (e.g., aggressive behaviour), lower self-esteem, and lower quality communication with parents (J. Lee et al., 2018). Among university students, survey-based research on students in Lebanon found that smartphone addiction (based on the Smartphone Addiction Scale – Short Version, and the Beck Anxiety Inventory) demonstrated higher rates of anxiety, and, though mediated by a positive relationship with anxiety, clinically significant problematic family relations (Hawi & Samaha, 2017).

A related concern is that of “Nomophobia,” the fear and stress from not being able to use one’s phone. Research on 270 smartphone users (young business professionals in or past postsecondary education) found that Nomophobia could be moderated by providing certainty with respect to the period they will be without their phones as well as a clear indication of control (freedom, autonomy, and discretion) over how to respond to an unforeseen circumstance (Tams, Legoux, & Léger, 2018).

Nomophobia provides a weak proxy for smartphone addiction, which has not been reliably examined in academic literature in terms of prevalence, especially in North America. However, it is acknowledged as a real addiction with comparable characteristics to substance abuse, but the paucity of existing research into this area is largely limited to Korea and China (Hopper, 2016; S.-J. Lee, Lee, & Lee, 2016). The percentage of Korean adolescents addicted to smartphones has increased annually, from 11.4 per cent in 2011 to 29.2 per cent in 2014 (National Information Society Agency as cited in S.-J. Lee et al., 2016). SecurEnvoy, a two-factor authentication company, found in a 2012 panel survey of 1,000 employed respondents (aged 18 and over) in the UK that nomophobia had increased from 53 per cent in 2008 to 66 per cent at the time of the study. Furthermore, the highest rates (77 per cent) were among respondents aged 18 to 24 (2012). In the US, 2015 panel survey data on respondents aged 18 and older provides a similar proxy, though it is reliant on hyperbole and binary questions; it found that 46 per cent of respondents say that their smartphone is something they “couldn’t live without” as opposed to “not always needed” (54 per cent) (Pew Research Center, 2015). As well, the survey found that those who depend on their smartphone for internet access (do not have alternative devices) were not significantly more inclined to give the say they “couldn’t live without” them. Notably, the survey also found that smartphone owners were substantially more likely to have positive views of the devices as opposed to negative ones during additional binary questions, such as being more “helpful” than “annoying,” representing “freedom” versus a “leash,” and allowing “connecting” as opposed to being “distracting” (2015).

### **2.3.5. Educational Benefits of Smartphones**

The educational benefits of smartphones fit into two mutually non-exclusive categories. First, is the substitution for lacking resources (digital or print) in a given school or classroom. For example, replacing a dictionary, textbook, or other digital device such that each student has access to necessary means to carry out class activities (Sophia, personal communication, February 3, 2019; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019; Carr-Gregg et al., 2018). Second, are the benefits from a broad range of supplementary uses defined by the concept of “mobile learning” (m-learning), which encompasses “learning across multiple contexts,

through social and content interactions, using personal electronic devices [smartphones and tablets but may exclude laptops]” (Crompton, 2013a, p.4 as cited in Crompton, Burke, & Gregory, 2017, p. 52). The benefits to teachers and students from m-learning include:

(a) offering students multiple entry points and learning paths and allowing for differentiated learning; (b) enabling multiple modality via mobile devices by which students have a tool to create a different learning artifact [e.g., hardware/software] to suit their needs; (c) supporting student improvisation in situ, student may improvise as needed within the context of learning (e.g., take pictures to illustrate learning connections); and (d) supporting learning creation on the move with an ease of creating and sharing artifacts. (Liu et al., 2014, p. 356)

A survey of 628 high school students in the US found that 90.7 per cent were using their mobile phones for school-related work (Thomas & Muñoz, 2016). Systematic reviews of the benefits of m-learning have found overwhelmingly positive results. Work by Liu et al. on K-12 schools that used experimental designs to compare learning outcomes relative to traditional instructions found nine out of the thirteen studies demonstrated positive learning gains while three had neutral outcomes (2014). Another systematic review, examining 113 studies on learning activities with m-learning—19 per cent of which involved high schools and 34 percent involved mobile phones—found that 62 per cent reported positive student effects on student learning, 12 per cent reported neutral outcomes, and 1 per cent were negative<sup>3</sup> (Crompton et al., 2017). Similarly, Sung, Chang, and Liu (2016) reviewed 110 quantitative studies from 1993 to 2013 to examine the effects of m-learning on teaching and learning. The authors found that using mobile devices in the classroom were significantly more effective in terms of student learning (moderate mean effect size of 0.523)<sup>4</sup> than using other technologies (desktop computers) or not using technology (pen-and-paper). However, there were only 10 studies involving high schools, which had an effect size of 0.390, and 24 studies

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<sup>3</sup> The authors note that 34% reported “other” outcomes as they did not measure student learning and 9% of the studies had more than one outcome reported. To be clear, 10 of the studies had more than one outcome reported; overall 70/113 found positive learning outcomes, 2/113 were negative, 13/113 were neutral, and 38/113 were “other.”

<sup>4</sup> Effect size provides a measure of the sizes of associations or, as in this case, the sizes of differences between groups: “in this study it was found that using mobile devices in education had a medium effect size for learning achievement; in other words, 69.95% of learners using a mobile device performed significantly better in dependent variables related with cognitive achievement than those not using mobile devices” (Sung et al., 2016, p. 257).

involving cell phones, which had an effect size of 0.676.<sup>5</sup> Of note, they also point to the need to orchestrate strengthening both the functions and applicability of learning-oriented software alongside professional teacher-development programs for mobile-enhanced instruction, as this latter issue is one of the largest obstacles to their efficacy.

Even if other devices are available, smartphones may provide unique benefits from their incorporation into the classroom-setting due to their unique combination of comprehensive functionality (e.g., multi-tasking and multiple sources of learning materials), convenience (user familiarity, discrete, portability), and prevalence (ever-present among most students) outside and inside of school (Anshari, Almunawar, Shahrill, Wicaksono, & Huda, 2017). Specifically, they allow access to online resources, such as teaching materials or educational information, almost anywhere (Anshari et al., 2017; Schuck, Kearney, & Burden, 2017); provide organizational benefits by consolidating calendars, media (photos/recordings), and scheduling information on one device (Thomas & Muñoz, 2016; Walker, 2013); enable efficient communication about coursework via texting, calling, and online means (Anshari et al., 2017; Thomas & Muñoz, 2016; Walker, 2013); directly support teaching digital literacy (including media literacy); have been shown to improve engagement, and thus student learning, i.e., critical thinking and grades (Baron & Corbin, 2012; Carini, Kuh, & Klein, 2006; Carr-Gregg et al., 2018; Lahlafi & Rushton, 2016); offer real-time mental health services (e.g., crisis text lines) that may be perceived by students as more accessible (Sawyer & Patton, 2018); and incorporate applications to assist in self-management of medical needs (e.g., diabetes), which are most convenient when on a single, easily portable device such as a smartphone (Årsand et al., 2012).

Smartphones are often the most efficient tool for m-learning due to students' familiarity with them from through growing up in technology-rich environments and developing the skills to navigate with them effectively (Robb & Shellenbarger, 2012). Smartphones provides a means to facilitate learning through increased motivation and engagement, investigation, collecting data, enabling personalized and immediate feedback, recording media, creation and composition of digital artifacts, online group work, and ease of communication with peers in and beyond the classroom (Burden &

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<sup>5</sup> The effect size for high schools and cell phones, respectively, would indicate that 66% and 75% of relevant learners “performed significantly better in dependent variables related with cognitive achievement than those not using mobile devices” (2016, pp. 257–258).

Kearney, 2018; Crompton et al., 2017; Kearney, Schuck, Burden, & Aubusson, 2012; Liu et al., 2014; Schuck et al., 2017; Sung et al., 2016). There is a caveat, however, that teachers must supported towards meaningfully incorporating m-learning to collaborate and better engage with students, which require adjusting curricula and providing professional development (Carr-Gregg et al., 2018; Lahlaf & Rushton, 2016; Schuck et al., 2017; Sung et al., 2016). However, the field does demonstrate that there are benefits from selective, quality, and empowering uses of technology to improve learning and skill development (Callow & Orlando, 2015).

A final point about the educational benefits of incorporating smartphones into high school classrooms has to do with preparing students for life outside of school and past it (i.e., tertiary education, professional, and workplace environments). A key aspect of which is fostering self-control (Karine Ng, personal communication, March 3, 2019). While this area is poorly researched and subject to ongoing debate (Carr-Gregg et al., 2018), some of the foremost experts analyzing the interplay between technology and education highlight the importance of guiding high school students towards responsible device use as the best and most effective approach relative to prohibitions that are likely to be subverted. Namely, Thierry Karsenti, the Canada Research Chair in Technologies in Education (McQuigge, 2017) and Pasi Sahlberg (Sahlberg, 2018), the world-renowned Finnish education expert,<sup>6</sup> who has stated that “we should teach all children safe, smart and responsible use of technology. Every school in their own way” (The Educator, 2018, p. 2).

### **2.3.6. The trade-offs of common policy approaches**

The uncertainty surrounding the effects of smartphones on students extends to drawing conclusions from analyses of policy approaches in schools. With respect to regulating student device use, a survey-based study in Australia on 1,174 students across three secondary schools, found that almost 60 per cent of students found

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<sup>6</sup> Pasi Sahlberg is a luminary in education policy in many respects: having worked as an educator, researcher, and policy advisor in Finland; analyzed education policies (World Bank, European Training Foundation, and a visiting professor at Harvard University), and has advised education policymakers around the world (Sweden, Malta, Finland, Scotland); and published widely in academic journals, numerous books, professional magazines, and public media alongside being a member of several academic journal's editorial boards (University of News South Wales School of Education, 2016).



workarounds to device restrictions (Selwyn & Bulfin, 2016). The schools uniformly blocked certain websites (including social media, games, and video streaming) but differed across having either a BYOD policy requiring use of the school's network, a "Managed BYOD" policy that recommends a specified laptop but prohibits mobile phones and any screen time during recess and lunch, or a specific BYOD policy that prohibits mobile phones and requires each student to use an iPad for educational purposes only. Notably, the latter two schools found students had recurring concerns with mobile device prohibitions. Overall, concerns with regulated device use were positively associated with student age. However, the authors noted that very few students were directly challenging authority as most were "working around" the rules to their self-benefit. Students indicated that they exploited lapses in enforcement of regulations (inconsistent/non-enforcement of rules by teachers, times of day and/or locations without monitoring, or, in some cases, challenging teacher jurisdiction), technical "hacks," or engaged in surreptitious use. However, some of the students felt that the restrictions in place were appropriate and there was heterogeneity in students' perceptions of school technology rules. Other research corroborates this heterogeneity (Thomas & Muñoz, 2016), finding that 70 per cent of US high school students interviewed believe smartphones support learning while thirty per cent feel that the potential negative effects of smartphones justify school-wide bans. Selwyn and Bulfin (2016) conclude that school authorities, students, and educators would benefit from more open dialogue towards determining mutually agreeable expectations and clear rules around appropriate device use to decrease tension and improve adherence, which is corroborated by Car-Gregg et al. (2018) and Thomas and Muñoz (2016).

Ethnographic research on the same three Australian schools with various BYOD policies to provide one-to-one device access, found that the presence of personal devices tends to be more mundane in nature and effect than is often assumed (Selwyn et al., 2017). Their research demonstrated that everyday uses of personal devices (e.g., music, social media, games) continued at school but in forms that did not significantly interrupt the educational context, which other US studies that corroborate personal devices in school being associated with moderate 'incremental change' (Peck et al., 2016 as cited in Selwyn et al., 2017). Their investigations illustrated that "rather than constituting a radically 'transformational' mode of schooling . . . the mass presence of

personal technologies quickly becomes subsumed into existing conditions and arrangements of school organisation and control” (2017, p. 305).

With respect to adherence, a 2009 US telephone survey of 800 parents and their teenagers found that nearly 65 per cent of students attending schools with prohibitions brought them to school daily (Lenhart, Ling, Campbell, & Purcell, 2010). Relatedly, research in China involving 245 K-12 teachers on non-educational smartphone use found that complete prohibitions, even with those that provide exemptions during recess—the two prevailing policy approaches—were perceived as being ineffective at limiting mobile phone use and preventing distractions (Gao, Yan, Zhao, Pan, & Mo, 2014). In a follow-up study, examining the views of 1,226 K-12 teachers, parents, and students in China, both high school teachers and students indicated the same sentiment on inefficacy (Gao et al., 2017). This latter study demonstrated that discrepancies between educators emphasizing negative impacts on learning and well-being, students emphasizing educational and social benefits, and parents falling between the two may account for the failures of existing prohibitory approaches. The authors indicate that complete prohibitions are not feasible and that weighing more balanced policy approaches, considering the divergences between the three stakeholders, and keeping parents informed about the realities of students’ mobile phone use at school may improve policy efficacy. With the caveat that the research focused solely on non-educational uses, there was agreement in one question between all three stakeholders: banning mobile phones “during class and exams.” Gao et al. (2017) indicate that further research is necessary to examine if education on appropriate mobile phone use would help mitigate the negative impacts identified by teachers and parents and enable teachers to utilize potential instructional benefits (i.e., examine educational uses).

Alternative approaches to prohibitions, such as “technology breaks,” have been demonstrated to be effective in allowing students to use their devices to address internal and external distractions created by their attachment to their smartphones and routinized behaviour involving checking their smartphones ever 15 minutes or less (Rosen, Carrier, & Cheever, 2012; Rosen et al., 2013). The fundamental premise (Dumontheil et al., 2010 as cited in Rosen, Lim, Carrier, & Cheever, 2011) is that there are no neurological differences between externally driven task switching (e.g., responding to a notification) and internally driven switches (e.g., thoughts about a text message). In other words, neurological research suggests that “for young learners, ‘out of sight’ is most definitely

not ‘out of mind’” (Rosen et al., 2013, p. 956). Based on work with college students using trails involving a one-minute technology break followed by a 15-minute lesson or study period with smartphones face-down and on silent, the authors found attention, focus, and learning was enhanced. Another strategy proposed by Rosen et al. (2011) stems from research that found that students who waited to address text messages, such as when the lecture was deemed less important, performed substantially better than those who provided an immediate reply. The authors describe these strategies as being “metacognitive,” which refer to possessing an understanding of one’s cognitive abilities (and limits) and the capacity to consciously regulate internal processes and affective states (Hacker et al., 1998, p.11 as cited in Rosen et al., 2013). Rosen et al. conclude that:

The bottom line is that students want to multitask or task switch and technology encourages them to do so. Requiring them to unitask either in the classroom or while studying will turn out to be a fruitless effort as all this does is shift from external auditory, visual and tactile distractors to an internal, anxiety-laden need to check in with their electronic worlds. . . . [Instead, educational] models [should] include a combination of technology breaks and metacognitive skills that will teach students focus and attention, delayed gratification and knowing when multitasking is appropriate and when it may interfere with the learning process. (2013, p. 956)

### **2.3.7. Summary**

Collectively, the literature review presents a somewhat negative portrayal—or at least mixed view—of the potential impacts of smartphones in secondary schools. However, this perspective is contingent upon tentative conclusions, indirect research, inconsistently defined devices, and, most problematically, a focus on non-educational uses. As aptly summarized in the literature review conducted for the NSW review on the impacts in primary and secondary schools of non-educational mobile digital device use:

*The evidence behind the effect of mobile digital devices on student wellbeing in schools is both mixed and limited.* There is some evidence that cyberbullying is increasing, but this link cannot be directly attributed to mobile digital device use in school. There is also evidence that phones do distract students from learning, although this evidence largely comes from studies undertaken at the tertiary level. The evidence in terms of sexting points to the fact that teenagers are not sexting as much as other young adults, and that when they do it is often in the context of perceived mutual trust. Some evidence shows that use of mobile digital devices may hinder social interaction which can lead to lower levels of psychological wellbeing,

but other research shows that mobile digital device use may enhance important peer and family relationships. The same mix of evidence is found with regard to mental [health, namely, substantively small negative associations with questionable causation as opposed to more accessible mental health services] and physical health [limited research, negative associations with questionable causation as opposed to apps to help improve physical activity]. In terms of the most effective response to mobile digital devices in schools, the evidence similarly varies. There is some evidence that banning mobile phones may improve academic outcomes for low-achieving students, but other evidence shows that students are adept at 'getting around' bans on mobile digital device use in schools. Other researchers state that a ban is not the answer, that students need to be taught 'digital literacy' instead, and that mobile digital devices will simply be subsumed within existing school regulations and controls. (Griffiths & Williams, 2018, p. 9, emphasis added)

## **Chapter 3.**

### **Methodology**

#### **3.1. Overview**

The objective of the research project is to qualitatively evaluate secondary school cell phone policies using policy case studies informed by academic and “gray” literature, an extensive cross-jurisdictional scan, and targeted expert opinion. Therefore, the methodological approach is a case-study analysis supported by exploratory and investigative interviews and a literature review. In accordance, the research uses secondary data from published literature supplemented by interviews with stakeholders to present policy recommendations with respect to different smartphone policies. Specifically, the case study methodology explores the consequences of different policy approaches to cell phone use in schools. Namely, Complete Bans, Partial Bans, and Classroom Autonomy.

#### **3.2. Literature review and jurisdictional scan**

A review of academic and gray literature forms the backbone of the research by outlining the landscape of mobile phone policies in Canada and select international jurisdictions; providing the perspectives of directly affected stakeholders (students, parents, teachers, and administrators), governments, NGOs, and informed individuals; and informing an interdisciplinary understanding of the implications of existing academic research (education, psychology, political science, medicine, technology, and business) on the policy context for secondary public schools. A jurisdictional scan of politically and economically similar cases provides for an in-depth comparison with B.C.’s policy environment to inform key considerations, implementation strategies, and the analysis of proposed policies.

#### **3.3. Interviews with informed persons**

To explore the issue, validate conclusions, and account for gaps in secondary data, interviews with experts are employed. The objective of the interviews is to allow a

more thorough examination of the institutional (school district, school, and/or classroom) perspectives on the policy problem given their autonomy over decision-making, verify and evaluate key criteria and measures, and detail the rationale behind existing policies. Appendix C provides the final version of the semi-structured interview guide, Appendix D provides a list of the interviewees, and Appendix I summarizes key interview findings.

## **Chapter 4.**

### **Case studies**

#### **4.1. Overview**

The case study approach herein presents the findings from an international cross-jurisdictional review of policy approaches for smartphone management in secondary schools. Many schools in Canada, Australia, France, New Zealand, the UK, and the US have some form of restriction on cell phones in public secondary school classrooms (Carr-Gregg et al., 2018; Karsenti, 2018; McQuigge, 2017; Redmayne, Smith, & Abramson, 2011). Numerous jurisdictions have experimented with various cell phone policies, often prohibitions, to mixed results. Internationally, most countries currently opt to allow school administration, if not individual teachers, to decide upon the specifics of classroom policies on the devices. This chapter summarizes findings and provides insights from the policy variation across four jurisdictions—British Columbia, Ontario, New South Wales, and New York City. Additional information on New Zealand, France, and England are provided in appendices E, F, and G, respectively.

#### **4.2. British Columbia, Canada**

British Columbia has largely allowed Classroom Autonomy in managing smartphones across the province. The provincial government believes that professional autonomy within districts and schools is the best approach (Zussman & Stanton, 2019). Representatives from the Surrey School District (#36, the largest district in BC) and the Vancouver School Board, have indicated that cell phone policies are best left up to individual schools and teachers (On The Coast, 2019). Similarly, the BC Teachers' Federation (BCTF) does not have a specific policy, or stance around digital devices in classrooms, indicating that they strongly believe in teacher autonomy and each teacher's capacity to determine what is best for their classroom (Zussman & Stanton, 2019).

##### ***A Partial Ban exemplar towards best practices***

A notable case where a type of Partial Ban was successfully implemented in a public high school is that of Stanley Humphries Secondary School (SHSS) in Castlegar,

BC, which was recounted by David DeRosa, who is President of the BC Principals' and Vice-Principals' Association (On The Coast, 2019). Before discussing the following case, DeRosa made it clear that school communities without clear guidelines around appropriate devices uses were the most likely to face problems with smartphones, which is supported by research on the topic (Anshari et al., 2017; On The Coast, 2019; Thomas & Muñoz, 2016). DeRosa outlined that in the 2017–2018 school year, Shelly McKay's Family Studies class approached him about conducting a six-week student-led project involving academic research and surveying fellow students at SHSS to decide upon a school cell phone policy. Following the research, the school implemented a Partial Ban that prohibited classroom use without teacher permission (Appendix B provides the SHSS Cell Phone Protocol). The student-led project provided numerous insights towards best practices in respect of effective smartphone policy design and implementation:

- Including students in determining “appropriate device use” facilitated students meeting and even exceeding educator’s expectations around responsible use.
- School-wide initiatives with student support are met with the most support and compliance among the student body.
- It is important to allow teacher’s discretion over exemptions for educational uses as some classes may benefit greatly from incorporating them while others will not.
- Potentially allowing “tech breaks,” to help students stay focused can help with maintaining engagement, let alone Nomophobia, particularly if more restrictive policies are problematic.
- Distractions and excessive device use are understood by students to be an issue that needs to be addressed. Furthermore, the issues are not necessarily individual, as students remarked that there are negative externalities (distractions caused by other classmates) from non-educational uses in the classroom.

### **4.3. Ontario, Canada**

In Canada, the most notable examples of Complete Bans come from Ontario. Until 2009, most school boards in the province had bans on cell phones in class. Since then, board-wide bans have been removed and policies are now left at the discretion of individual schools and teachers. The rationale for rescinding bans was to keep pace with the increased demand for technology-based learning” (Star Editorial Board, 2018). For



example, the Toronto District School Board (TDSB) implemented a cell phone ban across the district in 2007 that was later lifted in 2011 to allow teachers to establish rules towards harnessing the growing educational potential of smartphones and support education on responsible technology use (Beeston, 2017; Boisvert, 2019; Rushowy, 2019).

### ***An unprecedented top-down restriction in Canada?***

Recently, however, the government of Ontario under Doug Ford announced that in September 2019, cell phones will be banned from all Ontario school classrooms, which would make it the first province to regulate school cell phone policies. The results of the 2018 education consultations—touted as Ontario’s largest-ever on education—indicated that 97 per cent of respondents supported some form of ban (Rushowy, 2019). Under the proposed policy, students will still be able to bring smartphones to class if they are needed for health/medical purposes or teachers are using them for educational purposes (2019). Despite the provincial mandate, it will still be up to individual boards, schools, and teachers to decide on how to enforce the ban. The top-down policy is meant to be accomplished by amending a provincial code of conduct policy and requiring boards to uphold the ban while allowing some—potentially significant—variation at the district and school level (2019). As such, beyond providing legislated support towards barring non-educational smartphone use in the classroom, the extent the government directive will change smartphone management in practice is questionable. Furthermore, if the policy is effectual when legislated, there are several principal concerns (Boisvert, 2019). Firstly, the lack of evidence supporting a sweeping ban. Secondly, avoiding the need to educate students about responsible and beneficial mobile device use in schools, which has been emphasized by the boards that have rescinded bans. Third, the administrative burden imposed on school personnel alongside the risk of potential complications from enforcing the policy (e.g., escalating disputes with students), which may be especially difficult for teachers teaching on call (TTOC). However, it seems unlikely that in Fall 2019 a province-wide Complete Ban will be in place—at least in practice—instead of the mixture of existing policies in secondary schools throughout Ontario.

## 4.4. New South Wales, Australia

In June 2018, a review was commissioned by the Ministry of Education in the state of New South Wales (NSW), Australia, to analyze the benefits and risks of non-educational digital device use<sup>7</sup> with an emphasis on smartphones. The report used nearly 14,000 responses to an online survey, focus groups, interviews, 80 written submissions, a formal literature review, and a jurisdictional scan to capture the insights and perspectives of an arguably exhaustive list of stakeholders, academics, and informed persons on the issue. As of December 2018, the government of NSW announced it would implement a ban on smartphones in public primary schools over the course of 2019, allowing secondary schools to opt-in voluntarily (NSW Department of Education, 2018a). In terms of secondary schools, the review summarized that:

Acknowledging concerns about the potential negative impacts of mobile digital devices on student wellbeing, but also taking into account the important role mobile digital devices can play in young people's education, social life and sense of identity, the review team recommends that all NSW secondary schools develop and implement a specific policy/approach to guide the use of mobile digital devices in schools [they provide 5 fundamental variations on mobile digital device policies for *schools* to follow]. (Carr-Gregg et al., 2018, p. 9, emphasis added)

In addition, the NSW review recommended that high schools support policy implementation with clear communication between stakeholders (students, parents, teacher, and administrators), evaluate and refine existing policies in accordance with the review's findings, and consider undertaking a consultation process within their school communities to determine the most appropriate approach (2018).

While the NSW review did not assess the prevalence of various smartphone policies, it did find that there is significant variation: ranging from prohibitions on school grounds and grade-specific exemptions for senior high school students at certain times or places to allowing the devices to be carried throughout the day with use limited to breaks and lunchtime and actively encouraging and incorporating the devices as educational tools (Carr-Gregg et al., 2018). The NSW review found similar variation in

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<sup>7</sup> "Mobile digital device" is used throughout the review to refer to smartphones, tablets, laptops, and other digital devices (e.g., smart watch). Where applicable, specific terms are used. However, the focus of the review is on smartphones, which are the primary "mobile digital device" of interest in the review.

the penalties for infractions, which included verbal warnings, detention, and confiscations for varying periods that may further require parents to “pick-up” the devices or meet with the school principal.

The NSW review’s surveys on stakeholder perspectives are informative of the prevailing opinions amongst students, parents, and educators on banning mobile digital devices in Australia (Carr-Gregg et al., 2018, pp. 40–41). Notably, students generally supported and expected regulation in terms of specific rules on device use. However, unlike students, most parents and educators were supportive of restrictions on device use (either completely during the school day or with exceptions for recess and lunch). The rationale was that “they saw mobile devices detracting from students’ educational progression, wasting valuable teaching time and effort, and felt that the available hours outside school were sufficient for students to make use of them and interact online” (Carr-Gregg et al., 2018, p. 40). However, all stakeholders were concerned that implementation would be remarkably challenging. Furthermore, some parents and educators, academics, and organizations believe it is more important for older high schools to learn self-control than to be disciplined (2018).

In addition to the paucity of research of applicable peer-reviewed literature on the topic, one of the foremost concerns found in the review, was that:

In recognition of the range of existing practices, teachers also reported inconsistent policy positions, directions and take-up within and between schools, and note that the lack of standardised direction from the Department for public schools makes management of mobile devices onerous because of inconsistent attitudes and practices across the teaching staff/school. (Carr-Gregg et al., 2018, p. 36)

### ***The need for clear direction***

There were several other key findings from the NSW review, as noted throughout this report. In the case of secondary students, they found that there was a better understanding of the risks of device use among older students as well as an appreciation for needing boundaries around them, though they also found that in many ways students are overly attached to their devices, which has been noted in Canadian secondary schools as well (2018; Karine Ng, personal communication, March 3, 2019; Daniel Tetrault, personal communication, January 31, 2019). It was further noted that that parents and teachers may provide poor examples of self-regulation and undermine

school policy because of their own over-attachments (Ibid.; Daniel Tetrault, personal communication, January 31, 2019). Notably, the NSW review found that many older students were supportive of the Complete Bans because of their potential to minimize distractions provided alternatives such as a laptop were available. In contrast, other students felt that prohibitions would be an infringement on their autonomy and the potential educational benefits of smartphones (Carr-Greg et al., 2018). The NSW review (Carr-Gregg et al., 2018, pp. 36–37, 44) provides several recommendations for developing smartphone policies:

- Align parental and teacher management of digital devices. The significant discrepancies from the former being much more relaxed hinder teacher’s perceived capacity for facilitating responsible use and effective management.
- Building consistent policy across the school community by involving parents, teachers, students, and government.
- “While schools should have the responsibility to manage their practices within policy and other frameworks that best reflect the values of their communities, given the diversity of existing approaches and differing outcomes, schools are seeking clear guidance and backup in the form of enforceable, manageable policies on the unauthorised use of mobile phones.”
- “School policies or approaches that have been developed in consultation with school staff, students and parents appear to be the most robust,” which is supported by other research (Thomas & Muñoz, 2016).

#### **4.5. New York City, New York, USA**

Across the entirety of the US there has been a decrease in school-wide prohibitions on cell phones and text messaging devices, with the prevalence of bans in K–12 public schools falling from 90.0 per cent in 2009–2010 to 75.9 per cent in 2013–2014 and to 65.8 per cent in 2015–2016 (Musu-Gillette et al., 2018). Over the same periods, restricting access to social networking websites from school computers was largely unchanged, from 93.4 per cent to 91.0 per cent and to 89.1 per cent, respectively. By way of a potential explanation, a 2016 survey by Nielson found that 45 per cent of children get smartphones between 10 and 12 years-of-age and 72 per cent have mobile wireless services including data. Therefore, the motivation behind the decline in Complete Bans may be parent-motivated as they exert considerable influence on school policy and there is a strong desire to be able to contact them during the school day for safety reasons, especially in case of an emergency (Liz Kolb as cited in

Ehrenkranz, 2018; Nielson, 2017). Among parents who provided a smartphone to their child before the age of 13, 90 per cent indicated that being able to contact their child and vice versa were the principal reasons for providing the device (Nielson, 2017).

### ***Redesigning restrictive policy for equity across stakeholders***

New York City (New York or NYC) is arguably the flagship school system with respect to managing cell phones due to its marked history of aggressively banning digital devices (St. Gerard, 2006). On March 2<sup>nd</sup>, 2015, the city of New York rescinded its 10-year ban on them. The city explained that the change will allow parents to contact their children when necessary and address the inequities in enforcement under the previous policy as it was largely limited to schools in low-income communities with metal detectors (Sandoval, Eisinger, & Blau, 2015). Furthermore, the previous Complete Ban barred electronic devices from school premises entirely, forcing students to either leave them at home or store them outside school in private storage for a daily fee, costing on average \$180 USD each year (NYC Press Office, 2015). The new city regulation that governs digital device use in school requires that principals must consult with School Leadership Teams (SLTs)<sup>8</sup> to determine the best approach from a range of policies to manage devices:

- Store mobile devices in backpacks or a designated location during the school day (Complete Ban)
- Allow mobile devices to be used during lunch or in designated areas only (Relaxed Complete Ban or Strict Partial Ban)
- Allow mobile devices for instructional purposes in some or all classrooms (Partial Ban)

The NY Department of Education also stated that if a school does not develop a policy, they will be required to implement a Complete Ban: “the default will be a policy that allows students to bring cell phones into the building, but requires that the school or students store the phones out of sight for the duration of the school day” (2015, p. 2).

The policy has been widely hailed as an improvement, given its recognition that

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<sup>8</sup> SLTs are groups of people who develop educational policies for their respective schools that must include principals, Parent Association/Parent-Teacher Association Presidents, and United Federation of Teachers Chapter Leaders as well as a minimum of two students for high school SLTs, with optional membership from community-based organizations and other elected parents and staff members. The exact composition of a school’s SLT is outlined in the team’s bylaws (NYC Department of Education, 2019).

technology is part of everyday life, provides a means communication between parents and their children for safety and emergency reasons, and reflects the view that it is more effective to help students learn to use technology productively and responsibly than to prohibit it (2015).

## **4.6. Key Insights from Interviews, Literature Review, and Case-Studies**

### **4.6.1. Equity and socioeconomics**

A central factor contributing to the distributional impacts of smartphones in an educational context is socioeconomic circumstances, both in terms of a school's financial means and those of the school community (Sophia, personal communication, February 3, 2019; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019; Carr-Gregg et al., 2018). Fundamentally, when other digital devices, quality internet connectivity, or printed resources are lacking, smartphones provide greater educational value than when the opposite is true.

Furthermore, students with an autism diagnosis, anxiety, ADHD, seeking mental health supports, French and ESL (English as a second language) students, and students requiring additional accommodations (disabilities, learning plans, behaviour issues, and sensory needs) are more likely to benefit from access to smartphones, let alone those that need them in the case of specific medical conditions, such as diabetes (Ibid.; Sawyer & Patton, 2018). More restrictive policies on smartphones may introduce inequalities amongst students unable to afford alternatives, exacerbating the digital divide in access to the internet and digital devices among low-income families and minority students (Ibid.; Callow & Orlando, 2015; Lenhart, 2015; Thomas & Muñoz, 2016). However, based on research by the London School of Economics, low-achieving students are more likely to be distracted by the presence of mobile phones than high-achieving students, which suggests a successfully enforced ban could help reduce educational inequality (Beland & Murphy, 2015).

#### **4.6.2. Education on “appropriate device use” and the role of parents**

The NSW review found that education on the “safe, smart, and responsible use of technology” must be central to every school’s digital device policies (Carr-Gregg et al., 2018, p. 50). However, school policy should be supplemented by educating and incorporating parents in guiding students’ appropriate, safe, and socially acceptable uses (2018). The role of the school is important, but parents play an even greater role in educating adolescents on the responsible use and regulation of digital devices.

#### **4.6.3. Student safety and parental contact**

Safety is one of the undisputed rationales behind allowing students to take smartphones to and from school as they allow contact with parents during commutes (Carr-Gregg et al., 2018; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019). However, while most parents consider smartphones useful for emergencies and illness during school hours, many educators and administrative staff believe that there are readily available alternatives, such as contacting the school office (Ibid.). Furthermore, two interviewees and other research has noted that non-emergency text messaging with parents caused disruptions in class and throughout the school day, outlining the need for schools to clearly outline alternative means of contact during school hours (Carr-Gregg et al., 2018; Selwyn, Nemorin, Bulfin, & Johnson, 2017 Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019).

#### **4.6.4. Teacher autonomy and incorporating digital devices**

“Teacher autonomy can be conceptualized as the perceived and actual capacity to exercise control [exert influence] over teaching and assessment, curriculum development, school functioning, or professional development matters, within the limits of the educational goals accepted by the school community” (Usma Wilches, 2007). It is a central goal, value, and documented professional right within the BCTF’s Policies and Procedures as well as the Code of Ethics, which are applicable to all of BC’s public school teachers (BCTF, 2018). Furthermore, A discussion paper a senior researcher at the BCTF (Naylor, 2011) emphasizes seven key aspects of teacher autonomy, which are

supported extensively in academic literature throughout and corroborated in other literature cited below:

- 1) A basic human need and an imperative to teaching
- 2) Schools as emotionally-charged spaces where students are finding their place, and where teachers must exercise judgment
- 3) Building autonomy requires teachers to move from “private” [working] to “public” spaces [peer discourse]
- 4) Autonomy is supported by and requires reflection and collaboration with peers [systematic, community investigation]
- 5) Teachers’ professional development needs to be autonomous (Ingersoll, 2007)
- 6) Autonomy is greatly valued by teachers (Naylor, 2009)
- 7) Reducing autonomy negatively impacts schools and increases teacher attrition (Ingersoll, 2007, 2011)

Notably, research in Finland has highlighted the importance of both teacher and school autonomy in the country’s success in international student assessments (Sahlberg, 2007). Undoubtedly, there are other factors that contribute to their success, but educational reforms that have provided more autonomy and responsibility to teachers have contributed to teacher status, satisfaction, and effectiveness (Sahlberg, 2007, 2011). Similarly, the increase in professional development support in terms of long-term programs, continuous upgrading becoming a right, increased funding, and a movement towards systemic, school-wide improvement efforts as opposed to fragmented in-service training has contributed substantially (Ibid.).

Teacher autonomy provides pragmatic benefits when incorporating digital devices for a variety of reasons (Sophia, personal communication, February 3, 2019; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019). First, teachers must govern and enforce classroom rules, which places the burden of enforcement in their hands. Thus, the efficacy of policy relies on teacher support. Second, teachers have unique experiences, perspectives, and skills with digital devices, which require adaptability. Third, having variable school-based technological assistance and lacking professional development supports towards incorporating devices within the



context of digital-based curriculum and mandates on digital literacy requires flexibility. Undoubtedly, teacher autonomy is important. However, the issue with absolute autonomy over smartphone policies in high schools is that externalities accrue (teacher and student frustration, conflict, noncompliance, and surreptitious use) from potentially drastically inconsistent policies when each student has 7 or 8 teachers. These problems are exacerbated when school administration is similarly inconsistent in or withdrawn from the enforcement of smartphone policies.

#### **4.6.5. Interviewee Recommendations**

When asked about preferred policy approaches, two out of the four interviewees indicated that a Partial Ban-type policy would be their preferred option (Daniel Tetrault, and Karine Ng). The other two interviewees were “in between” a Partial Ban and Classroom Autonomy (Sophia and VL). The interviewees uniformly stated that consistency and clear guidelines at the school level, as also noted in the NSW review, would help to ensure policy efficacy. Furthermore, it was noted that an overarching policy framework at the district level that provides clear guidelines, outlines best practices, and hashes out the role of school personnel in enforcement would ensure smartphone policies were effective in fostering appropriate device use, especially under a Partial Ban (Karine Ng, personal communication, March 3, 2019). All the interviewees noted that preserving a degree of teacher autonomy while establishing clear school-wide guidelines would be difficult to develop in practice due to the necessity of consensus-building. However, it was viewed as ideal if achievable. Further, it was clear that restrictions outside the classroom would likely prove administratively problematic and burdensome on teachers, despite the possibility of benefits on student development and well-being. For that reason, the Partial Ban policy option does not explicitly include additional restrictions applicable outside the classroom.

Interviewees indicated that Partial Bans would allow parents to maintain means of communication while mediating teachers’ and students’ frustration around inconsistent policy enforcement. Complete Bans were viewed as not realistic to enforce due to the additional burdens placed on educators and administrators alongside the potential for conflict with students under harsh penalties for repeated infractions. Conversely, Classroom Autonomy was viewed as being prone to exploitation by students that can take advantage of policy inconsistency which exacerbates feelings of injustice. While

each interviewee emphasized that teacher autonomy is important, when aggregated at the high school level, the resulting variability has the potential to create negative externalities and impede policy efficacy (Karine Ng, personal communication, March 3, 2019). Additional detail on the insights provided during the interviews is presented in Appendix I.

## **Chapter 5.**

### **Policy options**

#### ***Preface***

The policy options presented below outline different approaches to smartphone management within secondary public schools.

#### **5.1. Policy option 1: Complete Ban**

The Complete Ban policy option entails a school-wide prohibition on cell phones. The specifics of the policy vary. Some require that these devices do not enter school grounds and therefore must be left at home or stored outside of school premises. Others require that during the school day or while on school premises they are effectively “invisible” such that they are always turned off and stored in either a locker, with the school office, or in backpacks. Allowing devices to be stored in students’ clothes’ pockets or leaving them with each secondary school teacher (high school students may have up to eight different teachers) are generally less common due to the enforcement and administrative issues that may arise. An infraction under this policy when a student either has a device on school grounds or has a device ‘out’ while at school.

#### **5.2. Policy option 2: Partial Ban**

Under the Partial Ban policy option, students are restricted from using smartphones during class time unless expressly permitted by the teacher (see the exemplar Partial Ban in Appendix B). The policy option herein does not explicitly include restrictions outside the classroom. Furthermore, while affording educational exemptions at the discretion of each teacher to an extent, it is marked by the necessity of establishing consistent school-wide and classroom guidelines on appropriate uses based on the circumstances of the school community. As such, stakeholder consultation and consensus-building among educators and administrators is essential.

The Partial Ban approach is motivated by helping students habitually disconnect in-class to facilitate an appreciation of the value of self-regulating device use. This

policy strives to balance the competing needs of guiding exclusively educational smartphone uses in the classroom, preserving a degree of teacher autonomy, and facilitating student self-control while managing the potential risks of allowing smartphones on school grounds. An important caveat is that it is prone to becoming Classroom Autonomy if not designed with clear classroom guidelines, stakeholder support, and consistently implemented (Karine Ng, personal communication, March 3, 2019).

### **5.3. Policy option 3: Classroom Autonomy**

The Classroom Autonomy approach allows individual teachers to decide on a cell phone policy that “works best for them and their classroom.” Fundamentally, this policy does not operate in absence of school-wide policies around “acceptable electronic device use.” Rather, this approach allows each teacher within the school to decide on a policy from across the full spectrum of device management schemes. Furthermore, Classroom Autonomy offers flexibility. More lax or stricter rules may be adopted as necessary by teachers (Sophia, personal communication, February 3, 2019). The central differentiations between Classroom Autonomy and a Partial Ban are the consultation process and the consistency of school-wide rules and classroom-specific policies, especially in relation to restrictions on non-educational uses.

## Chapter 6.

### Evaluation criteria for policy options

#### 6.1. Policy Objectives

The long-term objective of secondary public school cell phone policies is to manage the potential risks of smartphones while harnessing their potential as educational tools. Specifically, the long-term goal is to foster self-regulation, digital literacy, and responsible use while controlling for distractions, smartphone addiction, negative impacts on holistic well-being, and academic dishonesty.

In the short-term, policy objectives involve clearly communicating how the policy requires adjustment in behaviour, facilitating effective implementation, gaining acceptance among stakeholders, and ensuring the appropriate supports are in place (e.g., teacher training, software/hardware tech support, guidance on enforcement, network strength, provisions for device security).

Accordingly, each of the policy options is evaluated against five criteria, with 1.a) and 1.b) representing criteria relating to long-term societal objectives and 2.a) and 2.b) representing criteria relating to short-term management objectives:

1. Societal
  - a. Student Development
  - b. Student Health
2. Management
  - a. Stakeholder Acceptance
    - i. Parents
    - ii. Educators
  - b. Administrative Complexity
    - i. Affordability of Enforcement
    - ii. Policy Clarity

Although each of these criteria are evaluated in the analysis, student development is deemed to be the most important. The rationale is that the top priority of education in secondary schools is to foster student development. Not only was this finding

documented during interviews, it also reflects a central finding from one of the most insightful longitudinal studies on the individual factors that influence measures of health, wealth, and criminal offending over time, the Dunedin Multidisciplinary Health and Development Study<sup>9</sup> (Moffitt et al., 2011). Namely—and more important than intelligence, social class, and mistakes made during adolescence—in terms of achieving personal goals and contributing positively to society is being equipped with the skills of self-control in childhood. Furthermore, increasing self-control in adolescence predicted better outcomes. Self-control (self-regulation of impulses, emotional intelligence, and the capacity to concentrate, amongst others<sup>10</sup>) alongside the relevant subject knowledge and social skills to pursue their desired path in life are integral during the transition from the education system into society (2011). The importance of students learning to self-regulate smartphone use and understand the trade-offs is therefore the top priority relative to other criteria, and certainly related to the broader factors of self-control (Karine Ng, personal communication, March 3, 2019).

The remaining objectives are of secondary, though equal importance as key metrics in the evaluation of smartphone policies in secondary public schools. Protecting and caring for students and their health is a fundamental responsibility of the education system. Stakeholder acceptance is essential among influential actors such as parents and educators as smartphones are potentially both positively and negatively impactful in an educational context and there are divergent viewpoints. Furthermore, stakeholder acceptance among these two groups provides an indication of the likelihood of policy efficacy, consistency, and adherence (Sophia, personal communication, February 3, 2019; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019; Karine Ng, personal communication, March 3, 2019). The affordability of enforcement for a given policy provides an indication of its feasibility, as the higher the cost of enforcement in terms of lost teaching time, resolving conflicts, or foregone administrative work, the less feasible it is to implement by school personnel.

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<sup>9</sup> The Dunedin Multidisciplinary Health and Development Study (the Dunedin Study) is “a longitudinal study of a complete birth cohort of 1,037 children born in one city in a single year, whom we have followed from birth to the age of 32 y[ears-of-age] with 96% retention” (Moffitt et al., 2011, p. 2693)

<sup>10</sup> The authors of research using the Dunedin Study provide a more complete definition of self-control: “an umbrella construct that bridges concepts and measurements from different disciplines (e.g., impulsivity, conscientiousness, self-regulation, delay of gratification, inattention-hyperactivity, executive function, willpower, intertemporal choice)” (Ibid.).

Policy clarity reflects another aspect of feasibility, the simplicity of policy design as it relates to verifying an infraction. For example, an infraction may be clear in the case of an “invisibility” policy (i.e., seeing the device is an infraction) or relatively unclear (e.g., if online research is permitted, verifying off-task activity or policing brief non-educational activities such as responding to a text or checking social media requires judgement).

## 6.2. Evaluation Framework

The table below outlines the evaluation framework employed to analyze each policy approach. Table 6-1 summarizes the objectives, criteria, measures, and methodology relevant for assessment of the various policy alternatives.

**Table 6-1 Evaluation Framework**

| Objectives                           | Criteria            | Measures / Weight / Ranking Values  | Methodology  |
|--------------------------------------|---------------------|---|--|
| <b>Societal Objectives</b>           |                     |   |  |
| Development (Individual Fulfillment) | Student Development | The extent to which a smartphone policy is expected to influence the capacity of secondary public schools to foster a breadth of measures relating to cognition and self-control (e.g., critical thinking skills, academic performance, ability to concentrate, self-regulation, and willpower) among its students.<br><br>Weight: x3<br><br>Ranking Type:<br>Qualitative<br>High (H) = 3,<br>Medium (M) = 2,<br>Low (L) =1 | Literature review, interviews, jurisdictional scan |
| Security & Protection (Health)       | Student Health      | The estimated impact of a school cell phone policy on students' well-being (e.g. increased physical activity and social engagement, as well as reducing screen time and the incidence of cyberbullying, depression, and anxiety).<br><br>Weight: x1<br><br>Ranking Type:<br>Qualitative<br>High (H) = 3<br>Medium (M) = 2<br>Low (L) =1   | Literature review, interviews, jurisdictional scan |
| <b>Management Objectives</b>         |                     |   |  |

| <b>Objectives</b>         | <b>Criteria</b>                    | <b>Measures / Weight / Ranking Values</b>  | <b>Methodology</b>                                 |
|---------------------------|------------------------------------|--|--|
| Stakeholder Acceptance    | Stakeholder Acceptance (Parents)   | The extent to which a smartphone policy is expected to receive the support of parents.<br>Weight: x1<br>Ranking Type: Qualitative<br>High (H) = 3<br>Medium (M) = 2<br>Low (L) = 1   | Literature review, interviews, jurisdictional scan |
|                           | Stakeholder Acceptance (Educators) | The extent to which a smartphone policy is expected to receive the support of educators.<br>Weight: x1<br>Ranking Type: Qualitative<br>High (H) = 3<br>Medium (M) = 2<br>Low (L) = 1   | Literature review, interviews, jurisdictional scan |
| Administrative Complexity | Affordability of Enforcement       | The anticipated costs incurred by school staff, educators, and administrators to design, implement, and enforce a given smartphone policy, largely measuring the additional time burden required to effectively administer the policy.<br>Weight: x1<br>Ranking Type: Qualitative<br>High (H) = 3<br>Medium (M) = 2<br>Low (L) = 1 | Literature review, interviews, jurisdictional scan |
|                           | Policy Clarity                     | The anticipated ease at which student compliance with a smartphone policy can be assessed and validated, which reflects how straightforward the policy is in relation to defining and verifying an infraction.<br>Weight: x1<br>Ranking Type: Qualitative<br>High (H) = 3<br>Medium (M) = 2<br>Low (L) = 1                         | Literature review, interviews, jurisdictional scan |



## Chapter 7.

### Policy Analysis

#### 7.1. Policy option 1: Complete Ban

##### 7.1.1. Student Development

The Complete Ban policy option effectively removes smartphones from high school premises. Overall, the impact on student cognition from smartphones is generally considered to be negative. Each interviewee pointed towards downward trends in student cognition, and recent surveys of teachers have documented similar concerns with students. The academic literature notes improvements from Complete Bans on the standardized test scores of low-achieving students and, vice versa, finds significant negative associations—though few substantively impactful—between non-educational device use and academic performance. However, the research also notes that incorporating smartphones through m-learning or using “tech breaks” provides educational benefits. Furthermore, this approach is especially lacking with respect to fostering self-control given its inherently paternal nature: prohibition. While the policy does not preclude education about appropriate device use, its rationale is removed from students’ realities outside of school, let alone what they are transitioning towards. In our digital age, immediate access to information must be tempered with an ability to decipher polarized, polemic, and potentially illegitimate sources of the same. Further, the impact on higher-order thinking from smartphones is empirically unclear.

In theory, a successful Complete Ban with improved parental guidance outside of school has the potential to offer considerable benefits to many aspects of student development. However, the reality of socioeconomic constraints, equity considerations, teaching digital literacy, fostering self-regulation, life post-secondary school, and accommodating students’ needs for multi-tasking and increased engagement suggest that this approach falls somewhat short. In accordance with the potential to improve learning outcomes and remove distractions at the expense of fostering appropriate device use and self-regulation in practice, the impact on student development of a Complete Ban would be characterized as: **Medium**

### 7.1.2. Student Health

The academic literature on the impacts of smartphones on student health generally points towards downward trends, which interviewees and surveys corroborate. Although causation is questionable, and the negative associations are not entirely clear nor consistently substantively negative, especially in relation to smartphones and the contribution of use at school, the results are disconcerting. While there are exceptions to the notion of negative impacts on well-being from smartphones as some students may be building social skills and receiving support through their devices, the broader impacts cannot be ignored. In the eyes of some, socializing is simply different now and has adapted to match our growingly digital environments. In the eyes of others, it now fails to develop interpersonal skills and ignores the importance of non-verbal cues (i.e., body language) that are fundamental to face-to-face communication. Screen time is one of the strongest arguments behind completely banning devices, but few adhere to the recommended guidelines of less than two hours for those aged 17 and under, which either suggests that it is a lost cause or that schools may be the one place it can be reduced (Daniel Tetrault, personal communication, January 31, 2019). Although primarily anecdotal, the jurisdictions that have banned smartphones outright have noticed improvements in physical activity and social engagement (Carr-Greg et al, 2018). As well, smartphone bans may well serve to sever the ties from the devices, which in some cases are indicative of addiction.

In accordance with the negative trends in holistic measures of student's physical and especially mental and emotional health, though somewhat tempered by the unclear, tenuous conclusions from academic literature, the positive impact of a Complete Ban on students' overall health would be characterized as: **High**

### 7.1.3. Stakeholder Acceptance – Parents & Educators

Although there is a substantial uncertainty with respect to student development and health in relation to smartphone policies, there are somewhat clearer positions amongst stakeholder. The NSW review found substantial support on the part of parents for prohibiting device use either during the entire school day or potentially excluding breaks and lunch. Often, those in support feel that smartphones play too large of a role in their children's lives and do not belong in an educational context (Carr-Gregg et al.,

2018; Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019). Parents against Complete Bans largely cite safety during commutes and emergency contact as a principal reason, but this is only relevant if cell phones are prohibited from school grounds. Furthermore, not only is the school office able to facilitate emergency communication, but most parent-student communication is mundane or not time-sensitive (Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019). However, the fear of a very low probability risk with a potentially severe outcome can lead to irrational thinking,<sup>11</sup> and parents are influential on school policy. As well, some desire the capacity for communication with their child during the school day (Ibid.; Carr-Gregg et al., 2018). More importantly, some parents believe that schools play an important role in helping student's learn appropriate use and management of their devices (Ibid.; Karine Ng, personal communication, March 3, 2019).

Educators have mixed views, with many different paradigms and life experiences shaping their perspective on whether the device's benefits outweigh the risks. The NSW review (Carr-Gregg et al., 2018) found most educators to be in support of a Complete Ban-type policy. They cited a desire to avoid wasted educational time and effort as well help prevent activities that detract from students' educational progression. However, respondents in the NSW review and all interviewees expressed misgivings about the burdens placed on school personnel in enforcing them, especially in secondary schools (Daniel Tetrault, personal communication, January 31, 2019; Karine Ng, personal communication, March 3, 2019; Sophia, personal communication, February 3, 2019; VL, personal communication, January 26, 2019). None of the educators interviewed recommended a Complete Ban (Ibid.). In part, this is because educators are generally not supportive of the rationale (no educational benefits from smartphones when considering digital literacy and curricula, equity considerations, and resource gaps) nor the loss of adaptability in their classroom (Ibid.). But, the major concern is that in practice, the burden of enforcement largely falls upon them while failing to eliminate liability concerns and time spent (both inside and outside the classroom) policing surreptitious use. For most, the policy of a ban is just not feasible to enforce unless it is

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<sup>11</sup> The concept is called "possibility effect" whereby the fear of a low probability but very high cost risk leads to an investment to avoid the risk that exceeds the expected value of the risk based on its low likelihood. From Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263-291.

strongly supported by the school community following significant issues that warrant a highly restrictive approach.

In accordance with the mixed viewpoints and perspectives among both stakeholders, the degree of stakeholder acceptance for a Complete Ban would be characterized as: **Medium** for parents and **Medium** for educators.

#### **7.1.4. Affordability of Enforcement**

The principal issue with a Complete Ban is enforcement and the burden placed on school staff to effectively implement one (Gao et al., 2017, 2014; Lenhart et al., 2010; Selwyn & Bulfin, 2016). Although it has been noted that students and parents may adapt over time to prohibitions, the issue is more problematic in public secondary schools (Karine Ng, personal communication, March 3, 2019; Daniel Tetrault, personal communication, January 31, 2019). In part, because high school students are more independent and some already manage smartphones outside of school at a job, which creates a sense of injustice (Sophia, personal communication, February 3, 2019). But also, because high schools generally have larger student-to-staff ratios and numerous different teachers for each student, effective enforcement is more difficult (Daniel Tetrault, personal communication, January 31, 2019; VL, personal communication, January 26, 2019). If students do not comply with policy, there will not only be high rates of infractions requiring enforcement, but potentially also more severe conflicts with students, depending on the consequences used to deter misuse (e.g., escalating to confiscation with additional conditions or for long periods) (Daniel Tetrault, personal communication, January 31, 2019; Karine Ng, personal communication, March 3, 2019; Sophia, personal communication, February 3, 2019).

In accordance with the difficulties of imposing a ban on high school students, unless exceptional circumstances were met in the design and implementation of the policy (consensus amongst educators and school administrators in design and overwhelming buy-in from students and parents), the anticipated affordability of enforcement under a Complete Ban would be characterized as: **Low**

### 7.1.5. Policy Clarity

The greatest strength of the Complete Ban approach is that it is straightforward. Often there is not a lot of “gray area” with respect to what constitutes an infraction and, as such, assessing and validating compliance with the policy is relatively easy. Be it a ban on school premises or an “invisibility” policy, the rules are clear, and while disputes may arise regarding enforcement in practice (i.e., “when push comes to shove”), they are unlikely to arise with respect to whether a rule was broken or not. Therefore, the anticipated ease at which compliance with the schools’ smartphone policy can be assessed and verified under a Complete Ban would be characterized as: **High**

## 7.2. Policy option 2: Partial Ban

### 7.2.1. Student Development

The Partial Ban approach specifically targets student development by guiding appropriate device use while mediating the risks of their incorporation as educational tools (i.e., distractions and noncompliance with what are perceived as overly restrictive or inconsistent policies). This policy option addresses the potential negative impacts by establishing buy-in from the school community and affording exemptions for students that stand to disproportionately benefit (mental health, medical needs, language courses, low-income, and accommodating disabilities) students’ opportunities to engage in m-learning, alleviate Nomophobia during non-educational uses outside class, and learn self-regulation. Conversely, it allows teachers to harness the utility of the devices for educational purposes to supplement education and replace lacking resources. Ultimately, the policy’s goal is to allow students to develop self-regulation by building trust, incorporating their views, and guiding them in terms of both practical and formal education on appropriate device use and digital citizenship. Furthermore, the policy allows teachers to collectively establish guidelines and affords a degree of flexibility in adapting them such that their teaching is positively impacted.

The principal objective of this approach is to ensure that when smartphones are used in classrooms, they are used to improve teaching. The challenge is in finding and implementing the balance appropriate for a given school community. As such, the capacity for a Partial Ban to facilitate student development is characterized as: **High**

## 7.2.2. Student Health

The Partial Ban balances restricting the potentially detrimental impacts of non-educational smartphone in class while affording students the ability to periodically engage in them between classes. Notably, this policy would likely not facilitate increased student physical activity and social engagement outside the classroom. “Disconnecting” is potentially beneficial for students’ overall state of mind with the caveat that it potentially creates a degree of distress when imposed upon them. Another important consideration is the degree to which a Partial Ban represents a significant movement away from the status quo. That is, differences in terms of total screen time and non-educational smartphone use may not be substantial. As well, mental health benefits such as crisis text lines would not be acceptable in class, though still available outside of class. However, this policy is more conducive to addressing equity and providing special accommodations, especially in relation to socioeconomic considerations. For example, it affords use to students requiring smartphones for learning purposes (e.g., disabilities, autism diagnosis, ADHD, sensory needs), to assist with mental health concerns (e.g., depression, anxiety), behavioural issues, and for medical purposes (e.g., diabetes). However, Complete Bans often provide similar exemptions, though not always as comprehensively nor easily in practice.

Considering the lack of certainty both in the terms of primary and secondary research as well as the limited decrease in non-educational smartphone use under a Partial Ban despite affording for equity considerations, the anticipated impact on student health is characterized as: **Medium**

## 7.2.3. Stakeholder Acceptance – Parents & Educators

Stakeholder acceptance is an integral aspect of a Partial Ban. In the event consensus or meaningful compromise cannot be reached on design and implementation, the approach is subject to becoming ineffectual. School administration, parent advisory councils, and educators would likely have the final say during decision-making. This means that some views may be marginalized, be they minority viewpoints “at the table” or those “not at it.” Further, gaining support and achieving meaningful compromise within the school community may be difficult and require substantial effort from all school community stakeholders to obtain (Daniel Tetrault, personal

communication, January 31, 2019; Karine Ng, personal communication, March 3, 2019; Sophia, personal communication, February 3, 2019; VL personal communication, January 26, 2019). As such, an important limitation of this approach is that if there are strong views among parents and, especially in the case of educators, the compromise reached might be circumspect (Ibid.). This creates the risk that due to inconsistency in how school personnel enforce the policy or how teachers define “educational uses,” the policy may become ineffectual, largely becoming a Classroom Autonomy approach.

However, the challenge of consensus-building affords an opportunity to weigh the concerns and considerations that pertain to the entire school community. As such, this process is considered to be the most effective way to establish robust policy (Carr-Gregg et al., 2018; Selwyn & Bulfin, 2016; Thomas & Muñoz, 2016). In this way, a Partial Ban offers a unique strength in overcoming the limitation of divergent perspectives: inclusive dialogue and consultation. Overall, parents would be supportive of a Partial Ban insofar as it provides for safety and emergency contact, educational benefits, and teaches self-regulation (Ibid.; Carr-Gregg et al., 2018). Further, this policy uniquely involves parents through education and dialogue towards guiding students’ responsible device use outside of school. That said, physical activity and socialization at school may not be improved as much as parents would like. Educators would generally be supportive of this approach as it preserves a degree of autonomy; brings salience, clarity, and consistency to smartphone policies; and supports teachers in facilitating the benefits of smartphones while conferring confidence in enforcement against misuse. However, building consensus may prove difficult and frustrating to some teachers, even if the result is ideal.

In accordance with the value placed on school community input and reliance on building consensus towards meaningful compromise across parents and educators—which may have very divergent experiences and perspectives about the best smartphone policy approach in a school—the anticipated level of stakeholder acceptance for a Partial Ban would be characterized as: **High** for parents and **High** for educators.

#### **7.2.4. Affordability of Enforcement**

The administrative cost of establishing and administering a Partial Ban is likely to be high. All stakeholders need to actively participate in a discussion around determining consistent smartphone policies. Furthermore, the policy must allow teachers to, within reasonable limits, define exemptions under “educational uses” in their classrooms. The policy must then be enforced for uses that fall outside of these rules, which will likely require additional work for both educators and administrators. The nuances in design that make a Partial Ban work for a school community will therefore likely make it costly to design, and potentially to enforce, especially if difficulties are faced during consultations or in implementation. Once successfully implemented, the required stakeholder buy-in would likely ensure the long-term costs are relatively low, but the costs in design and implementation would be high relative to other approaches. Overall, the anticipated affordability of enforcement under a Partial Ban is characterized as: **Low**

#### **7.2.5. Policy Clarity**

The clarity of policy under a Partial Ban is mixed. On the one hand, policy is informed and shaped by the entirety of the school community. In other words, there are clear expectations established around school policy about when devices can be used (i.e., only with teacher permission). On the other, restricting device use unless permitted by a teacher for educational purposes has its risks. Specifically, in terms of the nature of permitted educational uses. Students continually monitor and learn from the habits and behaviours of their teachers as they relate to enforcement and compliance around class policies. To be clear, they figure out what they can and cannot get away with quickly and this information is readily shared. As a result, if there are “gray areas” around “educational uses,” this may compromise policy efficacy. This is problematic both in terms of compliance (i.e., students will engage in non-educational uses) and enforcement (i.e., teachers need to police their students more attentively and potentially make judgements that may or may not be valid with respect to an infraction, potentially leading to perceptions of injustice or inconsistency). As such, compliance and enforcement are potentially more complex than under a prohibition. However, this approach provides students with opportunities to engage in non-educational uses outside the classroom, which disincentivizes noncompliance and minimizes external and internal distractions from routinized behaviours with their smartphones. As well, the



flexibility in defining educational uses, while it could be problematic if done inconsistently, could provide for “tech breaks.” In accordance, the anticipated ease at which compliance with the schools’ smartphone policy can be assessed and verified under a Partial Ban would be characterized as: **Medium**

## **7.3. Policy option 3: Classroom Autonomy**

### **7.3.1. Student Development**

The Classroom Autonomy approach is common because the notion that subsidiarity (the principal of devolving decisions to the lowest practical level) and teacher autonomy contribute to effective education and digital device policy is pervasive among academics, professional unions, and school districts (Ingersoll, 2007; Naylor, 2011; On The Coast, 2019; Rushowy, 2019; Sahlberg, 2007; Star Editorial Board, 2018; Zussman & Stanton, 2019). Teaching students digital literacy and to become responsible digital citizens is a key foundation of 21<sup>st</sup> century education. Accordingly, the capacity of secondary school teachers to utilize digital devices for educational purposes while managing the distractions they can create is an important consideration. As was noted in interviews, the potential patchwork of policies created under this policy approach lends itself to inconsistency, creating a negative externality at the school-level that diminishes overall policy efficacy. While the additive benefits of smartphones when other digital devices are debatable, incorporating smartphones can provide a means to empower students in their education (m-learning) by facilitating an understanding of their appropriate use and trade-offs. However, gaining the benefits requires appropriate instruction, professional development and tech support, and consistent enforcement. Currently, the benefits of digital devices are often limited to situations when other digital devices or print resources are lacking.

However, students are incredibly attached, even addicted to smartphones—as many teachers, parents, and other adults arguably are, too. This creates a dilemma for teachers given their ubiquity, especially when there is a lack of clear guidance on best practices. In fact, guidance is often more than unclear, it is contradictory, with some advocating for ways to incorporate them and others outlining how they impede learning. The only clear guidance many teachers have is “to design a policy that works for you,” which many try to extend to one that works for their students as well. However, in

secondary schools, tailoring a policy to seven or eight different classrooms is rarely feasible. The result is that in most secondary schools, there is a patchwork of different policies, from complete prohibition to incorporating them extensively or from shoe boxes at the back of the classroom to special cases attached to desks that block the phones from receiving/sending signals and even being accessed without teacher permission.

Fundamentally, the Classroom Autonomy approach is a patchwork amalgamation from across the spectrum of Complete Bans to Partial Bans and minimal rules to full incorporation. While the degree of variance depends on the school and its teachers, the impact on student development is particularly inconsistent: positive in some cases, negative in others. The issue with the approach is the potential for inconsistency leading to frustration and noncompliance. Considered collectively at a school, district—or larger level for that matter—the benefits of this approach are that some teachers can effectively manage and ensure smartphones contribute to student development while others struggle, in part due to the inconsistency, and in part due to a lack of guidance, divergent pedagogical perspectives, and means at their disposal to effectively facilitate appropriate smartphone use. Accordingly, the anticipated impact of Classroom Autonomy on student development is: **Low**

### **7.3.2. Student Health**

This approach may confer the advantages of facilitating a break from devices under classrooms with prohibitions and foster appropriate smartphone use in more inclusive ones. However, it is unlikely to facilitate improved physical activity or social interaction like a broader prohibition. Furthermore, the potential for inconsistency at the school-level lends often itself towards frustration, conflict, noncompliance, and students' misuse also distracting other students (Karine Ng, personal communication, March 3, 2019; Daniel Tetrault, personal communication, January 31, 2019). Its impact on student well-being in terms of total screen time, non-educational device use, and smartphone addiction is at best, incremental. Conversely, this approach may not always have drastic variation and may therefore provide student health benefits comparable to a Partial ban. As well, the policy does not preclude formal education on appropriate device use and it provides flexibility to adapt policy for socioeconomic and equity reasons. Accordingly, the anticipated impact of Classroom Autonomy on student holistic well-being is characterized as: **Medium**

### 7.3.3. Stakeholder Acceptance – Parents & Educators

In the case of stakeholder acceptance, Classroom Autonomy is generally solely appreciated by parents for student safety and emergency reasons as well as providing means of communication during the day (Daniel Tetrault, personal communication, January 31, 2019). However, the policy is potentially lacking to those parents who want high schools to have more uniform restrictions, effectively mitigate perceived risks, and provide education on appropriate device use. Educators have a balanced perspective, as many believe it is integral to be able to decide on a policy that works best for them, but while some teachers are successful at incorporating and managing the devices, others are not, and at least in part because of the inconsistency amongst their colleagues. As a result, the anticipated extent of stakeholder acceptance towards Classroom Autonomy is characterized as: **Low** for parents and **Medium** for educators

### 7.3.4. Affordability of Enforcement

The Classroom Autonomy policy is the status quo because it reflects many schools' responses to both financial and resource constraints as well as individual teacher's divergent perspectives on smartphones. This approach is an equilibrium of sorts with respect to the feasibility of administering a smartphone policy. Although Classroom Autonomy is *ad hoc* for all intents and purposes, it is what has been deemed workable under the current circumstances in many secondary schools. However, enforcing an inconsistent policy can be costly for some teachers, easy for others, and simply disregarded by those that feel that enforcing restrictions is like "fighting the tide" in a digital age. These issues can be exacerbated by inconsistent support in enforcement from school administrators. As well, the approach may create serious conflicts with students relative to teachers who have more restrictive policies, which can prove costly in terms of lost class time, poor student outcomes, and additional administrative work towards dispute resolution involving parents and school heads. As a result, the anticipated impact of a Classroom Autonomy approach on administrative affordability is characterized as: **Low**

### 7.3.5. Policy Clarity

Due to the inherent variation in smartphone management from classroom to classroom under a Classroom Autonomy approach, administrative simplicity is the greatest weakness of the policy. While this policy approach often does not go as far as to specify additional restrictions on non-educational uses outside the classrooms to be enforced by school personnel, in every classroom the rules are likely at least a little different, if not greatly so. This not only complicates matters for teachers, who may benefit from designing their own classroom policy at the risk of challenges created by their differences relative to their colleagues, but it creates problematic gaps in the policy for students. For example, compliance with a restrictive policy may be perceived as “up for debate” and lend itself to students bending the rules to their advantage, which unfortunately means non-educational device uses may pervade. Not only making smartphone management policies ineffectual but creating conflict and negative externalities on other students. Even in the case of more inclusive policies with smartphones, there can be issues with students deceptively engaging in non-educational uses under the guise of educational ones. While this may or may not be substantively impactful, nor unique to this policy approach, it potentially defeats the purpose of having a more inclusive policy—especially one without clear guidelines and supporting frameworks for enforcement. Accordingly, the anticipated ease at which compliance with a policy can be assessed and verified is characterized as: **Low**

## 7.4. Policy Evaluation

**Table 7-1 Matrix Analysis**

| <b>Criteria</b>                                   | <b>Complete Ban</b>    | <b>Partial Ban</b>  | <b>Classroom Autonomy</b> |
|---|------------------------|---------------------|---------------------------|
| <i>Student Development</i><br>Weight [x3]         | <b>Medium (2)→ [6]</b> | <b>High (3)→[9]</b> | <b>Low (1)→[3]</b>        |
| Student Health<br>Weight [x1]                     | <b>High (3)</b>        | <b>Medium (2)</b>   | <b>Medium (2)</b>         |
| Stakeholder Acceptance (Parents)<br>Weight [x1]   | <b>Medium (2)</b>      | <b>High (3)</b>     | <b>Low (1)</b>            |
| Stakeholder Acceptance (Educators)<br>Weight [x1] | <b>Medium (2)</b>      | <b>High (3)s</b>    | <b>Medium (2)</b>         |
| Affordability of Enforcement<br>Weight [x1]       | <b>Low (1)</b>         | <b>Low (1)</b>      | <b>Low (1)</b>            |
| Policy Clarity<br>Weight [x1]                     | <b>High (3)</b>        | <b>Medium (2)</b>   | <b>Low (1)</b>            |
| Total Un-weighted Score:                          | 13                     | 14                  | 8                         |
| <b>Total Weighted Score:</b>                      | 17                     | <b>20</b>           | 10                        |

## Chapter 8.

### Recommendation and conclusion

#### 8.1. Conclusion

If bans are not enforceable in secondary schools in terms of compliance and enforcement, yet the prevailing classroom by classroom approach leads to inconsistency that frustrates smartphone management and impedes policy efficacy, finding some sort of middle-ground policy is the logical conclusion. While no “one-size-fits all” policy approach is applicable to every school, a balance can be struck to ensure that the educational and developmental benefits of digital devices are fostered while the risks of distractions and negative impacts on well-being are mediated. This balance is unique to each school community, reflecting the diversity of perspectives of its stakeholders, financial constraints, and their chosen path towards education that seeks a way to foster digital device use as an educational tool and must develop digital literacy. Education about appropriate device use is key to the success of any smartphone policy. As well, supportive guidelines around smartphone management from an overarching framework developed at the government or school district level is key to both establish consistency and support the implementation and enforcement of policy.

Fundamentally, a **Partial Ban**, which relies upon the additional investment in incorporating stakeholder perspectives into determining the specifics of the policy, has not only the flexibility to allow teachers to meet their unique needs, it allows students to contribute and shape a policy that they must live up to while also establishing clear and consistent rules on appropriate smartphone use. A key advantage of the policy is that despite the consistency in general rules and guidelines throughout a given school, it allows teachers a degree of flexibility to adjust their definition of educational uses to help facilitate self-regulation. If benefits are being realized, more autonomy can be given to students; if uses are growingly inappropriate, they can be restricted. In this way, teachers still have the autonomy over their classrooms, but there can be consistency in how smartphones are managed such that guidelines are clear and enforceable, developed with the support of parents and students, and inequities within a given school can be minimized.

The major barrier to a Partial Ban lies in building-consensus within the school community on the best way to balance educational and non-educational uses, as “consistency” is the keyword underlying this policy. Incorporating students, parents, and educators in the design of the policy allows the competing desires and perspectives around smartphones in an educational context to be discussed and mediated. While the term “Partial Ban” includes “ban,” it does not preclude device uses—in fact, it’s about fostering “appropriate use”. Students are afforded the opportunity to use their smartphones in classes that benefit from their applications and functions. Similarly, teachers that wish to incorporate smartphones as a learning tool to supplement content, such as for m-learning, can do so. Furthermore, schools that are otherwise lacking physical and digital resources can use smartphones to replace missing dictionaries, textbooks, tablets, and laptops—although their capacity to serve as a complete replacement for all digital devices is somewhat limited without add-ons (e.g., Bluetooth keyboards for word-processing).

In short, an effort needs to be made to provide clear and consistent guidelines at each school in consultation with school communities to align smartphone policies. While this may appear to be an affront to teacher autonomy, it is rather an attempt to address a by-product from the unsettled debate on what defines “appropriate device use.” Since the debate is not settled—and will not be soon—then at the least, high schools need to try to ensure that a patchwork of policies that are inconsistent and create frustration don’t impede the efficacy of attempts to formally and practically educate students about the benefits and risks of smartphones. Secondary schools play an integral role in developing the cognitive skills and self-control that allows students to become successful adults—be it achieving personal goals or contributing to society. Accordingly, an effort must be made to ensure that educators are able to facilitate the development of those skills, to which managing smartphones use is a key part. While the devices themselves are exactly that, devices, they can create opportunities and fostering growth just as much as they provide an easy escape from the difficulties of reality, education, and transitioning to adulthood. Learning how to manage smartphones, becoming digitally literate, and developing self-regulation skills go hand-in-hand in this day and age. If banning devices is unenforceable and allowing each teacher to decide on their best approach works for some but not for others at the expense of policy efficacy, then the solution is to work towards a consensus at the school community level. Preserving a

degree of teacher autonomy while developing school community support, clear expectations, and guidelines for administration on smartphone policies would be the best approach. A Partial Ban balances the trade-offs of smartphones in an educational context better than a Complete Ban or Classroom Autonomy.



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## Appendix A.

### Implementation

To implement a Partial Ban, the recommended approach is for school administration (school boards alongside relevant school heads and educators serving dual administrative roles) to evaluate the socioeconomic circumstances applicable to their school communities, the budgetary considerations, and current digital device and smartphone policies (e.g., BYOD, 1-to-1 programs, no formal policy). The objective of this first step is to establish the central financial considerations and digital/print resource gaps applicable to broader digital device policies at the school district level.

Following this first step, it is recommended that school boards seek to provide an overarching framework around policies relating to smartphones as educational tools in the form guidelines tailored to the needs and circumstances of their schools. As noted in the NSW review:

There is widespread consensus that the use of mobile devices in both primary and secondary school should be regulated and overwhelming consensus that this decision is best made at the school level in consultation with the school community. A number of organisations recommended that schools continue to be able to determine their own policies, rather than having these dictated to them by government. *They were advocative of the government providing additional support, evidence and best practice to allow schools to make better informed decisions.* (Carr-Gregg et al., 2018, p. 39, emphasis added)

Clearly, there is a role to play for government and school districts in providing clear guidance and support towards enforceable policies on smartphones and non-educational uses (2018; Karine Ng, personal communication, March 3, 2019). Specifically, this framework is not meant to prescribe a given policy approach, but to offer district-wide direction relating to digital devices and smartphone policies, with consistent guidelines in support of administration and enforcement of policy. For example, clarifying the roles and responsibilities of educators and school administrators in the implementation and enforcement of smartphone policies applicable to the educational context of secondary schools and their classrooms. To be clear, a major aspect would be clarifying the rules around confiscation of devices in respect of legal considerations. As well, providing information on best practices from teachers that

successfully manage devices in different ways and are successful in fostering appropriate, educational smartphone use would be beneficial.

The path towards a broader framework applicable to each school district, after establishing the constraints applicable to gaps in resources under existing device policies, is to expand dialogue to include representation from relevant principals' and teachers' associations and unions, academics (psychology, medicine, and education), technology and social media experts, interest groups (ideally both those with a vested interest in software and tech adoption in schools as well as those for/against adoption of technology and software in schools), and students' as well as parents' organizations. Another key actor in the development of a broader framework is teachers that have found success in managing smartphone use towards student development and educational uses as well providing practical and formal education regarding the benefits and risks of digital devices, especially smartphones. The role of teachers that meet this category is in contributing invaluable input towards best practices alongside the insights of stakeholders, professionals, and the evolving academic understanding of the impact of smartphones on students' development, academic achievement, and well-being.

The next step is to closely examine the best potential uses of financial resources towards school consultations in relation to smartphone policies. Ideally, this is done such that viable options applicable to each school within a given district have already been narrowed down based on affordability and feasibility. A key consideration will be the digital and print resource constraints applicable to each school alongside financial considerations. Similarly, teachers' professional development and capacity to incorporate m-learning are important considerations. Following this assessment, the consultation process should begin within secondary school communities involving students, parents, teachers, and school administrators as well as any other relevant organizations (parental advisory councils) and staff that would be serving a role in the enforcement of a given smartphone policy.

The consultation process is meant to achieve consensus from the school community around what appropriate device use is in an educational context, both on school premises and specific to the classroom. Key considerations will be students' opinions, building consensus amongst educators, "extreme views" (e.g., completely prohibit or completely incorporate), parental concerns, digital/print resource constraints,

designing enforceable policy, how devices will be managed when restricted inside and outside the classroom, how punishments will be carried out, whether to include a code of conduct with electronic devices that includes smartphones and further one that students/parents have to sign, outlining how emergency contact or school-based emergencies will be handled, and any liability concerns to do with damage to devices, theft, and misuse.

Following consultations, it is recommended that individual school administrators and educators collectively determine the best policy, giving significant weight to student and parent opinion and designing a policy that minimizes the problematic “gray areas” of enforcement. With respect to defining “educational uses,” it is best left up to individual teachers, but a degree of consistency is necessary in how devices are managed with the understanding that smartphones are a privilege and are restricted unless otherwise permitted. The degree of restriction may depend on the teacher and their trust in students and desire for building self-regulation among their classes. This must be tempered with ways of feasibly enforcing non-educational device use and addressing noncompliance, especially chronic misuse.

The policy should then be phased in (generally by starting with more relaxed punishments) after providing lead time in advance of implementing the policy to clearly communicate information within the school community.

While the implementation outlined above reflects a process by which a non-existent policy becomes a Partial Ban approach, in many ways the policy change may be a great deal simpler, but the importance of consulting with students and parents as well as building consensus amongst educators is undeniably a central piece in ensuring a sound smartphone policy not only in design, but in implementation and more importantly, effect.

## Appendix B.

### Example Partial Ban: SHSS Cell Phone Protocol<sup>12</sup>

The staff of SHSS recognize that technology is a powerful educational tool. We want to help students manage their use of cell phones so that they can be used to enhance learning, without being a distraction.

Here are the guidelines that teachers will be following in their classes to help with regulation of cell phone use.

- All classroom teachers will have a designated spot in their room where students who bring cell phones to class are expected to place their phone during class time
- Students who do not want to put their phones in the holder are expected not to bring them to class
- Cell phones can be used with expressed permission from the teacher
- Phones should be set to “silent” when students enter the classroom

The following consequences are in place for students who do not respect the outlined:

- 1st incident: Phone is given to the teacher until the end of class
- 2nd incident: Phone goes to the office and the student picks it up at the end of the day
- 3rd incident: Consequences may include:
  - a meeting with parents and administration
  - storing the phone in the office during class time for a specified number of days
  - a cell phone use contract
- If incidents are frequent, a student’s phone privileges will be re-evaluated.

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<sup>12</sup> Retrieved from: <https://shsscastlegar.com/cell-phone-protocol/>



## Appendix C.

### Final Version of Semi-Structured Interview Guide

#### *Ethics – Oral Consent Questions*

1. Are you okay with participating in the study? To reiterate, your participation is voluntary and you're free to stop at any point in time.
  - a. Yes?
2. Are you okay with the interview being recorded and stored, and notes being kept for solely research purposes (as outlined in detail in the ethics consent form)?
  - a. Yes?
3. I encouraged you to look over the ethics information, please let me know if you have any concerns, particularly about privacy.
  - a. Any?
4. How would you like to be identified (i.e., name, position, affiliations, and background)?
  - a. ?

#### *Introduction*

#### For Reference – Cell Phone Policy Approaches

- i) Ban
  - (1) Complete bans on school grounds, where they are either not allowed on school grounds or not allowed to be used on the same.
- ii) Partial Ban
  - (1) Partial bans (school-wide), where they are not allowed in class unless a teacher specifically requires it for certain classwork. Often, smartphones are otherwise only allowed during certain periods (i.e., lunch, breaks), which may be further restricted to certain functions (i.e., music but not social media, texting, or photo/video-taking) or certain areas of the school.
- iii) Classroom Autonomy

- (1) Classroom autonomy, with policy dictated by the teacher and flexibility by classroom within the school, reflecting a classroom-based as opposed to school-wide policy. Note that in the case of flexibility by classroom, the policy could be anywhere on the spectrum (from an absolute prohibition to an active incorporation of the devices as learning tools in the classroom)

### *Interview Questions/Themes*

#### Interviewee Background & Policy Questions

- 1) Please provide a brief overview of your background in education. In addition, please speak to your experiences with technology and smartphones in secondary public schools and/or classrooms.
- 2) With respect to smartphone policies, is it correct that in most cases district school boards allow individual schools to determine their policy approach, where often individual teachers have the autonomy over the specifics that pertain to their classrooms and principals (potentially following teacher and school community discussion) determine the specifics of the school-wide policy?
- 3) In brief, do smartphones in secondary public schools currently pose a policy problem to school boards and/or individual schools/teachers? What aspects specifically motivate adjusting or maintaining the current policy approach?

#### Stakeholders

- 4) Parents
  - a) What are the principal interests and concerns of parents regarding cell phone policy approaches?
- 5) Students
  - a) What are the principal interests and concerns of secondary students?
- 6) Administrators (Principals/Superintendents/School Board Officials)
  - a) What are the principal interests and concerns of administrators/officials?
- 7) Educators (Teachers)
  - a) What are the principal interests and concerns of educators?
  - b) Thierry Karsenti, the Canada Research Chair on Technologies in Education, has asserted that educating teachers on how to properly incorporate digital

technologies into the classroom strongly influences their impact. For example, teacher tech savviness and perspectives on traditional vs. “new” educational methods (i.e., digital learning tools) may be influential.

In your view, to what extent do individual teacher’s perspectives on smartphones (in relation to their perceived impact on academic performance and well-being) influence the actual impacts these devices have in the classroom?

### Smartphones & Students – Academics & Well-being

- 8) In your experience/to your knowledge, is the overall impact of smartphones on academic performance positive or negative?
  - a) Why (major contributing factors i.e., games, educational apps, multi-tasking, social media, texting)?
- 9) In your experience/to your knowledge, is the overall impact of smartphones on students’ holistic well-being positive or negative?
  - a) Cognition (attention, concentration, memory, and critical thinking)
  - b) Mental health/emotional impact (social media, internet, and smartphone addiction, cyberbullying)

### Best Practices

- 10) What is your understanding of how cell phone policies are decided upon currently (in either specific schools you are familiar with or in general)?
- 11) What do you believe are the best practices around cell phone policies primary and/or secondary public schools? In particular:
  - a) In developing a policy
    - i) Who should be consulted?
    - ii) For how long should it be evaluated?
    - iii) How should the decision be made (who should it be left with/to)?
    - iv) What should the main decision-making criteria be (safety, academic performance, privacy, etc.)?
  - b) Implementation, Enforcement, & Compliance
    - i) Applicable to everyone (all staff, policy applied in staff meetings, etc.) or just students?

- ii) Should there be a phase-in period?
  - (1) In terms of the grades affected by the policy?
  - (2) In terms of the severity of penalties given?
- iii) What are appropriate penalties?

### Attitudinal

#### 12) Opinions on:

- a) Smartphone (and related technology) addiction(s) and the role of the school?
- b) Face-to-face interaction and socialization vs. digital networking vis-à-vis the school environment?
- c) Whether technology's (digital devices in general) role in the classroom is positive or negative in sum currently and the contributing factors in your assessment?
  - i) Are smartphones an effective replacement for other technologies in the classroom, such as laptops/computers (i.e., word processing) or tablets (iPads/Chromebooks)?
- d) Screen time
  - i) The Canadian Pediatric Society recommends in its healthy active living guidelines that children (5- to 11-years-old) and youth (12- to 17-years-old) should limit recreational screen time to no more than two hours per day, with lower levels being associated with additional health benefits. What is your view of the role in schools in relation to smartphones given this recommended guideline?
- e) How to address inequalities in policies that support smartphones in the classroom? For example, bring-your-own-device [BYOD] policies may lead some less fortunate students to not have a device to take advantage of related services.
  - i) Research from 2000 to 2011 on high schools in four cities in the UK (Birmingham, London, Leicester and Manchester) suggests that a broadly enforced outright cell phone ban helps reduce inequality in achievement between students largely by improving the performance of low-achieving students with a relatively negligible impact on high-achieving ones. In this way, the authors assert that bans may help close "education gap." What are your thoughts on these findings, particularly in light of our current (more lenient) policies on cell phones in schools?

### Investigative/Analytical

13) What are the trade-offs and major barriers to each cell phone policy (i.e., school size and enforcing a ban, primary vs. secondary students and rebelliousness, etc.)?

Please speak with specific reference to student development, academic performance, student holistic well-being, administrative feasibility/cost of the policy, and stakeholder acceptance among students, teachers, parents, principals, school board officials. If there are any other major considerations, please elaborate.

i) Ban

(1) Complete bans on school grounds, where they are either not allowed on school grounds or not allowed to be used on the same?

(a) Trade-offs & Constraints:

ii) Partial Ban

(1) Partial bans (relatively uniform, school-wide policies with broadly enforceable restrictions on use), where they are not allowed in class unless a teacher specifically requires it for certain classwork. Often, smartphones are otherwise only allowed during certain periods (i.e., lunch, breaks), which may be further restricted to certain functions (i.e., music but not social media, texting, or photo/video-taking) or certain areas of the school?

(a) Trade-offs & Constraints:

(b) Is reduced functionality a feasible approach (enforcement concerns)?

iii) Flexible by classroom/teacher (variable from classroom to classroom,

(1) Classroom autonomy, with policy dictated by the teacher and flexibility by classroom within the school, reflecting a classroom-based as opposed to school-wide policy. Note that in the case of flexibility by classroom, the policy could be anywhere on the spectrum (from an absolute prohibition to an active incorporation of the devices as learning tools in the classroom?

(a) Trade-offs & Constraints:

14) As a final assessment, of the various policy approaches to cell phones, which do you prefer and why?

## Appendix D.

### List of Interviewees

Four educators, collectively providing experience across both contract and teachers teaching on call (TTOC) positions, working in primary and secondary education as well as special resource, French as a second language, and with school administration. Table D1 outlines the positions and dates of the interviews.

**Table D1 List of Informed Persons Interviewed**

| Informed Person | Position   | Expertise  | Date of Interview               |
|-----------------|--|--|---------------------------------|
| VL              | Schoolteacher in Vancouver's Lower Mainland  | Teaching for over 13 years, with experience in French immersion, junior elementary and high school, special resource teacher, French as a second language, music classes, TTOC | January 26 <sup>th</sup> , 2019 |
| Daniel Tetrault | Past High School Social Studies Teacher, 1 <sup>st</sup> Vice-President of Burnaby Teacher's Association | Masters in Equity in Education. 8 years of experience in the classroom and 2.5 years working with school administration since.   | January 31 <sup>st</sup> , 2019 |
| Sophia          | Schoolteacher in Ontario (K-12)  | 23 years of teaching experience, largely in Ontario middle schools. Has worked in 5 different provinces, including schools with BYOD policies.                                 | February 3 <sup>rd</sup> , 2019 |
| Karine Ng       | TTOC in Vancouver's Lower Mainland   | 14 years of experience both as a contract and TTOC in both secondary and primary schools in the Vancouver School District  | March 3 <sup>rd</sup> , 2019    |

## Appendix E.

### Case Study – New Zealand

#### ***An emphasis on what's best for individual school communities***

In response to France's national and statutory approach, both the Secondary Principals' Association of New Zealand (SPANZ) and the New Zealand Principals' Federation (NZPF) stressed the rashness of imposing a digital device ban on NZ schools (Cowie, 2018). Instead, both associations emphasize the right of individual schools to determine policies that work best for their communities. For example, Tararua College, a secondary school covering years<sup>13</sup> 9 through 15,<sup>14</sup> implemented a Complete Ban on cell phones at the request of parents (Wairarapa Times-Age, 2006). Infractions resulted in confiscation until the end of the week, which further required the pupil's parent/guardian to retrieve the device. Under the previous policy, confiscation proved extremely problematic and wasteful of school resources when device use was inappropriate. Phones were being stolen and used to bully other students. As well, teachers were being abused and threatened when trying to take phones away. Following the ban, outside of a few students still trying to smuggle the devices in, the issues with confiscation and both negative student-to-student and student-teacher interaction stemming from the devices drastically decreased. Exemplifying that, if it is not feasible to incorporate the devices responsibly into the educational context and manage the risks posed by smartphones, absolute prohibitions can be beneficial with stakeholder support.

#### ***Complete Bans and noncompliance***

NZ has limited academic research on the topic. One of the most informative studies examined cell phone policies and their impact on device use in schools in the Wellington region (the 3<sup>rd</sup> most populous of the 16 regions in the country). The research used both a brief census on school policies and a more detailed survey on a subset of classes in years 7 and/or 8. While not solely covering secondary schools, the school

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<sup>13</sup> While "Year" essentially corresponds to "Grade" in terms of age-ranges when comparing Australia to Canada, when comparing the Canada to NZ, "Year" corresponds to "Grade" minus 1 (i.e., Year 13 = Grade 12).

<sup>14</sup> Standard schooling ends at Year 13; Years 14 and 15 are applicable to schools that provide additional educational supports and/or accommodate teenage parents.

census provides an approximation for them as it represents 137 of the 139 schools in the region and captures each school type: years 1–8, years 7–8, years 1–13, and years 7–15 (Redmayne et al., 2011). The study indicated that despite all schools having a ban in place on non-educational cell phone use, 43 per cent of year 7 and 8 students—surveyed from a representative subset of 16 schools—admitted to using the devices regardless. The study found that over 90 per cent of schools allowed cell phones to be brought to school, but 87 per cent did not allow any use during school hours, opting for a Complete Ban (2011). For the remainder, 11 per cent allowed use during breaks and less than 2 per cent allowed use for specified learning purposes, opting for a Partial Ban. Table E-1 provides a summary of the study’s findings from the school census with respect to consequences for violations and how cell phones are managed once on school grounds.

**Table E-1 Selected results from Redmayne et al.’s census of ‘cellphones in schools’ (to the nearest 1%)\***

| <b>Device Management: What happens to cell phones that are brought to school?</b>            |     |
|--|-----|
| Hand in to office or teacher for the day   | 52% |
| Student to choose location [to store device]   | 24% |
| Keep out of classroom (cannot hand in)   | 15% |
| Keep out of classroom (can hand in)  | 2%  |
| Not applicable   | 7%  |
| <b>1<sup>st</sup> Violations: What is the first consequence of using ignoring the rules?</b> |     |
| Confiscate for the day   | 30% |
| Confiscate until parent collects it  | 30% |
| Other (specific [to circumstances of violation])   | 15% |
| No specific consequence  | 14% |
| Confiscate for the week  | 7%  |
| Not applicable   | 4%  |
| <b>Repeat Violations: What is the consequence of further ignoring the rules?</b>             |     |
| No specific consequence  | 42% |
| Other, usually behaviour management plan   | 19% |
| Confiscate until parent collects it  | 17% |
| Confiscate for the week  | 7%  |
| Confiscate for a month or rest of term   | 6%  |
| Phone banned at school in future   | 5%  |
| Not applicable   | 4%  |

\* Modified from (Redmayne et al., 2011)

The follow-up survey on 373 students between the ages of 10 and 13 indicated that rules on the phone location did not significantly influence use in class, with almost half of the students not handing the devices in despite possessing them, often for the purposes of in-pocket texting (Ibid.). Similarly, the relationship between repeated use in class and



consequences was not significant. However, certain consequences for first violations were found to be statistically significant, where “confiscation for a week’ and an unknown consequence determined by the circumstances appeared effective [at reducing phone use in class]” (Ibid., p. 356). In summary, the findings from the census and survey indicate that:

Allowing students to carry a cellphone but prohibiting its use, seems unrealistic and would be hard to enforce. Accordingly, we found considerable disparity between cellphone policy requirements and students’ compliance. So while a requirement to hand cellphones in was somewhat effective, it did not appear to reduce the texting frequency during lessons; many students covertly texted close to their abdomen or inguinal area. This may indicate that while the low risk-takers tended to conform to the requirements, the rules had little impact on higher risk-takers. This was particularly evident in harsher consequences for re-offending which appeared to be counter-productive. If the phone was retained, it was likely to be kept in a pocket. . . . Many principals stated that they had no, or few, incidents of private cellphone use during lessons, whereas by students’ own admission, 43% regular cellphone users had used one in class in the current year and a further 12% (who denied using one at school) reported sending texts regularly from within a pocket. (Ibid.)

### ***Balancing the trade-offs of different approaches***

Discussion with students at three secondary schools with different smartphone policies uncovered some informative aspects relating to the trade-offs (Cowie, 2018). One of the schools is Pakuranga College in Auckland, NZ, which has a mandatory BYOD policy that requires a tablet or laptop and incorporates considerable digital-based curriculum. Furthermore, it has a Partial Ban on smartphones such that they are only allowed for educational purposes, cannot be used during breaks or lunch, and safe-keeping the sole responsibility of students as storage is not provided. Penalties for infractions include warnings, temporarily suspending device use, being barred from bringing the device to school, and confiscation until parental contact is made. (Pakuranga College, 2018). The school decided that since smartphones are ubiquitous and growingly important as students transition to tertiary education and the workforce, the school was the best place to facilitate self-regulation and education on responsible use (Cowie, 2018). To assist, the College established a student-run “Digital Leadership Council” to help keep teachers up-to-date on educational uses, help students manage smartphone addiction and distractions, and build digital literacy in the student body. However, the Council acknowledged that its work has been challenging given students’

attachment to their devices. As well, the school only allows one device to access the school's Wi-Fi, which self-limited phone use. Largely because most students prefer to use laptops for practical reasons and would rather not use their data plans.

Alternatively, the all-boys Auckland Grammar School has a Complete Ban. If a phone is seen, it is confiscated for a week and only released to a parent/guardian. One of the students interviewed emphasized that a more liberal policy would likely result, by his own admission, in a struggle to manage the distraction of his phone (Cowie, 2018). St. Matthew's Collegiate, a girls' day and boarding school, uses a Partial Ban that allows phones at school but has heavy firewall restrictions to limit. For example, students can see notifications on their phones from social media, but they are unable to access them, which was noted as exacerbating anxiety around being digitally "disconnected" and contributing to "Fear of Missing Out" (FOMO). To this end, some students suggested they would prefer a stricter Partial Ban that required them to hand their phones in at the start of class that avoids the issue completely (2018). A consideration when interpreting these findings is that each of these schools draws their students from amongst the highest socioeconomic communities as classified by the NZ Ministry of Education.<sup>15</sup>

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<sup>15</sup> For more information on New Zealand's socioeconomic decile system and how they are applied to schools, please see, <https://www.ppta.org.nz/dmsdocument/119> and <https://education.govt.nz/school/running-a-school/resourcing/operational-funding/school-decile-ratings/>

## Appendix F.

### Case Study – England

#### ***Restrictions on the rise—considerations in design and implementation***

Throughout England, cell phone policies are often left up to schools as “there is no official policy or recommendation set out by the Department of Education in England regarding mobile phone usage in schools” (Beland & Murphy, 2015, p. 6). As mentioned in the Literature Review section, the research published in 2015 by Beland and Murphy on the four English cities of Birmingham, London, Leicester and Manchester provides one of the landmark studies about the impact of mobile devices on academic performance. The authors found that by 2012, 90 of the 91 high schools<sup>16</sup> studied had implemented a Complete Ban on mobile devices whereas when the study began in 2000 and even in 2001 not a single school had a ban in place (2015). Tanya Goodin, the London-based founder a consultancy group on digital health, indicated that 70 per cent of the 100 schools she consults with have a Complete or Partial Ban, or are in the process of implementing one (Hymas, 2018). With respect to implementation, secondary schools in England have adopted a variety of approaches in administering Complete Bans. For example, barring devices from entering school premises, enforcing an “invisibility” policy where they are to be kept switched off and out of sight for the entire school day at the risk of detention, or requiring the devices to be turned off and stored in lockers or left with the school’s office or the office for a given grade (Year Office) until the end of the school day. Other schools differentiate their policy based on student age. For example, banning pupils aged 11 to 13 from using them but allowing pupils aged 14 to 16 to use them briefly for constructive purposes, such as taking a picture of a diagram, schedule, or school notice.

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<sup>16</sup> The education system in England is notably different from other jurisdictions and further complicated by variation between different types of schools as well as between state-funded as opposed to fee-paying independent schools. The “Year” of school is similar to NZ in that it refers to the same level of schooling as “Grade” minus 1 relative to Canada or the US (e.g., Year 11 in England = Grade 10 in Canada in terms of age groups). The high schools/secondary students referred to in the study are in Years 7 to 11, at the end of which they write General Certificates of Secondary Education and may progress through more schooling or pursue a number of other paths, but that it is the end of compulsory school-based education (Beland & Murphy, 2015).

### ***Consistency, involving parents, and Codes of Conduct***

Schools that have implemented restrictions have anecdotally noted positive impacts on students, largely in terms of physical activity, involvement in extracurricular activities, and socializing (Hymas, 2018). Tanya Goodin recommends that secondary schools follow a type of “invisibility” policy, a strict Partial Ban, whereby devices are kept in bags or pockets for the entirety of the day unless expressly permitted by a teacher. For the approach to be effective, staff adhering to the policy and parents modelling healthy smartphone behaviour outside of school are important (Goodin, 2018). Goodin states that a consistent policy across the school as opposed to Classroom Autonomy lends itself to easier enforcement, while also affording teachers with the flexibility to incorporate the devices on their own terms. A related best practice is to ensure parents and pupils sign a code of conduct that is re-signed by the school to ensure the policy is understood, taken seriously, and that there is a commitment in writing to support the school in enforcement (Hymas, 2018). The NSW review reiterated the importance of incorporating parents into smartphone policies, indicating that:

Parents frequently want more information about their school’s mobile device policy. Often they have either limited or no understanding of this policy, and some claim they have never been provided with a copy. Parents had stronger understanding of the school policy where a ‘contract’ regarding the school mobile device policy was part of the school’s enrolment process, indicating that a digital license may be an effective way of raising parents’ awareness about school policy and expectations relating to the use of mobile digital devices. (Carr-Gregg et al., 2018, p. 37)

## Appendix G.

### Case Study – France

France is the one of the few countries with national legislation on cell phones in schools (alongside Albania<sup>17</sup> and Greece<sup>18</sup>). Specifically, France implemented a Complete Ban on all digital devices capable of connecting to the internet for schoolchildren between 3 and 15 years of age (up to the 8<sup>th</sup> grade) in September 2018 (Agence France-Presse, 2018). It is comparable to the policy adopted in NSW, Australia, but using more prescriptive statutory means that still allow institutions to choose the exact methods of administering the ban. Previously, a law passed in 2010 banned the use of smartphones “during all teaching activity,” but this has not been particularly effective at reducing phone use, let alone the negative impacts of cyberbullying and distractions (The Local, 2018). The new law clarifies exceptions for disabled students, during extracurricular activities, for emergencies, and for express educational use (2018). More importantly, however, the new law bans smartphone use outside the classroom during the school day (Samuel, 2017). French secondary schools with students aged 15 and older are be able to determine whether to adopt the ban or not. However, the law is a somewhat incremental change as around half of the country’s 51,000 elementary schools, 7,000 junior high schools, and secondary schools have already banned mobiles from school grounds (Agence France-Presse, 2018; The Local, 2018). Despite the prevalence of bans, secondary schools have the biggest problem with smartphones causing disruptions in class. Up to 40 per cent of punishments in high schools were smartphone-related according to member of the secondary headmasters union, SNPDEN-UNSA (Samuel, 2017). Another justification for the national law is to provide relatively greater consistency and a supporting overarching legal framework to help schools by conferring authority, reinforcing procedure, and providing confidence in enforcement (Beardsley, 2018; The Local, 2018).

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<sup>17</sup>[http://www.xinhuanet.com/english/2018-08/03/c\\_137366699.htm](http://www.xinhuanet.com/english/2018-08/03/c_137366699.htm)

<sup>18</sup><https://www.sbs.com.au/yourlanguage/greek/en/article/2018/06/26/greece-bans-mobile-phones-schools?language=en>

### ***Mixed early developments***

When the policy was first proposed, parents' groups were concerned about how difficult it will be to enforce, especially because lawyers have indicated that teachers do not have the right to seize non-dangerous belonging from students (Samuel, 2017). That said, existing school policies have been able to manage despite that limitation, often incorporating lockers, bins in classrooms, or labelled bags brought to the office at the beginning of the school day (2017). Although, the results of the law have yet to be evaluated—particularly in high schools—Eleanor Beardsley offers some anecdotal evidence from two middle schools in Paris, which indicate that the change has led to mixed results (Beardsley, 2018). At a school with 1,600 students of diverse backgrounds, it was noted that previous issues relating to cyber harassment and inappropriate videos have been eliminated. The principal noted that students seem friendlier, politer, are socializing more, and are engaging in more physical activity, which a few of the other schools examined also found since implementing the ban (Beardsley, 2018; Chrisafis, 2018). Students remarked that despite missing the entertainment of the devices, they appreciate that they are a distraction and potential impediment to schoolwork and enjoy the time away from the devices (Ibid.). A high school teacher interviewed, who previously led an education research group, indicated that the ban is ineffective as it would be better to use “phones as a tool for learning, and if anything, we should try to make phones banal rather than make them more enticing by banning them” (Beardsley, 2018, p. 2). At another middle school in Paris, Beardsley noted that kids were largely unaffected by the policy as they weren't allowed to use their phones in class before the ban due to preexisting Complete Bans or Partial Bans. Suggesting that substantive policy differences and changes in behaviour may be limited following prohibition.

## Appendix H.

### Literature Review: Texting in class

The impact of texting on learning in the classroom has the potential to be significant, as a survey of 4,390 high school students in Quebec indicated that 80 per cent have a cell phone, 88.4 per cent indicated use was restricted in class, yet among them only 12.9 per cent indicated they had never sent a text while 55.7 per cent felt it was acceptable to read or respond to them in class (Karsenti, 2018; McQuigge, 2017). Academic research on the topic has often focused on experimental designs where a lecture or presentation is given to a control group and a set of experimental groups receiving variable levels of text-based distractions. The students are then assessed in terms of learning objectives. In three similar studies using a single lecture with a control, a low- or moderate-distraction, and a high-distraction experimental group, it was found that a strong positive correlation exists between performance on measures of learning (multiple-choice exam /quiz and detailed notes) with significant differences between control and high-distraction groups (Dietz & Henrich, 2014; Kuznekoff & Titsworth, 2013; Rosen et al., 2011). A noteworthy conclusion from the research done by Dietz & Henrich (2014) was that despite the clear and significant association between texting during the lecture and negative learning outcomes, students felt that even though texting may be distracting in general, it is not so for themselves!

Research on texting and academic performance has also included the topic of message content to determine if it is influential in affecting learning. A research design similar to those previously mentioned, using a single lecture that included an additional experimental group receiving lecture-related content via text message, demonstrated that the control group and those receiving on-topic messages were significantly more likely to achieve a higher grade, take more detailed notes, and recall more information, but not different otherwise (Kuznekoff, Munz, & Titsworth, 2015). In another study of similar design by Lee et al. (2017) participant groups were instead separated by four types of hypothetical cell phone policies (allowed, banned, allowed but cannot use, and a no-instruction group), watched a brief lecture, and had learning objectives assessed. The researchers found that only the participants under the ban performed significantly better (S. Lee, Kim, McDonough, Mendoza, & Min, 2017). Another study design carried

out over the course of a semester in a marketing classroom showed that texting frequency was not a significant predictor of lower GPA, but the choice to text or not in class was a significant predictor of GPA (Clayson & Haley, 2013).



# Appendix I.

## Interview Results

The semi-structured interviews with four educators provided a variety of insights on smartphone policies in an educational context. The findings are summarized in Table I-1 below:

**Table I-1 Key Interview Results**

| Issue                   | Viewpoint   | Interviewees                           |
|-------------------------|---|--|
| Policy Problem          | <p>There is a policy problem with smartphones in secondary schools, and it is largely due to the varied levels of authority, the lack of support and clear policy guidance towards both best practices and enforcement (especially confiscation with respect to teachers and administrators), the burden placed on teachers in policing smartphones, and the inconsistency of policies and enforcement due to divergent pedagogical paradigms on the appropriate role of smartphones in the classroom.</p> <p>All had seen some positive uses and considerable negative impacts depending on the applications of smartphones, surrounding rules, and other idiosyncrasies. Noted as especially problematic for TTOCs, but generally beneficial for English as a Second Language, teaching French, accommodating special needs, and helping students with “difficulties focusing” that find music helps them concentrate).</p> | Karine Ng, Daniel Tetrault, Sophia, VL |
|                         | It may depend on who you ask as to whether smartphones are the problem or a failure to properly incorporate them.   | Daniel Tetrault                        |
|                         | Clear and consistent guidelines are important to establish in a given classroom, with agreement and understanding between the teacher and students proving beneficial, though some teachers just state their policy and force students to adapt.  | Karine Ng, Daniel Tetrault, Sophia, VL |
|                         | The development of an overarching, non-prescriptive framework on smartphone policies at the school district level may be especially beneficial, particularly under a Partial Ban, to provide guidance on best practices, clarify the role of educators and administrators in enforcing restrictions (largely in terms of smartphone confiscation, and help support consistent administration of school-wide and classroom rules.  | Karine Ng                              |
|                         | Privacy concerns for photos or videos outside taken at school and posted online without requisite permissions.  | Sophia                                 |
| Parents as Stakeholders | Parents want to be able to get a hold of their child at any time of day, but especially for safety during commutes to school and in case of an emergency. However, a lot of non-emergency logistical communication was noted to occur during the school day while in class.   | Karine Ng, Daniel Tetrault, Sophia, VL |

| Issue                          | Viewpoint  | Interviewees                           |
|--------------------------------|--|--|
|                                | Parents feel their children may spend too much time on their devices and want to see smartphones regulated at school, but they still send their kids to school with the devices, which they may have purchased and finance for them, and leave it up to teachers and schools to manage them.   | Karine Ng                              |
|                                | Parents are highly influential stakeholders in policy change or maintaining the status quo in schools around smartphone policies   | Daniel Tetrault                        |
| Students as Stakeholders       | Autonomy versus paternal policies that micro-managed their device use. Disputes in high school classrooms primarily being the result of disagreement on acceptable uses. The prevalence of excessive screen time in youth and the imperative to “stay connected” leading to a lacking ability to act on an appreciation of potentially unhealthy use, i.e., students recognize they spend too much time on their smartphones but feel somewhat helpless to control their use. A desire, addiction almost, to being “connected” and not having access to their devices can create discomfort and sometimes significant conflict (Nomophobia). | Karine Ng, Daniel Tetrault, Sophia, VL |
| Administrators as Stakeholders | Administrators want to ensure that school district priorities are active in practice, with or without detailed guidance or supporting means. Imparting autonomy to teachers within the broad objectives of the district, but potentially not providing much further guidance to facilitate the implementation of overarching education goals.  | Sophia, Karine Ng, VL, Daniel Tetrault |
|                                | While it is difficult to generalize, district administrators generally place greater weight on the views of parents when compared with school administrators, which have the challenge of balancing the views of stakeholders across the school community with their teachers’ viewpoints being more influential.  | Karine Ng, Daniel Tetrault             |
|                                | Administrators and educators are getting mixed messages pedagogically on technology and smartphones in education as some discuss innovative uses, how to incorporate them effectively, and their benefits while others discuss the negative impacts and how to moderate them   | Daniel Tetrault                        |
| Educators as Stakeholders      | Developing self-control is a primary concern alongside other cognitive development considerations such as critical thinking, problem solving, and attention/memory, there is a need to ensure students can focus and work productively for extended periods of time, which appears to have decreased.  | Karine Ng, VL, Daniel Tetrault, Sophia |
|                                | Incorporating education about “appropriate smartphone use” in both a classroom setting and in life into curricula.   | Daniel Tetrault, Karine Ng, Sophia     |
|                                | Concerns with smartphone addiction (on the part of both students and teachers) and the capacity for negative impacts in the classroom, such as distractions, are pervasive concerns.   | Sophia, Karine Ng, VL, Daniel Tetrault |

| Issue   | Viewpoint  | Interviewees                           |
|---|--|--|
|   | Regardless of the smartphone policy, stakeholder acceptance is paramount, especially among school personnel, for efficacy. Educators' support is more important than parents as teachers know best and are the ones enforcing and administering it. Furthermore, teacher-buy-in should facilitate student buy-in through the willingness to enforce a clear policy with consistently applied rules.  | Daniel Tetrault                        |
|   | It is imperative to create a community in your classroom and if an educator is always forced to police and resolve conflict around devices it limits the ability to teach and engage students.   | Sophia                                 |
| Overall Impact on Cognition                           | Negatively impacted, with attention, concentration, problem solving, and critical thinking seeming to be worse over time. While it depends on the teacher, parenting, and students, generally the overall impact has been negative, largely due to distractions and a notable decrease in the capacity to pay attention during class and concentrate. However, immediate access to information may be beneficial in satiating and feeding curiosity which may help overall understanding of a topic and improve the efficiency of learning material. Although, smartphones are not unique in offering immediate access to information or in providing music to help some students concentrate and do homework. | Sophia, Karine Ng, VL, Daniel Tetrault |
| Overall Impact on Student Mental and Emotional Health | Negatively impacted. Outside of privacy and cyberbullying campaigns having a positive impact, the broader impacts are generally negative. The pressure to be online and "connected" to maintain a digital life creates added emotional/mental stress and love-hate relationships with social media and other social or networking smartphone applications. As well, smartphone and digital device addiction appears to be a growing problem among students (and adults, too), which is only made worse by the pervasiveness of addictive designs being incorporated into most applications to ensure continued use (maximize profitability).   | Sophia, Karine Ng, VL, Daniel Tetrault |
| Education and Technology                              | Smartphones do not offer unique benefits or effectively replace (substitute for) other digital devices, but they may help close digital or print resource gaps when other alternatives are not available.  | Sophia, Karine Ng, VL, Daniel Tetrault |
| Schools, Technology, and Socialization                | There has been a notable decrease in social interaction and interpersonal skill development, exacerbated by a reliance on communicating without face-to-face contact, which can lead to miscommunication without body language cues. Not to mention declines in physical activity.   | Daniel Tetrault, Karine Ng, VL, Sophia |
| Complete Ban  | <b>Cons:</b> Hard to extremely hard to enforce, likely to frustrate students and parents, may alienate some teachers and school administrators who want to use smartphones as digital learning tools. Notably harder to enforce in larger schools. School administrators may feel that a lot of time would be "wasted" in carrying out ineffectual enforcement. The potential for significant conflict with students extremely addicted or vehemently opposed to forced prohibition. Potentially missing the point given the ubiquity of smartphones in society. Might place teachers in a difficult position with respect to liability and potential disputes around confiscation.                            | Daniel Tetrault, Karine Ng, VL, Sophia |

| Issue              | Viewpoint   | Interviewees                           |
|--------------------|---|--|
|                    | <p><b>Pros:</b> Has the benefit of clarity in administration, which may become easier over time as students adapt. Eliminates the marginally negative impacts of smartphone use in terms of screen time and non-educational device use. May increase student physical activity and socializing.</p> <p>In short, all interviewees were all against this policy approach relative to the other two options.</p>  |  |
| Partial Ban        | <p><b>Cons:</b> Consensus or near-consensus in the school community on “appropriate smartphone use” is necessary, which may be extremely difficult to achieve. Liability issues depending on how devices are managed (e.g., phone hotels and storing devices in shared spaces). Verifying an infraction can be difficult to do accurately, which may lead to conflict and wasteful use of teacher time in “policing”. Certain non-educational uses may be beneficial for students, such as listening to music, though they may not be precluded despite appearing to not be an “educational use.” Requires guidance for educators and administrators on enforcement, specifically confiscation. May turn into Classroom Autonomy with inconsistent implementation, as most schools, e.g., BC’s Lower Mainland, have <i>de facto</i> Partial Bans that are implemented inconsistently throughout the school and thus are effectively Classroom Autonomy approaches.</p> <p><b>Pros:</b> <i>Assuming buy-in from school staff, the best model because it preserves a degree of teacher autonomy, provides relatively consistent guidelines and clear expectations, and appeases parent’s concerns about safety and emergencies. More likely to have buy-in from students and parents relative to other approaches. Allows some flexibility among teachers who want to incorporate or restrict devices relatively more than their colleagues in their definitions of “educational uses.”</i></p> | Daniel Tetrault, Karine Ng, VL, Sophia |
| Classroom Autonomy | <p><b>Cons:</b> The inconsistency can create a sense of discord in the classroom and/or among staff members, especially if there are significantly divergent perspectives on smartphones policies throughout the school. Ultimately, this can exacerbate existing issues with noncompliance or create discontent amongst students and decrease their willingness to participate in the learning curriculum. The pervasiveness of distractions in the classroom is only made worse by the fact that students take advantage of variable policies or may feel entitled to “push back” against those that are overly restrictive across the many teachers they have in a given school day.</p> <p><b>Pros:</b> Teacher autonomy is made paramount with the understanding that what works for certain classrooms and teachers is different. Provides teachers with the ability to adapt to their students and curriculum towards building a classroom community is the ideal, though it is potentially complicated by the number of different sets of students each teacher has. Provides the flexibility to readily adapt and allow certain students to use smartphones to their benefit that others may not find helpful, which overarching rules may complicate.</p>   | Daniel Tetrault, Karine Ng, VL, Sophia |