THE 21ST CENTURY CLASSROOM

THE 21ST CENTURY CLASSROOM: TECHNOLOGY AS A TRANSFORMATIVE TOOL IN EDUCATIONAL ROUTINES, RULES, AND RITUALS

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EXTENDED ABSTRACT

This dissertation discusses a current niche in sociological literature: technology and interaction rituals in elementary schools. In particular, it examines the relationship between classroom interactions and the increasing available new forms of technologies (i.e. iPads, robotics kits, Smart boards) that are finding their way into schools. In doing so, I consider what new interactions and digital tools might mean for student engagement in what has now become known as the "21st century classroom". Two pivotal sociological theories are utilized in this project: 1) Collins (2004) interaction ritual (IR) theory and 2) Bourdieu's (1974; 1986) concept of cultural capital. Both are valuable in understanding how the introduction of digital tools in mainstream schools can influence or change interactions between and among students and teachers in classrooms, how they may impact student engagement gaps. Traditionally speaking, schools have long valued and rewarded certain types of interactions—student obedience alongside teacher authority, an orderly and compliant classroom, emphasis on more traditional teaching and so forth. Student engagement was not necessarily a point of interest, as was having a systematic classroom. However, perhaps technology is beginning to change those valuations, and create new types of classroom interactions that are unique to the 21st century—classrooms that have a more student-centered pedagogy, whereby teachers work in tandem with students to engross them in the learning process, and where student engagement is more much valued. If this is true, this may be a sign of some new emerging types of IRs that are beginning to surface in the presence of technology.

Collins' (2004) theory of IR focuses on the emotional input and feedback of individuals that transpire in interactions among actors, which in the case of classrooms, consist of teachers and students. The theory holds that interactions produce or deplete "emotional energy" of participants depending on many key factors (physical co-presence, exclusivity of group, mutual focus/mood, bodily synchronization). A successful ritual is one in which participants have a mutual focus on a particular "symbol" or "emblem" unique to that group. Through this research, I propose that technology can serve as that "emblem" to group membership, and as a result, can facilitate new kinds of IR. "Cultural capital", in comparison, is usually considered to be a collection of symbolic elements such as skills, tastes, clothing, materials, credentials and so on that one acquires by being a member of a particular social class. In education, cultural capital can refer to having valued sets of skills and knowledge that are aligned with school rewards. Traditionally, this usually meant a middle-upper class advantage in schooling, as students of more affluent families were able to learn valued kinds of skill sets to help them achieve better in school. However, with the advent of new technologies, I question whether notions of cultural capital have changed as a result, and whether possessing a digital skillset is in and of itself, a new type of valued capital. Can new technologies produce more equalizing experiences for students of varying SES backgrounds?

To explore the possibility of digital tools in classrooms creating new sets of rituals with new kinds of valued cultural capital, this study adopts a qualitative methodology, consisting of elementary classroom observations, interviews, and focus groups with

teachers and students in ten school boards across Ontario, Canada. My research discusses three integrated themes. I begin by asking first, how have technologies transformed the ways in which students and teachers interact with, and amongst each other? By providing a new medium for both teacher pedagogy and student learning, this has major implications for classroom engagement. Secondly, I explore the possibility that one unintended consequence of using digital resources (compared to more traditional print media), has been a reduction in home-based inequalities, and a more "even playing field" for students of varying SES. With the ease, accessibility, and affordability of technology today, students in vary capacities are exposed to new valued skillsets. Lastly, I consider how technology can be a type of "leveler" for different kinds of students, which can allow them to participate and facilitate new types of ritual inclusions. I focus both on gendered interactions and exchanges between students with special needs as examples. The exploration of these three themes guides my research on the use of educational technologies across classrooms. These have important implications for sociologists, educational researchers, and policy-makers alike.

Keywords: sociology of education; digital technologies; student engagement; social inequalities; qualitative research

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DEDICATION

To my angels: Teta, Sassy, and Thérèse—I know you would have been so proud of me. I dedicate this to you.

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CHAPTER 1

INTRODUCTION

1.1 Welcome to the 21st Century Classroom

It should come as no surprise that communicative technologies are an integral part of our lives—computers, tablets, cell phones—arguably, all of these have impacted and changed the ways in which people interrelate. With the rise and demand of such new technologies, a key question that has begun to emerge in sociological literature is the relationship between such modern technologies and everyday social exchanges. In other words, how do such new forms of communicative technology effect everyday social interactions? While many disciplines ranging from psychology to neuroscience have become interested in the social impact of technology, they have generally failed to consider how such technologies may have the potential to impact group processes. Even within the discipline of sociology, there has been a range of scholarly work examining technology—from using it as a focal point to understanding social inequalities (see following sections on the digital divide literature**)**, to network scholars that have examined technology's impact on ties and frequencies of interactions (see Wellman, 2010; Rainie & Wellman, 2012)—and yet, little research has attempted to directly observe the impact of technology in the formal interactions of small groups.

My research attempts to fill such a niche in sociological literature by examining the relationship between student interactions with technologies in what has now become known as the "21st century classroom"—a pedagogical approach that aims to promote new forms of learning that are more collaborative and creative than those easily captured in standardized tests (see next section for a more detailed definition). In 21st century classrooms, teachers are facilitators of student learning and creators of productive classroom environments in which students can develop the skills they will need in the workplace. "21st century skills" are often touted as core competencies that schools ought to be teaching to help students in today's fast paced world—skills such as collaboration, critical thinking, problem-solving, and of course, digital literacy. This is relevant to my dissertation, as digital skills are increasingly being seen as a prime lever for generating such learning, and at the same time, are also been hailed as critical skills (i.e. coding, learning word processing proficiency) to future employers.

This dissertation utilizes Collins (2004) perspective of a theory of interaction—*interaction ritual (IR) theory*, along with Bourdieu's (1973;1986) concept of *cultural capital*, to consider how the rise of modern day classroom technologies can facilitate new types of tech-fueled interactions and rituals amongst elementary aged students. Theoretically, there can be many competing expectations of technology from the perspective of an interaction theory. For instance, there is the potential that technologies introduced in classrooms may create *dull* rituals through the provision of a medium that

actually dilutes the effects of bodily co-presence. Similarly, there's the possibility that such new technologies could *strengthen* rituals if these technologies become a sort of "shared object" of attention, thereby creating a common group symbol. It is also conceivable that technology may *individualize* interactions through the possible de-centering of attention from a single focal point (i.e. the teacher), thereby creating a more scattering effect overall.

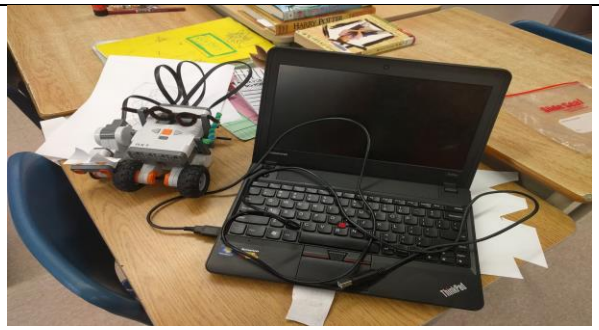
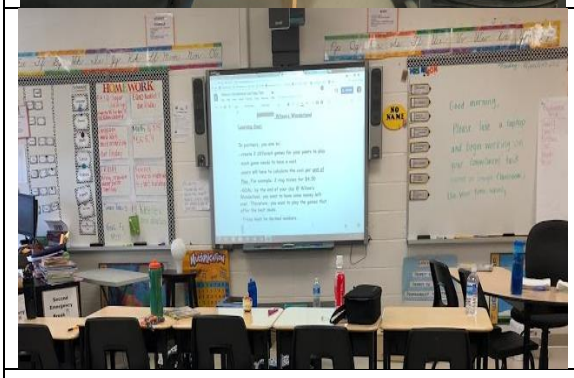
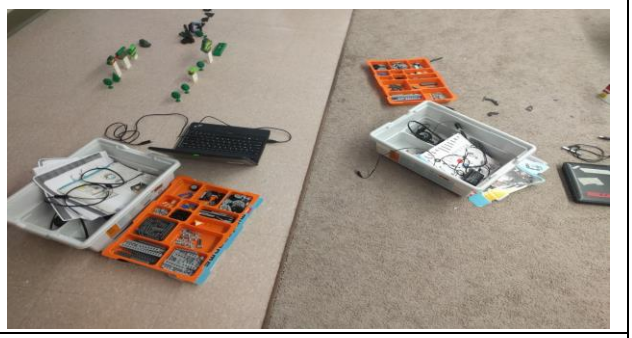
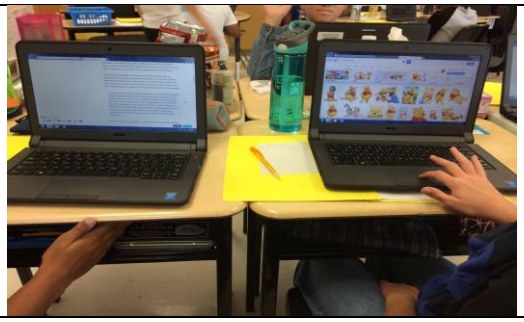
Given this unique place in sociological literature, I consider how classroom interactions can be modified by new technologies, and in specific, how IR theory can be used as a lens to describe very micro changes in the classroom brought on by new technologies[1]. Given the recent push towards 21st century learning, it is fitting that my research tackles these issues. I utilize two different sites to studying technology in the elementary classrooms (see the methodology chapter for a greater description)

1) 32 interviews with K-8 teachers in the Spencer District School Board (SDSB)[2]; Observations of students and teachers in 16 classrooms—classrooms that used general technology in a variety of educational settings (mainstream classrooms, ESL, library, and special education rooms)
2) Data from 38 in-depth interviews with teachers, including 10 focus group interviews (95 participants including teachers and administrators), and 11 classroom observations in 9 different school boards[3] (separate from SDSB) with a particular focus on robotics kits.

The design of this research was created in order to provide broad coverage of technology as, 1) it is used with mainstream students (i.e. Grade 5), compared to more specific student populations (i.e. special needs), and 2) to explore the varying kinds of technology that are being utilized—from technologies that are quickly become widely established in classrooms (tablets, Smart Boards, iPads etc.), to one that is just now emerging—robotics and coding in general. Below are a few examples of such technology:

Figure 1: Examples of Technology in Classrooms[4]

[1] …and how these micro changes have the potential to get at broader, cultural shifts in educational institutions.
[2] School Board name has been changed.
[3] As part of the "Robotics and 21st century competencies" study funded by the Ministry of Education and the Council of Ontario Directions of Education (CODE).
[4] Images taken in classrooms with permission of teachers.

Smart Boards	Robotics Kits
	
	
Smart Tables	**Assitive Technology**
	
Chromebooks	**iPads**
	
Desktop Computer	

This research does not attempt to showcase any methodological possibilities, but instead, it is exploratory in nature. In other words, the goal of this research was not to necessarily provide concrete evidence for any one question, but rather, the goal was to begin to consider issues relating to technology as they unfold in the field. I use the word "exploratory" here because generally speaking, the sociology of education has well-developed methods for confirming theories, particularly those utilizing quantitative methods. Since my intention was to enter a classroom field and observe what kinds of changes were beginning to emerge with new technologies, I maintain that it is exploratory. In this research, I have contrived of classrooms as constantly changing, and because of this instability, I am *exploring* those changes on the ground, as they unfold, rather than testing any particular theory. Ultimately, this means I cannot say with any certainty whether such changes can impact measured outcomes such as achievement, attendance, and attainment, which would likely require longitudinal methods. Instead, this study considers three broad questions in relation to new technologies and micro-changes in the classroom as they are emerging:

1) **Classroom Interactions**: Can and does technology create new classroom rituals that are different from traditional ones? Are there new sets of rituals amongst teachers and students that are facilitated through the use of technology as a new medium for learning?

2) **Digital Literacy & Stratification**: What do new technologies mean for stratification literature? How can we understand issues relating to the digital divide in a world where technology has become much more accessible than traditional print media? Can the continual use and integration of different digital tools help to alleviate the gap between school and home divides?

3) **New Ritual Productions: Gender & Special Education:** Has the integration of technology become a "leveler" for all students? Can focusing on gendered and special needs student interactions provide a window into new ritual productions?

These are some probing questions that resulted from both a preliminary study in which I observed technology use in a summer literacy camp, prior to beginning my official

doctoral research, and through the process of being emerged in educational fields and research (see Chapter 3 for more details on this). These questions, as I will demonstrate below, have important implications for both literature and theory. Studies within the sociology of education have had a notable absence of research relating to digital technologies in classrooms, as this remains a relatively new area of study. In particular, research combining the frameworks of Collins (2004) and Bourdieu (1973) is also a unique branch that attempts to integrate new technologies within the framework of interaction ritual theory and cultural capital. Considering interactions, stratification, and examples of new ritual productions are important for new conceptualizations of student engagement in 21st century classrooms. My first question considers whether technology in fact, can be conceived as a new "emblem" that can bind students into a collective identity. This may offer new meanings in terms of how micro-interactions that play out in the classroom can potentially influence student engagement. Similarly, this question considers whether interactions that center around technology can produce a new type of "digital" culture that can extend traditional thinking of cultural capital theory. My second question considers stratification and digital learning. It is important to consider how digital technologies may enhance our understandings of cultural capital theory. Today's generation is certainly more digitally-fluent than text-fluent—what can that mean for student success in schools? Likewise, if greater value is placed on technology, then this may even be conceived of as a symbolic element for IR theory. Students may be more likely to invest in school-sponsored material that has a tech-element because of its added value to peer groups. Lastly, it is important to also consider *who* is participating in these new rituals in classrooms. If technology allows for greater cohesion amongst gender and special needs students, what does that mean in terms of accessing digital capital? Can technology create interaction rituals that allow for students who may have been either segregated or on the periphery of rituals, to participate in a much larger group culture? If so, can this serve as yet another case for digital skills to be considered a new type of cultural capital? Thus, all three research questions are important for providing an updated understanding of Bourdieu's cultural capital theory, and for novel conversations around IR theory in classrooms.

It is important to reiterate that the purpose of this study is not to obtain conclusive and definitive answers to the questions above. Nor does it seek to evaluate technology uses either. Instead, I use the platform of this dissertation to shed light on these general areas of inquiry, as technology is quickly becoming a part of school realities. Furthermore, because my research is focused on elementary aged students (between the ages of 5-13), it is important to highlight that studying this age group, in general, is at odds with much of the literature considering student subcultures and resistance, which tends to take place more in high school environments (see Carter, 2006; MacLeod, 1987; Pascoe, 2012; Paulle, 2013; Willis, 1977 for examples). By tackling large macro sociological issues (i.e. integrating technology into classrooms) and examining micro changes as they occur in the classrooms (i.e. through student-student, student-teacher interactions), this research contributes to both sociological and educational fields. Exploring younger aged students and their interactions with technology as a pedagogical

tool provides new territory for understanding the youth culture as we embark upon 21st century classrooms.

1.2 Routines in Sociology of Education

Classrooms have come a long way in the sociology of education. The term "classroom" can conjure up many images. For instance, hearing the word "classroom" often invokes traditional images of the word—a room consisting of rows of desks for instance, usually directed towards a chalkboard, with a teacher normally at the front of the room providing instruction. There certainly has been standardized images and depictions of classroom processes that have become very routine in the sociology of education. According to Jaffee (2003), the teaching and learning environment can be thought of as a type of "pedagogical ecology". In a traditional classroom, this can include

> sets of proscribed social roles and normative expectations that not only shape behavior but also confer greater status and power to particular social actors. When students enter the classroom, they sit in desks, take out notebooks and pens, and look towards the front of the classroom for further direction or information. In contrast, when instructors enter the classroom, they assume the focal space at the front of the room where student attention is directed, and they usually remain standing (p. 228).

According to Jaffee (2003) both the physical and social roles have been institutionalized in ways that create a taken for-granted teaching and learning environment along with an associated set of assertive and deferential role behaviours. Thus, scholars suggest that there is a link between the environment and the learning process (Brown, Collins, & Duguid, 1989; Strange & Banning, 1990). Critical scholars often depicted 20th century classrooms in different ways— working class schools as a battle between authoritarian teachers and resisting students for example (see MacLeod, 1985; Willis 1977), while middle class schools were usually conceived of as being far more harmonious, yet shallow, exercises in status striving (see Khan, 2011; Lareau, 2003 for examples). However, in reality, schooling experiences were probably quite varied, and likely depended on a number of factors including, but not limited to, teacher personality, neighborhood, SES backgrounds and so forth.

What has remained relatively constant over the years however, is the reliance of print-text to teach students, as technology is a relatively recent phenomenon. Tyack and Tobin (1994) remind us that teaching methods have in fact remained quite stable for decades, as established forms of schooling hard to change. This means that student engagement with curriculum has as a result, been wide-ranging over the years. Scholars such as Newmann (1992) have suggested that student disengagement with schools has been considered the most persisting issue for both students and teachers over time. Schools have often relied on traditional methods of teaching in hopes to engage students—worksheets, textbooks, curriculum guidebooks—and were often more

preoccupied with covering basic skills and curriculum milestones than they were on engaging the student (Newmann, 1992). Schools ability to engage students has constantly been tested over time— between the increase number of students who require special education, to more cultural diversity amongst student bodies, and a host of other powerful distractions that often compete for students' time and emotional investments (Newmann, 1992, p. 2). But, as we embark upon 21st century classrooms, it is worth asking whether student engagement is less varied with digital technologies than it was in the print-text era, and whether they can alter our prevailing images of classrooms. Can the use of new technologies create a new kind of student engagement?

Table 1 below offers a side by side comparisons of 20th century classroom structures to those that are supposedly on the rise in 21st classrooms, brought about by the increase use in technology. Whereas older 20th century classrooms were structured around order and routine, 21st century classrooms claim to provide new flexible and creative learning spaces for students and teachers alike. With technology, teachers are free to be more explorative and creative in their teachings—equipping students with new mechanisms to engage them, making learning engaging and accessible to all. Perhaps most importantly, it has shifted and decentralized classroom dynamics, making them more student-directed, and less teacher-focused. With digital tools, there remains the possibility that students are less stratified by social class differences, and that new forms of cultural capital are emerging that did not exist during the print-text era. Peer processes as a result of the growing emphasis on digital technologies, may become more attuned to school sponsored goals and curriculum. Thus, using digital instructional technologies can be conceptualized as a new and distinct type of structural environment that is capable of reshaping role behaviours and social relations between instructors and students (Jaffee, 2003). Whereas 20th century classrooms most likely featured the basic first wave of technology that had just begun to enter schools, 21st century classrooms by contrast are boasting a host of new technologies that have the potential to alter classroom settings. My dissertation probes these new and emerging features of 21st century classrooms as they relate to student engagement with technology.

Table 1: Classroom Comparisons

20th Century Classrooms (Pre-Tech)	21st Century Classrooms (Tech)
- conventional "chalk & talk" methods - student engagement much more varied	- provides new medium to engage students; - school-sponsored learning has potential to greatly engage students in ways print-media could not
- teacher centered - teacher in control of classroom	- student centered - teacher is decentralized in classroom
- passive learning	- active learning
- engagement could be layered by social class to some degree, with variation	- engagement seems to bridge SES backgrounds
- more traditional teaching; planned lessons - textbook-driven	- tech allows for more spontaneous lessons/instructions

	- research driven
- print-text primary mechanism for learning and assessment	- multimedia is utilized to engage and assess students
- potential for peers to distract from school-sponsored classroom activities - more isolated learning	- peer processes more attuned to school sponsored goals - more collaborative learning
- students of more middle-upper class families able to secure educational advantages through familial exposure	- less stratification based on SES; more exposure of knowledge through technology - new forms of cultural capital are rewarded

1.3 Bridging the Fields of Sociology and Education

This research is important because it bridges two academic fields of research together: sociology and education. Digital technologies are a broad concern for both educational and sociological researchers, which makes this research accessible to both theorists and policy orientated scholars. Merging both these fields paves way for what Kerr (2004) has called "a theory of sociology of educational technology", which joins two sets of issues—those important to sociologists, and those of interest to educators. Thus, utilizing Collins (2004) and Bourdieu (1973)—two scholars who have provided theories of sociology—in an applied setting—observations in classrooms across Ontario—can nicely combine the theoretical world of sociology to the applied setting of schools and classrooms. In order to properly incorporate sociology and education, we must examine how people interact in group settings, and how those settings can shape and constrain individual action—and technology use in the classroom provides the ideal opportunity to do so (Kerr, 2004). There are growing opportunities for sociologists of education to really explore ways of engaging in the active construction of educational practices and institutions that reflect, challenge, and build upon the wider socio-technical changes of today (Selwyn & Facer, 2014, p. 483). Thus, the issue of digital technologies in classrooms has significance for research in sociology and educational fields.

Historically, education is one area in which people have long assumed that technological solutions may bring increased efficiency, order, and productivity (Apple, 1991; Kerr, 2004). This new technology-infused era was actually preceded by a century of experimentation with precisely articulated techniques for organizing school practice, carefully specified approaches to the design of school buildings, and an abiding enthusiasm for systematic methods of presenting textual and visual material through technology (Apple, 1991; Cuban, 1984, 1986). This was done all with the hope that technology would and could alter learning. As Kerr (2004) argues:

> …there was a kind of mechanistic enthusiasm about many of these efforts. If we could just find the right approach, the thinking seemed to go, we could address the problems of schooling and improve education immensely. The world of the student, the classroom, the school was, in this interpretation, a machine (perhaps a computer), needing only the right program to run smoothly (p. 1).

As I will discuss in greater detail shortly, the first round of technology introduced in schools, or what is sometimes called Web 1.0., was largely seen to be a huge disappointment. Web 1.0 technology refers to the early stages of the conceptual evolution of the World Wide Web most often delivered through computers. While being initiated with high hopes to significantly alter the classroom, this first round was not well-developed enough to truly alter the classroom experience (Cuban, 1984, 1986, 1993). But what is to say of current integrations of technologies in schools?

The twenty-first century has without a doubt brought about a digital culture that places new demands on education (Bitner & Bitner, 2002). There are many considerations in today's area of education, particularly from a sociologist's perspective: Does technology serve to enhance school-sponsored rituals, sharpening students' focus on school material, or does it provide more peer-based distractions? Do digital technologies create a further wedge between social class divides—creating unequal relations of power in education in terms of access and exposure—or can they assist in reducing the gap? Can technology be a levelling tool for all different types of students and learners? Thus, there is a growing need for more applicable research into the current wave of technology 2.0 to better provides scholars, researchers, and policy-makers with a, "better representation of the affordances of emerging technologies, and how these influences will transform the teachers, students, and classrooms who utilize them" (Churchill & Wang, 2014, p. 214).

1.4 A Look at 21st Century Classrooms and Competencies

21st century classrooms are the topic of much discussion surrounding global education and policies. This global boom of communication technology has made it possible to expand and expedite learning for children in the classroom (Kenney, 2011). The popular expression, "21st century classrooms" has now become synonymous with a larger general shift in educational pedagogy. This shift includes a variety of learning tools and skills that vary amongst and between classes and schools. The expression, "21st century classrooms" is most often used to signal educational changes in pedagogy, policies, and practices that have arisen in the era of a new or "next" generation of learners (Jenson & Taylor, 2010). In particular, this educational shift is geared toward preparing students with "21st century competencies" (i.e. knowledge, skills and attributes) that will enable them to face complex challenges and reach their full potential. Some examples of such competencies include, but are not limited to, critical thinking, communication, collaboration, creativity and innovation (Ontario Ministry of Education, 2016). According to a recent policy document put forth by the Ontario Ministry of Education (2016), one reason why it is important to focus on 21st century classrooms is, in brief, to keep pace with changing times that are often linked to "changes in the work force from an industrial model of production to rapidly transforming, technology-driven, and interconnected globalized knowledge economy" (p. 6). Thus, technology and 21st century classrooms are inevitably linked.

Scholars are increasingly making reference to the rapid use of technology such as computers, laptops, iPads, and smartphones, in education all across the globe, and in particular, in schools and classrooms (Churchill & Wang, 2014; Goode, 2010; Haste,

2009; Kerr, 2004; Mao, 2014; Selwyn & Facer, 2014). Such rapid increases in technology have certainly revolutionized the elementary education experience (Kenney, 2011). While this broader movement has been evolving worldwide, my research focuses exclusively on Ontario, as relative to most jurisdictions, Ontario has been seen to promote progressive pedagogies using technology, arguably more than elsewhere, which makes it an interesting test case for my research. In addition, Ontario has a renewed vision for education in terms of its commitment to define and measure 21st century competencies (Ontario Ministry of Education, 2016) which include technology.

Using technology in classrooms—from preschool, right through higher education—can have many benefits for learners of all kinds. Such benefits include things such as: increased motivation and engagement (Kenney, 2011; Kinash, Brand, & Mathew, 2012); decrease in discipline problems and dropout rates (Cardon & Christensen, 1998; Yard, 2015); greater communication and collaboration among students and between teachers and students (see Hutchinson, Beschorner, & Schmidt-Crawford, 2012; Kenney, 2011; Keser & Özdamli, 2012); more stimulating work environments[5] (Costley, 2014; Kenney, 2011; Kurt, 2010); wider range of teaching strategies and flexibility (see Fernández-López, Rodríguez-Fórtiz, Rodriguez-Almendros, & Martinez-Segura, 2013) and the ability to foster greater independence and individualized learning (see Kenney, 2011; McLanhan, Williams, Kennedy, & Tate, 2012). Thus, there is no shortage of literature documenting some of the implications that technology may have on students when introduced in classroom settings. As we enter this new era of digitalization in schools, the question of how technology can alter classroom rituals and interactions becomes key. This pedagogical shift from traditional classrooms to 21st century models has brought about new educational philosophies that matter for classroom learning and engagement. Haste (2009) for instance has argued that future education will indeed be able to assume that internet-accessible, communication-rich technology will be in the hands of most, if not all, young people—just as in the past, we had assumed that students would all have pens, rulers, and compasses. Thus, the role of technology can and does play a significant role in supporting the development of the full range of "21st century competencies" (Ontario Ministry of Education, 2016, p. 34), and continues to remodel what we have come to know as educational institutions. This dissertation will explore 21st century classrooms as they relate to technology and student interactions. As I will unpack, such classrooms are now less teacher-centered, more collaborative in nature, and are increasingly attempting to equip students with 21st century skills in hopes to better prepare them for their future.

1.5 Introduction to the Theoretical Framework

In order to understand micro-changes that are occurring in classrooms through educational rituals, I will utilize Randall Collin's theory of Interaction Ritual Chains (IRC) and extensions of Bourdieu's theory of cultural capital, to unpack the ways in

[5] Often dubbed the "Starbucks" classroom for their encouragement of free seating choice and a "work-at-your-own-pace" logic (see Delzer, 2015).

which new technologies have indirectly pushed classrooms away from the distinct rituals of previous traditional classroom interactions and into more progressive spaces. I will delve further into these two theories in much greater detail in Chapter 2, but for now, I will offer a brief introduction to both IR theory and cultural capital. Broadly speaking, IRC is a theory of situations; a theory of momentary encounters among human bodies that charge up with emotions and consciousness because they have gone through chains of previous encounters (Collins, 2004, p. 5). Merging both the work of Durkheim and Goffman, Collins makes the claim that emotions generated in face-to-face interactions can drive feelings of social solidarity that have the possibility to bind individuals and social institutions together (Rivera, 2015, pp. 1343-4). In other words, at the center of an IR is the process by which participants develop a mutual focus of attention and become entrained in each other's bodily micro-rhythms and emotions (Collins, 2004, p. 47). Collins asserts that this occurs because people are stratified by emotional responses that they evoke in others. Rituals in Collins' language requires among other things, shared symbols or emblems that represent "the group", which members feel are associated with themselves collectively (Collins, 2004). This in turn can allow individuals to feel a sense of excitement and "buzz", or in the language of Durkheim, a feeling of, "collective effervescence", as such interactions can bind individuals together. But, what can be conceived as a valued "symbol" or, in the language of Bourdieu (to be explored next), "cultural capital" for group rituals? We can think of cultural capital as being viewed as a set of shared symbols and identities that is generated in successful rituals, and that can facilitate future interactions. In other words, it can refer to *any* stock of symbols that facilitates interaction in *any* group (see Davies & Rizk, 2018). Considering this theory in relation to technology and classroom interactions raises important questions regarding the kinds of micro changes that are occurring as a result of new digital tools. For instance, can technology now be interpreted as a "sacred" or common "emblem" amongst students? Does a shared focus on technology produce new classroom rituals between students and teachers—perhaps shifting the focus away from the teacher, and instead, diverting student attention and engagement towards the technology? Studying classrooms through the lens of IR theory provides ample opportunity to examine shifting classroom dynamics (i.e. collaboration, decentralization of teachers), that arguably, have been brought forward with the onset of technology.

In addition to Collins', this research also utilizes Bourdieu's signature concept of "cultural capital". Bourdieu's (1973) initial formulation of cultural capital referred to cultural traits that are rewarded in fields like education (Davies & Rizk, 2018). In other words, cultural capital can refer to resources that equip individuals with particular kinds of knowledge's and skills that are recognized and rewarded by institutional gatekeepers (Jaeger, 2011). This theory arose as a theoretical hypothesis to help explain unequal scholastic achievement of children originating from different social classes by relating academic success to the distribution of cultural capital between the classes (Bellamy, 1994, p. 122; Bourdieu, 1986). In an educational framework, this means that "valued" cultural capital that is rewarded and reinforced by the education system normally reflects the culture of the dominant class. Older forms of cultural capital were solely determined by class background, but, can the same thing be said today? Is cultural capital in today's

digital world, as class divided? Scholars such as Lizardo (2008) have suggested that cultural capital may not necessarily be a particular "substance" that generates rewards across all contexts, but rather, it may be any capacity that fits well with dynamics in particular fields and generates rewards. In this regard, it may be conceivable that with greater availability of technology in students' lives, there is the potential that it has changed what we may considered as valued "cultural capital". Using Bourdieu's theory is particularly useful for exploring whether this new digital culture found in schools is *less* stratified than older notions of cultural capital. As technology continues to be rolled out and used in schools of varying socio-economic standings, could it be possible that access to technology is now easier than ever, which as an unintended result, has created a more digitally fluid generation?

It is important to stress that notions of cultural capital are quite varied and have not unanimously been agreed upon (see Davies & Rizk, 2018). In Bourdieu's original formulation of cultural capital for instance, there were greater points of contact between middle class culture and school curricula. He often focused on reading, styles of speaking, and a general familiarity with classic humanities; implicitly he assumed that familiarity with curricula breeds engagement. From there, scholars such as DiMaggio (see DiMaggio, 1982; DiMaggio & Mukhtar, 1985, 2004) extended Bourdieu's argument by focusing on the home cultivation of reading and related skills that generate success in schooling. In this train of thought, cultural capital was seen to been associated more with "high-brow" culture—trips to the museums, familiarity with literature, vacations and so forth. More recently, scholars such as Lareau (2003) have created their own version of cultural capital which includes the concept that middle-class parents strive to recreate school-like conditions and connections at home. She implicitly assumes that concertedly cultivated kids take their confidence and feelings of entitlement into the classroom, generating engagement (see also Calarco, 2014). Less developed has been Collins version of IRC as it relates to cultural capital theory (as mentioned above). Collins broke from Bourdieu by placing greater casual importance on micro level productions of cultural capital, and by recognizing subordinate cultural forms. He saw rituals as a social mechanism that can transform cultural fields, not merely reproduce them (Davies & Rizk, 2018). His implicit theory is that home reading can generate chains of successful rituals that extend into the classroom. Thus, classic images of cultural capital saw affluent students who, through their families, had been exposed to all sorts of high culture, and thus entered schools with lots of familiarity with markers of status culture – lots of prior reading, an expansive vocabulary, familiarity with prestigious aesthetics and the like. The quintessential working-class lad was seen, in contrast, to lack all of the above, and hence was less prepped for school. But, what kind of vignette exists today with the integration of technology? Can traditional notions of cultural capital be updated to include the micro interactions of students with technology? Does technology integration have the potential for a new kind of cultural capital to exist; one in which familiarity with old print text is less important?

This newly digitalized classroom of today is indisputably making schools more relevant to interactions in the *outside* world, rather than as isolated rituals. With this in mind, perhaps using technology in classrooms is simultaneously making schools less

distinct as interaction spaces, leading to more intensified rituals, and heightened student engagement. As I take up later on, historical accounts of school ethnographies (for example, MacLeod, 1987; Willis, 1977) often documented fairly distinct school rituals that were regularly informed by notions of discipline—with highly scripted interactions that were quite formal (for instance, students often emphasized obedience and deference to teachers, as they sat quietly, in rows, and in an orderly fashion, etc.) Interestingly, sociological ethnographies have long emphasized the disruptions of those "classic" rituals via student resistance—from the counter-school culture of Willis' (1977) lads' who subverted teacher authority and administrators, to the oppositional behavior of the "Hallway Hangers" in MacLeod's (1987) ethnography. These kind of school rituals were fairly rare in society, perhaps paralleled only by such things as religious ceremonies or military organizations. Again, these were documentations of a type of school culture that pre-dated technology. With new digital tools being used for instructions and learning across Ontario classrooms, the question stands: does a new, 21st century classroom ritual exist?

It is important here to consider the interplay and integration of both Collins' work on IRs and extensions of Bourdieu's theory to this dissertation. Used in unison with each other, they offer important contributions to this research—mainly, restructuring what has traditionally been conceived of as "cultural capital" theory through observations of micro-interactions with technology. These offer important insights into framing the discussion of student engagement in Ontario classrooms. As I have outlined, Bourdieu initially explained inequalities in education specifically, making the assertion that cultural markers are built into the curriculum and built into teacher perceptions of students. His conception of "cultural capital" was used to refer to cultural traits that are rewarded in fields like education (Davies & Rizk, 2018). Inherent in Bourdieu's conception of cultural capital however was "class"— cultural capital was something that was strongly associated with "high status", as those from upper classes were generally speaking, more well-read and this likely contributed to their success in schooling. Collins' (2004) interaction ritual theory by contrast, was not created with an educational setting in mind, nor was it considered a mechanism that could contribute to schooling processes. He borrowed from cultural capital theory and contrived cultural capital as a more fluid concept that can embody many elements outside of just education. He took a micro-level approach to understanding interactions—in fact, he conceived of "cultural capital" as a core element of face-to-face interaction, importing this concept into his greater theory of IRC. Unlike Bourdieu, Collins does not make the same assumption of familial acquisition as a necessary feature of equipping students with a valued kind of cultural capital that is rewarded in schools. Rather, Collins contends that cultural capital in a micro-lens can be conceived as *any* kind of shared symbol or emblem that represents a particular group. In his version, cultural capital can for instance, refer to knowledge of basic vocabularies, concepts, styles, and sacred objects in any set of rituals (Davies & Rizk, 2018). In the context of technology then, it is likely that compared to print text, students can now secure their own kinds of cultural capital either through themselves or peer networks. Meaning, 21st century students are likely to pick up technology skills at an alarmingly faster rate than traditional literacy skills (which often required parental support), as digital

skills have become both valuable and easier to acquire. Thus, used in accordance with each other, both extensions of Bourdieu and IR theory are useful for understanding the elements of cultural capital theory in 21st century classrooms.

Together, these theories also have implications for research on digital technologies. Bourdieu for instance made a clear distinction between class and access to *print* literature. He contended for instance, that familiarity with a particular kind of print-text literature— "high-brow" literature— that was frequently found in middle and upper-class homes can attribute to subsequent success in schooling. However, can the same line of thinking be applied today? Arguably, one of the limitations to Bourdieu's work was that class advantages were largely limited to print text. It goes without saying that the growth of technology at the time of his writing was nowhere near where it is today. That being said, this research attempts to extend his line of thinking about cultural capital to the digital world. Perhaps with the increase of technology, there have become fewer markers of status differences in terms of access to content, compared with the distinctions of class found in print literature. There may perhaps remain an associated status (likely amongst peer groups) in terms of the *kind* of technology used, but can the same be said about the content? In other words, the available resources (i.e. access to the internet) remains the same whether one uses an outdated computer, or the latest iPhone X. Compared to print text, there was much more *status* in terms of what students were reading—latent classic literature for instance that may have been required for schooling. The digitalization of the modern world has taken this a step further. Learning in today's classroom has become much more technical based, and less status associated. Bourdieu's argument was rooted in class, but with technology, this distinction does not seem to exist. Given the amount of change that classrooms have witnessed over time—merging from a print-text dominated institution to one that harbors digital technologies—it becomes imperative that in order for cultural capital theory to remain relevant, we begin to recognize how this theory can be applied in the new digital world and adapt our understandings as a result. This is unquestionably a major benefit of applying digital technology to cultural capital theory, as Collins' theory can build on our ideas of cultural capital.

If digital technologies have levelled out class differences so to speak, and familiarity with print-text no longer is the assumption of successful students, how can we understand student engagement in classrooms today? Applying Collins' theory to digital technology use in education can assist in understanding new versions of cultural capital in classrooms today. Using IR theory can help explain some of the new valuations placed on digital resources that can contribute to new meanings of cultural capital theory. The sociology of education has had a long traditional of classroom-based ethnographies—ranging from exploring the reproduction of the working class and race within the school system (MacLeod, 1987; Willis, 1977), to boarding schools (Cookson Jr. & Persell, 1987) to studies of the interactions between gender, race, and class (Bettie, 2014; Ochoa, 2013). Less defined however, has been research that uses an IR lens to study sociological issues, particularly ones that apply to the classroom. A few notable scholars have taken up IR theory in various contexts. For instance, Olitsky (2007a; 2007b; 2007c) has applied interaction rituals to student engagement with science in classrooms. Rivera (2015) has

more recently applied Collins' (2004) IR theory to job interviews and hiring practices to confirm that emotional energy in the form of excitement is an important basis of interpersonal evaluation and selection in hiring (p. 1383). It is fair to say then, that the use of IR theory in sociology of education is, at best, sporadic and rare, and remains untested in the field. Thus, by applying this theory to student engagement with digital technologies, I am participating in a new type of novel research that is beginning to apply IR theory to different cultural areas in which group interactions are observed and understood. Unlike Bourdieu, Collins is perhaps better suited for understanding the micro, everyday interactions and valuations in classrooms that can help explain student engagement in a digital world. In other words, while cultural capital theory alone is not really observational or grounded in the micro-level, like Rivera (2015), I seek to blend both cultural capital and IR theory to studying classroom engagement and technology—making this research part of a new movement within sociology that is beginning to focus on microlevel mechanisms in various settings. As students of all ages and grades are increasingly being exposed to technologies, both inside and outside of educational institutions, classrooms are now, more than ever, stimulating sites to examine some of the social impacts of technology in terms of interactions and engagement. Thus, a considerable benefit to also applying IR theory to classrooms is that I am able to connect ritual chains to perhaps, eventual long-term outcomes in classrooms. Thus, this is an institutional realm that does have high stakes. Given this theoretical puzzle, it is worthwhile to consider how modern-day classrooms are ideal empirical testing grounds to examine such processes.

1.6 Main Research Questions

Considering that technology holds a unique place in modern classrooms, the focus of this research then will be on the various ways technology impacts classroom rituals and interactions in different educational settings. What is the impact of new educational technologies on classroom dynamics? Do they impact social exchanges between students and teachers? In what ways have new technologies changed classroom interactions? Employing an IRC perspective, I theorize the question in ways that illuminate possibilities for new micro-classroom analysis.

First off, I raise the topic of ***classroom interactions and exchanges***. Through this research, I conceptualize technology, not just as devices used in classrooms, but rather as new sources of *emotional energy* or EE (ala Collins) within schools—energies that might be applied in a variety of ways to alter the roles of teachers, students, and the overall school experience and interactions (Kerr, 2004). Emotional energy in this case can be potentially enhanced by technology, in that it has the ability to amplify student engagement with school materials. In the same way, technology may also enhance the experiences of low EE students, those who are emotionally drained by peer interactions; technology may give them a new focus that allows them to bypass more negative peer processes[6]. I consider how using technology can re-shift classroom dynamics, perhaps

[6] In much the same way that Bowen Paulle (2013) wrote about "ghetto nerds".

transforming student and teacher processes, and creating a mutual focus.

Considering the relationship between technology and classroom interactions also lends itself to issues surrounding technology and the growing ***digital divide*** of our generation—does using digital tools in classrooms help tighten or widen the existing gap? What does it mean for those students who would otherwise not have access to technology at home? In traditional studies of cultural capital, it was long established that regular print texts were readily stratified by SES. For example, studies following in the DiMaggio tradition (see Chapter 2 for more details), have long showed that children of higher educated parents tend to have greater school advantages because they get read to more often. This advantage can translate to children having increasingly larger vocabularies, literacy scores, grades, social skills and so forth. This is important in discussions of digital pedagogies, for one may wonder whether new technologies simply reproduce cultural capital transmissions of the past (as in, children of highly educated parents will thrive better with technologies because they have been exposed to them prior), or whether new technologies have perhaps, unintentionally, created a more stable digital divide? Conceivably, with the ease and accessibility of technology today (in both classroom and home environments), elementary aged students can secure their own advantages, indifferent of their SES.

Lastly, I begin to scratch the surface of technology and its relation to ***new ritual productions*** amongst students—through gendered and special needs student interactions. Can technology provide a new mechanism for engaging all students? Does it have the ability to transcend older "gendered" or "special need" divides, and instead, create more neutralizing experiences when utilized? Can new rituals be created as a result? Digital technology use in schools has replaced many traditional classroom conventions. For instance, there is less reliance on print text in lessons and evaluations, more individualized work and assignments, and more student-facilitated learning. As technology becomes central to children and peer groups in general, it is likely that technology has altered classroom dynamics. Let's start with gender as an example.

Arguably, the two main trains of thought when it comes to gender in schools is that, a) gendered play remains largely segregated, and b) there remains a "boy problem" in schools. Scholars had documented that play in primary school was often sex-typed, in that boy and girl peer groups were often stratified by gender, and produced different symbolic identity systems (Alder, Kless, & Alder, 1992; Thorne, 1993b). By the same token, there has historically been a divide between girls' and boys' engagement in schools. Recent education literature has identified a "boy problem" in schools—stemming from males' lack of enthusiasm for literacy and school mandated curriculum, which has often translated into disciplinary problems (Greig, 2003; Martino & Kehler, 2006; Martino, 2008; Sax, 2007). Interestingly, it was not long ago that scholars initially suggested schools aimed to perpetuate traditional gender roles, and that females were at a disadvantage (Buchmann, DiPrete, & McDaniel, 2008; DiPrete & Buchmann, 2013). Around the 1980s, this gender achievement gap began to switch, and women instead of men, were found to have a greater advantage in schooling, especially within higher education. With this reversal from a male advantage to a female advantage, and overall gains of women in education, public discourse in educational policy began to shift (see

Hoff Sommers, 2001), as many educators began to worry about the boys. With the arrival of new technologies, I question whether they can, a) serve to be a common element to both girls and boys in terms of their interests and play and, b) as a result of its popularity, also serve to reengage boys in the learning process. Furthermore, while the realm of regular, hard-copy print text has been a domain in which girls have long thrived, and many have come to see as a more feminine domain[7], can the girls of today also benefit and succeed in new digital-mediated realms?

In a similar fashion, I extend the idea of engagement with technology, to question whether new ritual productions can occur for students with various learning needs. How can technology modify the ways in which non-mainstream students learn, and the kinds of skills they are taught in schools?[8] Students who have traditionally been "labelled" often faced a great deal of stigma in schools and have found themselves at a distance from both peer groups and teachers (Ong-Dean, 2009). However, as I explore through this dissertation, it is plausible that with technology, it has become easier for students with learning needs to participate in peer-sponsored rituals and to communicate in new ways with teachers. Recall that today's classrooms focus less on print text, and more on the availability of digital tools. What does this mean for the engagement and interactions of students with identified needs?

In short, the goal of this research is to examine the ways in which technology has impacted modern day classroom interactions, and to offer a contrasting vignette to how people may conceive of educational spaces in the 21st century. I offer a new perspective for educational theory—one that considers how technological consumption may be a fuel for emotional energy and social bonding based on common and shared symbols, and how this may or may not influence social interactions. Through a variety of qualitative methods (to be discussed below), I explore how social interactions in classrooms are created by such new technologies in different classroom settings.

Studying the sociology of technology can be a challenging topic, as technology use in educational institutions is a new type of social change that is constantly shifting and updating. However, by beginning to shed light to these changes as they are unfolding in the early stages, this dissertation can have huge potential for future research. The goal of my research is not to offer an evaluative stance on technology use, nor is it to paint a crystal-clear picture on the benefits of technology to student learning. Instead, the research questions outlined above are purposely exploratory in nature; devised to look more broadly at the impact of new technologies on classroom interactions and educational cultural shifts as they continue to be developed. There is no shortage of technologies manifesting their ways into classrooms (everything from Chrome books, to iPads, even Apple TVs), and while there may be no way to realistically keep on top of the changing

[7] In fact, a whole host of literature has emerged claiming that "boys don't like to read". For example, the Ministry of Education has produced resources such as "Me Read? No Way!' aimed at improving boys" literacy skills (see Ontario Ministry of Education, 2004).

[8] It is important to note here again that my data collection will not necessarily answer these questions definitively, but at the very least, will have implications for these broader issues that matter for both sociologists and education scholars alike.

nature of technology, there is the possibility to start a conversation regarding the kinds of social impacts, and schooling shifts are occurring as we speak—one that arguably begins with minor, micro changes we can observe in classroom rituals.

1.7 Guide to the Dissertation

In the chapters to follow, I combine multiple framings to consider the role of technology use in Ontario schools. **Chapter 2** provides an extensive literature review on the main ideas relating to technology in 21st century classroom. In particular, I begin by taking up in greater detail the conceptual background literature—Collins' theory of interaction rituals and Bourdieu's work and extensions of cultural capital theory. In doing so, I further develop IR theory and cultural capital as my theoretical frameworks; emphasizing their contribution to understanding technology in student engagement and learning. This is done through discussing the idea of rituals in schooling, notions of schools as organizers/socializers of distinct school rituals, and cultural capital theory as they relate to technology and classroom interactions. This is followed by education-applied sections, beginning with a look first at classroom pedagogies, more specifically, traditional versus progressive debates. From here, the discussion moves towards a discussion of technology in schools—starting with a review of its potential nearly a decade ago, compared to how technology is used today. In doing so, I consider how technology has transformed Ontario classrooms into "21st century" learning spaces, through examples such as robotics and attempts to "gamify" the curriculum. In considering the vast amount of technology in today's classrooms, I contemplate what this means for matters of stratification and the digital divide, but also for interactions amongst gender and special needs students. Lastly, I provide a richer discussion of how theories of interaction rituals can be applied to classrooms and to technology in general, while also reflecting on how this research contributes to micro-sociology. **Chapter 3** will focus on the methodological tools utilized in this research project. I begin with an overview of qualitative sociological works, highlighting the relevance and significance to my own research. From here, I sketch out my method to studying technology in Ontario classrooms, undertaking two main sites for data collection: 1) interviews with teachers, and classroom observations in the Spencer District School Board (SDSB), and 2) focus groups, interviews, and observations with teachers and students utilizing a specific technology—robotics—sponsored by the Council of Ontario Directors of Education (CODE). I explore each site in greater detail, while outlining some methodological troubles encountered along the way.

Chapters 4-7 focus on the empirical findings of my research. **Chapter 4** in particular, explores interaction rituals as they relate to new classroom technologies. I highlight some of the changes in interactions that are occurring through technology use, such as changes in student engagement, student-teacher relations, and the overall classroom dynamic. In **Chapter 5,** I provide new ways of thinking about the digital divide in an age where the use of print media is declining. What does the accessibility of technology mean for student engagement and learning in the 21st century? I provide examples of new ritual intensities that are occurring in the classroom and unpack what

technology means in terms of home-school connections. **Chapter 6** investigates the potential for new ritual engagements to occur amongst a traditionally segregated group of students—boys and girls. Thus, I probe whether technology can forge more gender-neutral symbols, and hence, gender-neutral emotional energy that can lead to new ritual chains and new meanings of cultural capital theory? In a similar process, **Chapter 7** considers another traditionally segregated group of students to build on this line of thinking—special needs students. In this chapter, I emphasize that technology can play an important role in generating new interaction rituals that can further bind special needs students to schools, and at the same time, extend our thinking about digital capital. Lastly, **Chapter 8** reviews key arguments made in this dissertation and provides a review of the major findings. I conclude with some policy recommendations, as well as some suggestions for future research that are significant for sociologists, education scholars and policy makers.

Through illuminating the impact of technology on small group interactions and rituals in elementary schools, I suggest that using an IR theory lens can contribute to our understandings of micro-sociology. In short, I am putting forward the idea that new kinds of student rituals have emerged with the rise of new technologies in schools, and this has implications for student engagement. I consider the likelihood that today's learners are different that those of the print-text generation, in that they have been raised on new technologies, and as such, respond to learning environments differently. In other words, technology can affect, albeit in a very long chain, future stratification. Furthermore, I establish the relevance of this dissertation to policy initiatives. Educational decision makers, particularly in Ontario, are charged with the mission to better engage students, while at the same time, provide equal opportunities to all. Technology thus is being hailed as a possible solution to both the issues of student engagement, and SES-based inequalities. Thus, through this research, I hope to capture and address such impacts of technology in our 21st century classrooms.

CHAPTER 2

THEORY and LITERATURE REVIEW

2.1 Interaction Ritual Chains (IRC)

The main conceptual framework for this dissertation derives from Randall Collins and his work on interaction ritual chains (IRC). I use this framework to understand how the integration of technology in schools can create new kinds of classroom rituals; rituals that may alter the ways in which we have traditionally conceived of classrooms. Modern day theorizing of IRC according to Collins, merges out of the classic works of both Durkheim's (1912) writings on rituals/ceremonies in the religious sense, and Goffman's (1967) conceptualizations of rituals as everyday interactions between people. No discussion of Collins would be complete without first revisiting his initial inspirations for ritual theory: Durkheim.

Durkheim had initially indicated that during religious rituals, shared action and awareness, along with shared emotion deriving from groups congregated were two interrelated and mutually reinforcing mechanisms that occurred in "successful" rituals. In studying the ritual gatherings, Durkheim had alluded to the what he called a "totem"—an emblem for the group, or in other words, a symbol of group identity and membership. This was important, for group participation in rituals, coupled with shared group symbols or "totems" could lead to successful rituals. Successful rituals for Durkheim, produced an outcome he called, "collective effervesce"— a sort of electricity that is generated when individuals gather together, which can launch individuals into an extraordinary height of exaltation (Durkheim, 1912). In short, the main characteristics in Durkheim's conceptualizations of ritual consisted of establishing a shared focus (on a sacred object) within the group, along with shared feelings (collective effervescence).

Goffman (1967) then broadened Durkheim's original macro level analysis and applied rituals in a more micro sense—employing it to mean any kind of interaction where structure is being sanctioned or maintained, in particular, through ceremonies of everyday social interactions. Goffman applied rituals to study face-to-face interactions in natural settings; in every minute, everyday-life interactions that comprised the bulk of social experience such as acquaintances having everyday conversations (Goffman, 1967)—thereby coining "interaction rituals". In Goffman's view, the *self* becomes part of a ceremonial thing—a "sacred" object in the Durkheimian sense, which must be treated with proper ritual care.

Collins (2004) has extended and built upon the work of both Durkheim and Goffman's uses of rituals to present a more modern approach to group behavior that postulates that rituals could be found almost anywhere—potentially, even in classrooms as I postulate. Collins maintains that there are **four** main ingredients to an "IR" chain (p. 49):

1. Physical assembly (affecting others through bodily presence)
2. Insider/outside boundaries
3. Shared attention on common object/activity (communicating this focus to each other makes everyone mutually aware of the focus of attention)
4. Sharing common moods or emotional experiences

According to Collins, these ingredients feed back upon each other. Participant's mutual entrainment of emotion and attention is the key process, as it can produce a shared emotional and cognitive experience (p. 48). If successful, there are also **four** main outcomes of an IR, which include experiences of:

1. Group solidarity, a feeling of membership
2. Emotional energy (EE); a feeling of confidence, elation, strength, enthusiasm, and imitative in taking action
3. Symbols that represent the group: emblems or other representations (visual icons, words, gestures) that members feel are associated with themselves collectively (aka Durkheim's "sacred objects")
4. Feelings of morality: the sense of rightness in adhering to the group, respecting its symbols, and defending both against transgressors

According to Collins (2004), "everyday life is the experience of moving through a chain of interaction rituals, charging up some symbols with emotional significance and leaving others to fade" (p. 44). Whereas Durkheim maintained that the individual consciousness is part of the collective consciousness, or rather, that the individual is socialized from the outside by social experiences, Collins takes this one step further by arguing that "we are constantly being socialized by our interactional experiences throughout our lives. It is the intense interactions that generate the most powerful emotional energy and the most vivid symbols, and it is these that are internalized" (2004, p. 44). The feelings of attachment to the group assembled transform the emotions into a long-term feeling.

The strength in interaction rituals has traditionally been seen through physical group presence. Yet, in more recent work, Collins (2011) himself has considered whether bonds can be found outside of bodily presence. He takes up the issue of cyber-bullying, which in brief, he posits that this is a modern-day example of how bonds can be formed through online platforms like email or chatrooms. Emotional ties then can be developed online as people become fueled through posting negative messages, and building off of others, or trashing similar targets. This too can generate a high level of collective effervescence when participants ramp up their sending and resending of messages at rapid rates[9]. Despite the fact that such rhythmic entrainment can generate emotional excitement, Collins maintains that face-to-face and bodily presence will not disappear anytime soon, as bodily presence makes it easier for human beings to "monitor each

[9] This can arguably be seen as the dark side of digital culture; as digital bullying has emerged as a real and prominent issue over the last decade. With this in mind, it is worth thinking whether digital pedagogy, something that is involving regular day-to-to pedagogy in classrooms, can itself can have a "dark side". For more on this, see Chapter 8.

other's signals and bodily expressions; to get into shared rhythm, caught up in each other's motions and emotions; and to signal and confirm a common focus of attention and thus a state of intersubjectivity" (p. 64). After all, rituals are essentially a bodily process (Collins, 2004, p. 53), and it is clear that social processes tend to be much more powerful in person. Classrooms and schools then are no exception.

Collins reminds us however, that not all rituals are necessarily successful— "some fail, some are painful, some just fade away, while others are empty, and may even be discarded" (p. 50). While successful rituals are important for group cohesion, we cannot expect that ritual intensity will be the same for all kinds of rituals, in all kinds of situations. Collins brings our attention to other kinds of rituals, such as failed, or empty rituals, which he describes as having a low level of collective effervescence—a lack of momentary buzz with no shared entrainment. Failed rituals are important extensions on Durkheim's work because in those situations, there are little to no feelings of group solidarity, no sense of one's identity as affirmed or changed, no respect for the group's symbols, and certainly no heightened emotional energy. These strong negative states are just as important as the highly positive successful ones. Both natural and formal rituals can fail as well, for failed rituals have missing ingredients that both Durkheim and Collins would argue are essential: lack of shared attention and shared emotional energy that can be built up and transformed into a sense of collective participation. Successful rituals are hence exhilarating, while failed ones are energy draining (Collins, 2004, pp. 52-53).

Collins also identifies what he calls, "forced rituals". Such rituals occur when individuals are obligated to put on a show of participating wholeheartedly in interaction rituals. Consequently, when a person is required to take a lead in attempting to make rituals succeed—such as a host or hostess of party, it can be especially draining. Thus, "where the individual's social position is such that they feel motivated to take the lead in a continuous round of interactional conviviality, the cumulative effects of energy drain can be considerable" (Collins, 2004, p. 53). What such rituals lack is emotional energy (EE) according to Collins (and perhaps a collective effervescence for Durkheim). Instead of participants becoming naturally charged up, they have to, as Collins says, put energy into giving the impression that they are charged up. In considering the nature of rituals—ones that can succeed, ones that fail, and everything in between—we are left to wonder what kinds of new rituals do technologies in the classroom create? Are they successful in creating a social group experience? Or do they perhaps create failed ones?

Since Collins initial work on IRC, studies have begun to apply IR theory to real-life events to show the powerful effects of group interactions. More recently, Benzecry and Collins (2014) have applied IRC to the micro-sociological dimensions in the lives of opera fanatics; pointing to similarities between music and religious behaviour. They found the operatic peak to be a perfect example of an interaction ritual for at its most successful level it is an intense social experience:

> It begins with the ingredients of bodily co-presence, mutually aware focus of attention, shared emotional quality, and exclusion of outside distractions; if successful, it intensifies the mutual focus and emotional experience so that participants become absorbed into their common object of attention and feel a

> very strong emotion about it. This mutual experience, simultaneously internal and external, generates a second emotion (p. 310).

This creates a kind of collective effervescence, as participants tend to feel a sense of excitement being in close resonance with others. Through a kind of bodily immersion, opera fanatics have a distinct realm of group ritual and can begin to generate their own sense of collective attunement. This is perfectly captured in an earlier study by Benzecry (2011) whereby opera fanatics of Buenos Aires were found to:

> …gather in long queues to buy tickets; they rush excitedly up the price-segregated entrance stairs to get good positions in the upper balconies of the theater; they strike up conversations from long familiarity with each other's faces, discussing past performances and anticipations of this one. They share a common emotion about the opera they are focusing attention upon, and they join in applause— or sometimes booing—that further generates and regenerates group solidarity (p. 312).

Collins (2015) has even demonstrated how IRC can be applied in more everyday settings, such as gym members. He writes that individuals who attend the gym for example, are focused on the same thing and are thus aware of each other's focus. This is carried out by "shared bodily rhythms, conveyed especially by sounds" (p. 37). In being mutually engulfed by the act of working out, gym members experience a common mood, which builds up into an intense feeling of bodily-and-emotional coordination[10]. As we know, an interaction ritual is considered successful when it results in feelings of group solidarity or group membership. In the case of gym goers, intense emotional energy in individuals can pump them up with confidence and enthusiasm for the group's goal—a workout! Such a successful IR makes symbolic objects out of their focus on attention, which in this case, could be things like the various machines and equipment used to exercise, or mutual gaze on an instructor in a group class. This mutual focus gives a sort of sacred quality to that realm of their lives (Collins, 2004, p. 37).

The basic elements of Collins' work have also been applied and illuminated in more unconventional settings, such as job hiring practices. Rivera (2015) used interaction ritual theory recently to examine emotional process in elite job interviews. Here, she suggested that candidates who failed to elicit excitement, or who elicited feelings of anger/boredom from interviewers, were strongly penalized (p. 1379). Her findings implied that eliciting excitement from gatekeepers is a form of *emotional capital* that was found to have economic conversion value in labor markets. Stated otherwise, emotional energy in the form of excitement was an important basis of interpersonal evaluation and selection in hiring (p. 1383). She adds that oftentimes, the development of emotional energy seemed to begin even before face-to-face interaction through the construction of an energy expectation. Like job hiring, or group solidarity through gym memberships and opera fanatics, my research contributes to this literature by applying IR theory to

[10] Or "collective effervescence" for Durkheim.

technology use in elementary schools. In particular, through this dissertation I attempt to explore the potential for technology to become that of a "sacred" object or a modernized symbol that combines mutual focus, attention, and a common goal amongst students. This is a relatively underdeveloped area of research in sociological literature, with only a handful of studies applying IR theory to educational settings (Hallett, 2007; Olitsky, 2007a, 2007b, 2007c). However, IR theory as of yet, has not been explored in relation to technology use in elementary classrooms. Collins (2004) only briefly touches on the "technology-oriented" individual in earlier writings, to which he writes that the technical skill itself may form a symbol on its own, however, I extend his argument by applying IR theory and technology use to elementary aged students, and asking whether technology can foster new kinds of social rituals in educational settings? The different applications of IR theory paint an interesting picture for considering the ways in which technology use may be experienced in the classroom. Throughout this dissertation, I attempt to probe how IR theory can be created through technology use in classrooms. It remains plausible that technology-based pedagogy in classrooms may bring about new classroom rituals that have the potential to foster intense feelings of group membership, or "successful" rituals in Collins terms—rituals that may be new to 21st century classrooms.

2.1.1 Rituals in Schoolings

Schools have traditionally had distinct rituals. Ask any student of Ontario their experience in elementary school and they could probably easily conjure up a list of "rituals" common to young students—standing up for "Oh Canada" or prayers, handing in agendas to the teachers' desks, lining up a few minutes before the bell to get ready for recess. Many of these common, everyday practices, while seemingly insignificant, actually contribute to the ways in which everyday rituals occur in schooling. Some of these are school wide (i.e. assemblies), while others are class specific (i.e. sitting on the carpet as soon as you walk in to class) but regardless, they have the same thing in common: rituals serve to socialize and bind the school community and culture together.

As I will unpack throughout this dissertation, school rituals are key to understanding the dynamic changes that have come with 21st century technology. It is vital to first conceptualize how rituals can be applied to schooling. The sociology of ritual, to recap, is a sociology of gatherings—of crowds, assemblies, congregations, and audiences (Collins, 2004, p. 34). Generally speaking, rituals bind us in the most primordial levels through community and culture, as they are extremely powerful modes of communication that give meaning for groups[11] (Manning, 2000). Because they "unfold in spaces", rituals clearly differentiate themselves from those of everyday discourse or action (Manning, 2000). Rituals generally refer to a relatively rigid pattern of acts specific to a situation which construct a framework of meaning over and beyond the specific situational meanings (Bernstein, Elvin, & Peters, 1966). If we conceptualize this in the context of classrooms, it can become clearer how school-based rituals may function.

[11] See Manning (2000) for a discussion of rituals as cultural markers of college campuses as she explicates the unique culture of higher education through the medium of rituals and ceremonies.

As discussed above, Durkheim originally linked religion and other universal belief systems to rituals (Durkheim, 1912). Durkheim set forth most of the components of social rituals in his discussion of how religion is socially produced, using as his example, the tribal gatherings of Australian aborigines (Collins, 2004, p. 33). Religion, composed of beliefs and doctrines, employed rituals as means by which collective beliefs and ideals are simultaneously generated, experienced, and affirmed as *real* by the community. Hence, ritual was considered the means by which individual perception and behavior were socially appropriated or conditioned (Manning, 2000). As we know, rituals can extend far beyond that of human religious heritage (McLaren, 1985). As Goffman affirms, even small-scale gatherings can be conceived as rituals:

> a couple of acquaintances stopping to talk, or merely nodding in passing, or even strangers avoiding each other's glance…when human bodies are together in the same place, there is a physical attunement: currents of feelings, a sense of wariness or interest, a palpable change in the atmosphere" (as cited in Collins, 2004, p. 34).

If executed skillfully, rituals can become a source of inspiration, insight, and creativity. The action, language, symbols and other aspects of rituals can and perhaps must, engender a connection between community members and ideas larger than themselves. The magic and spiritualty of rituals builds the connection between the individual and larger, more significant goals (Manning, 2000, p. 124).

Many traditional scholars have understood schooling from the perspective of culture and ritual performance (see next discussion on schooling as organizers). In fact, Foucault (1972) had once argued, "what is an educational system after all, if not the ritualization of the word" (as cited in Giroux, 1983, p. 207). The primacy of understanding schools in the traditional sense, can come from the perspective of culture and ritual performance (McLaren, 1985). Rituals symbolically transmit societal and cultural ideologies, and it is possible to know how ideologies do their "work" by examining the key symbols and root paradigms of the ritual system (McLaren, 1985, p. 162). Classroom rituals in particular, can be considered those repeated activities that students learn to expect as part of their time in school. These activities may be routine and occur daily at an expected time or could be used for specific occasions, such as when students need to be quieter. Rituals can be changed at any time when students or even the teacher lose interest, or become newly created, when the need arises (Deal & Peterson, 2010). Rituals of instruction in schools have been previously documented. For instance, rituals can exist at both the *micro* level (i.e. day to day lessons), and the *macro* level (i.e. lessons collectively over a single day). There can also be rituals of *revitalization*—processional events which give participants renewed commitment, motivations, and values (e.g. class rituals in the form of emotional discussions between teachers and student). There are also rituals of *intensification* (i.e. types of revitalization which can emotionally recharge students or teachers) (McLaren, 1985). In addition, there are what Bernstein et al. (1966) have outlined as *consensual* rituals, those which function to bind together all members of the school as a moral community; as a distinct collectivity. These

rituals also create the school's values and norms, as an important component in the ritual of punishment and reward. These could consist of assemblies and ceremonies of various kinds, with the imagery of signs and totems, perhaps in the form of school slogans or crests. There are also *differentiating* rituals. These are concerned with marking off groups within the school from each other, usually in terms of age, sex, relation or social function. The differentiating rituals deepen local attachment behaviour to, and detachment behavior from, specific groups; they also deepen respect to those in various positions of authority and create order in time. Such rituals are major mechanisms for the internalizing and revivifying of social order. They function to maintain continuity, order, boundary and the control of dual loyalties and ambivalence. In this case, ritualizing within the school is a major means through which such single ideologies are transmitted, and through which social cohesion is maintained under conditions of rapid social change. The school itself symbolizes and celebrates the social order to come (Bernstein et al., 1996).

Perhaps the most common type of ritual documented are rituals of *resistance*[12] (see MacLeod, 1987; Willis, 1977 for examples). Classic ethnographies such as Willis' (1977) *Learning to Labor,* or MacLeod's (1987) *Ain't no Makin' It,* demonstrated studies whereby schooling and classroom experiences were characterized by very strict and orderly traditional pedagogies. This "resistance" tradition, which largely restated the old subcultural theory tradition, was focused on how peers maneuvered around classroom control processes—creating some autonomous ritual spaces for themselves, evading direct control from teachers, mocking and ridiculing teachers, and even sometimes erupting into direct confrontation over control of the immediate situation. For Marxists, all of this was just really about some sort of class confrontation occurring in the confines of the classroom (Davies, 1995). Resistance rituals (which include rituals of conflict) could be conceived as a type of ceremonial "de-structuring". According to McLaren (1985), "rituals of resistance transform students into combatants and antagonists, while mobilizing hidden grudges and tensions for the purpose of rupturing school rules and subverting the grammars of mainstream classroom discourse" (p. 169). Thus, throughout the process of schooling, culture is continually made and remade.

When considering how the expressive culture of school is passed on to students, Bernstein et al. (1996) have suggested that a major means of its transmission is through ritualization (p. 433). In this regard, ritualization is likely to be highly developed in schools where pupils are ordered and grouped on the basis of a fixed attribute, or an attribute which is thought to be fixed. The expressive culture then in a stratified school is transmitted through a communication system which is verbally both highly condensed and highly redundant and rational. A major source of control in stratified schools is the internalizing of the social structure and the arousal and organization of sentiments evoked through ritual, signs, lineaments, heraldic imagery and totems (Bernstein et al, 1996, p. 434). In other words, studying ritual practice in schools provides a partial answer to the "question of what part ritual plays in the multi-chartered, multi-grouped institutions that educate, socialize and enculturate young people into modern megalopolises" (Burnett, 1969, p. 9 as cited in Kapferer, 1981). Symbols and rituals express the awareness that

[12] At least within the sociology literature; perhaps demonstrating sociology's bias towards resistance rituals

teachers, and students, both individually and collectively, in the organization of schools, have of their socializing function. An understanding of the dynamics of the ritual dimensions of schooling uncovers possibilities for understanding how socialization "works" through dominant structural arrangements and human agency. Socialization is constructed from the many outcomes of negotiations between symbolic meanings. Such meanings are continually mediated by socioeconomic conditions, relationships of power and privilege, and the diverse ways students engage in the world (McLaren, 1985, p. 181). Much (if not all) of this literature on school rituals have been written at a time that preceded the new wave of technology that has hit schools. Now, with the increased classroom flexibility that technology brings, it becomes worthwhile to unpack whether new sets of rituals are emerging as a result of 21st century classroom changes, and whether technology is organizing and socializing youth in new ways.

2.1.2 Schools as Organizers/Socializers: The Emergence of Distinct Rituals

Schools can easily be thought of as organizations; as groups of people intentionally brought together to accomplish some specific purpose. Education as a social institution has existed in various forms in history, but it is only in the last 100 years or so that it has come to have a distinctive and nearly universal organizational form (Kerr, 2004). In fact, our notions surrounding the purpose of education and the role that schools as institutions should serve have shifted over the last fifty years. Earlier sociological studies of the 50s and 60s—original functionalists such as Durkheim and Parsons—came to conceptualize schools as modernizers; as modern institutions that would create new citizens for the new economy. Education in this view was conceived as a way to teach specific skills necessary for future occupations—an important function for industrial societies with increasing complex and specialized division of labour (Durkheim, 1961). This view did not last long however, as the Marxist Critical types of the 70s and 80s (see Bowles & Gintis, 1976 for an example) later saw education and schools instead, as perpetuators of inequality. Such scholars viewed the schooling system as more of a mechanism for social reproduction rather than for social change (Bowles & Gintis, 1976; Giroux, 1983). They portrayed schools as fueling capitalism rather than modernization. Bowles and Gintis (1976) for example, emphasized schools' roles in providing the capitalist economy with compliant workers—workers who would know their place and would be prepared for certain roles. In other words, Marxist scholars argued that the capitalist control of educational institutions habituates workers to a docile culture of discipline (Bowles & Gintis, 1976). Such studies of schools focused on the role of *production*—teachers were workers, students were products, and teaching materials and techniques were means of production (Kerr, 2004, p. 12). In the years to follow, newer identity critical type scholars began to focus mainly on racial inequality (see Anderson, 1999; Carter, 2006 for examples), without the focus on capitalism or modernity.

Historically, the emphasis in education was generally not on student engagement, nor on any need to unlock student's intrinsic desire to learn. Instead, schools were seen as preparation for the working world. Scholars have suggested that traditional ideologies of schooling viewed schools as *processes* (see Berger & Luckmann, 1971). Furthermore,

they contended that the social construction and creation of social reality came through traditional things like classrooms, blackboards, chalk, book, pencils and so on. They maintained that there was a standardization and repression that plagued schooling—repression of individual unique qualities was not encouraged, and students and teachers as a result, were to weed out "differences". Davies and Guppy (2018) have argued that one of the most poignant criticisms of modern schools is that they are overly bureaucratic, inhumane, and indifferent to the needs of students. Such critics portrayed schools as being "factory-like" enterprises that treated students as widgets or "inputs". Once in school, they were "processed" by curricula, pedagogy, and rules, and by the end, had become "outputs" possessing cookie-cutter credentials. Critics implied that these highly bureaucratic schools were indifferent to the idiosyncratic needs of individual students" (p. 98). Even classic studies such as Gracey (1972) have suggested that schools, above all, were seen as a preparatory system—run like an assembly-line and filled with common signals and expected responses. The goal was to teach children, "the student role": to learn unquestionably to conform to rules, regulations, and procedures that they would be expected to follow not only in kindergarten, but throughout their academic career. Students who successfully learned the student role would most likely be better prepared to succeed in adult roles as factory workers or in other bureaucratic settings where conformity to structure, rules, and regulations were deemed essential (Gracey, 1972). Such obedience and submission to authority were said to be "conducive to integration into the structure of relations in the school and the labour force and were further implicated in the social reproduction of the class structure" (Sargent, 2009, p. 2). More contemporary research has reframed classrooms from those of a strict, orderly structure, to institutions organized more around active student engagement and involvement, with activities and conditions of schoolings aiming to generate higher-quality learning than before (Brint, Contreras, & Matthews, 2001). In a more recent review of school inequalities, (Downey & Condron, 2016) have suggested that while many researchers have suggested schools can reinforce inequality, schools do partly equalize learning opportunities and are actually *more* compensatory when considering educational inequalities than previously thought. Given the age of 21st century learning, whereby students are becoming digital natives (sometimes even more so than their teachers), it may be useful to ponder how these new technologies are being received in classrooms. It is feasible that technology has begun to produce new school rituals that reflect new cultures, and in doing so, has altered patterns of past inequalities. It is likely as well, that technology-based rituals may even create newer forms cultural capital that has become valued amongst youth. This is to be discussed next.

2.2 Cultural Capital Theory

If school-based technology is being welcomed into classrooms, whilst also becoming an integral part in childhood culture, it is imperative to analyze what the implications of digital tools are to meanings of cultural capital—can technology use become a new valued "capital" in the language of Bourdieu? Traditionally, Bourdieu

(1986) outlined cultural capital as a theoretical hypothesis, one which made it possible to explain the unequal scholastic achievement of children originating from different social classes. In other words, there were different profits that children from different classes could obtain in the academic market, depending on their familial exposure (p. 243). Cultural capital was seen as an attempt to theorize the system which at the time, valued attributes that only children of a certain class-background could bring to school and exchange for other forms of capital (i.e. social connections). Bourdieu showed the powerful influences of French children's class background—usually measured as their father's occupational category—on school outcomes, entry into university, and eventual destinations in their own occupational categories (Davies & Rizk, 2018). Bourdieu had argued that educational performance depended on "the cultural capital previously invested by the family" (Bourdieu & Passerson, 1977, p. 244). In other words, it was traditionally thought that family backgrounds can provide resources such as values, language, knowledge, and social class—resources that make up cultural capital and had value merely because they were privileged by society (Williams, 1995). Schools as a result, were said to mirror this inequitable distribution of capital by providing different economic classes with different educational experiences in regard to the knowledge distributed, pedagogical practices, and access to resources. Middle class cultural capital was thought to be legitimized through school systems, as children of more affluent families were taught values, ways of speaking and acting that were then rewarded in schools (see Hinchey, 1998). Students who had acquired the desired cultural capital were thought to have an advantage in terms of academic success, not because they were smarter, but as Ong-Dean (2009) has described:

> …children of privileged social class backgrounds do better in school not simply because they are better students or because their objective academic skills are stronger, but because they display elite cultural traits that other children cannot acquire through schools, since the most elite forms of cultural capital are not part of the school curriculum, although they are a basis for perceiving privileged children's performance as superior (p. 42).

Cultural capital thus was coined to understand some of the persisting inequalities that scholars saw emerging in schools. However, despite Bourdieu's original creation of the term, scholars over the last decade have elaborated on his theory in very distinct ways.

Davies and Rizk (2018) have suggested that there have been different "streams" of empirical research since Bourdieu's initial induction of "cultural capital". Over the years, a "third generation" of cultural capital research has emerged that has built upon the works of Paul DiMaggio, Annette Lareau, and Randall Collins. The "DiMaggio" branch viewed cultural capital theory as a derivation from a Weberian interpretation and notion of "elite status culture"; that is, as specific and distinctive cultural traits, tastes, and styles of individuals who share a common sense of honor based upon and reinforced by shared conventions" (Lareau & Weininger, 2003, p. 574). Using largely surveys to quantify culture capital DiMaggio (1982; DiMaggio & Mukhtar, 1985) linked cultural capital to participation in high-status cultural activities. He operationalized this as children's

exposure to cultural participating in the forms of familiarity with classical music or attending art galleries for instance, which were largely provided for by families. At its core, the DiMaggio image of cultural capital would argue that more literate home environments, coupled with participation and exposure in more "high-brow" culture, had traditionally given their kids greater advantaged in schools.

In the years to follow, Lareau (2000; 2003) would criticize Bourdieu's original formulation of cultural capital for not paying sufficient attention to the difference between the possession and the activation of, "cultural capital". Claiming that Bourdieu lacked focus on the "crucial mediating role of individuals who serve as "gatekeepers" and decision makers in organizations" (Lareau, 2003, p. 363), her extension theorized techniques and strategies that parents use to pass on advantages to their children. In essence, Lareau's interpretation of cultural capital elucidates how parenting styles and roles (concerted cultivation vs. accomplishment of natural growth) pass on particular skills to their children (i.e. teaching them to interact more confidently with authorities). Key to the "Lareau" branch of cultural capital is the concept of "alignment"—that cultural capital is an assemblage of actions and parenting logics by which families "align" their lifestyles with school rewards. Thus, middle-class parents are able to customize their children's experiences and entice educational professionals to comply with their wishes in ways that varied from lower SES families (Davies & Rizk, 2018).

An interesting, and less developed conceptualization of cultural capital can be extrapolated form Collins. Recall the previous section on his work on interaction ritual chains. For Collins, intense ritual experiences can actually create new symbolic objects, and generate energies that can fuel major social changes (2004, p. 43)—these can be conceived of as new versions of cultural capital. Collins has claimed that Bourdieu greatly overstates the importance of cultural capital being created and transmitted within the "formal culture-producing institutions such as schools and museums, as well as that which is passed along in the family as class "habitus" (p. 392). Collins' extension of cultural capital presents it as more micro level, conceiving it as a core element of face-to-face interaction. Taken in this way, cultural capital can be understood as a facility with symbols that can aid in one's participation in successful IRs. Thus, cultural capital can be regarded as any item of culture that becomes charged up by interaction rituals, which can shift in local significance with situational processes over time (2004, p. 390). In this way, we may consider the *motivation* that builds up emotional energy (EE) in rituals as a precursor to success. But what does the integration of technology mean for cultural capital literature? On the one hand, it may very well be that in both the framings of DiMaggio and Lareau, students who have had both access to technologies outside of school and increased parental support may be more likely to succeed in tech-fueled classrooms. However, the exact opposite may also hold true: it is also possible that because of the growing accessibility of technology in classrooms, students who may have not been exposed to digital tools can now benefit from school's compensatory effect, since the majority of schools are providing technology in some form or another. Likewise, many students are now self-taught when it comes to using technology, and thus can more easily secure advantages with technology than with traditional print text.

Out of the three extensions of cultural capital theory however, the Collins branch

is the most applicable in terms of the potential impact of technology on student culture. In this case, it is conceivable that technology may become the "sacred" element in student interactions, and that the act of participating in digital realms may hatch an emotional bond; partly because students are similarly focusing their attention on technology and thus becoming caught up in one another's feelings (Collins, 2004, p. 108). Technology in short, may become a new 21st century symbol of cultural capital, one that arguably children are able to secure for themselves (see Chapter 5). Thinking of cultural capital through the lens of Collins adds layers of group identity, shared symbols and emotions to the mix. Technology may serve to be a new focus amongst school-aged students, which in turn can create new meanings of cultural capital. Stanton-Salazar (1997) had argued that it should be schools' responsibility to provide content and procedural knowledge needed by students to prosper in the educational system. Technological information, as well as the ability to develop supportive collaborative peer relationships, are cited among the key institutional-based knowledge (Stanton-Salazar, 1997, p. 13). Perhaps in our new era of digital technologies, technology has become a more effective and vivid medium of cultural capital. That is, maybe it is an efficient conveyer of group symbols that has become internalized, and in which one can become immersed. In our current age, technological skills are become more valued and desirable than ever, perhaps shedding light to the changing nature of school pedagogy.

2.3 Classroom Pedagogies: Traditional Versus Progressive

Notions of schooling have witnessed a tremendous amount of growth over the years, as ideologies surrounding what the purpose of education "should" be have evolved over time. Over the last decade or so, schooling has become more mandated to accommodate students with diverse skills, introducing a philosophy of pedagogical change which Canadians called "progressive education". This term has been since used to reference a style of schooling usually contrasted with more "traditional" styles (Davies & Guppy, 2018, p. 175). In mainstream classrooms, it seems that teacher pedagogies have been largely dominated by either traditional or progressive ideologies—and arguably, both have had major influences on student engagement. Below I outline the two pedagogies and their role in the 21st century classroom.

Figure 2: Traditional vs. Progressive Classrooms

Traditional classrooms are perhaps what many are most familiar with when they think of schools—an environment in which students are expected to adjust to school rules and mandated curriculum. Here, teachers are at the center of the classroom—they are the main authority figure and the main source of knowledge. As such, there tends to be a direct flow of knowledge that stems from teachers, and teachers alone. In other words, students learn based on what the teacher teachers, but hardly ever the other way around. Expert authorities such as teachers or instructors are never questioned, but rather, are respected. As the gate-keepers of knowledge, traditional pedagogy imposes adult standards on students, who are seen as not mature enough to actively participate in their own education and learning. Students as a result, must become more of a passive recipient of new knowledge, and obedient to the rules enforced upon them (Dewey, 1963). Along with teachers, textbooks where seen as an equal source of resource that could guide student learning in traditional classroom environments. As Kohn (2008) has indicated, in traditional classrooms, there is a greater emphasis on content, structure, ordered systems, formal learning and measurable outcomes. The purpose of such traditional education was meant to be prepare youth for the demands of life after school (Dewey, 1963; Kohn 2008).

The traditional classroom can be contrasted to that of the progressive one (see Table 2 further below). Over the last century, progressive reforms have been emerging in hopes to optimize teaching and learning. According to Christou (2016) we are now in the midst of a progressivist educational tide. Progressive pedagogy, Davies and Guppy (2018) claim, aims to make schooling more egalitarian, humanistic, and child centered; in other words, shifting pedagogical styles to value the unique needs and interests of student (p. 175). Progressive thought has been said to respect individual interests and abilities, while at the same time, promoting the variability of learners, and recognizing that the personal abilities and qualities in learners are constantly in flux and exist at the intersection between individuals and their experiences (Kohn, 2015; Meyer, Rose, & Gordon, 2014). Whereas traditional settings assumed a more one-way flow of knowledge from teachers to students, in progressive settings, students play a more active and important role in the learning process—leading students to develop deeper understandings around problem solving, questioning, and thinking deeply about issues that might matter to students, which in turn, can create strategic learners (Kohn, 2008; Meyer et al., 2014)

Table 2: Characteristics of Traditional vs. Progressive Pedagogy

Traditional	**Progressive**
-Meant to prepare youth for working world	-Seizes learning opportunities in student lives, and respects individual interests and abilities
-One-size-fits all mentality	-Promotes variability of learners
-Classrooms are teacher centered	-Classrooms are student centered
-Teachers pass down knowledge to passive students	-Students play an active role in their own learning

-Textbooks are the main resource	-Textbooks are one among many resources that can include different forms of technology
-Teachers as authority figures	-Teachers are coachers/facilitators
-Students expected to be disciplined	-Student interaction encouraged
-Desks arranged in rows	-Flexible seating
-Students face teacher	-Students face each other
-Rote rules and regulations type pedagogy	-Discovery type pedagogy

Scholars in both education and sociology domains have become more intrigued with progressive pedagogy. For instance, authors such as Kohn (2008) have understood schools to be characterized as progressive in accordance to how closely they reflect a commitment to values such as: collaboration, social justice, intrinsic motivation, active learning, community, the ability to take kids seriously, deep understanding, and attending to the whole child. Progressives are committed to relating school life to the modern, evolving, and rapidly-transforming realities of social existence (Christou, 2016, p. 61). However, scholars such as Davies (2002) remind us that because some progressive educational goals—promotion of critical thinking, democratic citizenship and well-rounded individuals— are vague, schools are bound to have a highly ambiguous means-end organizational relationship. Thus, progressivism endures as a set of ideals, rather than as a body of concrete practices—serving to legitimate broad goals, rather than tightly determine actual reform[13] (Davies, 2002, p. 283)

This gradual change from traditional to progressive schools began substantially in the 1960s, whereby progressives made the call for schools to be less regimented; arguing that strict rules and procedures could stifle student imaginations (Davies & Guppy, 2018, p. 163). In his historical review of progressive education in Canada, Axelrod (2005) declared that Toronto for instance, had significant elements of progressive education in the 1950s, but that educators' approach was more pragmatic, not deeply philosophical, and the system they governed remained ordered, disciplined and hierarchical. School policy in this regard, was an "amalgam in which educators were using available and emerging tools to address the perceived instructional need for a ballooning population" (p. 240). They employed what they thought worked but did so within the political culture and dominant values of the province and the time (p. 241). Thus, according to Axelrod (2005), it was not a case of progressive or traditional education necessarily, as elements of new education were in play at least since 1937 in Ontario, but "the maintenance of order in the classroom and the school yard was not compromised. Indeed, educational authorities believed that schools could not achieve their aims (progressive or otherwise) without strict discipline" (p. 241). According to Axelrod, schooling came under the sway of educators who were, in many ways, strongly committed to realizing the progressive ideal, but now believed, in concert with emerging social values of the day, that this goal could only be achieved in a more liberal classroom setting that was free of repressive tools (p. 241).

[13] It is important to note that many people are not against such ideals, but rather, many believe that to truly achieve a progressive classroom would be difficult, considering the organizational model of the mass public school that is set within our contemporary economy and its competitiveness and stratification.

Ideals of progressive education stemmed largely from the work of John Dewey, who claimed that there needed to be a more child-centered approach to learning, with activities directed as much by the teacher as by the student. This shift would supposedly unleash student's motivation for learning (Davies & Guppy, 2018). Dewey had suggested that "democracy has to be born anew every generation, and education is its midwife" (Dewey, Boydston, & Hook, 2008, p. 139). He felt as though schools should not simply be places where lessons are disseminated that could, or could not, one day play a role in a student's life. Schools he maintained, should be full of activities that are vital and important to their daily learning. In Dewey's viewpoint, traditional education set up children to play a passive, receptive role in their educational process. The schoolrooms and curriculum that were being utilized during this time were that of a one-size fits all mentality. Dewey attempted to show the important links between education and politics; believing that active learning would help people develop the ability and motivation to think critically about the world around them. Progressive education was therefore a vital part of successful democracy as it was necessary for people to be able to think for themselves (Dewey & Dewey, 1915). By the time we approached the 20th century, many traditional methods of social control increasingly became frowned upon. As such, schools needed to develop legitimate norms to accommodate the vast array of student talent and preparedness that entered their doors (Davies, 2002, p. 271). Overtime, children themselves no longer tolerated traditional forms of pedagogy. Instead, a child-centered pedagogy was framed in terms of cultural change, portrayed as a tool to deal with a liberated generation (Davies, 2002, p. 280). Over the past 50 years, there have been changes documented within the structure of education that have helped gradually shift classrooms from traditional to progressive structures, including: fewer rote and memory-based exercises; less demand for rigid discipline, and instead, a greater encouragement for student interaction, allowing them to chat more freely in the classroom (Davies & Guppy, 2018). In addition, the roles of teachers and students began to blend. In progressive classrooms, teachers must be more comfortable with a certain level of uncertainty—the ability to abandon the goal to find the "right answer" but instead, to let students play an active role; allowing students to take some ownership. In this way, progressives have aimed to create a schooling style that is in direct contrast with traditional teacher-centered classes—shifting from "teacher teaching" towards "student learning" (Davies, 2002; Kohn, 2008).

With progressive pedagogy, even the physical space of the classroom began to change over time—with fewer arranged desks into straight rows, and more adorning of walls with colourful posters, and student artwork. Such measures were hoped to encourage students to feel "more at home, relaxed, and motivated" (Davies & Guppy, 2018, p. 164). This stemmed from hopes of creating a lesser authoritarian classroom structure, with less rote rules and regulations, to more of a discovery type pedagogy aimed at, "exposing students to a fuller range of contemporary controversies, beliefs, and ideals, and encouraging informed choices" while relying less on "moral indoctrination and more on criticizing society, questioning dominant values, and illuminating social problems" (Davies & Guppy, 2018, p. 223).

Progressive pedagogy is just one modern case of a broader movement for greater participatory organization. There exists older, extreme, accounts of child-centered approaches to learning such as, Ann Swidler's (1979) work on free schools. Free schools are one radical example of an educational institution that allowed students to be in full control of their own educational experiences. Teachers were given no authority in which to govern student activity and learning, but instead, their main purpose was to just scaffold students to learn about themselves. One of the major lessons from Swidler's account was that free schools became organizationally unstable, which ultimately, lead to their demise. Even decades later, Kohn (2008) has suggested that despite multiple attempts, schools and classrooms that can actually be considered "progressive" are far and few. This is partly because progressive education is not only less familiar, but also much harder to do, and especially, *to do well.* Thus, expectations are especially more demanding of teachers and administrators, as both must be comfortable with a certain level of uncertainty.

Despite its complexity[14], notions of progressive ideologies continue to persist—and this is important for conversations surrounding technology in 21st century classrooms, which are often thought of as embodying more progressive ideals. Thus, many questions are beginning to arise—*can traditional classrooms continue to exist in parallel to the strong push towards 21st century digital learning? Are there new forms of progressive pedagogy that occur as technology becomes more integrated into classrooms?* It perhaps goes without saying that the push for digital learning tools has potential to drive forward progressive ideas, as technology is being used as a vehicle for more individualized and student-driven learning, which are features in progressive education. By the same token however, one could also wonder whether technologies can be used to also re-establish traditional practices. Perhaps digital technologies have the ability to control learners through automation in much the same way that sociological theorists saw automated technology as a tool in which managers used machines to control workers. This is another dynamic of new technologies that must be considered. Below I begin to map out the historical trajectory of technology use in schools—beginning with the look at the first wave of technology to enter the school system, compared to the current, or second wave, found in many Ontario school boards.

2.4 The Potential of Technology: A Decade Ago

Computer technology has been in schools for decades, yet, they have been utilized in very different ways over the years, largely as a result of education philosophies. Scholars have previously written on earlier introductions of technology (Web 1.0) that first entered classrooms and schools. Computers were initially introduced with much anticipation; with high hopes of individualizing student learning, permitting mastery at one's own pace, and allowing students to have greater autonomy than in many teacher-directed settings. These qualities were thought to allow learners to be more in charge—something that seemed missing in the lives of many students, especially those who were

[14] And the disappearance of radical progressive accounts such as free or open schools.

at-risk (Cuban, 1993, n8). In the 80's and early 90's, there were strong impulses by coalitions of school reformers to embrace computers and telecommunications as a way of unfreezing the perceived inefficiencies and rigidities of American schooling— "faster, better, and cheaper" was the drumbeat of such a productivity impulse (Cuban, 1993). Cuban (1993) for instance, believed that this technology began as a way to revolutionize our educational system, as a way to improve academic achievement and alter the ways teachers taught. The promise of these new machines was "anchored in the dream of increasing teacher and student productivity", where "more could be taught in less time", and students could enviably learn "more and even better than from textbooks or even the teacher" (n6).

Yet, scholars met technology with strong reservations (see Apple, 1991; Budin, 1991; Cuban, 1986, 1993). Budin (1991) for example, stressed that the initial introduction of technology in schools was met with much teacher anxiety surrounding their use. For one, teachers were already overburdened, and many perceived the new pressure to learn how to use new technologies as overwhelming, and in many cases, received little help[15]. Many teachers worried about how they could fit the use of computers into their daily work, while others were fearful that computers would in some ways replace their role as teachers (Budin, 1991). Others, worried that the extensive use of computers might ultimately corrode the teacher-student relationship, the social climate of the classroom, and the importance of students' learning to work collaboratively (Cuban, 1993, n31). This pessimism was not uncommon for scholars at this time. In Apple's (1991) classic, *The New Technology: Is it Part of the Solution or Part of the Problem in Education*, he writes:

> …go out and smash the machines that threaten our jobs or our children. The new technology is here. It will not go away. Our task as educators is to make sure that when it enters the classroom it is there for politically, economically, and educationally wise reasons, not because powerful groups may be redefining our major educational goals in their own image. We should be very clear about whether or not the future it promises to our teachers and students is real, not fictitious. We need to be certain that it is a future all of our students can share in, not just a select few. After all, the new technology is expensive and will take up a good deal of our time and that of our teachers, administrators, and students. It is more than a little important that we question whether the wagon we have been asked to ride on is going in the right direction (p. 77).

While educational historians such as Cuban (1986) predicted that there would be an increase in the popularity of computers in the elementary classroom, he concluded that overall, technology fell short, as there were no real breakthroughs in teacher use and patterns of teaching (p. 99). The promise of technology was followed by sporadic and limited entry of machines into the classrooms, with:

[15] Which ironically enough, still holds true today as I discovered through my interviews with teachers (see Chapter 8).

> growing practitioner disillusionment with the inaccessibility of the machines, academic studies documenting small learning effects from the new technology, and a final round of blame usually deposited on the backs of teachers. With another technological invention, this cycle of ecstasy, disappointment, and blame would begin anew (n6).

In short, Web 1.0 was met with great dissatisfaction. So, did technology's initial imprint really last? According to Cuban (2001), not really. While there were general shifts from more teacher-centered to student-centered classrooms, the ways that teachers taught remained relatively consistent over time. Without an adjustment to the way in which teachers teach, and so long as teachers continued to teach in the same ways, technology for scholars like Cuban (2001), could not and would not, change any classroom experiences (p. 196). Cuban also found that when computers were integrated into classrooms, it was often during "free choice time" (2001, p. 50), when students could choose from various activities that were offered by different learning centers. Rarely did teachers try and use new technologies to actually structure and guide their classrooms and lesson plans. It seemed as though technology was not heavily integrated into the dynamics of the classroom, nor the school culture. There was little valued placed on the use of computers and other technologies.

Why then, did the first round of digital technology fail to leave a lasting imprint, or to alter classrooms decades ago? One possibility is that the technologies that began to infiltrate schools (mainly desktop computers), had not really pervaded everyday life yet. We did not have the level of tech-integration we see today, that spills into our personal and public lives—iPads, Smartphones, laptops and so on. Hence, many teachers (and likely administrators) were unfamiliar with how to use technologies at the time (never mind their students), and thus were less likely to attempt to integrate technology into the curriculum. It is feasible that some people did have desktops and laptops at home, but much of what we have today did not exist, as there were only the rudiments of educational software and games available. The falling out of Web 1.0 is also related to the dominant ideologies surrounding education at the time—or "Education 1.0" as Keats and Schmidt (2007) argue. Like the first generation of Web 1.0, Education 1.0 was a largely one-way process. Students would go to school to get education from teachers, who supplied them with knowledge largely in the form of a stand-up routine that may have included use of class notes, handouts, textbooks, videos and perhaps in more recent times, the World Wide Web. Students were largely consumers of information that were delivered to them at the time. Although students may have engaged in activities around those resources, for the most part, they were undertaken in isolation or in isolated local groups. Rarely, if ever did the results of those activities impact the students carrying them out (Keats & Schmidt. 2007, p. 2). The initial introduction of Web 1.0 in schools was thus needless to say, anticlimactic. Despite this, Cuban (2001) predicted that technology would continue to pervade schools, especially overtime, as knowledge about technology becomes more readily available. This was of course, an accurate prediction, as technology has grown to become ever-present in our everyday lives—from home, to school, to work. The question remains, has anything changed in classrooms today?

2.5 Overview of Technology Today

Twenty years ago, much skepticism existed around computers and technologies being used in schools. In 2001, Larry Cuban once said that the investment of technology "has yet to produce any worthy outcomes" (p. 197). So, were Cuban and like-minded scholars correct in their grim predictions about the longevity and importance of technology in education? Have teacher(ing) methods continued to stay constant despite the rise of technology that is now finding its way more and more into classrooms: iPads, Smart Boards, Chromebooks, and the like? Or, have teachers begun to adapt their methods to accommodate the rise of technology? Is Web 2.0 in education any different than its predecessor?

The short answer is yes, as we embark upon 21st century progressive ideologies and the influx of technology that has become widely accessible, new versions of technology in classrooms tell a different story. More recent technological innovations—such as the interactive Smart Board for instance—have begun to receive praise over the years, as they are thought to attract students to learning and are believed to be better equipped for teachers to monitor student progress in ways that seem unimaginable previously (O'Connor, 2011; Piccicotto, 2010). As Hardman (2015) suggests, knowing how to use technology to support teaching and learning is no longer an option as it once was; it is becoming mandatory to providing the skills students need to succeed. Even the Ontario Ministry of Education (2016) supports the role of technology today—claiming that technology-enabled teaching and learning practices now play a significant role in supporting the development of the full range of 21st century competencies (p. 34). It would seem as though these are indicators of a new conversation that is stirring when it comes to new technologies in school—a conversation that includes greater teacher enthusiasm, increased student engagement, and a shift in classroom dynamics. It is also possible that even though computers have been around for decades, we are only now beginning to see their potential impact on educational pedagogy. Consider a recent discussion by Collins (2013), where he asserts that technology's impact on the distribution of jobs for instance, often takes decades to be truly felt. Thus, only now as capitalism's inherent tendency to replace humans with technology becomes fatal, that we have entered into an era in which digital technologies can create mass unemployment. It is plausible then, that the same is true for technology in schools as well; that the long-term effects of technology are only now catching up with us.

Keats and Schmidt (2007) have also suggested that much like technology's transition from Web 1.0 to Web 2.0, education has had a similar evolution. As stated earlier, "Education 1.0" largely hailed the teacher as the primary source of knowledge, with minimum participation in technology. But education ideals have evolved alongside technology. "Education 2.0" Keats and Schmidt (2007) claim, was reached soon after technology began to permeate schools. Education 2.0 consumed the basic principles of Web 2.0 to enhance traditional approaches to education. For instance, this could mean employing new methods such as blogs or podcast as part of teacher pedagogy. However, this occurred largely within the embedded framework of "Education 1.0"—as in the educational pedagogy had not transformed significantly, but the groundwork for broader

transformation was being laid. Keats and Schmidt assert that today, we are fast approaching "Education 3.0". This involves breakdowns of most boundaries imposed within education to create a much more free and open system focused on learning. This third generation of education is characterized by rich, cross-institutional, cross-cultural educational opportunities within which learners play a key role as creators of knowledge that are shared, and where social networking and social benefits outside the immediate scope of activity play a strong role. This seems to mesh well with the Ontario Ministry of Education's (2016) new focus on technology and civic education and engagement in the 21st century. Technology in the classroom today allows for what Haste (2009) has called a "bottom-up" rather than "top-down" structure—allowing students to become "agents" rather than "recipients" of knowledge. Thus, it is inevitable that as technology advances, so too will education. In the sections to follow, I take up different facets of the 21st century classroom—juxtaposing classrooms of today to those of the past, while considering the different utilizations of technology. Could modern day technologies have the potential to influence student interactions and engagement in ways that the previous line of technology was unable to?

2.5.1 Technology and Classroom Restructuring: The 21st Century Class

The amount of technologies that are finding their ways into schools today have without a doubt, restructured the nature of classrooms. Perhaps one of the most obvious classroom changes has been that of traditional teaching roles. Despite some barriers to utilizing new technologies (see Hew & Brush, 2007 for a discussion) overall, these new digital tools have been shown to: restructure teachers time in ways that were unimaginable over a few years ago (Kerr, 2004; McKnight et al., 2016; Zhao & Frank, 2003), enhance communication and feedback (McKnight et al., 2016), significantly decrease teacher management problems (Kerr, 2004; Zhao, 2003); and generally, shift the teacher role to one of a coach and mentor position (Kerr, 2004; McKnight et al., 2016). Likewise, technology has also been linked to changes in the student role as well, with greater student involvement in project-oriented learning (Kerr, 2004), an increase in group learning and participation (Churchill & Wang, 2014; Kerr, 2004; Lyons & Tredwell, 2015) and a greater shift in student accountability, as they begin to take greater responsibility for their own learning (Churchill & Wang, 2014; Kerr, 2004; McKnight et al., 2016; Lyons & Tredwell, 2015). In addition, students now more than ever, tend to be heavily attracted to the usability of technology in classrooms, as they are considered more user-friendly, easy, fast, convenient and fun[16] (Mao, 2014). Without question, such shifts in both teacher and student roles have the ability over time to break down older patterns of isolation and parochialism, leading to greater collegiality, and an overall "fun" environment (Churchill & Wang, 2014; Kerr, 2004; Lyons & Tredwell, 2015). McKnight et al. (2016) have reported that amongst the most profound changes that technology can bring to the classroom is the shift from being "teacher-centered" to more "student-

[16] All of which is very applicable to Collins' Interaction Ritual Chain concept.

centered", as technology overwhelming has begun to transform both student and teacher roles, creating a more equalizing classroom experience. This is a far cry from classic sociological literature which often described more power divisions between students and teachers (Jackson, 1968). It is important to highlight however, that much of the research on technology's impact on teachers and students are now almost a decade old—many of which were written during the initial spillover of technology in classrooms. Through this dissertation, I hope to offer an update in some respects to the current status of technology in schools. It is unquestionable that all of these new dynamics of technology have the potential to significantly alter classroom dynamics and captivate students' attention in ways that would be unheard of only a few years ago. While there are many kinds of new digital resources in today's classroom, the next discussion I turn to considers one specific type of technology commonly used in Ontario schools—robotics kits.

2.5.2 Robotics in the Classroom

New pedagogical challenges in the 21st century require a new balance between academic fluency and that of ever-evolving technology. With the rapid development of technology in the 21st century, the use of multi-media tools in education has become increasingly popular, and robotics are one example of this (Toh et al., 2016). Robotics kits in the classroom are a new site of technological learning that is beginning to spread across schools and classrooms in Ontario[17]. Educational robotics kits are a new generation of learning manipulatives that claim to help children develop a stronger understanding of mathematical concepts such as number, size, and shape in much the same way that traditional materials like pattern blocks, beads, and balls did (Brosterman, 1997; Resnick, Rusk, & Cooke, 1998). They provide an enhanced learning environment in which the individuals involved are stimulated through designing and creating objects similar to those in our lives, and control them through a computer system (Chambers, Carbonaro, & Murray, 2008; Mousa, Ismail, & Salam, 2017). Internationally, schools have started to incorporate robotics into the educational process—depending on the age or grade, it could range from simple robotics building technologies (e.g. LEGO Mindstorms), to more complex systems (e.g. VEX Robotics), as many have touted robotics as a new and exciting way to expose students to the "STEM" fields as they are commonly known[18](Chambers et al., 2008; Sullivan & Bers, 2016). This is important, as STEM enrollments have traditionally seen a large male presence, and educational robotics may offer a more hands-on pedagogical approach that can not only engage students' imaginations, but potentially inspire younger children to further their interest in STEM careers (Ruzzenente, Koo, Nielsen, Grespan, & Fiorini, 2012). Thus, part of the educational appeal of robotics in classrooms stems from their multiple types of design:

[17] In Ontario for instance, robotics kits were provided to summer learning programs in 2015, which created a hands-on learning experience connected to technology, science, and mathematics (Ontario Ministry of Education, 2016).

[18] "STEM" stands for Science, Technology, Engineering and Mathematics. Recently however, the idea of adding an "A" for "Arts" has been gaining momentum. Moving from "STEM" to "STEAM" (see Allina, 2018).

from a structures and mechanism design, to a more computational one. In the process, students begin to learn important engineering, math, and computer science concepts (Ruzzenente et al., 2012).

Scholars in the last decade have begun to describe some of the attached benefits of using robotics in an educational setting. Educational robotics have been shown to benefit all levels of education—primary, secondary, undergraduate and even postgraduate levels. Ruzzenete et al. (2014) have showcased their benefits in tertiary education specifically, drawing on their ability to be incorporated into traditional disciplinary learning activities in subjects such as mathematics, computer programming, electronics, and physics, but also in areas such as philosophy, language development, history, and literacy curricula. More pertinent to my research however, is the ability for robotics to impact elementary classrooms. The incorporation of robotics into educational pedagogy has been shown to facilitate the curiosity of both the educator and the student alike, but perhaps most importantly, foster multiple paths for student engagement—encouraging interactive learning and attracting children's attention in new ways (Mousa et al., 2017; Rusk et al., 2008; Ruzzenente et al., 2012; Sullivan & Bers, 2016). Not only is there preliminary evidence to support the claim that robotics kits can be a useful and engaging educational tool, one in which students claim to have "fun" using, but robotics have been found to be easily integrated into other curricular units that happen in the classroom (Sullivan & Bers, 2016; Wei, Hung, Lee, & Chen, 2011).

Likewise, the use of robotics has been found to potentially help children develop various academic skills like science, mathematical concept development, and improvement of achievement scores (Barker & Ansorge, 2007; Chen & Teng, 2011; Highfield, 2010; Toh et al., 2016; Wei et al., 2011). Research has shown that the continued use and integration of robotics represent clear opportunities for children's intellectual growth and development (Levy & Mioduser, 2008). In particular, it can have the potential to facilitate cognitive as well as fine motor and social development (Kazakoff, Sullivan, & Bers, 2013; Sullivan & Bers, 2016), and to support more kinds of differentiated learning styles (Rusk et al., 2008). This can occur through giving students the opportunity to play and gain confidence and self-esteem with specialized technology. Through hands-on experimentation, and the use of manipulatives, robotics kits have been said to directly improve problem-solving abilities (Wei et al., 2011), help transform abstract ideas into concrete, real-world understanding, as children are able to directly view the impact of their programming commands on the robot's actions (Barker & Ansorge, 2007; Bers, 2008) and improve children's conceptual development (Chambers et al., 2008). A recent study by Kazakoff et al. (2013) has also shown that using robotics can have a positive impact on sequencing ability for students as young as kindergarten age in as little as one week. Having the ability to sequence is a skill that is applicable to multiple domains such as mathematics, reading, and even basic life tasks. Robotics have also been used in many diverse ways, such as teaching English as a second language in primary classrooms for instance (Chen, Quadir, & Teng, 2011). Thus, using robotics to teach computer programming skills maybe a powerful tool for educating children across multiple domains (Kazakoff et al., 2013, p. 252).

As a new source of technology found in 21st century classrooms, robotics kits are a fascinating tool to study student interactions and engagement. Studies illustrate that new strategies and technologies, like robotics, can provide multiple paths for engagement—for both children, teens, families, and educators (Rusk et al., 2008). Robotics are one new kind of technology that is not only providing an alternative pathway to learning and student engagement, but as I will explore in Chapter 6, preliminary research suggests that children who are exposed to STEM curriculum (like robotics) at an early age demonstrate fewer gender-based stereotypes regarding STEM careers (Metz, 2007; Steele, 1997), and fewer obstacles entering these fields (Madill et al., 2007; Markert, 1996). Robotics thus can integrate all these different disciplines in an applied way (Kazakoff et al., 2013). It is important to keep in mind that robotics kits are just one of the many tools teachers are turning to, to create and facilitate new and engaging student interactions in classrooms. Many teachers are beginning to combine elements of games in hopes to attract greater student participation and engagement—what is being hailed as the "gamification" of curriculum. This is where I turn to next.

2.5.3 The "Gamification" of Curriculum

In recent years, teachers have sought to find novel instructional approaches, as it has largely been agreed that one of the major problems schools face today are around student motivation and engagement (Lee & Hammer, 2011). For many students, "traditional" schooling methods have been perceived as ineffective and boring (Dicheva, Dichev, Agre, & Angelova, 2015). But, with the influence and impact of Web 2.0, schools are able to take advantage of new tech-trends that could alter the ways students learn and can access information (Simões, Redondo, & Vilas, 2013). Technology has not only transformed the structure of classrooms, along with the roles of teachers and students, but it has also made huge modifications to how curriculum can be taught. In fact, scholars on a global level have begun documenting a recent trend dubbed, the "gamification" of education (Chang & Wei, 2016; Deterding, Dixon, Khaled, & Nacke, 2011; Dicheva et al., 2015; Erenli, 2013; Lee & Hammer, 2011; Muntean, 2011; Nolan & McBride, 2015; Simões et al., 2013). Briefly put, "gamification" refers to the incorporation of game design elements into non-game settings (Deterding et al., 2011; Lee & Hammer, 2011). Any application, task, process or context can theoretically be "gamified". The main goal of gamification is to increase the engagement of users (in this case, students) by using game-like-techniques such as scoreboards or personalized fast feedback to capture student interest (see Flatla, 2011; Muntean, 2011; Simões et al., 2013). The aim is to extract the game elements that make good games enjoyable and fun to play, and then to adapt and use those elements in the teaching and learning process. Thus, learning can be considered "fun", if students were to learn as if they were playing a game[19] (Simões et al., 2013, p. 347). Video games have always had a long sought-after popularity, and this, coupled with the existence of a new generation of digital natives can lend itself to new ways of learning (Simões et al., 2013). Lee and Hammer (2011) have

[19] Not necessarily by playing a specific game.

eloquently stated that bringing education and game elements together could turn out like "peanut butter meeting chocolate: two great tastes working together", which in turn, can boost student engagement and assist in developing new 21st century skills.

Gamification may be a recent widespread trend in many Ontario classrooms, however, the ideas of using games for learning is not at all new (Muntean, 2011). While scholars contend that the first documented use of "gamification" was around 2008[20] (Deterding et al., 2011; Nolan & McBride, 2015), academics had already long begun to document the benefits of video games to learning skills (Gee, 2003; Simões et al., 2013). Prensky (2001) for example, advocated the use of electronic games in teaching in 2001, suggesting that its use would be natural for future generations. Other scholars such as Gee (2003) had also highlighted the potential of video games in learning processes, describing the impact of game play on cognitive development, while identifying many learning principles that could be found in video games. Thus, learning from games may not be a new concept, but it has however, recently skyrocketed in popularity. For instance, in *SuperBetter: A Revolutionary Approach to Getting Stronger, Happier, Braver, and More Resilient,* McGonigal (2016) documents how gaming can actually help people engage with things that would previously be difficult for them to motivate themselves to do. In detailing how to purposefully use games in everyday life (even in higher education curricula), McGonigal makes the claim that playing games has a powerful effect on our overall well-being. Her work makes claims to the "science of games". This is only one of many recent examples of scholars drawing on the benefits of gaming to different facets of life, like education.

Gamifying the curriculum has been shown to have many benefits to students and teachers alike; perhaps most obviously linking itself to an increase in student engagement and motivation by combining intrinsic motivation with extrinsic ones (Chang & Wei, 2016; Lee & Hammer, 2011; Muntean, 2011; Simões et al., 2013). Furthermore, gamifying lessons has been said to aid in cognitive skills, giving students clear, actionable tasks while promising students immediate rewards instead of vague long-term benefits (Lee & Hammer, 2011). It also taps into their emotional needs—invoking a range of powerful emotions, from curiosity to frustration to joy (see Lazzaro, 2005; Lee & Hammer, 2011). These emotional components of gaming have crucial importance for IR theory—as they may form new "ritual" type bonds. Gamification also can help students deal with failure—seeing it as a natural part of the learning process and building their resilience (since they are less likely to give up), which can ultimately lead to a greater level of engagement (Simões et al., 2013). Social rewards also exist for students, as games can allow players to try on new identities and roles, allowing them to safely experience different sides of themselves in gamified social learning environments. Rewards and incentives given by peers, teachers, and parents can also reinforce the development of such identities (Gee, 2003; Lee & Hammer, 2011; Simões et al., 2013; Squire, 2006). Thus, through strong group identification, it can also create opportunities for collaboration, whereby students can learn from one another; allowing students to gain

[20] However, it did not actually see any widespread adoption until around the second half of 2010 (Bohyun, 2015).

more positive motivation (Chang et al., 2016; Muntean, 2011).

Gamifying the curriculum also can lead to greater motivation for teachers (and parents) to reward student progress, as they can do it more often, while at the same time, continue to monitor student achievement (Simões et al., 2013). A gamified pedagogy also has the possibility of showing students that education and learning can be a joyful experience—blurring the boundaries between informal and formal learning, while allowing students to be inspired in new ways (Lee & Hammer, 2011, p. 5). In short, gamification can allow teachers to: create challenges tailored to students' level of knowledge; to set up multiple ways to successfully achieve any objective; to set goals with simple objectives; consider failure as part of the learning process (i.e. a task can be completed successfully after several failed attempts without penalizing the student); provide feed-back for an immediate reward that allows progress to a new task; enable recognition of the student's progress; and use competition to promote valuable behaviours (Banfield & Wilkerson, 2014; Gee, 2003; Kapp, 2012; Marczewski, 2013). Unlike the institutional spaces that children are socialized into, gaming environments are flexible and familiar spaces that are often repurposed and organized by children themselves (Nolan & McBride, 2015; Stevens, Satwicz, & McCarthy, 2008) created in a context in which "each child can get different things out of the space— based on their own choices, purposes, and identities" (Gee, 2004, p. 85). Thus, children are more likely to be engaged in activities that are interesting to them, especially if they are able to choose how and when, and for how long, they engage in it for. This is true whether they are experiencing either success or meaningful failure in the activity. In such situations, the game-play is the curriculum content, and the content itself draws children together into shared exploration and learning (Nolan & McBride, 2015). In short, as gamification spreads throughout the real world, there is little question it will also impact our schools (Lee & Hammer, 2011).

There are many apps and programs used to "gamify" Ontario's curriculum. I will briefly draw on one particular game that has become popular in many Ontario schools to paint a picture of the gaming scene: *Prodigy Math Game*[21].

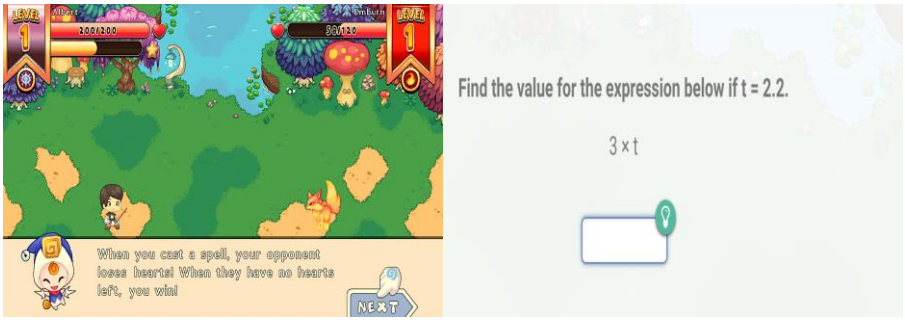


Figure 3: Screenshots from Prodigy Game

Developed by Waterloo Engineers, *Prodigy Math game* is an interactive online platform

[21] For more information, see https://prodigygame.com/.

that encourages students to use math concepts to solve questions that progress them, in a very video game-like fashion, to the next level. Thus, not only does it take a gaming format, but, it uses pop cultural images and symbols in a Pokémon-style format that calls into question students learning of grade appropriate math concepts. In other words, it is harnessing many of the IR components from kids' leisure time for academic purposes. It also claims to increase students' likeability towards math related skills. What's more, *Prodigy* takes game-based learning and it extends it to provide teachers with a powerful set of reporting and assessment tools, that they claim, allow them to easily identify trouble spots (i.e., teachers can customize the content of the game and align the game with whatever topic they are teaching in the class, while also reviewing statistics to enable them to see where students have the most difficulty), differentiated instruction (i.e. teachers can manually log into their class accounts and set-up different levels and specific questions for different students in their class), and better manage classroom time. *Prodigy* can be accessed at school or at home on virtually any device—bridging learning in both the school and home domains. It is aligned to the Ontario curriculum for Grades 1-8, and features content from each of the five major strands[22]. It is designed to engage students by using an adaptive technology to really cater to each individual. As such, it boasts on having a personalized approach that can identify gaps in students' understanding and works with them by pulling them back to prerequisite skills, then scaffolding them forward through more challenging concepts. Games like *Prodigy* demonstrate the kinds of technological innovations that have become widely spread and are increasingly being utilized across many classrooms in Ontario.

Using gaming methods to teach students can not only reinforce knowledge but give students opportunities to learn important skills such as problem-solving, collaboration, and communication (Dicheva et al., 2015). One of gaming's remarkable qualities is in its ability to absorb the full attention of the player; causing players to zone out distractions and focus solely on the game. Regular face-to-face interactions usually have trouble doing the same. In this regard, one of the traditional problems with regular classroom rituals is that when they are unsuccessful, many students exhibit signs of boredom—becoming distracted, fidgeting, watching the clock, day dreaming and so forth. One can make the case that good gamified curricula can more readily engage learners, but the question is, can students also *learn* more from them? While the use of educational games as learning tools is a promising approach, it is not a universal panacea (Dicheva et al., 2015; Lee & Hammer, 2011). There is the potential that gamification may absorb teacher resources or teach students that they should learn only when provided with external rewards (Lee & Hammer, 2011). Too much mandatory play may even create rule-based experiences that feel just like school[23]. Gamification has the potential to improve learning if it is well designed and used correctly (Dicheva et al., 2015), for "without play, education becomes a force of compliance, not intelligence, and in this sense what we most urgently require of schooling today is that it can once again teach us to play, not to

[22] Number sense and Numeration; Measurement; Geometry and Spatial Sense; Patterning and Algebra; Data Management and Probability.

[23] As Lee and Hammer (2011) say, instead of chocolate and peanut butter, such projects would now become "chocolate-covered broccoli".

obey" (de Castell & Jenson, 2003, p. 49; Nolan & McBride, 2015). We cannot deny the huge presence of technology in our everyday lives, and now, in everyday schooling. However, one point of interest is whether access and exposure to technology (games included) is equally divided.

2.6 Technology and the Digital Divide

There has been an abundance of research documenting the effects of social class and education (see Calarco, 2011, 2014; Demerath, 2009; Downey, von Hippel, & Broh, 2004; Lareau, 2003; MacLeod, 1987; Mullen, 2010; Willis, 1977 for examples). Scholars concur that social class differences in children's behaviours have real consequences for their opportunities and outcomes (Calarco, 2011). In fact, it is an understatement to say that the effects of class on education has been the perennial "bread and butter" topic for sociology of education. In this context, it remains important to understand what the use of technology might mean for understanding social inequalities in today's day and age. Selwyn and Facer (2014) argue that the spectrum of the "digital divide" still looms large over any discussion of the potential benefits of digital technology in education (p. 489). Researchers have found that today's information age produces a knowledge explosion that filters down to children, but could this be delivered in unequal ways?

Before applying our old thinking about educational inequality to the concept of the digital divide, it might be helpful to think about the "pre-digital divide period". This period had the following contours: Firstly, a key source of the divide was that schools widely used print-based text in their pedagogy and evaluations (i.e. textbooks for math or science lessons), and home use of that medium had long been biased towards middle class households who could afford books and other resources geared to academics. Secondly, the surrounding job market was sharply divided between blue collar versus white collar jobs; the latter demanded print-text literacy, and hence favored graduates with credentials.

So, what are the assumptions of those who are extending this reasoning to our digital era? Some may assume that the basic "literacy" that facilitates school sponsored learning remains largely similar as it was during the heyday of print text—in otherwise, that it has changed little. The same kinds of homes that were advantaged before (i.e. owning books, magazines, newspapers) are now replicating those advantages in the digital age (i.e., through purchasing and owning laptops, phones, tablets, internet access and so forth). Having home access to high-speed internet or the latest version of the iPad for example is comparable to having had home access to many books once upon a time. Thus, could it be that the same problem of social class differences in engagement will continue to persist through this digital age? While this remains a possibility, I put forward the case that the digital era has actually made access to knowledge much easier than ever before. As I will explore below, it is much easier to access the internet on one single digital device, than it would have been to own a collection of encyclopedias on any given topic. Herein lies the fundamental difference in how knowledge can be retrieved today with digital devices compared to print media: it is much easier! This of course, has huge implications for student learning and engagement.

It is important to note that concerns regarding the digital divide are *not* unique to Canada. A major sociological fear has been the continuation of inequalities and injustices associated with the use of technology in education, and the equity to access information. One side of this argument suggests that technology can in fact *widen* the education gap (Du, Harvard, Yu, & Adams, 2004; Goode, 2010; Looker & Thiessen, 2003; Neuman, 2014). Looker and Thiessen (2003) have argued that there is a growing body of evidence to suggest that educational uses of digital technology are differentiated along a number of lines. Such inequalities are especially pronounced in terms of socio-economic status, social class, race, gender, geography, age, primary language, dis(ability), and educational background—divisions that hold as true for younger generations of learners as they do for older generations. All of these characteristics are shown to be associated with disparities in access to, and use of technology (Goode, 2010; Helsper & Eynon, 2009; White & Selwyn, 2012). Patterns of uneven distribution in terms of access to technologies (including computer and internet access) do exist, which is particularly important for considering the learning needs and access of low-income and minority students (Du et al., 2004). Likewise, Neuman (2014) also has argued that technological access has contributed to a widening of the knowledge gap between richer and poorer; a widening that becomes most pertinent during the summer months. It is possible, according to Du et al. (2004), that the use of these technologies may best accommodate those who already take advantage of available educational opportunities. With this in mind, opening up classrooms and schools to technologies means we must concern ourselves with matters of the digital divide.

By the same token however, it is worth considering whether the opposite may be true: that if there really exists a digital divide amongst families, might schools' adoption of up-to-date technology actually help *lessen* that divide; perhaps playing more of an equalizing role? Is it possible that technologies can foster student engagement in ways that can actually minimize the digital divide? If we recall, one of the unintended consequences with print-text culture was that children were oriented towards it in highly unequal ways (for instance, DiMaggio & Mukhtar, 1985). Many studies documented the ways in which SES could strongly predict conventional text literacy. Stated otherwise, children of more affluent families had more resources in place to better succeed in a print-dominated world. However, it is feasible that 21st century digital culture has had its own unintended consequences. Since digital literacy is widely and more evenly distributed across social classes (perhaps even more so in lower SES neighbourhoods), an inadvertent result of promoting technology could in theory be the narrowing of the SES gap. In fact, a recent Statistics Canada study has shown that nearly *all* Canadians under the age of 45 use some form of technology every single day (Statistics Canada, 2017) and in the United States, nearly nine-in-ten Americans are online (which is up from about half in the early 2000s) (Smith, 2017). Scholars such as Cotton and Jelenewicz (2006) have suggested that whenever you can bring people together in a structured environment (such as schools), where individuals have assured access, the digital divide seems to dissipate. Thus, schools do have the possibility to minimize effects of the digital gap merely by providing access to new technologies.

Discussions surrounding technology and the digital divide also raise the question

of whether technology, and the widespread use of communication technologies in daily life, fit into our prevailing concepts of cultural stratification? Many scholars (see DiMaggio, 1982; DiMaggio & Mukhtar, 1985, 2004) have written on how cultural activities and participation can create a kind of cultural capital. I suggest that this can be true for technology as well. In this regard, it is possible that navigating digital tools, being as important as it is today, is a skill in which students are capitalizing from at schools and creating for themselves—a new kind of cultural capital that is beginning to take form. In other words, providing technology centered classrooms and pedagogy may actually be providing students with: 1) a new set of IRs that are centered around technology, and 2) access to a new set of valued skills (or cultural capital) that could ultimately reduce traces of the digital divide. Integrating technologies into classrooms, even in unequal ways, can have positive impacts for students of all social backgrounds. Likewise, it is possible that the introduction of technology may have gendered implications as well. The next section will consider the relationship between gender and technology.

2.7 Gender and Technology

Gender continues to be an issue salient to much research in education (see Hyde, Lindberg, Linn, Ellis, & Williams, 2008). Scholars have for years largely written about the gender bias in education, and how the experience of education can differ based on one's gender. Like issues of social class, there is no shortage of research on gender and education, as scholarly work has spanned everything from the gendered segregation in play (Thorne, 1993b), gender and class in high school (Bettie, 2014), sexuality and gender identity in high school (Pascoe, 2012), academic gender gap and inequalities (see Buchmann et al., 2008; Charles, 2011; Charles & Bradley, 2009; DiPrete & Buchmann, 2013; Morris, 2011) to name a few. My research adds a new element of questioning regarding gendered experiences in school: mainly, do males and females experience new technologies differently? What benefits might technology offer boys and girls? And what is the role of technology in the lives of young males and females?

Traditionally, when scholars documented "gender inequalities" in schools, they largely referred to a female disadvantage. In other words, the theory posited that women lagged considerably behind men in their educational attainments (Buchmann et al., 2008; DiPrete & Buchmann, 2013; Lehman, Sax, & Zimmerman, 2016). However, fast forward to the present, and it tells a different story—one in which women have made substantial gains in the realm of education, as girls are generally outperforming men on many accounts. This growing female advantage has attracted the attention of researchers and policymakers alike, trying to deduce why most industrialized societies now have a reversal from a male advantage to a female (DiPrete & Buchmann, 2013). As Lehman et al. (2016) have argued, this is a fascinating reversal as far as scholarship on gender is concerned. The shift in educational research has now moved towards a focus on male performance in school, or what has been come to be known as the "boy crisis". Recent literature has dedicated itself towards studying the "boy problem" in schools (see DiPrete & Buchmann, 2013; Grant, 2014; Morris, 2011a; Watson, Kehler, & Martino, 2010;

Weaver-Hightower, 2003). In fact, over the last twenty years or so, male underachievement has become a fact, with some scholars blaming outdated pedagogies as the source of male disengagement (DiPrete & Buchmann, 2013; Morris, 2011b) along with the feminization of teaching and curriculum in general, that are said to be geared more towards girls (Lehman et al., 2016; Morris, 2011b; Tyre, 2008).

Many critics are now concerning themselves more with this "lost" generation of boys; calling on new instructional pedagogies, and "boy-friendly" strategies to alleviate this problem (Watson et al., 2010). This is where technology poses an interesting question. Can the use of technology reengage young males into learning? Some scholars would argue that yes, new technologies such as iPad, Smart Boards, and more general "gamifying" of the curriculum can be potential solutions to reengage boys into academics. While some researchers such as Margolis and Fisher (2003) maintain that society and culture have linked interest and success with technology to boys and men, and that because of this, tech has been seen as more of a male area (Huffman, Whetten, & Huffman, 2013), research over the last decade has produced contradictory results regarding gender differences in technology use, and whether technology is in fact more "boy friendly" (Adams, 1998; Bain & Rice, 2006; Crocco, Cramer, & Meier, 2008; Gibson & Nocente, 1999; Kadijevich, 2000).

It is also meaningful to consider what the implications are for young girls who are exposed to technology early on in their educational trajectory. Research amongst adolescents in both North American and European countries have found that boys are, on average, somewhat more likely than girls to value mathematics, physical sciences, computers and technology (UNESCO, 2017, p. 134). This is not surprising, as there remains a clear gendered pattern that emerges in higher education, with male students being the majority of those enrolled in STEM fields (Björkholm, 2010). Essential to my research, is inquiring whether exposing young girls to technology, such as robotics, can provide new ways of thinking about future disciplines or career paths. Scholars such as Heyder and Kessels (2013) would argue that yes, gender differences in academics and academic careers often are the result of the interplay between one's own gender, gender role self-concept, and gender stereotyping of academic domains and school in general. Opportunities to interact with technology have been found to affect interest in science among girls, while early interventions of technology (i.e. visits to google, female engineers discussing careers in computer science and technology) are also said to impact girls' choice of computer science as a high school major (UNESCO, 2017, p. 237). Thus, early opportunities to engage with technology can have long-term implications for girls.

Overall, it would seem that technology can have the potential to benefit both male and female students alike. Participation in the digital world has become an essential part of youth identities, as today's students are the first true digital natives—technology is part of their everyday lives and will be essential to their future careers (Clark & Avrith, 2017; Haste, 2009; Kafai, Peppler, & Chapman, 2009). Research has suggested that the continued use of technology in education has the potential to: foster a greater level of student engagement amongst both males and females, increase collaborative learning for both genders (Laird & Kuh, 2005) along with their learning of arithmetic, and lastly, it can positively impact their motivation, persistence, curiosity, attention and attitude

towards learning (Heyder & Kessels, 2013). Shin, Sutherland, Norris, and Soloway (2012) have even found that when technology-based games were used in elementary schools, students who played, regardless of their gender, outperformed those students who used paper-based games. Thus, technology can likely benefit both males and females.

These issues are integral to my dissertation, as I continue to consider what gendered engagements with technology might mean in terms of interaction rituals and overall engagement. Collins' (2004) IR theory has traditionally lacked a focus on the gendered components of rituals; failing to ask whether or not there even exists a "gendered ritual". Do interaction rituals vary when using technology depending on whether the student is male or female? Or, if technology is being used as an educational pedagogy in classrooms, can it become more of a gender neutralizer, as both males and females seem to respond well to it? Perhaps males and females have a united type of classroom "ritual" with regards to technology—one that is vital to both their worlds. Classrooms are one of the few sites where gendered segregation has largely been a characteristic, especially for elementary aged students. With the rise and use of new technologies however, there is the possibility that such resources could actually provide a medium that links the rituals and play of both girls and boys alike. Thus, the link between gender and technology is one that needs to be taken up in current research. My work serves as a perfect opportunity to explore gendered dynamics to technology use and IRs—perhaps conceptualizing technology as a mutual focus of interest for both genders. But, could this line of thinking extend past gendered engagement with technology? What about student ability? Could technology use neutralize not only gendered differences, but also learning differences as well? Stated otherwise, could engagement with technology and the facilitation of new rituals occur even amongst students with special needs and mainstream students alike?

2.8 Special Education and Technology

The use of technology is not limited to just "mainstream" classrooms. Among other places in the school, technology has more recently become implemented as a staple in special education classrooms, and at the same time, is gradually being given to students who identify as "special needs" students. Special need students may fall under the category of "exceptionality" as outlined by the Ontario Ministry of Education. This term is used to identify patterns of strengths and needs common across groups of students. The Education Act (1990) identifies five categories of exceptionalities for exceptional students:

1. behaviour
2. communication (autism, deaf and hard-of hearing, language impairment, speech impairment, learning disability)
3. intellectual (giftedness, mild intellectual disability, developmental disability)
4. physical (physical disability, blind and low vision)

5. multiple (multiple exceptionalities)

Special education however, is a broad umbrella term that may also include students who receive services though they may have not been identified as "exceptional" (Ontario Ministry of Education, 2017). In Ontario, the numbers of students who are receive special education assistance continue to grow. In People for Education's (2017) annual school survey, an average of 18% of students in Ontario elementary schools, and 27% of students in each secondary school, received assistance from the special education department. A special education program is defined in Ontario Education Act (1990) as an educational program that: is based on and modified by the results of continuous assessment and evaluation; and includes a plan (called an Individual Education Plan or IEP) containing specific objectives and an outline of special education services that meet the needs of the exceptional pupil. Ontario schools have different options for students depending on the level of needs. For instance, students may remain in their mainstream classrooms, but receive an individualized education program (IEP), and may have an educational assistant (EA) or educational resource worker (ERW) placed with them. Students may also have the option to be pulled out of their mainstream class for part of the day to work with a special education resource teacher (SERT), or in a special education resource classroom (SERC). Oftentimes, students with a more formal diagnosis (i.e. ASD, Global Developmental Delay), will be placed permanently in a special education room for the duration of their elementary schooling. Here, students are not grouped by age, by rather by level of needs—with classrooms ranging from low, moderate, high, and severe needs. It is worth mentioning here, that much of the technology that is found in special education rooms, or with special education teachers and special needs students, are the same as what is being used in mainstream classrooms: Smart Boards, iPads, computers and the like. Again, the amount of technology will vary depending on the budget/resources of the school, and teacher's own initiatives, however what is interesting to consider in this case, is how such technology can significantly alter the ways in which students with exceptionalities learn.

Schools play a central role in promoting a more inclusive environment, and technology is capable of providing students with special needs a great learning advantage (Santarosa & Conforto, 2016). Scholars have largely been documenting the effects of having modern day technologies in special educational classrooms and for students with learning difficulties (Alnahdi, 2014; Burgstahler, 2003; Chen, Gallagher-Mackay, & Kidder, 2014; Hasselbring & Glaser, 2000; Liu, Wu, & Chen, 2013; Nepo, 2010; Santarosa & Conforto, 2016; Wallace & Georgina, 2014; White & Robertson, 2015). The continued use of technology amongst students with special needs has been show to, among other things: maximize independence in academic tasks, leading to greater student achievement (Burgstahler, 2003; Chen et al., 2014; Jenson & Taylor, 2010; White & Robertson, 2015), self-advocate (Burgstahler, 2003), establish an atmosphere where skills are valued, and can aid in work-based learning experiences (Burgstahler, 2003; Sider & Maich, 2014; White & Robertson, 2015), secure high levels of independent living (Burgstahler, 2003; Chen et al., 2014), prepare for transitions into post-secondary and later careers (Burgstahler, 2003), allow for more differentiated instruction (Meyer et al.,

2014; Woodward & Rieth, 1997), establish class routines (White & Robertson, 2015) and much more. Likewise, new technologies act as an easy and cheap alternative to replace bulkier, older expensive forms of assistive technology, and for children with poor fine-motor skills, a touch-screen design is much more convenient than a desktop and mouse (Nirvi, 2011). Most of these processes are examples of what an enhanced EE (emotional energy), as per Collins', may look like. If students are more engaged with technology—navigating it in easier ways than before—perhaps then, technology has the potential to create successful rituals for students with special needs. Just like the discussion of gender, technology may also provide a way for students receiving special education support to engage in new interaction rituals, both with their peers, and with their teachers in novel ways. Technology, without a doubt, has changed, and continues to change, the ways in which we live our lives. A natural extension of this would be to witness the impact and integration of technology in education for students with learning disabilities (Alnahdi, 2014). With the onset of this new type of digital tool, it is imperative that research examine *how* technology is being used (Hasselbring & Glaser, 2000), and the *ways* in which new technologies have altered traditional interactions amongst students of all kinds.

2.9 Applying IR Theory to Classrooms

Interaction Ritual theory is perhaps Collin's most profound work—demonstrating to a large degree, the power that group membership can have. To summarize, rituals have the power to focus our attention on physical objects, which can in turn become emblems of group membership, and serve as a reminder of the intensity of that ritual practice (Collins, 2004, p. 317). Feelings of group membership, solidarity, and interest in particular activities can emerge from successful interaction rituals, which Collins (2004) argues are characterized by a build-up of mutual focus, the development of a common rhythm and mood, and consequently, an increase in positive feelings associated with the group. Studies by Olitsky (2007a, 2007b, 2007c)—Collins' former student—have for instance, extended his work and applied IR theory to classrooms; exploring the outcomes of micro-level interactions in terms of group membership in science classrooms. Through observations in an 8th grade Philadelphia science classroom, (Olitsky, 2007a) found that learning science was not just a cognitive endeavor, but:

> It entails developing a social identity associated with scientific practice and discourse. To acquire such identities, students need to develop feelings of group membership associated with science, which can emerge out of solidarity-building interactions in the classroom. However, the portrayal of science language as a boundary marker to prevent newcomers from entering an elite, high-status group, rather than as a mutual focus for successful interactions that involve the whole class, can interfere with solidarity by having a negative influence on students' comfort level talking science and an association of science language with low levels of EE (emotional energy) (p. 219).

Olitsky (2007a) claimed that in the case of science, opportunities needed to be given to students in order for them to develop solidarity with their peers through the use of science language. Thus, the ways in which teachers "perform" as science teachers can have a considerable influence over the types of interactions among students. In other words, the type of influence can ensure whether science language is associated with a gain or loss in what Collins called emotional energy (EE). EE can be derived from rituals because of an association with the group and with group symbols. These types of interactions matter, for they can affect student association with science. They may first develop a sense of group membership with their peers, and then, through this initial bonding, gain the incentive to develop the relevant, skills, dispositions, discursive practices, and identities for participation (Olitsky, 2007a). Thus, it remains possible that through a series of successful interactions in science class, there could be more of a "community-of-practice" type of environment, where IRs could foster feelings of group membership, but also, group interest in the subject. In this light, it could be helpful for teachers to understand how to facilitate successful IRs (Olitsky, 2007b).

Olitsky's studies excel at addressing how successful IRs can contribute to student interest, even in topics that perhaps had not been previously considered to be at all relevant to students' everyday lives—such as science. They can serve as an effective mutual focus for successful IRs. Science symbols, languages, ideas, and concepts can all become invested with EE through successful IRs—things like lab materials, beakers, diagrams and so forth. While students may not consider these symbols to be "sacred objects" by any means, having a successful IR through the use of such objects can foster a sense of group membership. Such rituals and symbols unique to science classrooms can be understood as a form of learning and student engagement. However, whether that student engagement can translate into deeper learning remains questionable.

Olitsky reminds us that even though students may have participated in successful science experiment rituals (i.e. they may have been able to mix chemicals together and create a reaction), and where perhaps for all intents and purposes "engaged" (i.e. on task, not distracted), some may not be able to translate those IR experiences into a deeper cultural capital. In other words, despite being fascinated and actively participating in experiments or science activities, many students could rarely use scientific concepts to explain *why* things happened. This is a vital distinction for the issue of student engagement in schools: the difference between a successful IR in which kids are engaged in an *immediate* situation, compared to a longer chain of IRs in which students really learn a new cultural capital. This is important for considerations around student engagement and technology use. Can new classroom technologies create a lengthy chain of successful IRs—generating new school-sponsored cultural and greater student engagement? Or, is technology use powerful only in the immediate moment— making learning fun and engaging, but not really extending much beyond that?[24]

In another application of IR theory to science classes, Gonsalves (2014) presented evidence to support the claim that opportunities for youth to express their voices can have

[24] This is the million-dollar question. Although my research cannot realistic provide a solidified answer, it remains an important question that my work pushes forward for future research to consider.

the potential to reconstruct ideas about science. Like Olitsky, Gonsalves (2014) draws on science classes to demonstrate that science learning could occur when youth expressed themselves in ways that enabled them to become fuller members of a science-related group, or when then used their voices to position themselves as knowledgeable in relation to a group of science learners (p. 202). Thus, this is another example whereby group solidarity can form around sacred objects in interaction rituals that can lead to positive emotional energy. Gonsalves' (2014) framework illuminated how common experiences and symbols, when introduced in the context of science learning, and when emergent from youth's *own* conversation, can generate the solidarity necessary for successful interactions.

Outside of the science classroom, other scholars such as Sargent (2009) have also applied Collins' theory to analyze national pedagogy. Sargent used IR theory to analyze China's embrace of a new progressive pedagogy— "New Curriculum" in hopes to make its school more engaging and student-directed. These new reforms have created a more open classroom environment, together with a more positive atmosphere, where students can develop their own thinking process and desire to explore their own curiosity, learning and imagination. Through this mix-method approach, Sargent compared traditional classrooms with more progressive ones. In traditional classrooms, she found textual reproduction as central, as there was an emphasis on exam preparation and value placed on getting the "right" answer, along with memorization of rules and procedures. This was in contrast to progressive classrooms, where Sargent (2009) found that teachers not only encouraged students to express their own ideas and opinions, but they also allowed students to become co-constructors of knowledge (p. 22). Students responded more favorably to the progressive classroom. Thus, there were notable differences in classrooms where a New Curriculum reform was present. Thus, Sargent's findings would suggest that the implementations of different pedagogical styles can greatly influence classroom interactions, rules, and routines. But, can the same logic apply to classrooms where technology is used? In other words, in classrooms where technology is present, can it reengage and motivate students amidst a new 21st century pedagogy? Throughout this dissertation I focus on the micro-interactions of students and teachers with technology to help answer this question. The final section will review microsociology as an important facet in this research.

2.10 Microsociology

Researching technology in classrooms not only contributes to IR theory and to extensions of cultural capital theory, but it also provides greater insight into the general area of microsociology. Exploring educational technologies is useful for assessing whether or not they can serve as a catalyst for classroom-based rituals—perhaps minimizing the gap in digital literacies, creating new rituals between students of all genders and learning abilities, while at the same time, pushing overall student engagement to an all-time high. The key is that technology use is largely child and student centered. Thus, children, through their own play and interests are playing a large

role in securing their own sets of digital skills. There has been research on child agency and microsociology that predate my research. Chin and Phillips (2004) for instance have written largely on child agency; specifically, in the ways in which children have been found to structure their own participation during summer months. Calarco (2011; 2014; 2018) has also considered the role of child advocacy; exploring the role of children in educational settings and how they can single-handily contribute to their own educational stratification— securing their own kinds of strategies and opportunities. Calarco's findings suggest that certain children are in fact in charge of their own learning, and often negotiate the boundaries of classrooms using skills and resources transmitted by their parents. It is plausible that the same may even hold true for technology skills. While it could very well be that only certain kinds of students—perhaps students of higher SES classes—are securing their own kinds of technology skills, I hypothesize that digital tools can reach a wider variety of students (compared to print text), that can allow the majority of students to secure their own kind of digital learning.

In much of the same fashion, my research contributes to the area of microsociology by examining student subculture and technology in elementary schools. While I cannot provide definitive answers to technology's impact in the classroom, interrogating the role of technology in classrooms has allowed me to explore questions that are important for future studies in microsociology: Can new technologies be part of a larger peer culture whereby children are securing their own advantages? Does the introduction of technology encourage students to participate in a youth subculture; providing a "collective effervescent" experience? Since experiences of heightened mutual awareness—in this sense, through play and group membership—and emotional arousal can give rise to markers of group identity (Collins, 2004, p. 36), it is worth considering whether new digital tools can take on this role. Children do possess their own sets of resources or "child capital"—human capital, social capital, and cultural capital that enables children to know more about "kid activities" than their parents or even teachers. It should not come as any surprise that today's elementary aged children are much more fluent in digital technology than their parents are. As Chin and Phillips (2004) suggest, this is often because such resources "accrue to children more through their charisma and motivation than through their social class" (p. 187). Such differences in child capital, according to the authors, tend to even reduce the magnitude of social-class differences.

Employing an IR theory approach to this research is helpful for discussions surrounding child capital— does a new "child capital" exist in terms of acquiring relevant technology skills and knowledge, and does this shape how involved students are in technological orientated rituals? Furthermore, how can child-secured knowledge and capital affect student engagement in schools? What kinds of micro dynamics and micro variations emerge? For example, do certain kinds of students (i.e. quiet, loud, etc.) find themselves at the center of class rituals while using technology? Or perhaps technology engages all different types of students? It has been established that children do in fact have the ability to produce their own shared world without the direct dependence of adults, for now more than ever, children are routinely socializing one another (Corsaro, 1992, p. 162), and this may be very applicable to the case of technology. Thus, it is worth considering whether, and to what extent, children themselves may be able to navigate a

digital world inside (and outside) the classroom.

CHAPTER 3

METHODOLOGY

3.1 Overview of Methods

This dissertation utilizes an exploratory qualitative methodological design in order to probe technology's role in facilitating new types of ritual interactions amongst and between students and teachers, while considering what this means for student engagement in the 21st century classroom. The qualitative approach taken in this research is thus more suitable to understanding, in broad strokes, "the engagement gap" in classrooms, rather than any noticeable "achievement gaps". "Engagement" in this sense can refer in the general sense as "students' attitudes towards schooling, and their participation in school activities" (Willms, 2003, p.8). Newmann (1992) for instance, has also defined student engagement as: "...the student's psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote" (p. 12). The methodological approach used in this research—interviews and observations—have allowed me to be placed in the center of engagement issues as they unfold in the field. Thus, qualitative methods remain central to understanding issues surrounding classroom engagement, just as a quantitative methodology would be better suited for considering achievement gaps. Such methods allow for an increased understanding of how interactions with technology may produce more engaged students— more inductive type reasoning. In brief, this research consisted of three phases:

A. **Phase 1:** Pre-Observation phase as a Research Assistant during a summer literacy camp

B. Secondary Research Phase
    1) **Phase 2:** Interviews with 32 K-8 teachers in various capacities in the "Spencer District School Board" (SDSB); Observations (16 classrooms) with teachers using general technology in a variety of classrooms (i.e. mainstream, ESL, Library, Special Education).

    2) **Phase 3:** 38 in-depth interviews with teachers, 10 focus group interviews (95 participants including teachers and administrators), and 11 classroom observations in 9 different school boards[25] (separate from SDSB), utilizing robotics kits.

[25] As part of the "Robotics and 21st century competencies" study funded by the Council of Ontario Directors of Education (CODE). See http://ontariodirectors.ca/CODE-rob/Robotics_Final_Report_Sept_22_2017.pdf

Choosing to focus on the engagement gap via qualitative research methods is strategic. While my research places student engagement at the center, there is still an undeniable link between engagement and achievement. Often times, school reforms attempt to increase student *achievement* by directing their attention towards classroom *engagement*—aiming to find new ways to connect students to school learning. In fact, studies have suggested that classroom engagement is actually highly correlated with achievement, and that student engagement does matter for subsequent school success (Fisher, Frey, & Lapp, 2011; Joseph, 2009; Kennedy, 2010; Khodaeifaal, 2017; Moller, Stearns, Mickelson, Bottia, & Banerjee, 2014; Robinson & Mueller, 2014; Trusty, Mellin, & Herbert, 2008; Willms, 2003). Fisher et al. (2011) for instance have contended that any measures to close the achievement gap will require a significant amount of attention to creating opportunities for students and their teachers to interact with one another in meaningful ways—or in other words, creating opportunities for engagement (pp. 63-64). In addition, many contemporary school reforms aiming to boost achievement do so by channeling their energy on classroom engagement—attempting to entice students with fun and absorbing classroom activities. The Ontario Ministry of Education has for instance released numerous policy reports aimed at "closing the achievement gap", whereby they emphasize the importance of student engagement in promoting student success (Ontario Ministry of Education, 2012; 2013). In the policy report entitled, "*What did you do in school today",* Willms, Friesen, and Milton (2009) examined difference types of student engagement (i.e. social, academic, and intellectual), in an attempt to accentuate the importance that the classroom teacher and instruction has in facilitating student engagement. There are now more than ever, reforms aimed at helping disengaged students through programs and services aimed at boosting their engagement with school (Willms, 2003). It would seem as though there is a larger emphasis today on teachers to cultivate and strengthen practices in designing a learning environment that can promote student engagement (Friesen, 2010), as it has been found that students are more engaged in schools when there are positive student-teacher relations, high expectations for student success, and engagement-oriented activities (Willms, 2003, p. 55). Thus, there is good justification for studying the engagement gap in 21st century classrooms through a qualitative undertaking. In particular, exploring technology's role in potentially boosting student engagement, while altering traditional classroom rituals and routines. I begin by first outlining some classic qualitative research within the sociology of education before moving on to a more detailed description of my own research.

3.2 Review of Qualitative Research in the Sociology of Education

This dissertation draws on a mix of field observations based on a sample of settings, along with interviews for a qualitative methodology. Observations were central to conducting this study, as it was through classroom observations where this topic of

technology was born. As an elementary classroom teacher, I had plenty of opportunities through my own experiences to witness firsthand some of the changes and interactions that were occurring in classrooms. There has been much literature in the social sciences that have emphasized the importance of qualitative observation to collecting critical data. In *Great American City: Chicago and the Enduring Neighborhood Effect,* Sampson (2013) for example, used social observations (along with statistics and survey questionnaires) to study the social conditions of Chicago neighborhoods. In doing so, he was able to focus on the macro and micro influences that could shape individual behavior in Chicago neighbourhoods. Studying streets through observation methodology allowed him to provide a rich visual image of the urban landscape. Direct observation, Sampson claimed, is fundamental to the advancement of knowledge (p. 88). Likewise, Randall Collins in his 2004 work, *Interaction Rituals,* argues as well that theory can best advance in tandem with empirical observations (p. 184). He claims that often times within the social sciences, we generally accord the status of objective reality to statistics, and yet, observations can be richer and often lead to more immediate types of empirical data (p. 259). According to Collins, micro-situational encounters are the ground zero of all social action and all sociological evidence (p. 259). Observational methodology also sharpens our ethnographic eye as to what to look for, and what kinds of details to probe for in our questions (Collins, 2016).

Much qualitative classroom studies within the sociology of education have also stemmed from classroom ethnographies, which take up a large observational component (see Calarco, 2011, 2014; 2018; MacLeod, 1987; Willis, 1977 for examples). For instance, Willis (1977) and MacLeod (1987), two staple books in the sociology of education, employed different measures of qualitative research—observations, interviews and participant observation—to examine the aspirations and attainments of working-class students. Willis (1977) employed such methodologies to uncover "why working-class kids get working class jobs" (p. 1) Through interviews, Willis was able to understand participants' actions from their own point of view in everyday contexts, while observations allowed him to witness micro-events as they were occurring. A decade later, MacLeod (1987) attempted to examine the lived experiences of youth from a different angle, comparing *two* opposing groups—the Caucasian "Hallway Hangers", and the African American group dubbed the "Brothers". Compared to Willis, MacLeod sought to understand *how* these two groups view their prospects for social upgrading, and how such estimation affects their aspirations. What unseen social and economic forces influence these boys? How do they make sense of and act upon complex and often contradictory messages that emanate around them? Such questions required a level of complexity and richness of the human side of the story; a level of understanding that questionnaire surveys were incapable of providing (MacLeod, 1987, p. 8). Much of MacLeod's time was spent intensively participating in the lives of these fifteen boys, observing them during school and afterwards, along with field notes, personal interviews, and informal discussions.

The last decade or so has also seen an increase in school-based ethnographies in much of the same spirit as traditional works. Lareau's (2003) classic, *Unequal Childhoods,* draws on a small intensive data set collected by interviewing and observing

children ages 8-10 and their families to examine how unequal childhoods can lead to an unequal adult life. In doing so, she finds that parental approaches vary by class and greatly impact educational inequalities. For her, employing a quantitative study would produce very limited ideas about how to conceptualize the mechanism through which social advantage is transmitted; neglecting to capture the *interactive* nature of routine, and illuminating the meanings of everyday activities that she is able to with qualitative work. A few years later, Milner (2006) engaged in qualitative methods to examine the role of peer group in teenager's lives. To study the link between teenage status systems and consumers, Milner used a three-year observation period of students in one particular high school. It was his observations that provided descriptions of why teenagers behaved the way they do. Like Lareau, Milner argued that employing any kind of survey research would have necessarily missed the flow of social interaction over time, along with the unanticipated events that observers could not record. Even more recently, students of Lareau such as Calarco (2011; 2014; 2018) have conducted school ethnographies of their own. Through classroom observations, interviews, and participant observations with students in Grades 3-5, their parents, parent surveys, and analyses of students' school records, Calarco (2018) was able to describe the active processes by which class-based cultures are transmitted across generations to show how such processes contribute to social reproduction, and how children themselves shape their own classroom experiences. Thus, it was through observational methodologies that she was able observe and understand real-life interactions (and their consequences) as they unfolded in context (p. 3).

These studies are classic examples of ethnographies employing an observational component to study classrooms. Such examples have been useful for qualitatively exploring why class-based patterns in attainment emerge. Traditional research in the sociology of education has sought to uncover some of the structural constraints in the course of school inequalities (Bourdieu, 1998; Bourdieu & Passerson, 1977; Bowles & Gintis, 1976), which have often excluded interpersonal and subjective processes. Using large-scale surveys and quantitative methods to study such social interaction and inequalities at the school level can excel at providing a greater scope of information on a more generalizable population, allowing researchers to gather more reliable data (Alexander, Entwisle, & Dauber, 1993; Downey et al., 2004).

However, conducting qualitative research can also give us deeper insights into a particular phenomenon through examining smaller group processes. Thus, qualitative work can be effective for understanding the ways in which observed social processes can occur—the why and how. In this spirit, many modern researchers (see Calarco, 2011; 2014; 2018 Milner, 2006; Pascoe, 2012; Paulle, 2013 for examples) have moved towards the methodological principle of conducting real-world observations in various settings to witness micro-changes as they occur. Often times, when conducted in conjunction with interviews or focus groups, observations can help to triangulate data. Such literature within the sociology of education provide examples of inquiry processes by which researchers can observe micro changes as they unfold, oftentimes resulting in new kinds of insights. Thus, scholars have showcased the importance of returning to the sociology of education to detail observations of classroom processes. My research extends on

previous work by noting the impact of technology in the classroom as it transpires. While quantitative methods are necessary for measuring achievement gaps, qualitative methods are more suitable for studying engagement gaps, which is what my dissertation attempts to explore.

Traditional research in the sociology of education, particularly those who observed classrooms, tended to center around certain themes, including, teacher-pupil relationships and mechanisms of social control (Waller, 1965); student resistance, whereby student peer groups could subvert school scripts (MacLeod, 1987; Willis, 1977), school control in organizations without adult-centered arrangements (Swidler, 1979), inner-city school life (Paulle, 2013), gendered play (Thorne, 1993a), masculinity and sexuality (Pascoe, 2012), identity construction in relationship to race, ethnicity and gender (Bettie, 2003), elite boarding schools (Khan, 2011), teenage consumption and culture (Milner, 2006), gender gap in achievement (Morris, 2011b), and educational attainment in low-income urban communities (Carter, 2006), to name a few. As far as this kind of literature is concerned however, there is very little on student engagement, especially when it comes to new digital technologies. My own research builds on previous classroom studies by conducting classrooms observations, but takes it one step further by adding the element of technology— *can technology produce new kinds of classroom rituals; rituals that can alter student engagement, teacher-student dynamic, and perhaps provide a more equitable and enjoyable experience?* Kerr (2004) once argued that, "what the field is missing, and could profit from, are studies that would point out for us how and where technology *is* and *is not* embedded into the daily routines of teachers, and into the patterns of social interaction that characterize the school and the community" (p. 29). Such questions and issues will be raised and considered through my qualitative inquiry.

3.3 Phase I: Pre-Observations in Summer Literacy Camps

The seeds for this dissertation were planted in the summer of 2014, during which I held a position as a research assistant to Drs. Scott Davies and Janice Aurini as part of their "Ontario Summer Literacy Learning Project" (Davies & Aurini, 2010). As lead investigators on this project, their goal was to study the impact of summer literacy camps on summer learning loss. This program targeted primary aged students (between Grades 1-3) who had been recruited because of limited literacy skills, or who had fewer opportunities for enriched summer learning experiences (see Davies & Aurini, 2010). These summer camps were organized to have a minimum of 15 students per site, for a minimum of 2 weeks. Staffed by fully qualified teachers, they aimed to offer high quality and engaging literacy programs to students in need. It was here, while I was conducting interviews with children and parents about their summer learning experiences, that I began to notice the unavoidable presence of technology in much of the camp. In August 2015 I returned again as an RA to this project, but this time, I started the position with the intention to focus on technology—how was technology being used? Where and under what circumstances? How did instructors feel about it? How did students interact when

technology was being used compared to when it was not? Using two summer literacy camp sites—both of which had strong technology components to their daily routines and programs—I was able to begin a pilot study for my subsequent research in order to gain some preliminary impressions of technology integration.

For over three weeks, I attended two schools: Spring Hill Elementary School and Oak Ridge Elementary School[26]. Both schools incorporated many of the same kinds of technology throughout their programs—mainly Smart Boards, iPads, and computers. I alternated the days I attended each school and stayed for the entire duration of the camp day (from 8:30 am until 3:30 pm). I spoke with both the directors of the program at each school and informed them of my presence and interest in observing students and teachers using technology in the different "classes" that took place over the summer. The kinds of classes offered varied, but for the most part, consisted of mandatory literacy and math periods, followed by a variety of enriching and diverse classes such as, health/fitness, scrapbooking, reading and so on. The administrators and students were aware of my presence and were more than happy to allow me to freely move around from class to class.

Each day would begin with me setting up either at the library at Oak Ridge, or in an unused classroom at Spring Hill. From here, I would have a brief meeting with the Program Director at each site. In doing so, they would inform if there was anything unusual occurring throughout the day, such as a special activity, a time where I would be unable to observe, or particular moments where it would be ideal to observe[27]. From here, I would roam freely from class to class. Depending on what the lesson was, or whether there was technology used (or not), I would spend more time in certain classes than other. There was no fixed schedule for my observations. During this period, I had the opportunity to examine the use of technology, and the interactions of students on site with an observation protocol that I created (see Appendix A). Some examples of questions I considered as I began my first phase of research with technology were: *What features of technology use stand out in the summer camp? How is technology introduced and used? How receptive are students to technological instruction? What kinds of apps and games are used? How do students and teachers interact with them? What do these classrooms look like with the introduction of technology compared to traditional classrooms?* This pre-observation phase allowed me to gain a more comprehensive understanding of the ways in which technology is being used and implemented, along with student reactions to such technology. In addition, I had ample opportunities to engage in informal conversations with teachers and students throughout my visits.

[26] These are both pseudonyms for the schools. This was done in order to maintain confidentiality.

[27] Many times, a special guest would come into the school and demonstrate some new form of technology to the staff and students. For instance, on one occasion the creators of the game *Prodigy* came to observe students using their program, while on another day, a technology teacher came to set up a green screen with students. These served as optimal moments for me to be present in the classroom. Often, I would be able to actively participate with the students as they were trying out such new technologies.

3.4 Secondary Research Phase

The secondary research phase of my dissertation consisted of two sites for studying technology use: i) interviews with teachers/administrators/board office members, and classroom observations in two elementary schools in SDSB, consisting of mainstream classrooms (FDK-Grade 8), and "other" rooms (libraries, ESL, SPEC ED rooms), and ii) interviews and observations with teachers/admin/support staff/students in 9 different school boards utilizing robotics kits in Ontario. Overall, I was able to explore technology in 10 Ontario school boards. Diversifying my examination of technology in Ontario elementary schools through these two streams allowed me, in brief, to understand how technology can manifest itself in different classroom settings. For one, conducting observations with general technology use[28] in different classes provided me with a sense of exactly what kinds of technology are being used—where, how, when, and in what ways. Without necessarily focusing on any one specific kind of technological device, general observations provided the opportunity to see technology as a whole; to be able to step back and unearth how the integration of technology could significantly alter classroom routines and rituals. Then, being able to interview the same teachers whom I had observed their classrooms gave me the opportunity to discuss teachers own observations of technology use in their classrooms. Through interviews, I was able to converse with teachers in varying capacities (i.e. mainstream, special education, librarian, ESL, itinerant support), the challenges and benefits they see using technology in their specific classroom contexts, and what kinds of new changes they have witnessed as experts and leaders of their classes. It was through this secondary phase of research—observations and interviews—where I really began to tease out some of the interactions with technologies in different grades and class settings.

The next research phase, by contrast, allowed me to see a *specific* type of technology use in action—robotics kits, and coding/programming skills by default. As I write this dissertation, robotics kits continue to be rolled out in many schools and across many school boards, as they are largely being viewed as new and novel ways to engage students in the STEM fields. Ontario classrooms are being encouraged to use and incorporate them into their daily teachings, as they offer great potential to reengage students by providing them with an opportunity to learn many skills that can be applied to the curriculum in a fun, active, and collaborative manner. As the goal of most educators is to, arguably, increase student engagement, robotics provides an outlet to inspect whether or not hands-on technology can and does serve to reengage students in the learning process. Through my position as a research assistant, I was able to interview not only teachers, support staff and administrators, but students as well on their experiences with robotics. These were followed by classroom observations as well. Both sites will be discussed in further detail below.

[28] In other words, technology that is used on a regular basis such as Smart Boards and iPads etc.

3.4.1 A Note on Methodological Troubles

As an Ontario Certified Teacher, I have been occasionally teaching with the SDSB for over four years. Through this position, I developed very close relations to many of the staff, students, and administrators at various schools that I held positions in. Before I had even decided concretely on a dissertation topic, I used my position inside schools to begin to first think about what kinds of changes are elementary schools witnessing in light of the push towards 21st century classrooms? Informally, I paid close attention to the schools and classrooms I would visit each day—*what stood out to me? What was different?* Here, I began to see some of the ways in which technology would enter the equation. I began notice the differences in how teachers structured their classrooms—some with a room full of technology integration, and others without a trace. I began to wonder what all these technological innovations could mean for a new generation of learners.

Initially, I chose not to conduct research through SDSB, opting instead to apply to the school board that housed the summer learning project I had been a part of. In October of 2015, I submitted an application to conduct research in West Hope District School Board (WHDSB)[29], and highlighted the two schools I conducted research as part of the summer learning project as potential sites of interest. The rationale behind this idea was firstly, that I had already established a rapport with some staff and students, but also, both of those schools were about to pilot a huge technology project beginning September 2015. Oak Ridge for instance, would have been one of seven schools in the district to pilot a new technology program that would feature a 1:1 student to iPad ratio for students in Grade 4-8. They would be heavily invested in technology as the projected plan was to feed students into a new high school that was supposedly aiming for a heavy tech-centered pedagogy. Spring Hill by comparison (located only 15 minutes away), would not have the same emphasis on technology. Because they were not a feeder school, they would only have a set of shared resources (iPad cart, selected rooms with Smart Boards), that would vary from class to class. What both schools did share however, was that their student population was composed largely of children from lower SES backgrounds. This would have provided me with the opportunity to understand whether student engagement may vary when technology is used in two schools of similar demographics, but different levels of technology integration. In addition, it would have allowed me to examine class processes as they relate to technology use and integration. Thus, my first plan was to use these ideal sites to study technology as it relates to engagement of students from lower SES backgrounds. At the time same, I also submitted an application to the McMaster Research Ethics Board (MREB) for approval of this study.

In January of 2016, I received consent to conduct this research form the MREB, however, I did not receive any contact from the WHDSB until April of 2016, to which I was instructed a collaboration with the board may be better suited. As such, I met in June of 2016 with a member of the WHDSB research department, where we discussed the

[29] Again, school board name has been changed.

possibility of conducting research on the nature of technology use in special education rooms across various schools in this board. It was discussed that in the fall of 2016, I would conduct research as part of their ongoing project that was examining technology and learning[30]. Since special education classes were about to receive a roll out of 1:1 technology of their own, I would be responsible for collecting data through observations and interviews with special education teachers and students during a "pre" and "post" technology phase. However, there were a number of delays in getting this project up and running from the administrative side of WHDSB, which meant that unfortunately, the project kept getting pushed further and further into the school year. With concerns that this might not pick up (and before the position of the RA to the robotics project was mentioned), I decided to consider using my position as an occasional teacher to collect data. This is where Phase I begins.

3.4.2 Phase II: Spencer District School Board Observations and Interviews

a. Observations

I chose to conduct first, observations at two elementary schools in the SDSB where I had the strongest rapport with staff and students through my position as an occasional teacher. Many of them already knew I was enrolled in a PhD program, and thus, when I approached administrators at both schools about the possibility of doing observations of technology use in various classrooms, I was welcomed with open arms. The two schools I conducted these classroom observations—Summerville Elementary school, and St. Helena[31], are part of the same family of schools, located less than ten minutes from one another. Both schools are located in relatively middle-class neighbourhoods, with a diverse student population. At Summerville, I was granted permission by administrators to conduct observations, but was asked to first speak to teachers individually and ask them directly for permission to drop in and observe their classrooms. I began by asking teachers who I developed close connections with first. Once they had agreed, I asked them to refer me to any other teacher in the school whom they thought might be willing to participate.

At St. Helena, the principal was enthusiastic about the nature of my work and took the initiative himself to suggest names of staff whom he felt would be ideal teachers to talk to, given my research in technology, as they each had diverse technology use in their classrooms (ranging from no tech, to all tech). I then spoke individually with each teacher and informed them about the nature of my study and whether they would be willing to allow me to drop in to their classes to observe. At both schools, I ensured that teachers knew that despite having a prior relationship with me, they were in no way obligated to allow me to observe. None of the teachers declined, in fact, the response was

[30] This project was initiated in September 2014. WHDSB launched a 1:1 student to iPad program for students in Grades 4-8.
[31] Again, names of schools have been changed to protect identity of participants

overwhelmingly positive. At both Summerville and St. Helena, I met with teachers before beginning any observations to coordinate a schedule for my visits. I made sure to consult with them regarding what day(s) and times during the school week would work best for them and not interfere with their day. I also made it a point to ask them if there were any ideal moments to observe technology use (i.e. when is technology normally used in your class? For what lessons?). In doing so, I was able to craft, on a weekly basis, a schedule to accommodate all teachers.

I began my observations in the spring of 2016 (Mid-April-End of June), then again in the Fall of 2016 (Mid-September-December). In this way I was able to observe the end of school year use with the beginning of the year. Between the two schools, I was able to observe all grades—from FDK right through Grade 8. Class sizes varied, but on average primary classrooms were capped at around 20-25, and intermediate between 25-30. In addition, I had the opportunity to observe alternative classroom settings such as ESL classrooms, special education rooms, and libraries. Each classroom varied in the amount of technology that was used and made available. As part of a board wide initiative, FDK and Intermediate classrooms were given Smart Boards, and more recently, Grade 8 classrooms were given Chrome Books. School council in both schools were able to fundraise Dell and iPad carts to go around. As well, both Summerville and St. Helena had a computer lab that was open for all students to use.

Before I began observations, I set up a schedule by asking teachers for ideal times to drop in—usually a week in advance. In this way, teachers had a better idea of appropriate times for me to be present. I attempted to visit the schools twice a week. Since I was conducting observations over a span of a few months, I felt no pressure trying to squeeze multiple visits in a week. Again, depending on when teachers were available on a given day, my observation schedule was constantly in flux. While I attempted to maintain a two-day a week visit, this was not necessarily consistent, as some weeks, either due to personal obligations or lack of availability on the teachers end, I may have only been able to visit once, while some other weeks I may have dropped by an extra day or two because of a really exciting lesson a teacher wanted me to witness. Normally, I would spend anywhere between 1-3 hours observing per day. Somedays I began soon after school hours began—around 9 A.M., and left by 12, other days I may have arrived after noon, and stayed until the end of the day (until 3-3:30 p.m.). Since the nature of school days could vary—between assemblies, school trips or the like, my schedule remained flexible and adjusted when necessary. Much like my pre-observations during the summer of 2015, during this five-month observational period, I would often roam freely between the classrooms, and depending on what kinds of technologies were being utilized or what lessons the teacher had, somedays I found myself staying a bit longer than others. I attempted to conduct my observations in classrooms that varied between in their technology use (i.e. low or high), and their instructional pedagogy (i.e. more traditional or progressive), in order to observe if any differences might be present with and without technology use[32]. In total, I observed two library classes, four special needs

[32] In lieu of any kind of widely accepted measure of technology intensiveness, this is based on my own judgement of what constitutes as high-technology compared to low-technology usage.

rooms, two ESL classrooms, and 8 mainstream classrooms, for a total of 16. Over a five-month period I had over 50 hours of observations completed. Normally, I would carry around a journal with me during my observations, where I would quickly jot notes about what I would witness in the class. Afterwards, I would review the notes at home, and begin to look for themes emerging over time. Once all the observations were completed, I then coded my field notes based on themes that emerged, such as student and teacher interactions, gender, social class differences and so on. Once coded, I began to type out all the field notes I considered to be the most relevant to be used in subsequent empirical chapters.

During my observations, I kept a keen eye for how technology was utilized and the ways in which it was integrated into the classroom. In particular, I was curious as to the relation between "high-tech" classrooms and progressive ideals, and "low-tech" with more traditional methods. Could classrooms use minimal technology yet still be progressive in terms of facilitating new and engaging classroom interactions and rituals? In classrooms that I considered to be a "high-tech" environment, I was interested in noting the different ways that technology was being incorporated into daily teachings, and the extent to which student and teacher interactions and engagement varied. These are classrooms that I conceived as more informal, flexible, and guided by the principals of 21st century classrooms (i.e. collaboration, perseverance). By comparison, I considered "low-tech" classrooms to be those where technology use was kept more at a minimum, and in its place was more "traditional" methods of teaching such as blackboards, overheads, textbooks and so on. I hypothesized that observations in more traditional classrooms would be associated more with low-technology use, and that it would be used more sparingly, with a greater emphasis on textbook and rote learning instead. There remained the possibility though, that in low tech, traditional classrooms, successful teachers may be highly charismatic (see Swidler, 1979) and as a result, could still facilitate new engaging classroom rituals. I predicted that educators who saw themselves as more progressive may be more likely to utilize technology and would create further informal learning spaces amongst their students. However, it seemed likely that changes in classroom interactions and rituals would ultimately be dependent on the individual teacher and his/her approach to education.

b. Interviews

During the summer of 2016 and into the beginning of the school year, it became apparent that my initial "Plan A" to conduct observations and interviews with students and teachers in special education rooms across the WHDSB was becoming less and less likely. After a scheduled committee meeting, it was proposed that I continue observations into the fall and begin conducting interviews with those teachers I have established connections with. Thus, when I returned in September to the respective schools to continue observations, I asked individual teachers whether they would be open to having a conversation with me about their experiences with technology. I began by first speaking with the majority of teachers whom I had observed their classrooms and asked them if

they would be willing to be interviewed. If they agreed, we set up a time and place to first review the nature of my research, go over consent, and provide an opportunity for teachers to ask me any additional questions about my study. This was usually done right before the interview was about to occur. Interviews occurred during the 2016-2017 school year. There was no fixed schedule like the observations, but rather, they occurred throughout the school year whenever teachers had available time, and as new teachers expressed their interest to be interviewed. All interviews were recorded on my iPhone device. Participants were named by number as to remain confidential. With elementary teachers, the interview was normally done in their classrooms either before or after school hours, or sometimes, even during their breaks! A few teachers even asked to have the interview over coffee outside of the school. Each interview ranged from 30 minutes to 2 hours depending on the availability of the teacher, and obviously, their interest in the subject manner. With each interview, I had some guiding questions that I kept with me (see Appendix B) to help lead the conversations, however, most questions and conversations occurred organically. After each interview took place, I would immediately upload the interview to my computer which was password protected. All files were then stored on a password protected USB. I transcribed all interviews using the "Transcribe by Wreally" website, which allowed me to use voice to text software. Once interviews were transcribed into a word document, the audio files were deleted. Afterwards, I imported all transcribed interviews into the qualitative software program, *NVIVO,* to be coded thematically. In this way, I was able to explore themes across and between interviews to help tell the story of technology in schools.

Through conversations with classroom teachers, I also became aware of support teachers in various capacities that took time off from classroom teaching to work at the head office. These teachers would often help school teachers with technology use—through for instance holding workshops at schools or the board office, "lunch and learns", "tech Tuesday" or by connecting with individual teachers to co-teach lessons or plan engaging activities with whatever technology was available at their school. These teachers often travelled from school to school to help assist classroom teachers in facilitating a more technology-fueled classroom, at the request of either the classroom teacher or administrator. A few people were recommended through my interviews with teachers. As such, I sent each one of them a quick email with a description of myself and the nature of my research and asked them if they would be willing to meet at a place and time of their choice. All of them agreed. I met with these teachers either at one of the two schools or at the board office.

In addition, one of the teachers whom I spoke with was overly enthusiastic to put me in touch with a colleague of hers whom she felt would be a great person to speak with on the nature of technology. She was a classroom teacher who spearheaded much technology in her school and was recently on leave to work at TVO Toronto in the digital learning division. Through this contact, I was able to schedule a meeting downtown at the TVO station, where I was also able to speak with three other elementary teachers who were also instructional liaisons seconded from various schools to help develop digital resources for Ontario schools. Below is a summary of all the teachers interviewed and their roles.

Table 3: List of Participants and Affiliations

#	Position	School
1.	Itinerant teacher (Special Education and Learning Services)	SDSB Head office
2.	Consultant - K-8 Innovation Pedagogy Program Department	SDSB Head office
3.	Literacy Support	SDSB Head office
4.	Instructional liaison developing digital resources for math & professional learning	TVO on secondment
5.	Instructional liaison developing digital resources for math & professional learning	TVO on secondment
6.	Instructional liaison developing digital resources for math & professional learning	TVO on secondment
7.	Instructional liaison developing digital resources for math & professional learning	TVO on secondment
8.	ESL	St. Helena
9.	SERT	St. Helena
10.	SERC/SERT	St. Helena
11.	SERC/SERT	Summerville
12.	SPEC ED teacher	St. Helena
13.	SPEC ED teacher	Summerville
14.	Librarian	St. Helena
15.	Librarian	Summerville
16.	FDK	Summerville
17.	FDK	St. Helena
18.	Grade 1	St. Helena
19.	Grade 1	St. Helena
20.	Grade 2/3	St. Helena
21.	Grade 2/3	Summerville
22.	Grade 3/4	Summerville
23.	Grade 4	Summerville
24.	Grade 4	St. Helena
25.	Grade 5	St. Helena
26.	Grade 6	St. Helena
27.	Grade 6	St. Helena
28.	Grade 6	Summerville
29.	Grade 6/7	Summerville
30.	Grade 7	St. Helena

31.	Grade 8	Summerville
32.	Grade 8	St. Helena

3.4.3 Phase III: Robotics and 21st Century Competencies

In January 2017, I began my role as a research assistant for the CODE-funded project entitled, *Robotics and 21st Century Competencies: An Examination of Implementation, Impact, and Integration in Nine Ontario School Boards* (see Aurini, McLevey, Stokes, & Gorbet, 2017). This research project was part of the Ministry of Education's initiative to support 21st century learning and engage pupils in innovative and forward-thinking activities. All 72 Ontario school boards received robotics kits in the fall of 2015. CODE organized and managed the distribution of the robotics kits. There were six possible selections that Ontario boards could choose from, coming from four manufactures: VEX, LEGO, fischertechnik, and Tetrix[33] Each kit had a range of capabilities that allowed participants to purchase depending on the grade levels and subjects they would be used in. Most often, they were used in elementary math, science, and technology classes. The project consisted of interviews and focus groups conducted between January 2017 and June 2017 with over 150 teacher and students, and 19 video-recorded classroom observations. The aim of this project was to look at the connections between robotics and teaching practices—are teachers able to make meaningful connections to the curriculum using robotics? Is there evidence that such technologies can produce tangible academic benefits? Do teachers themselves see robotics as a viable tool to support 21st century competencies (Aurini et al., 2017). Below are a few pictures from the classrooms visited using robotics:

Figure 4: Students using Robotic Kits

As research assistant, I had the opportunity to attend multiple classroom visits across the 9 boards and conduct interviews with teachers and focus groups with students. I was granted permission to use the coded observations and transcribed interviews where necessary for my own research. Interviews were transcribed by a third-party provider.

[33] VEX and LEGO being the most popular.

Video recorded observations were coded by myself using *NVivo* and excel sheets. Though I may not have been physically present for every classroom visit or interview, I had access to all the collected data. Below is a summary of the data collected for this project.

Table 4: Overview of Data and Participants in Robotics Project

Data Collected	**Participants**	**Notes**
10 focus groups	95 participants	Administrators and teachers
6 student focus groups	46 participants	Junior and intermediates
38 teacher interviews	38 participants	Administrators and teachers
19 video-recorded observations	19 classrooms	11 classrooms with robotics, 8 without

The following chapters will begin to unravel some of the empirical findings my research has produced. Beginning first with a look at some of interaction rituals between students and teachers.

CHAPTER 4

NEW CLASSROOM INTERACTIONS and RITUALS

Technology is kind of like the Trojan Horse, in that when you embrace it, you don't even know that you are going to be changing your class in a big way. So, you bring this to your classroom thinking you know what, I'm just going to try this new learning tool. But, because of the freedom that it allows the kids, they start to change. They change the way they interact, and then, they want things differently. And then because of the freedoms that it allows you as a teacher, you start to want changes. And then you start to say, well my classroom isn't conducive to my old way of doing things, so maybe now, I need to change. Before you know it, technology has completely transformed the classroom experience. -Itinerant Teacher, SDSB

4.1 Introduction and Research Questions

When we think back to our own elementary experiences, what sorts of classroom interactions and rituals come to mind? Is it sitting in rows waiting to be called upon by the teacher? Getting scolded for moving out of your seat without permission? Perhaps it is waiting for that recess bell to ring for even the slightest chance to be able to chat with peers? The image you may conjure is probably not a room full of lively conversations, with the movement of many bodies in the classroom—a room that is guided by the principle of collaboration, where students "teach" students and even the teacher at times. I would be willing to guess that that picture in your mind certainly does not include an image of a classroom in which personal electronic devices infiltrate lesson plans and learning methods, or a room in which technology seems to be at the center of much classroom engagement. Today's classrooms are hosting enormous changes that are affording teachers and students new opportunities and experiences, and a large part of these changes are occurring with the availability of technology in schools. It becomes important then, for research to consider the effects of school-based technologies in modifying classroom interactions and rituals. Thus, this chapter asks: *what kinds of new classroom interactions and rituals have emerged with the rise of new technologies in schools?* Extending this even further, it is crucial to inquire what new technologies might mean for sociological notions of interaction rituals (Collins, 2004), and for conceptions of cultural capital (Bourdieu, 1986). A such, this chapter asks the following questions: *can technology facilitate new interaction rituals that can produce high levels of emotional energy (EE) amongst students and even teachers; EE that may center around the use of technology symbols and new skill sets? Has the introduction of iPads, Smart Boards and other digital tools began to produce tech-sponsored rituals that perhaps have given birth to new valued sets of cultural capital amongst youth? What might new forms of cultural capital look like amongst tech-fueled rituals?*

Many educators of today are now pinning their hopes on technology as a pedagogical tool that may be capable of facilitating new 21st century skills. This is

interesting, for sociologists, particularly critical ones over the last decades, have routinely claimed to have debunked those hopes, claiming that students remain alienated from pedagogy and that various initiatives simply reproduce old inequalities. However, through this chapter I attempt to break away from this standard script (at least in the micro sense) and make that case that through observations and interviews with educators, technology may in fact provide a new type of learning and pedagogical tool that has changed student and teacher relations[34]. While micro-level sociological examinations of classrooms have tended to emphasize resistance or boredom, alienation, and at best, an instrumental engagement aimed at getting grades and credentials, there has been little evidence of an intrinsic type engagement. My research begins to probe at the possibility of technology facilitating a new type of innate enthusiasm amongst students and teachers, in addition to having the power to restructure the overall layout of style of classrooms. Today's classrooms, without a doubt, have begun to use technology as a tool to reengage students into learning, and in doing so, technology has born new sources of peer interactions and group memberships. Knowledge and understandings of the ebb and flow of technology—usages, games, apps skills—have now become valued sets of cultural capital. This has evidently facilitated new sets of exchanges between and amongst students and teachers.

Throughout this chapter I provide many examples of this shift in interactions. I discuss the decentralization of teachers in classroom rituals, as they are increasingly becoming second-in-line to the transfer of information (often with technology or other students coming first). Naturally, this means that there is now greater student-led authority than ever before, as students are beginning to play a more active role in their learning. In addition, the induction of technology has generated greater movement amongst teachers and students. Teachers are less likely to remain stationed at the front of the classroom, but rather, they are more likely to move around the class, weaving through students, just as students are less likely to stay seated in their desks, and are encouraged now to take up more space in the classroom. What's more, the advent of technology has provided a new online forum for teachers, as many have developed their own sets of online relations with students, school communities, parents, and other educators via social media platforms. In cases where educators have fully embraced technology, there is the tendency to have a restructured classroom—moving away from desks, chalkboards, and traditional classroom layouts towards more fluid spaces, where student choice is valued, and greater collaboration occurs. This chapter will further detail what today's 21st century classroom looks like in the age of technology, while considering the impact of technology on the interactions of students and teachers, and the overall classroom environment.

4.2 Interaction Ritual Theory and Technology

This chapter applies IR theory mainly to classrooms with technology use. In particular, I ponder, how, and in what ways, can technology facilitate new interaction rituals? What does technology mean for classroom interactions, routines, and rituals, and

[34] Though it remains to be seen whether macro-level outcomes will change as well. More research into the larger impacts of technology is needed.

how does this influence student engagement in the 21st century classroom? As Kerr (2004) has suggested, perhaps new technologies that are finding their ways into modern classrooms—iPads, Smart Boards and so forth—are much than just digital devices, but rather, maybe they too can be conceived of as new sources of emotional energy within schools; energy that when facilitated successfully, can alter the roles of teachers, students, and classrooms in general. Considering that we live in a time where the majority of today's students are digital natives, it is feasible to conceive of technology as a common binding symbol among students. Technology devices and even widespread apps and games (such as the 2016 *Pokémon Go* phenomena, which exhibited many classical elements of ritual behavior) can create new kinds of rituals that are unique to the tech-savvy generation. Collins briefly touches on how technology can be a tool for group membership—maintaining that technical experts for instance, tend to be entrained in their IRs, even engrossed at times, when they meet another technical expert. The same may be said of students who use technology on a regular basis. Conceivably, particular technologies—maybe devices, apps, websites for example—can create more of a social bonding and a sense of commonality amongst *all* kinds of students, indifferent of their age, gender, ability and so on. This is important, for it differs significantly from traditional IR theory, which usually centered around conversation primarily, rather than on a piece of technical material. For Collins (2004), tech-experts can create group membership through their mutual focus on devices, whereby they communicate through the equipment (p. 353). Although Collins does not extend technology rituals to education, he still reaffirms the idea that a mutual interest and focus on a symbolic element—even technology—can give that element a sacred quality that can link a community of people together (p. 353). This dissertation serves as a stepping stone towards documenting how new kinds of IR chains may be created as a result of modern technology being used in educational settings, and how these new rituals may facilitate higher levels of student engagement. Observing how technologies may generate new in-class rituals has the power to unearth new kinds of IRs that are beginning to emerge at the micro-level of schooling.

4.3 CHAPTER FINDINGS: STUDENT INTERACTIONS

4.3.1 Changes in Student Interactions

Predating this dissertation, it became very clear to me through my teaching experience, that new technologies entering schools were making waves. Through my formal observations and interviews with educators, this idea became more solidified—in that student interactions have most certainly evolved with the introduction of technology. Throughout this dissertation, I refer to interactions as the ways in which students and teachers communicate, collaborate, and engage with one another. Below, I begin to unravel the possibilities in place when new digital learning tools begin to accompany more progressive pedagogies. I argue that students are becoming more engaged,

collaborate better with one another, and essentially, are becoming active in taking charge of their own learning, as the digital realm is a territory that students know all too well. In fact, it was not uncommon in my interviews for teachers to suggest that students "knew more" about technology than they did, which as many acknowledged, created a shift in "authority" between teachers and students. Many welcomed a more student-fueled environment that has been growing to become more of the "norm" with the placement of technology in the classroom. Sometimes, just the presence of technology alone, even without proper pedagogy in place, was enough to draw students in immediately, as it is rapidly becoming tool to garner student attention and focus. This is the first issue I take up.

4.3.2 The Power of Technology

Perhaps one of the most outstanding features of 21st century classrooms, is the amount of influence that technology has on students in its presence. There is a certain gravitational hold that technology places on students that is like no other. Consider this image from an observation in one of the special needs classrooms I visited:

> *I walked into the NMSN (needs moderate-severe needs) room as it is known, where there are six students—all with different diagnosis, ranging from autism to cerebral palsy; all nonverbal. As I walk into the classroom, the first thing I noticed was a Smart Board placed smack in the middle of the room. This was at the center of the action. Around the room there were iPads placed around the student desks as well. It's "Morning Circle" block time. Chairs are set up in a semi-circle, facing the Smart Board. The students and teachers are sitting together, side-by-side, preparing for their "morning circle" routine. One by one, the teacher calls on a student to take their turn going up to the touchscreen and picking a music video or song. How amazing is it to see students ranging in their abilities, labelled as "special needs", yet being able to manipulate the interactive white board? They responded to the visual stimuli on the screen and were able navigate to a video of their choice. Their attention is largely drawn into the screen. What's even more interesting is this ritual in and of itself. There is no teacher standing in front of the classroom. No "authority" figure leading the room or the students. Rather, the teacher and the educational resource workers (ERWs) sit next to students and together, watch the videos playing in front of them. The teacher merely facilitated this routine, but the students executed it, creating a new ritual experience. Both student and teacher gaze were on the technology* – Field note, Special Needs Room, St. Helena

This was not a rare experience to witness. In fact, in many of the mainstream classrooms I observed, similar interactions could be found. In nearly every classroom where a Smart Board, or a projector of some kind were available, the students were often arranged around that piece of technology. Like clockwork, when teachers would announce that

some piece of technology was about to be used—be it a Smart Board, iPad, or Chromebook—student attention would immediately be drawn towards the device, almost as if a light switch had turned on. This came at a cost however, as teachers no longer served to be at the center of attention, but instead, began to work in conjunction with students using the technology. As one teacher commented, when technology is used, "for better or worse, all the attention will be drawn to it". In fact, many teachers felt the same way:

> *So as soon as you give them an iPad...like they focus. They love it. They become fixated.* – FDK Teacher, Summerville

> *Honestly, technology is the central focus for many learning activities nowadays. That's why we are using apps like ClassDojo[35] or VLE[36]. It is central to student interactions. You put the ClassDojo on, and students like immediately notice and get to work…*– Grade 5 Teacher, St. Helena

> *I told the kids at one point that they can just have a day to bring their technology. That whole day was super quiet. None of the kids were interactive with each other at all. They were just interactive through games. It was all they focused on. It was crazy.* – SERC/SERT, Summerville

> *I could give kids one lesson, and then do the exact same lesson, but using the Smart Board, and I guarantee you, most of them would be more focused on the technology than me.* – SDSB Itinerant teacher

This fixation on technology seems to be universal across students in different ages and grades observed, as they are increasingly becoming a technology engrossed generation. More than a decade ago, Collins (2004) wrote on the "technology obsessed" person, that an interaction ritual for them would vary greatly from an ordinary encounter, in that it was not usually a conversation primarily that took place, but rather, the ritual was centered around a piece of technological equipment. These individuals, "appear to be staring and manipulating a physical object more than talking to each other" (p. 184). Fast forward to schools in the 21st century, where technology is little by little, becoming that common symbol that has the ability to facilitate a unique type of interaction that can often become as solitary as it is a group experience. For instance, in one intermediate classroom I observed:

[35] ClassDojo is a classroom communication platform for teachers, parents and students. It is primarily used to track behavior in the classroom and communicate the results to parents (see www.classdojo.com).
[36] VLE stands for virtual learning environment. It is an online learning platform that allows teachers to share educational materials with their students via the web (higher education examples include: Avenue to Learn, Moodle etc.).

> *the teacher instructed students to work on an individual task at their desks. The room was quite noisy, as students were having conversations with each other, often not about the task at hand. One boy walks up to the teacher and says, "Miss, if you let us listen to music on our phones, I promise we will be so quiet". "Seriously", he continues, giving the teacher a convincing look. The teacher pauses, looks around, and almost reluctantly says, "okay fine. Grade 8s, you can listen to music quietly as you work". The sheer excitement of students was incredible to witness. Within minutes, an otherwise loud class full of lively conversations fell dead silent, as the focus moved from social interactions to digital solitude. All of the attention was moved from peers, to their own personal electronic devices (PEDS).* – Field note, Grade 8, Summerville

Technology certainly has the power to capture and hold student's attention in ways that textbooks and other traditional print texts probably will never have. This, as I will begin to outline below, has led many to associate higher levels of student engagement with technology use in classrooms.

4.3.3 Student Engagement

By far, nearly every educator I spoke with, both formally through my observations and interviews, and informally through my teaching experience, had said at one point or another, that students are much more engaged when technology is present. In fact, teachers often acknowledged student engagement as a prime reason for using technology as part of their teaching pedagogy. Below are a few examples of conversations with classroom teachers surrounding the high levels of student engagement that have become associated with technology:

> *I find that children are very engaged, very engrossed. They are very sucked into the technological world because it involves like sight, touch, sound. For different learners, it really captures their attention.* - FDK Teacher, Summerville

> *So, the mainstream benefits are like a hundred percent what I would call the engagement thing. It definitely creates strong student engagement.* – Itinerant teacher, SDSB

> *The kids become more engaged. When you bring those tools out, that's something they're comfortable with and that's something they love and enjoy. They love seeing the response on the board right away when you do a "Kahoot!" or a "Padlet". They are much more engaged this way.* – Grade 6 Teacher, St. Helena

> *I think that there is a natural engagement that comes from technology with kids. And I also feel like kids love it when the teachers don't know something. And then they can go show and teach the teachers and then show off their skills. It's like*

> *they get to, you know, feel more in control, and that engages them.* –Consultant, SDSB

There was really no question for teachers that student engagement was noticeably higher when using technology; making it likelier for educators to integrate such digital resources into their daily teaching, and often times even allowing students to use their own devices. Interestingly, it had long been hoped (and maybe still to a degree today) that reading print text for instance, would have this similar, absorbing, intense effect. But as we know, print reading is often more demanding for many people than are the uses of PEDS, and they seem to produce more variable reactions among students, with many becoming disengaged in the end. PEDS and the use of technology in general seems to greatly reduce variability in engagement. According to teachers, technology had a certain ability to capture student attention, student focus, and their overall enthusiasm for learning. Although this study was not able to necessarily capture whether student engagement could translate into academic achievement[37], teachers seemed convinced from their own experiences and observations, that students who are more engaged will naturally have better academic outcomes:

> *Well I think that any type of learning, if the learner is more engaged in it… then I feel like there is more learning taking place. so yes, I think that they would be more successful. because they are more engaged they're going to retain more* – Literacy support teacher, SDSB

> *I'm going to say this: student engagement always translates into learning. Always! Hands down always!* – Grade 4 teacher, St. Helena

> *Anything that engages kids will relate to learning. Because half the battle is just getting an interest out of students.* – Grade 5 Teacher, St. Helena

Interestingly enough, many educators followed such statements with a disclaimer that in order for technology to truly make a difference in student learning or for it to translate into academic achievement, there had to be some sort of pedagogy in place. In other words, using the technology without a purpose in mind most likely could not facilitate desired results:

> *If the pedagogy was equal then I would say probably yes, using technology would make a difference academically. Because of the engagement piece alone. But, if there was no strong pedagogy, just here, use the technology, then no I don't feel like it would make a difference in the long run…* - Grade 2/3 teacher, St. Helena

> *I think it really goes back to teaching philosophy of the classroom, and you're teaching practices. Are you using it as a one-off? Then it becomes a product or*

[37] A task no doubt, that should be included into future research areas on technology in classrooms.

> *like a fun activity just to do. Then there's no learning involved. I don't think you can say that having technology is just going to magically improve scores. It is another differentiation piece that if used appropriately and purposively, then yes, it will make a difference because students are naturally more engaged in it.* – Grade 6 teacher, Summerville

This most certainly has implications for both sociological theory and educational policy research alike. If technology is to truly generate school-sponsored learning, then student engagement must be, in Collins (2004) framing, a "necessary condition" and effective pedagogy, a "sufficient condition" in order have more than a superficial effect on learning. Thus, whether or not technology can facilitate school-sponsored rituals, as opposed to just facilitating social things, goofing off, leisure and so on, depends largely on the type of instruction in place (to be discussed in greater detail in Chapter 8). It is worthwhile to consider whether educators are developing strongly integrated tech-based pedagogy that is also effective. While this was not the main goal of this research, it is something that should be kept in mind. For instance, one teacher I spoke with had eagerly shared his own mini experiment with using technology to engage leaners. He had partnered up with another teacher in another school (but within the same school board), to examine whether technology could produce different outcomes in classrooms that were more or less similar (i.e. same grade, same community demographics etc.). They co-constructed a mathematical unit together—with the same lessons, same questions for assessment, same homework, except, one teacher taught using the Smart Board and other integrated technology, while the other did not. Did it make a difference for student learning? According to this teacher, yes! The class that was taught using technology produced higher math scores overall. Needless to say, comparing classrooms can be a tricky task, as there is a limit to how much one could control for (i.e. parental influence, teacher charisma, student exposure, learning (dis)abilities). Whether this could be true of most classrooms using technology remains unknown, however, this exchange is important for considerations of how ideas surrounding student engagement are changing.

I often probed teachers who claimed that students are more engaged when using technology by asking them, "*but, how do you know? What makes you stop and say this child is engaged".* This yielded many interesting responses, as several teachers had to reflect about what student engagement meant for them. Most commonly, teachers referred to body language as key indicator of student engagement. In other words, it was possible to tell that students were engaged because they were focused—their eyes were locked on the screen, their bodies still, conversations were on topic, and there were a reduced number of "wanderers" and less signs of visible boredom:

> *They're quiet, they're on task. They're on point. They rarely talk about anything they are not supposed to. They work independently. Their eyes are focused on the screen. I'll wander around. If they have a laptop in front of them, most of them are just staying seated. Whereas if they didn't, they may be prone to wander. They'd be more distracted. So, I mean it's a distraction from the distraction. It's a way to keep them focused. Especially those students who have special needs. They have*

> *focus issues and attention issues. It's definitely something that maintains their attention a little bit longer versus me just going up there and blabbing.* – Grade 8 teacher, St. Helena

> *I think it's the fact that they're not distracted. They are actually in the zone working. When you put that PED in front of them, it's really quiet. In a good way. I like noise, because noise means that they're learning as well. But they are engaged in their videos and they're writing... And you can see them actively writing things down off of the screen, or typing something, or cutting and pasting. Visually, you see them working. They're not wandering. The not staring out the window. They're not distracting other students as often. It's very cool to see.* – Grade 6 teacher, Summerville

> *As soon as you are rolling in that iPad cart, it's like that Christmas morning look on their faces. And this is coming from kids who would have been probably like "oh great, science again". They would have been giving me that body language, you know? Like "oh God, here we go again". The eye roll, the slouched-in-their-seat-disengaged-not-having-it kind of look. Now, they are getting ready. They are getting eager. They are excited. And then, I am seeing students engaged who I normally don't see. I hear their voices. They are participating.* –Grade 6 teacher, St. Helena

> *I mean as soon as I tell them let's use PEDS or some sort of technology, their eyes light up. They constantly ask me, sir, can we use our PEDS for this? Like how often does that happen, where students actively want to do research? When they ask you for work that allows them to use the tech? And once they have it, they are so focused on what they are doing in front of them I have to sometimes pry it away from them.* –Grade 6/7 teacher, Summerville

Sociologically speaking, these have very large IR overtones. As I have discussed earlier, rhythmic coordination and emotional entrainment are necessary ingredients of an IR, however, in order for successful IR to occur, there must be a mutual focus of attention (p. 79). This mutual focus of attention, joining and enhancing the already existing emotional entrainment means that shared symbols are being created as well (p. 80). This is very similar to the kind of introspective ritual that Benzecry and Collins (2014) for instance describe in their work on opera fanatics, in which they listen with almost a trance-like intensity—"they share a common emotion about the opera they are focusing attention upon" (p. 313). In much of the same way, technology is uniting student attention. This shared attention is what can separate successful rituals from ones that can fail. In "failed rituals", Collins (2004) writes that there is a flat feeling unaffected by the ritual, "or worse yet, a sense of drag, the feeling of boredom and constraint, even depression, interaction fatigue, a desire to escape." (p. 51). Failed rituals are often energy draining. Be that as it may, from the observations and interviews collected with educators, it would seem that when students engage with technology, this is not the case. In fact, quite the

opposite is true. In the presence of technology, students are *more* likely to display signs of enthusiasm and engagement. The descriptions teachers have provided about *how* they see students engaged (i.e. eyes light up, body language etc.) fit perfectly into Collins description of IR. According to Collins, high or low EE is visible in body postures and movements. At the peak moments during interactions, pattern tends to be shared among all participants—"bodies touch, eyes are aligned in the same direction, movements are rhythmically synchronized". This is in comparison to moments of failure, where "bodies turn way from each other, heads turn downwards, or inwards towards one's body, eyes look down or away" (p. 135). Collins states that often times, solidarity is directly expressed in eye contact, which as I have shown above, is usually a signal that a student in engaged in a group ritual. It would seem that technology is now beginning to serve as a kind of object that can facilitate interest in perhaps otherwise mundane academic material (e.g. Grade 5 Science or Math). This suggests that the medium can really alter how people receive the message—or in an educational sense, the content. It seems that technology is also capable of creating an educational space where there is greater collaboration and student led interactions.

4.3.4 Collaboration and Student Led Interactions

> *There are around seven junior-intermediate students (Grades 4-8) in Mr. X's special education Resource Classroom (SERC room as it is commonly known). Each of these students have various learning disabilities. Some of them are illiterate, while others are reading and writing below their grade levels. In this classroom, students are often doing the same modified work as decided by the teacher. Today however, Mr. X has teamed up with a Grade 3 teacher to have his students "teach" their younger peers how to create a project on a popular app for iPads, "Book creator". I watched as these students, who are often labelled as "dumb" by their peers, beam with pride as they now become the "experts" in the scenario, working alongside younger students to provide them with support, rather than the teacher.* – Field note, SERC, St. Helena

Many sociological subcultural theorists have often portrayed peer groups as entities capable of inverting classrooms and leading students to become more disengaged with academics (see again, MacLeod, 1987; Willis, 1977). However, my research observations have posed an interesting question: can technology alter the standard forms of stratified rituals in classrooms? Can technology help to facilitate new types of rituals whereby students work together towards attaining academic achievement, in a more collaborative environment? As this chapter has illustrated, this can certainly be a possibility when using technology. In essence, it is conceivable that new kinds of peer interactions can actually facilitate more group work, that can then serve to reengage students into learning. Across the board, many teachers interviewed indicated this as a major benefit to integrating technology into their class. In fact, teachers suggested that using digital tools in the classrooms are able to provide students with skill-sets considered necessary as they embark on a new digital era, with collaborative skills being noted as one of the most beneficial and noticeable changes. For educators in this study, new collaborations that could emerge whilst using technology were considered a major

enticement to using digital resources. Teachers interviewed found it evident that when students engaged with digital tools, they work better in groups than ever before. As one teacher suggested, students are learning "to work together more. Learning how to collaborate with each other as opposed to working in parallel with each other". Many others had similar feelings towards student cooperation:

> *Well, just this year, our learning buddies are— so because I have the Grade 1s too, the ones are…they're pretty young for the robotics, but our learning buddies are the access class, so there's some kids who are slow-paced learners and they have trouble with communicating and things like that, but when you get them together with the young kids, they're really learning how to collaborate and how to communicate. Some of the younger kids are the ones who are doing the modeling, so it's been a really good collaboration for both classes, and it's been great to see some of the kids who would normally just sit back, they're right in there and they feel comfortable and they're enjoying it and they're having fun and they're being good mentors and good leaders and things like that. It's been really good.* – Grade 1 teacher, Robotics Project

> *Students are now teaching each other. So that is a good thing. More collaboration. They will be like "oh how did you do that"? So, they teach each other how they did certain things.* – Junior/Intermediate teacher, Robotics Project

> *I have a student who is not very high academically. But you put the technology in front of him, then all of he a sudden, he is showing other kids what to do, leading group work, collaborating with his peers. He was so savvy with it and it brought out this side to him.* – Grade 3/4 teacher, Summerville

These were common observations that I found in many of the classrooms I was a part of. Often times, in the presence of technology, students would be sitting next to each other, conversing and engaging with what the other was doing. I found this to be particularly true in intermediate classrooms where students were more likely to ask each other for help— *"How do I connect to the Wi-Fi"; "Can you show me how to save my work onto the cloud".* More time was afforded to classroom teachers as students began to troubleshoot each other's problems. These strong student-led interactions did not go unnoticed by teachers:

> *I noticed this one thing the other day. One of the students said, "oh I know this one thing that would be awesome for so and so" ….and then they went and brought that idea to the other student. Which is like, kind of cool because they found something that their friend would like because they came across something. Because they have like a similar kind of idea… so he was like, "oh this is perfect for him" and he brought it over and he was like, "hey buddy check this out". It was amazing to see the ideas spill over.* – Grade 6 Teacher, St. Helena

> *I think when they have their own PEDS they want to show their friends more often. They want to collaborate. You will hear more of, "look what I found" or "look you can do this". In theory, you could do the same thing without technology, but it might not be the same. Now it is a different medium. They can use technology to communicate and work together in ways that weren't possible even one year ago* – Grade 8 Teacher, St. Helena

Even students themselves attributed peer collaboration as being a new skill that was beginning to bud when using new technologies, such as robotics, to learn:

> *I like it because it also helps us with collaboration because we have to work as a team in order to succeed with the challenges. Everyone has a role in my group. Yes, we work together really good and we end up getting the challenges completed. It is fairly easy because of our team work.* – Student Focus Group, Robotics Project

> *Once we had our robot, it wouldn't work, it wouldn't go. Then, we kept trying and we got it to work again. Then, we told them [another group] how to do it.* – Student Focus Group, Robotics Project

Technology not only enabled greater student collaborations, but what many teachers observed, was that it facilitated other important "soft skills" such as greater perseverance, and a willingness to work through problems. It allowed students to take control of their own learning, while at the same, utilizing each other's talents:

> *We were trying to get the NXT software to run properly. There was three or four of us one lunch hour – me and three students – and they were on their own devices, problem solving. Going on YouTube, looking, figuring this out. When they figured this out, they were ecstatic. Then, when the students came back in from the lunch hour, they were sharing with other people how to get the software running. They went and installed the NXT software on all the devices in my classes, so that no matter what was happening, they could always grab another device and continue their code. Then, they were like, "Well, my project isn't here." Then, the learned how to integrate it with Google Drive so that they can share and save anything they need on the cloud, so they could go get it…*- Junior/Intermediate teacher, Robotics Project

Thus, one potential benefit or impact of more classroom integrations of technology in educator's daily lessons and routines is that it is matters for student engagement. Earlier in this dissertation, I discussed how strong interaction rituals may have the potential to fuel higher levels of EE which can create positive and successful rituals, whereby students are highly engaged. For Collins (2004), this is also true of the technology-oriented person, who can communicate meaning by "showing, doing, pointing…they are interacting with each other via the equipment, and thereby tacitly invoking the rest of the

far-flung networks of machines related to the one in front of them, and the community of experts held together through these machines. The machinery is the sacred object of a cult" (p. 353). In much of the same way, students are engaging in new rituals through the medium of technology by actively showing each other how to properly use them and working together to solve problems. Thus, technology can have a strong effect on how students interact, and as I will explore next, how students develop informal-type group memberships.

4.3.5 Group Membership

> *Three boys are lying down on the floor playing the math computer game, Prodigy, on their iPads. They sit next to each other and compare "pets"— "I have him" … "I'll show you this" … "Look at me" … Woah…" The boys continue to compare their scores and achievements in the game. "But you need to know your math like me to get more points" one boy tells the other. "How did you get to that level" asks one boy. "I know my math really well" says the other. He looks to him with admiration and says, "so lucky".* – Field note, St. Helena

The daily integration of technology in many Ontario classrooms has generated new sets of interactions amongst students that are making them more engaged. Additionally, this level of engagement is now becoming crucial for new types of group memberships that are evolving—both through technology engagement and its related skillsets. In other words, having knowledge of the ins and outs of technology is considered a valuable asset—or to use it in terms of Bourdieu, a valued type of cultural capital. This begets the questions of what modern day, tech-fueled "cultural capital" may look like in 21st century classrooms? Is it observable? The short answer is, yes. In much of today's technology fueled classrooms, being an "expert" in the tech-world can give students not only a valued status position, but also, provide an extremely valuable capital that is now important to student culture. To give a concrete example, in another classroom I observed, much like the opening visual, there was a group of students playing once again, *Prodigy*, but this time, in the computer lab. The students were talking back and forth to each other about what levels they reached and other accomplishments— *"I'm on Level 5" … "wow, I'm on level 6" … "look what badge I have…".* They continued to talk back and forth about their achievements. The levels of competition[38] began to rise as students "competed" with each other about who "knows more math". In this seemingly insignificant encounter, math knowledge became the "valued" skill that was uniting students in their ritual of play using *Prodigy.* Remarkably, these types of exchanges were manifested more frequently in classrooms where technology was utilized. Regardless of the intention behind the technology (i.e. whether it was used for play, leisure, or learning), when digital resources were used, a new type of ritual was born and fueled by peers— *"Did you play Prodigy last night*"; "*I want to beat you at Kahoot!", "Do you*

[38] Friendly competition that is….

know how to print this", "Did you see my Minecraft server yet"? These common, everyday exchanges were found to lead to particular group memberships defined by common group symbols and knowledges (i.e. proper internet lingo or badges in a game) that students could only acquire if they were well-versed in the type of technology that was relevant to a particular group of students—perhaps their grade level peers. Noticeably, if their peers were engaging in particular apps or games, then that fueled the likelihood of it becoming part of a student subculture, and subsequently, becoming important to group membership. For some group of students this could mean excelling in *Prodigy*, for others be something different like knowledge of *Minecraft*, or the ability to code. Regardless, if it was deemed "cool" or "interesting" by peers, then it automatically became something of value, and thus, a common bonding tool. In this way, technology can both structure a form of competition while at the same time create new bonds—something that sociologists have usually see as antithetical. But, perhaps in the same way as sporting events garner friendly rivalry that push opposing teammates to advance within their field, so too can technology create some sort of binding competition. This is something conceivably unique to using technology; for could print based texts or math games have such comparable effects? Certainly not to the same degree. Teachers themselves have also witnessed the power of technology in student subculture:

> *I think in the tech world, there are things that are valued to students and kids, that are not to us adults. And the tech does something to kids… like it makes them to do things that they might not otherwise do. For example, I think of boys, and like the whole idea that technology reengages the boys. Like they probably are not going to be reading fiction books, because it is not like cherished amongst that age group. But, I'll tell you what, these boys are probably going to be reading a lot more non-fiction, and that's because of tech. Think about it. In the tech world, you need to read instructions or directions—they need to figure out how to play the game? What do I need to do? How do I get to the next level? I see this from even games like Minecraft. Boys are so eager to read just so they can follow their older friends and know how to excel at the game. So, it is through this gaming experience that boys might be learning to read—because they need this skill to be able to participate with their peers.* – Teacher librarian, St. Helena

This passage above hints at another element of peer membership that is becoming embedded in daily learning: gaming! An inescapable part of technology has been the crossover of using games and gaming techniques to engage leaners, which anyone who has played video games would know, has a huge group membership appeal! In conversation with teachers, many of them referred to using game concepts to create learning opportunities—things like "Kahoot!"[39] or Jeopardy games for test reviews. Teachers have inexplicitly related gaming culture to group membership:

[39] Kahoot! is a free game-based learning and trivia platform used to create quizzes and trivia (See https://kahoot.com/what-is-kahoot/).

> *I think there are huge benefits to gamifying lessons. I agree 100% that if you take elements of games and you turn them into learning experiences kids would respond well to that, and that would benefit the kids.* – Grade 6/7 teacher, Summerville

> *Like last year we used Kahoot! … and I think like the competitive juices come out and I think that the kinds really like that. It shows their rankings on the Kahoot! … and for the boys, that it something that drives them. Like you want to beat little Tommy beside you, or your friend next to you. So, maybe for kids they push themselves a bit more because they want to beat their friends, right?* – Grade 6 teacher, St. Helena

> *I can tell students are engaged because they are motivated to learn. They are focused. They participate. Especially when I do games with them like Kahoot!. They love competition, and that competitiveness, that feeling like they need to outdo their friends really gets them. Especially if they see their name and they know that is going to come up on the screen. They will say like "Oh, I got it, I am number 1" or like "So and so is number 2, I did better than you!". They love it!! They love to be challenged that way. So, it's more interactive for them and it's more engaging for them at the same time. As opposed to like just you know, you trying to teach them, and them listening and then just falling asleep or something. I find when they have an iPad or when they are on the computer, they're just more engaged, you know? They enjoy it more.* – Teacher librarian, Summerville

> *Ideally, I would love to see technology continued to be used. Like, I feel we are just at the tip of the iceberg with it all. Even all this gaming stuff, like it changes the way kids learn. It would be great to continue like taking video game elements, like the ones that kids use and love about games and apply them to learning. Because when you do that, it makes it important for kid culture. It depends on your attitude as a kid, and like if you don't mind failing at a video game. Like, when kids play games and their characters "die", they brush it off and say "whatever, I died, let me try again". They keep trying again and they keep working on it. They ask their friends for help. They learn the strategies, so they can keep up with their friends. But, you give them a math problem, do you think they will feel that way? Will they keep trying? No. Because they don't look at it the same way; they don't approach it in the same way. The question is can we take that video game mentality and then get them to apply it to education?* – Grade 7 Teacher, St. Helena

Thus, group membership matters in the context of play in learning. As we know, gaming culture has been on the rise over the last few years, as many scholars have begun to attribute gaming as a tool to enhance student learning and cognitive development (Bork, 2012; Gee, 2004, 2005). Even more so, gaming has long been associated with peer groups (Amialchuk & Kotalik, 2016). This fact was acknowledged by multiple teachers who

often spoke of the importance of "peers" to student engagement and learning, especially in the context of technology and games. Furthermore, many educators were also cognizant of the importance of extrapolating those skills from technology in different forms—through games or even activities such as coding and robotics. Having the appropriate language, understanding, and ability to navigate certain kinds of technology was something that many teachers thought was important to future prospects:

> *… technology gives students a common language to talk about. Okay, so your phone is doing this now. How do you think it's doing that? Why do you think it's doing that? What do you think that code looks like? Why do you think that your machines work this way, right? Because these kids are growing up in a world where these machines are all around them and we want them to understand a little better how this magic black box works. Not that it should be some mystery and I put in something and it pops up, you know. Helping them understand how computers think, I think is really essential.* – Junior/Intermediate teacher, Robotics Project

This perfectly illustrates Collins' ideas about the "sacred" object in group membership. In the context of education and digital tools, technology is becoming that "sacred" object for its users; in this case, students. Having a "common" language, skillset, or knowledge is certainly starting to bind youth in various capacities. Even more so, it is becoming a valued type of "capital" to use Bourdieu's wording, as having the appropriate workings of technology is becoming beneficial and important not only to youth culture, but also for jobs of the future (to be discussed in Chapter 5).

Perhaps unique to this generation of leaners is the ability of technology to evolve into a common ground for *different* types of students. Stated otherwise, new opportunities to participate in group rituals are now being provided for students who may have been traditionally labelled as "different"—students who perhaps were not star athletes, academic champions, or even keen on participating in school sponsored events. Technology and its associated group membership have given these types of a students a new outlet to enter. The quotation below demonstrates this in the context of a robotics club:

> *…they're on a team. Like, I teach self-contained gifted students, so the kids are quirky and a lot of them don't fit into a regular classroom, so they're brought into a regional program, and a lot of these kids will never be on a team. They're not athletic, they're not – you know…they don't participate in extracurriculars, so this is the first and maybe the only time that they get to feel that sense of pride in working together on a team like a sport. We have the tournaments and it is a really big deal for them just to have that in their life.* - Grade 4 teacher, Robotics Project

Just as sports, music, and even religion can create bonds among its participants, digital resources appear to be doing the same by having a mutually agreed upon focus:

technology. Collins (2004) has argued that amongst the tech-orientated, machinery is the sacred object in the culture. "It is the community that is joined together by their focus upon it" (p. 184). In much of the same way, technology in schools is serving this purpose. In fact, having that technical skills in Collins framing, is a form of group membership. For he writes that the technical skill itself is the "symbol or emblem, the focus of subjective identification, just as much as the solitary religious prayers of the religious membership symbols" (p. 184). Even students themselves have acknowledged how technology fueled activities, such as robotics, can offer new opportunities for other kinds of students:

> *Well, I think it's a great opportunity for other students because not everybody is interested in athletic or physical activities. It gives them a different road to go down than doing what everyone else does. Robotics is like… if you want to do it, then it's great. It's still fun for everybody, but not everybody wants to do like sports or anything. It gives them a chance to do something else.* – Student Focus Group, Robotics Project

This framing of technology also applied to students who may be considered "invisible", or in other words, quiet, shy, reserved even. Using technology gave them a new found "voice" as many teachers put it:

> *Building on that, the oral communication component of technology is key. You have these students who are typically quiet, and they don't talk a lot. They don't communicate. They are not very good at expressing their understanding. Well, in these situations, they are talking, they are communicating. They are showing what they know. It really does give that whole oral communication piece… It is huge because they are learning how to communicate, they are understanding in a different way while they are doing it… very clearly. Whereas in other situations, they might not be able to, but they are passionate about it.* – Grade 5 Teacher, St. Helena

> *Instead of getting kids to raise their hands, now it's like you can actually hear the voices of the kids who don't like to speak. For example, today I used Nearpod, which is kind of like a way to get kids to participate and give their voice without having to really speak. So, I would give them a question or like a big guiding idea to think about. And then they submit their answers on the tablets.* – Grade 6 Teacher, Summerville

> *…like for other kids, you know, they can film a project, they can upload it and then they can just sit at their desk and let it play instead of them going up in front of the class. So, it really takes like the pressure and that takes a day of like anxiety away and it makes it easier for kids. Maybe kids feel more confident or comfortable because they're not as worried about being judged on the content of their work based on their ability to speak in front of the class. It's just another*

> *option right… it's about giving kids the option to do other things. So, another kid I know who was like so anxious, you know, just can't talk in front of the class, she just shuts down. Just can't do it. Whereas …this whole week she has been excited to go out and film to show us what she knows. Part of my role as a teacher is that … I'm still doing conferencing and I'm still checking in because I want to make sure that they're not getting carried away with the fun …like with the fun and games of technology. I want to know if they're still hitting the point of it. You're not forgetting about the point of it which is the learning.* – Grade 6/7 Teacher, Summerville

For those "nerdy" students who would traditionally avoid sports or related ritual chains, technology has now presented them with an entirely new set of ritual chains. Except today, having technology associated capital is no longer considered "nerdy". "Nerd culture" is something that has been around for decades. In fact, Collins (2004) had once wrote on the case of technical expertise that these are:

> stratified emblems…they sharply demarcate those persons who know how to do it from those who haven't a clue, with a middle group of degrees of ineptness and apprenticeship in between. Just as the non-nerds look down on nerds, nerds in their own element look down on those outside their charmed circle (p. 352).

He continued to write that when the technology-oriented persons gather, they appear to be:

> …unsociable in the conventional sense—they are not ebullient, joking, story swapping or gossipy. In fact, they are often averse to interaction of this kind, finding it draining, and thus give the appearance of being shy. This is a case of being specialized in a particular kind of IR chain that brings EE, and that they much prefer over other kind of IRs in which their symbols and emotions do not match up with what other people are exchanging (p. 352).

While this may have been true two decades ago, today, the continual elaboration and improvement of digital technology has really enhanced this "nerd culture" and given it a new type of social cache and legitimacy. No longer are these tech-savvy individuals considered "nerdy" by society, as having tech-skills is a highly valued kind of cultural capital. The last generation alone has created tech-based heroes such as Steve Jobs, Bill Gates, Mark Zuckerberg, and even famous gamers such as PewDiePie[40]. Clearly, being seen as a "nerd" is not so bad now—nor does it necessarily entail that such a group will thrive in isolation like before. In fact, returning to IR theory, we can begin to conceive how for such students who may have otherwise been quiet, shy, and reserved students,

[40] A 28-year-old YouTuber who since 2010 has made over hundreds of millions of dollars playing video-games.

technology has created new rituals—rituals that have the power to energize them, allow them to engage with their peers in new ways, and allow them to partake in novel interactions both inside and outside of the classroom. This "inclusion" of technology was also found to apply to students whom have been traditionally labelled "deviant" or "troublesome". Engaging in technology was another way for these children to partake in new ritual inclusions:

> *I think one of the things that you see right away is the level of engagement that you get. Specifically, for some kids who may have challenges engaging in school in other ways. I will use a specific example. I have a boy who sadly is not allowed to be at school right now because of some safety issues, but we were able to uncover a strength that he had that none of the other kids in his grade had and it was through the robotics program. It was the one place at school where he could feel successful and sadly it wasn't enough to keep him in school, but this is a story I have seen played out in other cases, as well. That level of engagement is really critical and helping kids who may have skills that are hands on that aren't addressed elsewhere in the school settings.* – Junior/Intermediate teacher, Robotics Program

In short, IRs that involve technology seem to apply to all types of students—from the average engaged student, to the shy and quiet individual, to even the troubled and disengaged youth. I would argue that this has largely to do with the important weight students place on technology today. Gonsalves (2014) reminds us that drawing on "youth funds of knowledge", such as technology education, can generate positive emotional energy because it is something that is key to students lives. Thus, allowing students to explore learning through a medium that is part of their world—technology—can have huge contributions to their overall engagement in school.

4.4 CHANGES IN TEACHER INTERACTIONS

In much of the same way that technology has produced new sets of student interactions, it has also impacted the ways teachers interact with their students. In particular, it has altered the nature of the "teaching" role in ways that would have seemed unimaginable a decade ago. This section offers a more detailed look at technology's ability to incite changes amongst teachers and their interactions with students—beginning first and foremost with a shit from the teacher as "expert", to a teacher as "learner" in conjunction with students. Teachers have had to almost unexpectedly give up a level of control in the classroom to make room for student-led interactions. In addition, the availability of technology now means more instantaneous access to resources, new pedagogical frameworks, ands overall shift in classroom dynamics.

4.4.1 Student as "Expert"; Teacher as "Facilitator"

> *In a Grade 7 classroom, the teacher begins by asking students in the classroom to demonstrate how they arrived at their math answer. Instead of her saying the answers out loud, she asks for the students to lead. She calls on two students who eagerly shot their hands up to show how they arrived at their answer. They proceed to the Smart Board located in the center of the room. They begin to then "teach" the class their method—they write, draw pictures, and explain step by step the process of solving the answer. The teacher stands at the back of the class, just observing, and nodding her head. The technology is heavily drawn into the learning process, as students take control over the room, while the teacher facilitates from the back.* – Field note, Summerville

Perhaps the most striking feature of technology's presence in today's classrooms is the reduced role of teachers and teacher-led instruction. In other words, in many classrooms where technology was used, teachers began to both physically and metaphorically move away from the need to be at the center of the classroom. No longer were they the sole "authority" figure in the classroom, but instead, they were co-leaders with students. A greater value was placed on student-led instruction and student promoted "expertise". Many teachers began to refer to students as "the best teachers"[41], often teaching teachers and fellow peers:

> *Last year I had kids that were teaching each other just how to edit like scenes filmed across seven days. Like how to bring into iMovie and link it all together—put music in the background etc. The crazy thing is that they were teaching me how to do it in the process. And I was learning. I had never used iMovie before, and these kids like we're just blowing my mind. It was incredible. Like some of these kids even went out and thought about how to use some of their apps they normally use for fun in a more purposeful way […refers to an app called masquerade]. I am learning so much from the kids.* – Grade 6 teacher, Summerville

> *I mean sometimes I'm not the first person they come to because they're like, "oh okay, I remember that like so-and-so is really good at this or they did this with their presentation maybe I should ask that person first". So, it's a lot more of friends helping friends. Friends teaching friends. They are learning from each other basically. I'm learning from them and then if I can if I can add my two cents here and there you know then great…* - Grade 6/7 teacher, Summerville

> *So, you as a teacher move yourself out from the equation as the one with the answers. Legitimately not knowing is actually, probably the best way to do it. Your kids start to learn that okay, if there's something I want to do with a piece of code, I know that I need to see [my friend] Lisa to do that. And if I want to do something else, I know that Chris knows how to do that.* – Special education teacher, St. Helena

[41] That is, after teachers can move past the, "Oh my gosh, the students know all this more than I do" phase as one teacher said.

> *But it's those kinds of interactions where I'm like, "oh do you think you could fix it" ... which makes students feel like we're more on the same level now because I don't know. I'm not the expert, they are. So, we're kind of learning from each other, and I think that has kind of enhanced my relationship with the kids because then we're more like team members or partners rather than like me at the front of the room like this.* – Junior/Intermediate teacher, Robotics Project

Contrary to popular belief, this attitude of comfort in co-constructing knowledge with students was not related to age of teachers, or even length of teaching. In essence, this seemed to stem more from the type of teaching philosophy that each teacher held. In other words, *how does one see themselves as an educator? What are their classroom philosophies? Are they willing to take a step down from the traditional, authoritarian, leader type to a more equivalent student role?* As one teacher strongly put, "technology is not going to make you a progressive educator. Rather, being a progressive educator will make you more likely to use technology in the right ways". This was key for many self-aware educators who realized that while technology has helped bring about a more united type of ritual inclusion, the philosophy one holds is a more accurate indicator as to whether or not technology will be used to its greatest extent:

> *I think teachers have noticed that yeah, this is different. Like I think if teachers are honest with themselves and their kids, they will say to themselves "I don't know how to do this, can you help me. Like maybe we can all learn together?" Teachers will take more of the backseat. But I think it defaults to the philosophy of the classroom and teacher. If you're a person who truly believes that you are a learner with your students, and like on a journey, and not like the conductor or director at the front, and that's the style that you're going to facilitate, even with no technology.* – Literacy support teacher, SDSB

> *I have always been the type of person who was okay if I make a mistake and I'm not embarrassed to make mistakes and ask questions. I found that the kids like when they see you make mistakes, they appreciate it. But I know not all teachers are comfortable with this, but that goes back to their teaching philosophy. What kind of teacher are you?* – SERC/SERT, St. Helena

> *We are educators not masters of curriculum… so I think we should be more willing and open to learning about things with the children and let them grow and let them see that okay, maybe you know what, I'm not so comfortable with this, but I'm learning, and I'm going to learn. I think like that they're more willing to do those things if they see that you're more willing to do those things right. But that goes back to you and your comfort level.* - Grade 4 teacher, Summerville

Teachers are often considered to be the main conductors of classroom rituals. Yet, what happens when teachers pass this on to students, and allow students to be central? According to Collins (2004), IR markets have local stratifications— "it circles with EE

leaders in the center of attention, then surrounded by EE followers" (p. 157). Traditionally, students have been the followers. Furthermore, Collins has outlined how groups can reinforce the status of teachers as sacred objects, giving them more reputation among initiates than among the general public—"This has traditionally increased the attention and respect given to teachers in lecture classes and making those occasions more successful in rituals" (p. 193). Now, this has been shifted onto digital devices that are overpowering the attention traditionally given to teachers. It is also by default, giving students greater authority and control in facilitating their own kinds of classroom rituals. It is important here to consider as well, that many teachers may not necessarily feel comfortable with this new kind of interaction with students (see Chapter 8 for more details). However, the ones who have embraced the advent of technology and let go of the need to feel in control have provided students with new opportunities to be conductors in their own sets of rituals, which as I have documented, have the power to facilitate successful rituals. Part of "letting go" has to do with the physical positioning of teachers in classroom rituals, as many of them are now physically moving away from being at the center of instruction and instilling more mobility in classrooms.

4.4.2 The Movement of Teachers

> *With a set of iPads spread out across the classroom, the teacher begins to walk slowly around the desks, merely observing student work, rather than engaging in any work himself, or with the students. The students are working on "book creator". They are sprawled around the classroom, some even on the floor. Instead of having a line of students at the teacher's desk asking for help, the students are "asking Siri" how to spell a word or using the Dragon app for voice to text dictation. In this way, the teacher is spending less time answering multiple questions, and more time observing students in action, often times engaging with them when needed* – Field note, Grade 2/3, St. Helena

As I have begun to unpack in this chapter, teacher's roles have undergone changes with the addition of technology in classrooms. The exchange of expertise between teacher and student has been met with a physical decentering of the teacher in the classroom. This shift towards more student-centered interactions has given birth to a new set of classroom rituals whereby teachers interact with their physical space in different ways. Teachers are taking a step-back, literally, from being the "expert" and class-leader, and instead, placing the responsibility and onus onto students. This is being fueled by the integration of new technologies. It is no longer the norm to see classrooms where teachers spend the entirety of the day standing at the front of the classroom, writing on the chalkboard, while students sit and their desks becoming passive sponges absorbing the knowledge. Rather, this generation of tech-induced educators have slowly started to embrace student-led interactions by placing themselves on the sidelines. In lieu of "traditional" teaching methods (i.e. standing at the front, all eyes on them, no exchange of knowledge), teachers too have become explorers in classroom learning expeditions:

> *I'm not always teaching in the traditional sense anymore. I'm observing a lot of the time. Right? Like making notes about what they're doing and how they're researching and like are they connecting to different sites …* Grade 3/4 teacher, Summerville

> *You know, technology has got us to move around, right. It allows everybody to move around the classroom. So basically, when they're doing their work, technology allows them to work anywhere in the classroom. You know, they love being able to go wherever. I love being able to have that space to move around the classroom too. And I think that's what technology kind of is really pushing forward… is the idea of a more fluid classroom. I have like 5 wooden chairs and beanbag chairs that they are just kind of allowed to use whenever. They love just even going under the hooks to do their work. But this means that you're not sitting at your desk now. As a teacher, you're moving around. You're watching them. You're not standing at the front of the class or sitting at your desk. You have to move around just like the students are. Maybe you're working with a small group or students who need more support. Either way, you're moving.* – Grade 2/3 teacher, St. Helena

> *What I find this year is that I move around more. I move around the room more. Now it's like… I have a wireless keyboard and wireless mice that I give to students. So that when we're doing math now, I don't even have to be at the front of the class anymore. The students don't have to come up to the board. I could give them the mouse from their desks, and they're able to do it from there. Now I find I am more on the sidelines. Whereas I've never been like that before. I'm not the focal point of the class anymore. I'm not at the center. Now, it's the Smart Board…no longer are the eyes on me type of thing. Technology is really able to facilitate the discussions from the sides. So now… the students now they carry the conversation more than me really. I'm just leading the conversation...* – SERC/SERT, St. Helena

It would seem as though technology has started to aid in the transition towards new classroom rituals. We know and understand from Collins (2004) that bodily processes are necessary for successful IRs— "human bodies moving into the same place starts of the ritual process. There is a buzz, an excitement…when human bodies are near each other" (p. 53). The physical movement of the teacher, and where s/he places themselves amidst classroom routines and rituals has potential implications for the types of rituals produced. Consider this observation from a grade 4 classroom using robotics:

> *The students are working in groups in the classroom. Some are using desks, others the floor, while a few are out in the hallway. Their task is to make their "robot" complete certain challenges (i.e. turn 360 degrees, move on a straight line etc.). Throughout the entire period, the teacher is never standing still. She is moving between groups, watching as they work, and making suggestions here and*

> *there. When a group gets excited because their robot "works", they eagerly call out, "Mrs. X, Mrs. X!, come look, we got ours to work". The teacher engages in mutual excitement with the children. She is smiling, her eyes filled with joy, and her body moving up and down.*

In a separate robotics classroom, a similar scenario was encountered:

> *The teacher tells his Grade 7/8 students that they have only a few minutes left before they "compete". He sets up two lines of tape outside in the hallways. He asks the first two groups to get ready. They bring their "robot" to the beginning of the line, and each designate one person to control it. He primes them, "on your mark, get set, go" …and then the teacher, along with a group of peers standing and watching begin to cheer for their respective groups. "Go X, Go Y!". The teacher too begins to shout and cheer as the winning robot crosses the line.*

These observations serve as prime examples for how physically, the role of teachers has changed. Many of today's educators are beginning to participate alongside their students in rituals whereby they begin to feed off of each other's emotional energy. With educators now moving around the classroom and being physically involved in ritual gatherings using technology, they are providing more opportune movements to facilitate higher levels of EE amongst their students, as they too are signaling excitement with their bodies, hand gestures, facial expressions and so on. Rather than being disconnected at their desks, many teachers are engaging in a new classroom culture. By taking a step back, both metaphorically and physically, from the "front" of the classroom, educators are now bestowing a greater sense of responsibility and power to their students, while producing greater freedom in the classroom, and new sets of exchanges. This has also affected the type of workload teachers are responsible for today.

4.4.3 Changes in Teachers Workload

> *In the classroom, kids are sitting on the carpet watching the Smart Board. On the screen is a video of a celebrity reading a story for the kids. The students are glued to the screen. Their eyes are locked and focused, their bodies are still, they are not moving or fidgeting. Their mouths hang. They are so fixated on the screen. The teacher stays at her desk, at the back of the classroom, working on her laptop. This simple fact of having a Smart Board story play (rather than her read a story to the class) has freed up time for this teacher in ways that would have been unthinkable a few years ago. It seems that technology can replace teacher work (even something as simple as reading a story to the class)* – Field note, Summer Literacy Camp

Teaching workload has adapted to meet the ever-changing tech-fueled classroom. It has changed both in ways that have freed up teacher's times (as shown above), and in ways that have added new kinds of work-related stressors (to be described below). On the one hand, it was very common for educators to reference how using technology has in many

ways, made their jobs "easier", as resources are accessible almost instantaneously. This means that they are better able to cater their lessons to student needs as they arise. Many teachers described using technology as almost a default tool when in need of a quick fix, or when plans suddenly change:

> *Technology helps in the sense that I have information that I can get it instantly. Whereas before technology, I wouldn't have that. But then again, I guess I would have been more creative and thought of some quiet games. It has made me lazy too, really [laughs]. It's like automatically I default to technology to make my life easier. I love it. I would die without my Smart Board. Especially in Kindergarten. Oh my God, like if it is rainy day, we put on yoga, or a video, or like let's learn about this... Whereas before it would be like what can you do?* - FDK teacher, Summerville

> *In another classroom, the teacher decided that students needed a "movement break". She pulled up Go Noodle*[42] *on the Smart Board. The class gets very excited. They immediately become fixated on the technology screen in front of them, which is dictating movements for them (e.g. run on spot, dance, jump). During this time, the teacher becomes mobile. She is walking around the room, speaking to individual students, getting herself organized. In this moment, technology became the placeholder for this teacher, freeing their time, if even for a few moments to get things done*—Field note, Grade 1, St. Helena

In this regard, one of the strengths of having technology in the classroom is that technology can offer classrooms access to an entirely different level of resources than print text ever could. Previously, classrooms were limited to whatever piles of textbooks or novels were physically in the class. A well-stocked classroom could be very expensive to maintain, and needless to say, it may have been a challenge to find resources that would appeal to all students. Modern day technologies by contrast, allow for more variety, flexibility, and easy access. However, by the same token, these new resources and their accompanying rituals are now in a sense forcing teachers to engage in *more* planning. More of the job becomes front-loaded to create conditions for learning as opposed to performing it. Teachers in this study were concerned that for many, this could mean an added workload to an already hectic schedule. For those who were not "techy" themselves, they often found it "time-consuming" and raised issues concerning training or support (see Chapter 8). As one teacher said, technology has made teachers "more effective educators", but this has come at an added cost of more work for some:

[42] GoNoodle is a free website that helps teachers and parents get kids moving with short interactive activities (see www.gonoodle.com).

> *I've had to deal so many times with students who couldn't get their Wi-Fi working or things like that. That takes away from time I could spend, you know, helping them more academically.* – Grade 1 teacher, St. Helena

> *I think in terms of planning, it's much more time consuming because there's a lot that could go wrong right. Technologies never one hundred percent reliable* – Consultant teacher, SDSB

> *It definitely takes more planning in advance, and there's times when it's frustrating just because of the amount of time it takes.* – Grade 3/4 teacher, Summerville

> *I find that there's no time. Don't get me wrong I love technology and I think it's great, but I just don't have the time to invest into learning it. In terms of what I use… I feel like I could probably use a little bit more technology and I probably will… like as I have never been trained on the Smart Board and I feel uncomfortable with it, but there's so much more that I can do with it… but again I haven't received training for it. So, I'm hoping over the next while I'll feel even more comfortable with it and then I'll use it more.* – Grade 1 teacher, St. Helena

As illustrated by these quotes, technology can also create a level of unpredictability that perhaps was absent with the print text era—the ability for technology to freeze/crash, or even the amount of time that it could take a teacher to plan an engaging lesson with a piece of technology adds a layer of uncertainty to their work.

While technology can be used in ways that can facilitate new kinds of IR, through engaging methods, lessons, and classroom pedagogy, oftentimes the allure of technology is in its ability to take over part of the teacher's role. This has facilitated worry amongst teachers policing other teachers for using it as placeholder for actual "teaching"—as a tool to be supplemented for teaching when educators need to buy themselves more personal time. Cuban (1986) had once described fear amongst teachers that technologies, in their initial phase, may replace their jobs. More than two decades later, it would seem as though many teachers relish in the idea of having technology replace at least part of their work. As one teacher put it:

> *You know what's funny, is before, when we first received those big Apple computers, you know, like those bulky colourful ones when technology first entered? School teachers were scared because they worried technology was going to replace their jobs. But now, in a sense, they almost want the technology to replace their jobs, or at least, a large part of their workday.* – Itinerant Teacher, SDSB

This was voiced by many other teachers who were beginning to notice similar trends:

> *I would argue that most of the teachers at my school use the technology just as a way to free up some time so that they can catch up on their marking. I know a teacher personally who books the computer lab just, so she can spend time booking the next school trip. There's no direction for her class. I frequently observe classrooms and I see just improper use of technology. I'll tell teachers, that like your child is using research from Wikipedia and they can't even read certain things. But the teacher can't get up off of her ass to go circulate and to actually see what these kids are doing on the technology or give the kids the proper tools they need in order to understand what it means to do research.* -SERC/SERT, Summerville

> *I mean, I feel like it can be, and it is often use as a replacement for the teacher standing in front of the class. Like you know…at the front talking. Which is just as unhealthy, you know, because for example like in math, we want to spend a big part of the lesson you know, where they're actually doing an inquiry or whatever the case may be. So, like you don't want to… you don't want to take the whole time just to be on the Smart Board*. – Grade 5 teacher, St. Helena

Thus, technology has simultaneously both lightened and created more workload for teachers, depending on their individual characteristics. This can have both negative and positive consequences for IR chains depending on the ways in which it is used. A teacher who takes advantage of technology to create a new, engaging, and purposeful learning opportunity for their students may be able to facilitate higher EE type rituals. On the flip side, a teacher who uses technology merely as a way to free up some of their own time, perhaps by letting students busy themselves on the iPads for a period or two, may lead to more dull rituals with lower levels of EE. How technology is being employed makes a difference—and as the next section will explore, technology is shaping interactions that occur both inside, and outside of the classroom.

4.4.4 Changes in the Teaching Role: Technology Inside and Outside of the Classroom

> *I am sitting in an ESL classroom. There is one boy sitting across the ESL teacher. He is trying to communicate with her, but his English is very limited. The teacher is unsure of the message the boy is trying to send. The boy gets up, walks over to the classroom computer and pulls up a visual of what he is alluding to…* - Field note, ESL Classroom, St. Helena

Technology has begun to restructure teacher's workload in different ways. In much of the same fashion, technology has also started to shape how teachers "teach" both inside and outside of the classroom. One of the biggest changes, is what I have observed to be more "on the spot" or "spontaneous" type teaching/classroom rituals that are occurring when technology is present. Teaching, to a large degree, has become much more fluid—with more instantaneous access to resources, teachers are able to create more spur-of-the-moment learning experiences. All it takes is a quick click to reach the

plethora of resources on the internet. This means that technology can, in a positive way, often guide teachers away from structured plans to adapt to issues that may arise during lessons. For example, during one classroom observation block:

> *students were asked to line up in preparation for gym class. A few minutes later the teacher receives a phone call that the gym is closed for the day. It is cold outside, so going outside is not really an option. How does the teacher deal with this sudden change? "Okay class, let's walk towards the Smart Board, we are going to play Go Noodle instead". The teacher then proceeded to set it up on the projector (which is hooked up to her computer). The students were beaming with excitement, and they began to move their desks around to make room for movement. And just like that, what could have been a stressful moment was turned around with the accessibility of technology.* – Field note, Grade 2/3, Summerville

For many teachers, this immediate access was often credited as major buy in to using technology:

> *I have more resources now than I ever did. And often, there are things that I don't know…so if I don't know what the answer is, now I could just instantaneously get the answer right away. I can look for websites too. There's lots more websites for teachers. So, there's a lot more resources. More ways to get the answers to things.* – SERT, St. Helena

> *Like technology has taken away a lot of mundane tasks and made everything quick and efficient. Even before, we had to do everything by hand, like report cards. Now, it's just like click, click, click, done! Everything is online now. Anything you need. Now we take the instant access for granted, but only few know how we lived before technology entered.* – Teacher librarian, St. Helena

Consider this additional example from a field note observation in a Grade 5/6 classroom:

> *During the language block in class, students were discussing speech topics. One of the students began to describe reasons he wanted to choose Wayne Gretzky for his speech. The teacher remembered that just this morning, he had read a piece about Gretzky on CBC news, which jogged his memory. He immediately used the computer to pull it up and talk about it with his students as a research piece. This was not planned or researched, but it just happened on the spot. Both the teacher and students adapted to this change and went along with it.*

After this observation, I spoke with the classroom teacher about the impromptu Gretzky moment. He responded that this was one of many "awesome opportunities" that technology allows:

> *You are able to say, "okay now this just happened, we're in class, let's talk about it". It's instantaneous. You don't have to plan it, it's like immediate right, and I like that. It helps facilitate different types of interactions with students, especially those who may be more visual.* Grade 6 teacher, St. Helena

These are new types of "spontaneous" and natural classroom rituals that are organically emerging with the help of technology. Collins writes on "natural rituals" that these types of rituals are able to build up mutual focus and emotional entrainment without formally stereotyped procedures (p. 50). In these types of situations, such rituals are able to bring together a community perhaps unconsciously, and the necessary ingredients (i.e. mutual focus etc.) for a successful ritual. With immediate access to information, these types of instances were occurring more frequently. Teachers could freely dictate the ebb and flow of classroom discussions by pulling in and out of technology when necessary—sometimes that was as simple as pulling out their cellphones to look up something quickly.

The ease at which technology has become available makes a difference in classrooms. For instance, in the first wave of technology, teachers had to wait their turns to be able to take their classrooms to communal places like the computer lab (if their school was fortunate enough to have one), which would have limited student's ability to really engage with the devices. Today however, those limitations to technology have been almost completely removed:

> *no longer do you need to wait for your turn at the computer lab. You have information right at the access of your fingertips. Like access to technology is much easier than ever. I have a Smart Board in my class, the kids have their PEDS, I can even sign out iPads or Chromebooks for the day*– Grade 6/7 teacher, Summerville

As technology becomes more available, and as internet technology expands classroom access to resources, there are now more improvised, and less scripted IRs that can better engage students. Just as the previous teacher was able to pull up a timely news article related to the class discussion, many teachers suggested that technology has aided in providing more of a visual learning piece for lessons:

> *It helps planning because I can find easy resources. I find visual examples and put those on the board. It allows me to do this without a moment's notice. Now, I can find things whenever the class happens to be interested. So, like, if we are talking about a natural disaster that just occurred, I can easily do a Google search image for it. I can even use Google to translate things for students. I have an ESL student, so when there is a word that I am having trouble explaining, I either use the app or pull up a quick picture of it to make sure they understand.* – Grade 5 teacher, St. Helena

IRs are as a result, becoming more individualized, as teachers are able to cater to students of all abilities and interests (see Chapter 7 for more details). Even more so, the accessibility, access, and ease to which educators are able to integrate technology and cater to individual student needs has huge implications for cultural capital theory. Since the internet can broaden access to basic knowledge, this can more or less, level the playing field so to speak (see Chapter 5 for more details). In other words, greater access in schools as a whole, means that children from more disadvantaged homes will still be exposed to different kinds of technologies that could greatly benefit them. Furthermore, this individualization of learning needs means that teachers can also better reach all types of students:

> *I think you can individualize it better...because you can have different programs available. But in a classroom where you are teaching one grade, you have to have the same books. But in a classroom with computer access ...you can access very different abilities because it is easily accessible, and you can have all your students to go in their own direction of interests. There are endless possibilities depending on the interests of your own children* – teacher on secondment, TVO

An interesting feature to this, was that more interactions were now occurring online as well. Technology access meant that conversations and exchanges were not just limited to class time anymore, but instead, were carried over to the online world. For example, some teachers were using the internet to connect with their students, and allow their students to connect with each other:

> *Technology has changed the way I even interact with students. Like before, I used to have piles of paper on my desk. Now it's immediate. They had everything online. They get immediate feedback online, instead of me collecting work and having it sit on my desk. I interact with the online through the VLE or OneDrive.* – Grade 6/7 Teacher, Summerville

> *Like I find on my VLE, kids are interacting more with each other on the discussion board. You couldn't do that without technology. Like they comment on each other's posts and ideas outside of school.* – Grade 5 teacher, St. Helena

Likewise, technology has also created a digital realm that allows educators to connect with other educators:

> *Technology is great for like networking. And like networking opportunities… everyone is coming up with ideas together and just sharing general ideas together over like twitter or class websites. You can see what other teachers are doing in the same grade level as you.* Grade 7 teacher, St. Helena

> *…but like, then I can look at other schools can look it up and see what they're doing. So, I follow all other grade 6 teachers to see what they're doing, and they*

> *follow me too. I get some of my ideas just from looking at you know, other teachers on Twitter and on the social media, and what they're doing. So, twitter has become like a way to come put out information but it's a professional development opportunity for me.* - Grade 6 Teacher, St. Helena

> *Well technology has made me able to collaborate more globally. And like really to develop connections.... And you see everybody else's ideas. But the teachers for the most part, who are into tech are the ones who are the most alive teachers. 'Cuz the saddest thing to see is a teacher who's just given up. And someone who's just dragging themselves to the mud every day. And I feel like the ones were interested in tech are the most connected and have got the most things going on in their lives like they're doing it all. So, you start connecting with technology and then you start to really see like it just seems to take over their lives. So, it becomes almost like a life plan.* – Itinerant teacher SDSB

Studies within the sociology of teaching have traditional found that teaching can in fact, be quite an isolating job since it is usually performed in separate classrooms, with normally only one adult in the room (Bakkenes, De Brabander, & Imants, 1999; Flinders, 1988; Sandholtz, Ringstaff, & Dwyer, 1997) and this was often true for first year teachers (Schlichte, Yssel, & Merbler, 2005). By creating an online community, technology is changing this in many respects. It is now uniting teachers together on a digital platform and at the same time, alleviating some of the teacher isolation that is all too common. Even aside from networking opportunities, technology is beginning to affect the nature of teacher communication and interactions with parents:

> *…but it also changes how I interact with parents as well. It's all digital now. I know that freaks out teachers because then parents can message you call the time. But, if introduced properly, then parents won't message you all the time. I use ClassDojo. Then for Twitter, I send out short bursts of information* – Grade 6 teacher, St. Helena

> *Technology is starting to move toward online communication between teacher and parent. That's where technology is headed. Like I like to keep parents updated on what their children are doing by posting pictures throughout the day. Parents can comment and send me messages that makes it much easier than a phone call. More interactions are occurring online than in person.* – FDK teacher, Summerville

Thus, technology has changed many elements of teaching—from interactions with students inside the classroom, to connecting with a host of bodies on the web. As the next section describes, technology can even be used to introduce a new type of classroom management strategy.

4.4.5 Technology and Classroom Management: An Element of Control

The ways in which technology is used in classrooms varies tremendously. Some teachers have decided to use it as a leisurely option for students, while others have imbedded it completely in their teaching pedagogy. Alternatively, many teachers have even started to use technology as a classroom management tool. In other words, for some teachers, technology was slowly becoming a place holder for teacher discipline and authority and was often used to regulate student behavior and attitudes. Quite a number of educators described technology in this way:

> *technology means less behavioural issues for me, less need for classroom management. 100% they are more on task when the tech is used, and I deal with less behavioral issues"*- Special education teacher, St. Helena

> *…and I can also use it as a tool to manage the class. So, if I find that they are too loud and need to bring it down, we do Yoga on the tech....we do yoga on the Smart Board because I have that accessible to me.* – FDK teacher, Summerville

> *Technology makes my job easier. It gives me more one on one time with students. Instead of having the child turn around and start talking or being silly, they sit and work with the technology. It avoids bigger disciplinary issues. I know they would be more on task with the technology.* - Grade 1 teacher, Summerville

> *So, one of the things I like to use is ClassDojo because it is immediate. So, for instance, I can do it on my phone really quickly. When they hear the little beep sound, they know that somebody got points for doing good work. And they know that means they either have to be quiet, or focus, or gotta do their work, or cooperate with classmates. So yeah, the tech is absolutely being used for classroom management. ClassDojo is a combination of class management and learning skills. All of my dojo points are directly related to learning skills and they respond to that. And parents can see their children's behavior too.* - Grade 6 Teacher, St. Helena

This may be akin to the Marxist labour processes literature, which traditionally described assembly line technology as creating a kind of self-control among workers, making it less necessary for supervisors to constantly monitor the workers. There was a sense of alienation present. In the same way, teachers are turning to technology—websites like *ClassDojo* or technology type reward systems—to keep students in check. If we recall, in traditional classrooms that pre-dated technology, teachers were required to set stern classroom rules in order to maintain a level of classroom control. This often meant that teachers had to enforce those stern rules by walking around the classroom, looking over students' shoulders, staring at transgressors, and wield punishment when necessary. While this regime could keep order, it could at the same time, backfire if it sparked student rebellion and defiance, and if it made students disengage entirely. Today,

technology has implemented a way to "control" students that at the same time, keeps them engaged in learning. These technology-type management strategies are useful for allowing students to self-regulate, but at the same time, this also means that teachers have lost a certain level of control over their students. More technology in the hands of students does not necessarily mean it is being used in the most appropriate ways:

> *But the problem is you can't watch them all the time. I feel more comfortable giving them school related technology because you know they won't be doing anything they shouldn't be doing. Sometimes they want to use their tech and it's not the best use of their time. You got to be careful about like what they're doing on the tech that day, and I get making them accountable for it is key. Asking them like when you're done I need a quick little summary of what you've done, and like what sites you've looked at, to make sure they are not just like wasting time. You give them trust until like they do something that is untrustworthy, right? But I have to monitor them too because that is part of my job.* – Grade 6 teacher, St. Helena

> *You never know like when people have the technology in front of them…you don't know what they're doing. Especially with students. Like you want to make sure that they're doing the right thing with technology, but you can't watch them 24/7. But I can't watch them all the time and that's what makes me you know, uncomfortable. But I definitely think that the future is all tech...* – Grade 8 teacher, Summerville

> *I was teaching kids the other day how to setup the cloud, and all the kids were watching, except this one boy. He was constantly engaged in the computer. So, I walked over there...and what is he doing? Watching freaking Shrek!! So, this is one consequence of using technology, is teaching kids appropriate use, but you can't have eyes on them all at the same time.* – Grade 6/7 Teacher, Summerville

In an age where tech-based rituals are beginning to emerge, there may be a double-edged sword. On the one hand, students might engage in more self-control than they would have in print-text dominated classrooms, but this has come at the expense of teachers surrendering some of their own control. This is but one example of how classrooms have been restructured with the induction of technology.

4.5 Overall Classroom Changes

The amalgamation of technology into traditional classroom routines and rituals has also been met with structural changes that are occurring schools. Many teachers referred to new physical changes in their classrooms—communal tables, flexible seating, Smart Boards and other technologies—as having the potential to influence student and teacher interactions with each other. One of the most noticeable features of the "21st

century" classroom approach to learning involved flexible seating and a greater sense of movement in the classroom—creating what some are calling the "Starbucks" classroom[43]. Allow me to paint a picture of this type of classroom:

> *It is a Grade 3/4 classroom that I find myself in today. But this classroom, is not what I have been used to seeing in more "traditional" rooms. There are no desks, instead, there are "21st century learning tools"—communal tables, couches, bean bag chairs, stools, high tables, and other new types of furniture I had never seen in a classroom before. There is no chalkboard, but instead, a huge Smart Board in the middle of the room. Students are scattered all around. Some are sitting under the coat rack, some on the new furniture, others on a blue mat near the couch, while two students are working under a "tent" in the corner of the room. Two boys sit and use the iPad together, sharing headphones and observing whatever is on their screen. Another group works quietly next to them. The room is much quieter than normal. All the kids are fully immersed in some sort of technological device in front of them…. from time to time students will move around and switch their seating. Often, they will move to see what their peers are doing and then decide to either move near them or go back to their original choice. The teacher will often redirect from time to time, "Jackie, what are you working on?", but she has given students a generous amount of autonomy as to where they will do work.*

One can see these types of changes as part of a longer progressive tradition that has aimed to re-imagine the physical space of the classroom, and thereby alter its rituals. For instance, traditional free schools (see Swidler, 1979) often dispensed with rows of desks and traditional classroom structure by attempting to create more home-like atmospheres. They often had greater student involvement in decision making, and more innovative learning techniques. The problem however, was that those schools seemed to appeal to only a limited number of students and teachers (Davies & Guppy, 2018). In a way, they were "too free" and unstructured for most. Likewise, "open classrooms" encouraged students to move freely between various "activity areas" that were offered at randomly arranged tables, not in rows of desks. Walls were removed and were replaced instead with larger "pods" that had tables that could be flexibly arranged, and sometimes with tent-like reading areas, bean bag chairs, and even pillows (Davies & Guppy, 2018, p. 165). They too did not last long, as teachers found them to be noisy and overly distracting. Conversely, in today's 21st century classroom, it seems as though more classrooms that incorporate technology are recreating that progressive ethos. Today's classrooms however have one big advantage over them that makes them different from previous attempts at free or open schools: technology! It is possible that today, technology has become a new-

[43] The basic idea behind a "Starbucks" classroom is the idea of choice. Think of when you walk into a Starbucks, you choose where you want to sit; where you think you would be most comfortable. No one directs you to a spot telling you that you must sit there for the remainder of the day to work. If you need to get up, walk around, or choose a different seat, you are free to do so (see Delzer, 2015).

found form of progressivism; one that has offered a potential solution to the problem of control and distraction that emerged in older forms.

I often asked teachers to think about any noticeable classroom changes they thought were different today as a result of technology. Many accredited new technologies to helping them break away from traditional classroom experiences that had become so ingrained and routine overtime—desks in rows, quiet and obedient students, teacher authority and so on. Leaving these experiences behind assisted in creating a room with more movement, excitement, and an air of collaboration in the room:

> *Yeah, I think technology changes interactions in the class. I think it takes that like the traditional classroom blueprint and flips it on its head. The kids who would be sitting in the back of the classroom bored or sitting just goofing off and not paying attention, don't have the opportunity anymore because it's not a front to back model. Like everyone's everywhere, everyone's moving, everyone is engaged. Kids do work more independently now without the teacher because they have access to technology. Everyone is busy. Everyone is engaged. Everyone is doing something. Everyone is working at their own pace* – Special education teacher, St. Helena

> *... You walk into a classroom now, there are not 30 desks in a row and 30 eyes looking at the teacher. The technology enables the teacher to maybe have like something going on the Smart Board while they move around. And I love it when I see it… students will be like just sitting crouched on a couch or they're lying on the floor or they're gathering around the computer...so it's almost like the Starbucks model. Sit where you think you will do your best work today. Physically, the classrooms are changing to accommodate this. So, you want mats, you want cushions, you want standing desks, you want new lightning, like string lights while you turn off regular lights, you want plants… if you want background music, go for it!* – Itinerant teacher, SDSB

> *All classes should lend themselves more to this type of learning and this type of seating arrangement. A more mobile classroom where we can move around... where we can have kids just in the middle of the floor working on tablets or the Smart Board, as opposed to traditional desks and traditional groupings. We need a classroom that can fold and unfold itself to the needs of the learners. That's why I like the tables instead of desks.* – Literacy support teacher, SDSB

> *Every kid does something interesting…you need to find out what that something is. Give them one hour a week to figure this out—that's genius hour. So, technology is really allowing for this kind of movement. The only reason why you know people's classrooms are looking different is because they saw what's happening on the internet. The "Starbucksification" of the classroom. And this is all new. Makerspaces, genius hour.... They are new. Like even the library is now more of a communal space. Library spaces had a rebirth. You know there's makerspaces in libraries, there's kitchens, there's robotics clubs at the library,*

> *there's computers, there are couches there, like Starbucks spaces. And schools have changed overall. Like some schools are taking empty classrooms and turning them into a Yoga studio for example. And kids are now way more engaged. If they are engaged, there is a greater buy in. And technology really helps with that. Like without technology...you wouldn't know what's going on…you would be living in a bubble and stuck in the 1950s.* -ESL teacher, St. Helena

A major theme in progressive pedagogy has been the idea of moving away from the "sage on the stage" model towards a more student-centered, active learning model. Progressives have over time cultivated a theme in which they claim, as noted progressive scholar Kohn (2015) has, that true progressivism has never been truly implemented, and in order for it to occur, a full-on cultural revolution in education was needed. Kohn has argued that the rarity of this approach is significant to debates about education— "if students aren't learning effectively, it may be because of the persistence of traditional beliefs and practices in our nation's schools" (p. 7). Kohn (2015) argues that that in order for progressive ideals to manifest themselves, there needs to be a *community* in the classroom, along with collaboration, intrinsic motivation, active learning, and the ability to take kids seriously. Seemingly, all of these features of progressivism appear to be occurring naturally with technology. Technology in other words looks like it is driving considerable change in this domain—allowing for flexible seating, movement, choice and other features that free and open schools boasted. Could we have reached a new era of progressivism with the rise of technology? Possibly. Moreover, as one teacher above noted, technology has even begun to make its way outside of the classroom and leave its mark on traditional features of schools like libraries and the nature of librarian work.

4.6 New Role of Library/Librarians

The shift towards more progressive education is not only limited to classrooms and grade-level teachers, but instead, fragments of this new philosophy can be found in other school spaces such as the library and through librarian roles. There is a now a transformation of libraries that have called into question what the purpose of a librarian role is today. With Smart Boards and other technologies being provided to libraries across school boards, there is now, more than ever, a stronger push for libraries to move from being purely a reading hub, to a more "communal" type space that encourages reading, but also provides access to different types of technologies and related activities:

> *We don't even call it a library anymore. We're using words like "the common". So that's the direction that the library's going in. More the common room. So, this means like it's more like a common area for everyone. They're trying to move towards like a virtual learning environment. Having books still, but more like online resources like virtual libraries and other kinds of new technologies. See they want to move like the shelves and tables so that they can create a different work space and I think that's a great way to good way to keep people involved.* – Teacher librarian, St. Helena

This shift from a space that was once dedicated solely to books, to one that has embraced technology, has also changed the nature of librarian roles. Once upon a time, the role of the librarian in schools was to order literature, stock shelves, and normally, to read to students. However, with the influx of technology, librarians are now being held accountable to integrate technology in the library "space", and offer that support to other teachers and students:

> *Yeah, my role as a librarian has changed. I bring a lot more classes in here to do research and like showing them how to find information on the computers. Once the computers arrived, the shift became how to teach students to use computers, how to do research, what is considered good information, etc. Now I have to spend their "library" time on the computers. So, it has changed my role. I just don't have the time that I used to. When technology first started, a lot of teachers didn't have expertise, so we were expected overtime, as librarians, to have that focus.* – Teacher librarian, St. Helena

> *...when I look at my day, a lot of my time is spent helping students with the tech piece. You know, like my email is not working or, my password isn't working. Can you help me with my iPad? So, I kind of oversee the lab now. So now I am teaching them how to use Microsoft. How to use the OneDrive. I am sort of like a first level IT person.* – Teacher librarian, Summerville

Much like the case with technology in grade-level classrooms, having new sets of digital responsibilities in place in the library has also created new sets of stressors for librarians. While creating more opportunities for student learning, teacher librarians in this study often found themselves at the forefront of technical problems:

> *Now I have to troubleshoot all the problems right. I now deal with problems I never had before. Like almost every day at least once or twice a day there's somebody who lost their password or put in the wrong number or whatever, so I have to reset their passwords all the time. So, my job has taken on another role. Whereas before it was like controlling the library, now that the tech piece has entered, there's more for me to have to do. To help people with. Teachers and students. So, I have to stay on top of things. And how it changes. I like that, but a lot of people don't feel comfortable and they get out of the librarian role because they can't keep up with the technology. So, technology, yes has done good things for a lot of people but it has also changed the kind of work I do at schools.* – Teacher librarian, Summerville

Overall, it would seem that technology has the potential to facilitate new interactions outside of just the traditional classroom. With library spaces being turned into communal hubs where students are encouraged to engage with each other and with new types of technologies, traditional library routines have been altered. The routine of coming to the

library, signing out a book, and having an exchange with a librarian—regarding an overdue book perhaps—has expanded to a new kind of learning space involving technology. New sets of ritual interactions are now emerging as the following observation describes:

> *The librarian welcomes a Grade 7/8 classroom to the library today. There are six round tables spread out in the library. On each on the there is a set of iPads spread out. She instructs the class to come have a seat and face the Smart Board. They do a few activities on the Smart Board as a class (mainly Kahoot! quizzes to review for their upcoming Social Studies test). Afterwards the teacher instructs students to work in pairs/groups with the iPads. She has, around the room, placed "QR" codes for the students to scan using the iPad. Once they do this, it loads a video that they are then to watch and answer questions about. The students were all mutually engaged on this task. It was clear that there was a level of interest that was made possible in part, by technology* – Field note, Library, St. Helena

New ritual type interactions are occurring in libraries as they are in classrooms. Technology has created new meanings as to what the purpose of libraries are, and the overall roles of librarians. With more librarians being trained to "teach" research skills and other tech-related skills in the library (which is only growing in the amount of technology offered), more students are being taught necessary tech skills. This means that there is now an extension of cultural capital from classrooms to librarians. Students today are no longer limited to only the exposure of skills taught in grade-level classes, but rather, now the very act of going to a library (and having a tech-trained librarian), is providing students with greater technology skillsets than ever.

4.7 Conclusion

This chapter has considered technology's role in producing new interactions and rituals unique to 21st century classrooms. It began with a look at some of the changes surrounding student interactions, discussing the fixation students have with technology, and how this mutual focus of attention can help facilitate successful IRs. From here, it discussed the increased student engagement that teachers were convinced occurs when technology is used. This was supported by evidence of student body language and attitudes towards learning that were also contributing to successful IRs. Body language is key for Collins (2004) framing of what constitutes as a positive IR, one that can cultivate high levels of EE. A mutual focus of attention on the symbolic "technology" emblem meant that students were creating a level of group membership based on their knowledge of particular digital resources. This has implications for cultural capital theory as well, as peer groups are in a sense informally dictating what is become *valued* knowledge. Having a common interest with peers was important for producing higher levels of engagement with digital resources. Thus, my interviews and observations with teachers suggest that the availability of new digital tools in classroom can in fact, facilitate new types of interaction rituals between and amongst students and teachers that have slowly begun to

shift classrooms. In addition, group membership around technology has given new meanings for cultural capital theory in light of digital technologies.

The second half of this chapter looked at the changes in teacher interactions that have become evident with technology. The biggest modification has been a step back from teachers as authority figures. There is now a shift in teaching-led "expertise". With modern day digital tools—tools in which students often exceed teachers in their knowledge—interactions between teacher and students have now become more parallel. Teachers now learn from students, and students now learn from each other, and vice versa. Teachers have become decentralized in classroom rituals which in a way, has born a new type of classroom routine and ritual—teachers and students as co-constructors of knowledge. These new kinds of rituals have implications for how teachers navigate their own classrooms. Many for example have now moved away from traditional routines involving standing in front of the class and lecturing, and instead, have embraced a more fluid type movement in the classroom; being more mobile and dynamic in the room. However, acceptance of technology has also meant a change in teaching workloads. On the one hand, they have allowed for the ease of accessibility in pulling up "on the spot" material when needed. However, by the same token, it also means teachers must teach themselves technology and plan ahead of time for their students. With technology, educators are creating more online learning interactions with their students—allowing them to interact through online platforms—but also, they are utilizing the internet as a way to connect with parents and other educators, making teaching less isolating. Aside from fashioning new interactions, technology was also being used by educators as a tool for classroom management—being implemented to help students self-regulate, while at the same time, giving up a level of teacher-control.

The rise of technology has also created shifts in the physical layout of classrooms. There is more of a progressive-type ethos that seems present in classrooms of today, with many educators parting ways with traditional desks, chalkboards, and orderly seating, and moving instead towards a classroom that is set up for collaboration—tables, comfortable chairs, and the ability to choose where to work. This has even spread outside of the immediate classroom to libraries, which have become more of a communal technology hub that also encourages movement of students and teachers. This has come at the expense of librarian roles, which have expanded to include technology as part of their skillsets. In sum, there seems to be some sort of budding relationship between technology and 21st century classroom interactions and rituals that have significantly altered what classrooms look like. Table 5 below summarizes my key findings from this chapter and their implications for theory and policy.

Table 5: Chapter 4 Findings and Implications

Theme	Older Pre-tech, Traditional Pedagogy	New High-tech, Progressive Pedagogy	Implications for Theory	Implications for Policy
Focus of attention	Teacher centered and directed	Decentered, as students focus	Tech lessens the focus of	Forces us to reconsider forms

	Students easily distracted	on tech and become more active	rituals, re-directs them to tech, sometimes individualizing them	of progressive pedagogy, both their attractions and trade-offs
Student Engagement	Highly variable	More consistently high when technology is used	Tech seems to be tapping into a ritual mechanism of introspection	Usually a good thing, though depends on whether its accompanied with sound pedagogy
Group Membership	Dependent on various factors often times group membership could lead students away from academics	Largely linked to technology Can reengage students in academics	If tech is important to group memberships, students more likely to engage in high EE rituals New valued type of cultural capital emerging with technology	It is important to consider what is valued in peer groups and utilize it in lessons and teachings (i.e. what games are students interested in?)
Teacher-Student relationship	Unilateral Teacher authoritarian; student passive	Student-led, co-constructors of knowledge with teachers	New rituals that include both student and teachers together	How can we create classrooms where teachers are comfortable with relinquishing some control?
Movement of Teachers	Usually limited to the front of classroom; at desk	Forces teachers to move around more, work in conjunction with students	Bodily presence is important for facilitating rituals with high EE; teachers are part of these new rituals	Important for teachers to reflect on their interactions with students. Do they participate with and help energize their students?

Teacher workload	Planning limited to textbooks/curriculum documents/previous experiences More mundane type of work (i.e. photocopying paper)	Information is plenty and now easily accessible has freed up teacher time in some ways (i.e. uploading worksheets) but also created additional planning with tech	Access to information makes for more spontaneous rituals A properly planned lesson will engage students in more successful rituals	Are teachers being properly trained on technology in order to alleviate some of the extra burdens whilst using technology?
Interactions with others	Limited to physical engagement inside the classroom	Tech allows students to interact with their peers online on class websites Allows teachers to connect with parents and other educators online as well	New rituals question the extent to which physical presence is mandatory. Can similar online interactions occur?	This provides a new medium for students to "participate" and communicate with peers Teachers can feel supported online through a network of other teachers
Classroom Management	Teacher set strict rules/orderly classroom/expected silence/ teacher often walked around to monitor students individually	Technology/apps are being utilized to help students self-regulate; less teacher control	Technology has created new everyday routines and rituals around self-discipline	Can technology-based classroom management apps have long-term benefits for students and teachers?
Classroom Layout	Desks, tables, rows, chalkboards	Smart Boards, different digital devices available, communal tables, comfortable seating	New type of progressive pedagogy that is occurring unintentionally with technology (compared to free/open	Are classrooms being properly set-up to facilitate 21st century competencies and skills? What are the long-term

			schools of the past)	impacts of flexible seating on student achievement?
Library	Used mainly to house print-text Librarian in charge of book selection and read-a-louds	Transforming to "communal" hubs with multiple purposes (including tech) Librarian role to integrate technology into teachings	Greater transmission and exposure of tech skills to kids; more cultural capital	Are libraries/librarian teachers being used in the most effective way possible?
Collaboration	Much individualized work	Seems to facilitate collaboration by shared interest in gaming	Tech becomes an emblem for a group, provides new set of ritual chains for 'nerds'	Refers teachers to the *purpose* of technology—are they using it in ways that facilitate collaboration?
Expanding classroom resources	Resources largely fixed, static	Resources greatly expanded, almost infinite	Adds a dynamic, improvisational element to rituals	Places more onus on classroom planning Are teachers made aware of the number of resources available and how to use them?

CHAPTER 5

SOCIAL STRATIFICATION and STUDENT ENGAGEMENT:

TECHNOLOGY and the DIGITAL DIVIDE

Let's say that kids don't have access to it at home right....at some point, if they enter the workforce they need to. And it is our job to prepare them for that, regardless of what they have available to them at home. That's like saying, okay this kid didn't bring a pencil to school today, so I'm not going to teach them how to write. I think that having the technology at school really closes the digital divide.... like that digital learning literacy gap. If you approach it the right way, that is. If kids don't get that stuff at home they're getting exposed to it at school. We're trying to build more of a technological community and that is making a more even playing field for students.
- Consultant teacher, SDSB

5.1 Introduction and Research Questions

Whereas the previous chapter considered the link between IR theory and new technologies in producing new type of classroom interactions, this chapter focuses on the SES disparities in engagement, or what can be dubbed "the engagement gap", as it relates to technology in schools. In other words, I put forward the following question: *Can the use of digital technologies in classrooms alleviate some of the disparities in learning that were evident with print-text literature?* This chapter takes the stance that with technology infiltrating most Ontario schools and home life, it is now conceivable that technology may be able to reduce many home-based SES disparities—as it is providing access to *most*, if not *all*, students. Through this chapter, I propose that one of the unintended consequences of using technology as an educational tool, compared to more traditional forms of print media (i.e. books, newspapers, magazines), is that there is strong potential to reduce home-based inequalities and create more of an "even playing field" for students. As a result, there is a wider distribution of fluency of what we can call, "digital literacy"—competencies and familiarity with technology (including skills, knowledge and behaviours) involving digital devices (i.e. tablets, laptops, smartphones) that most often, children are securing for themselves. In other words, kids' orientations towards, access to, and familiarity with, digital technology is much more evenly distributed than it was for high quality print text. This chapter will explore the potential that new technologies have in increasing student engagement, compared to print text, by offering new opportunities for learning. I propose that unlike print text, the use of technology is successful in reaching more students inside and outside of schools, giving them greater points of access to information, which can translate into greater ritual excitement. With more technology becoming available in schools, more students from a variety of SES backgrounds are able

to use, learn, and take advantage of this learning tool in ways that they could not with print text. The nature of technology has also made it possible for students to go beyond mere teacher transmission of information, and instead, allow for greater self-initiation of learning through for instance, navigating the web, or even through peer transmission. Thus, one could hypothesize that when it comes to SES gaps in student engagement, technology might be doing more to help narrow the divide, then to perpetuate the gap.

This chapter begins by first outlining the sociological relevance of this new phenomena. In particular, unpacking the potential for technology to provide more equalizing opportunities for students, and for some, even their first exposure to some forms of technology, regardless of their SES. This largely has to do with the ways in which access to technology have increased since the use of print in 20th century classrooms. From here, I discuss how the expansion of technology in schools is able to create new sets of interaction rituals amongst students. Thus, with the accessibility of technology in classrooms, students are not only being held more accountable for their own learning and for that of their peers, but the ease at which students are acquiring digital skills is facilitating a greater kind of ritual excitement in the classroom, that can have immediate impacts for student engagement, as well as for future job prospects. Lastly, this chapter explores new types of home-school connections that differ from that of the print-text era. In specific, it establishes the possibility that because technology allows more learning to spill over into the household, it creates extensions of school learning that have become much simpler than previous generations of print-based learning. These extensions can reengage students into learning by virtue of making access to information outside of much school simpler. In doing so, these extensions have the potential to reduce stratifying processes that were more prevalent during the print-text era.

5.2 Technology and the Digital Divide: Sociological Implications

Much of scholarly literature within the sociology of education has concerned itself with issues surrounding school inequality and disengagement. Classic literature has normally portrayed working class students as being largely disengaged in schools, either as bored or passive, or engaging in resistance (recall MacLeod, 1987; Willis, 1977). These were characterisations of 20th century classrooms that largely used print media to educate students. In essence, print media "technology" played a role in student engagement historically, as it was often seen as boring, stiff, uninteresting, and irrelevant to kids' lives. Interestingly, there seemed to be a documented trend that emerged within the literature: that on average, middle-class students seemed to be much more engaged in school material than were working class kids, who often exhibited more visible signs of disengagement. While there of course remained variability in the levels of engagement, we can use both extensions of Bourdieu's theory of cultural capital, and Collins to understand why there may have been more noticeable engagement gaps that related to SES.

For starters, in Bourdieu's original formulation, he understood that there were greater points of contact between middle class culture and school curricula. Through a

fixation on reading, styles of speaking, and a general familiarity with classic humanities, he implicitly assumed that familiarity with curricula could breed higher engagement and school outcome (Bourdieu, 1973, 1986; Bourdieu & Passeron, 1990). DiMaggio (1982; DiMaggio & Mukhtar, 1985) extended this line of thought to focus mainly on the home cultivation of reading and related skills that generate success in school. Having exposure to more "highbrow" culture such as family vacations or trips to museums, and the skill building that is often associated with such exposure, could breed engagement according to DiMaggio. From Lareau's (2003) understanding, middle class parents have often strived to recreate school-like conditions and connections at home. This could include signing children up for extracurricular activities or hiring private tutoring for instance. In Lareau's framing, "concertedly cultivated" kids could then take their confidence and feelings of entitlement into the classroom, which could then generate greater engagement (see also Calarco, 2018). Through Collins' theory, it is likely that activities that align themselves with school discourses could generate successful rituals, and subsequently, increase student engagement. The act of reading with a child before bedtime for instance, could generate a successful ritual chain. In this way, associating reading with pleasure for a child could then be extended into the classroom, and perhaps could contribute to their engagement with reading. Thus, it is safe to say that student engagement in learning has traditionally been related to the kinds of prior exposure and access students had *outside* of schooling. More home-based resources, coupled with stronger parental engagement, often meant students were exposed to more skills that were aligned with school-based discourses, which could thus, translate into greater school engagement. While this was largely the case with the print-text era, the 21st century has seen a significant rise in technology both inside and outside of the classroom. In an age where technology permeates schools more so than ever—an age where technology is readily available and much more accessible than print text, is it possible that this has new implications for student engagement?

5.3 CHAPTER FINDINGS

It is essential to state that the data discussed in this chapter are not representative of all lower or middle-class schools or students by any means. They do however, offer a space in which to begin to consider what benefits technology might allow for students who may come from lower-income households (or households in which technology might not be present[44]), and how this can translate into further school engagement[45].

5.4 Accessibility

[44] Which seems to become increasingly rare these days. See statistics further down.

[45] As a reminder, by virtue of taking a qualitative approach, this research can provide valuable insights in terms of thinking about how enhancing student engagement may impact subsequent student achievement.

5.4.1 Access for All

Two students are sitting on a desktop playing on the educational website, "StarFall[46]". The boy turns to his friend and says, "I want to play this game at home, but I don't even have a computer or tablet…" It was at this point that I wondered whether such technologies could provide an equalizing medium for students to use during school hours.
– Field note, Grade 1, St. Helena

It may be startling to think of anyone in Canadian society who does not own, or has never possessed, a single piece of digital or electronic technology, computer, or cellphone—and for good reason. According to recent studies, 76% of all Canadians surveyed actually own a smart phone[47], 90% own two or more digital devices, and 71% own a laptop (Statistics Canada, 2017). Still, who could have predicted even a decade ago that technology could come full circle and would be spearheading much of the conversation regarding 21st century competencies in education? From this view, schools are offering new opportunities for students to gain experience with digital tools in novel and profound ways. This is perhaps the most obvious change we can witness in today's classrooms. Teachers that I interviewed and observed in this study strongly believed in the ability for schools to now provide important and necessary learning opportunities for *all* students, regardless of their individual home situations. This is perhaps the first major distinction that separates print-text from technology—accessibility:

> *I think like if students don't have access to tech at home, and they come to school, it is a huge benefit to their learning.* - ESL teacher, St. Helena

> *Yeah, like I can teach students the skills that they may not have gotten from home. It could be a benefit of the tech... like letting kids have access to technology at school if they don't have it at home. It's nice that they can learn these skills at school now.* – Junior/Intermediate teacher, Robotics Project

> *To an extent, I think that these technologies can close the digital divide, because you are providing a resource that maybe not all students would get.* - Grade 2/3 teacher, Summerville

> *…. you don't realize how many people don't have even things like Microsoft Word at home. Some people don't have laptops at home. This year, every one of my kids had access to technology, but last year I had two who didn't. I asked at the beginning of the year…so all that meant was that all their work has to be done in school. Problem solved.* - Grade 5 teacher, St. Helena

[46] *Starfall* is a children's website that teaches basic writing and reading skills (see http://www.starfall.com/).
[47] Similarly, around 77% of Americans own a smartphone (Smith, 2017).

Most, it not all, teachers in this study were cognizant of how much more accessible technology has become over the years, and how this availability can provide new types of experiences with digital tools for students who may not have had such an option before:

> *Either way, even if kids don't have access at home, at least they are coming to schools where there are options, there are laptops, iPads, computers. At least they get access to technology at schools. And if I have a student who had nothing at home, I would do more to make sure they had time during school with it* - Special education teacher, St. Helena

> *And I had a student when I first started at the school. His mom could not speak English, very minimal, but not a hundred percent, so he struggled academically. And when I asked his mom to try an alternative to her reading to her son, Raz-Kids[48], she told me they don't even own a computer. So that was a huge disadvantage for his learning. But because I knew that, because I knew he had no technology at home, I sent my class, and him in particular, to the computer lab pretty often, right? Like I don't know if he would have been given that opportunity otherwise. So, in this case, having this boy access technology during school hours was monumental for his reading comprehension. It the end, it really depends on the student and like their family background and what kind of exposure and familiarity that they have had.* - Grade 1 teacher, St. Helena

Today, there are greater opportunities for students to access new and up-to-the minute information with technology than there was during the print-era. This lies in the simple fact that digital technology is much easier to acquire than books or newspapers were in previous eras. One does not need to go far—to a bookstore, library, or even a museum—to get their hands-on prompt information like before. Consider this example: during the print-text era, encyclopedias were often considered a luxury source of information to have. Owning a wide-ranging set of encyclopedias could often range upwards of $1000 thirty years ago. To be able to stock a home with a good selection of books, or to even have a home library with quality books could have costed thousands of dollars. Today, this has changed. To buy a decent, outdated even, iPhone for instance, will not cost you more than a couple of hundred dollars. Even a relatively older cellphone can still give you access to the internet, in addition to having a phone, camera, email, and arguably even replacing the need for a landline and TV. Monthly charges that one might accrue could be considered roughly equal to what the cost of a monthly subscription to a newspaper or magazine might have been. Thus, while acquiring books and other print literature may have been costly in the past, perhaps reserved for middle class and wealthier households, today one does not have to invest a huge amount of money to secure a device, as they are becoming cheaper and more easily acquired. This, coupled with a convenience factor, and

[48] Raz-kids is a teaching product that provides online comprehensive leveled reading resources for students. It is, in short, an online digital library which gives students the options to either be read to, or practice independent reading on any digital device (see https://www.raz-kids.com/).

a growing desire for more digital learning tools in schools, means that technology has great potential to chip away at some of the stratification issues that remained from the previous print-media generation. According to Haste (2009), hand-held devices, which are often seen as "cool" and essential by young people are rapidly both dropping in price and becoming more sophisticated. Future education, according to Haste, should be able to assume that internet-accessible, communication-rich technology will be in the hands of all young people, just as in the past we assumed they would all have pens, rulers, and compasses (p. 5). Even in schools with "fewer" tech options to select from, options still exist. Schools with limited board-provided technology are attempting to supplement for instance by allowing students to "bring their own devices", or "BYOD" as it is known. This has huge implications for schooling:

> *I think the technology is getting a lot cheaper...and soon it won't be an issue around money. Like I mean, you can buy a tablet from Costco for less than a hundred bucks. Things are really coming down. And you can get cheaper devices and BYOD is also changing like access for all. Now there are even like cops that will come into the school…you know, the police officers have a program for kids in need, and they give kids computers…. technology access is becoming less and less of an issue…*- Grade 6 teacher, Summerville

> *Almost everyone has a computer or laptop now, even whether it's a family computer. I might tell them like, if you cannot access technology then you need to come see me. Like every parent has a phone or something. I've never had an issue where someone didn't have prior exposure or access to a piece of technology at home. And even if they didn't, it wouldn't be hard to provide access…* - Grade 5 teacher, St. Helena

> *I've got students who barely have enough food throughout the day, but hell, they'll have the latest iPhone.* - Grade 4 teacher, St. Helena

This is an undeniable fact of digital technology that is hard to ignore—it's everywhere. Some teachers, like the Grade 7 teacher below, have even begun to notice that technology can act as a "neutralizer" in a sense, by providing a common experience to students regardless of any class differences[49]. Thus, students who may not be able to afford to bring in their own devices from home, now have new opportunities to benefit from school-housed resources:

> *This community is pretty middle-upper class… probably more upper. When we first started, I found a few kids that didn't have technology at home. You would send home like research and they didn't have computers at the time I started*

[49] Although I do consider policy concerns about the regulation and distribution of digital technology in Chapter 8.

> *teaching. Now, that's changed. The biggest issue now is that many don't have a printer. That's usually the only issue. I think having the technology at school makes everyone feel more accepted right. You bring an iPad cart, and everybody gets the same one, verses allowing some to bring their PEDS to school and then you see the difference right, and like maybe twenty out of twenty-three have PEDS that they can use and three don't, then there's a problem. It singles kids out more than anything. And then students could judge each other like "oh you only have an iPhone 4", or "you have the old iPhone".* - Grade 7 teacher, St. Helena

Schools are gradually attempting to provide students with different kinds of resources they need to succeed *in* school—alleviating some of the burden that might have been placed on parents at home. This new level of access has implications for cultural capital theory. Recall that print literacy was seen as essential for Bourdieu's formulation of cultural capital. For Bourdieu, the ability to read and write was necessary for student engagement and subsequent success, and that ability was forged largely at home. In other words, the kinds of exposure that students had at home, *prior* to even beginning school, have traditionally played a major role in student attitudes towards school. For instance, various studies of school readiness (see Duncan et al., 2007; Hart & Risley, 1995; Magnuson, Meyers, Ruhm, & Waldfogel, 2004 for instance) show that gaps in early literacy and numeracy can be detected at very young, preschool ages. In Hart and Risley's (1995) well-known study, the authors found that family circumstances have a profound effect on how much exposure a child has in their most formative years. In specific, children from lower-income families hear about 1500 words less per *hour* than children from more professional families. If home environments have traditionally either hindered or assisted in providing children with accessible books or other forms of print media, the question is, has digital technology somehow altered this set-up, perhaps by providing new kinds of access points to a wider assortment of students? Many educators and administrators are becoming aware of such disparities and are even beginning to adjust demands regarding student work. Teachers are now increasingly allocating more in-class time to work on projects, assignments, and homework using technology. In doing so, they are beginning to afford more school-based resources to compensate for any home disparities[50]:

> *Like sometimes I hear students say like my printer doesn't work…but they then just print it off at school. We have all the tools now in schools. Now they could print off their work here using something like a Dropbox or OneDrive. Kids can even finish their assignments online and then they can just drop it in the Dropbox. Just like in University. You know, they could use PowerPoint, or they could use Prezi… they could do everything online, so they don't actually have to print anything off or do anything by hand. They can drop off their presentations and then access it from my computer. They don't even have to bring a USB anymore.*

[50] From my interviews with teachers, it seemed as though the biggest concern today was whether or not a student had access to a printer at home.

> *So, it just makes everything more efficient—easier and efficient. And once the teacher is comfortable with tech... it makes a difference!* - Grade 6 teacher, Summerville

Throughout my own in-class observations, I too often saw first-hand how some students could benefit from more technology in schools:

> *During a language block, the teacher is reviewing with students' what elements make a good speech. After spending a chunk of time conferencing with students and providing examples, she allows students time to start working on their rough copy. She tells the class that she would like the rough copy typed and printed off by Friday. One student approaches her and says, "I don't have a computer at home. Just an iPad. Can I use that?" She replies, "No, you know what? Just work on it at school. Since Johnny is using our classroom computer, go down the hall to Mr. X and use his computer during class time to type it up. Then, just save it to the drive and print if off Friday morning". "Oh, that's easy", student replies.* – field note, Grade 6, St. Helena

Such examples illustrate how technology has made learning more efficient than before. For some students, this could also be the first time they are exposed to certain kinds of technology or tech-related activities. For instance, a common theme amongst many of the teachers and administrators spoken to during the robotics phase of this study was that for many of the participating students, this was their first "real" experience not only with technology, but with learning *how* to use the technology in a purposeful way—how to build, code, or program:

> *…And for our kids, most of the home situations don't allow for the extras. They are not the kids that are doing this in summer camp and that kind of stuff. For a lot of them, it is the first time they have ever seen anything like this. They are just really excited to be working with it [robotics]* – Junior/Intermediate teacher, Robotics Project

For other students, like many of whom participated in the summer-literacy camps, technology skills were not something that were necessarily learnt at home:

> *During a "scrapbooking class", kids are working on their iPads to type up sentences to accompany pictures for their "all about me" section. Most of the kids are working on the iPads with no issues and seem to know exactly what they are doing. There is one child who seems to be struggling a bit. She turns to her peer and says, "I don't know if I am doing this right…I don't have one of these at home". The teacher overhears and decides to sit next to the student to teach her how to use it. She says, "here, let me show you what to do. You use this button to turn on the iPad..." She continues to teach the student how to navigate the iPad (something which the other students seem to have taken for granted). This*

> *exchange continues as the student wonders if the iPad "is dead", and the teacher reassures her that "maybe it is just not turned on…okay let's see…this is the button that turns it on and off". This lasts for a few more minutes, as the teacher continues to provide this student with valuable skills on how to use this piece of technology. Within minutes, the student was able to continue using the technology without teacher assistance* - field note, Summer literacy camp, Spring Hill

This is an example of an encounter with a student whom perhaps had very limited, if any, prior exposure to technology. Within minutes the teacher was able to turn this into a "teachable" moment and give that child the tools they needed to catch up to their peers. Perhaps more importantly, the student was able to pick up the skill quite fast. It is questionable whether reading and writing skills could as easily be taught "on the spot" in the same way described above. Many students often struggled with print literacy for years before they could truly read or write. But yet, here we have a learning tool that students seem to be handling with little to no learning curve. Ultimately, there seems to be an ease in which students are able to learn such digital skills, even by just being exposed to it during school hours.

5.4.2 Student Ease with Learning Technology

> *Oh yes, students know what they're doing. They know all the settings on the iPad…they know… they all know how to use it. There is no learning curve. Whereas like, when they go to the computer lab they don't even know how to hold a mouse. Like how to right click or double-click. They don't know how to do that. You know, like even the kids in my class who were struggling financially... they still have experience on iPad… like an iPod or something. They've got the schema from somewhere or something. But give a child a book, and could they pick up the skills to read as fast? I don't know.* - Teacher librarian, Summerville

I would argue that one of the most fascinating features of this new wave of technology is that, unlike traditional print media whereby students for years were taught how to read and write, often being pushed or encouraged to visit libraries to improve literacy skills, or sometimes prompted by parents who read to them every night, technological fluency, or "digital literacy" is a skill that students seem to be having less difficulty achieving. Students even as young as four and five are being praised for their knowledge of technology[51]:

> *And really if you think about it, like none of them [Kindergarten students] have used a Smart Board before, but there's no learning curve when they come to school. They're just kind of like, "oh okay". They are good with that. It's not like*

[51] What fascinated most teachers in this study was how younger children were able to master touchscreen technology at a rapid pace but yet, struggled with more "older" forms of technology such as a desktop computer and mouse. As one teacher put it, "they are used to a world where touchscreen is there. Old computers are not part of their world. Like sometimes I actually see them trying to tap on the computer…" – Teacher librarian, St. Helena

> *they are like, "no I don't want to try". I don't know if they have gotten that exposure from somewhere else. That's really interesting, right? Whereas you give them a book to read, and they are like um…?* - FDK teacher, Summerville

This was true even for students who had very limited, to no prior exposure to technology, either because they could not afford it, or did not have access to it. In either case, teachers unanimously agreed that this is something that students were able to rapidly acquire—much quicker than they would have with more traditional forms of print literature like books:

> *I have one kid in my class who doesn't have a computer at home. No internet access at home either, and you have to allow him the time that he needs to still put together his presentation knowing that he doesn't have that. Like for my class website for instance, there's a discussion section so I could post discussion question and say like okay you have to post and respond, but I need to give him time to do that at school. But he is already familiar with technology. That's the funny part. Maybe he doesn't know the newest or latest thing...but he sure knows how to navigate that piece of technology in front of him* - Grade 5 teacher, St. Helena

> *Even in grade one, they are so quick and learn things so fast. Last year I had a student who had no technology at home, but she just picked it up so quickly. Surprisingly, she became the most fluid, like she became the student who had the most understanding of technology and she had nothing at home. I'm not sure I would be able to say the same for a child with no books at home* - Grade 1 teacher, St. Helena

> *It's very rare to encounter a student with no technology exposure. Like [name of student] was new to the country, and she was able to use the iPads and computers, no problem. She would have had no access to technology, but she picked it up so fast and that was a great experience to see. She came from a new country and she was able to do it. She had minimal technology but picked it up so fast. And she doesn't even have any at home* – Grade 1 teacher, St. Helena

The "ease" by which many students in FDK to Grade 8 were able to pick up tech-related skills was not just limited to mainstream students, or students with exceptionalities. It is significant to mention here, that this fluency also translated to students who have been identified with learning disabilities and special needs (to be discussed in greater detail in Chapter 7):

> *I don't think there is a learning curve for students who don't have any technology. Thirteen and fourteen-year-olds really know how to use it. Even my ASD student. He is just self-taught, and probably, a lot of it he is getting just from school. He sits on his computer and creates so many PowerPoints just on his own! He*

> *decided on his own what this is, and what he likes to do. It's still a skill for him. Like that facilitated independent work for a special needs' student. He would just sit quietly on his own and the create PowerPoints of celebrities or like who won the Grammy's last night. Then he would ask me to present it to the class.* - Grade 8 teacher, St. Helena

> *So, what technology can do, and most teachers get it, is it can change the life of a child with needs. I feel like a kid who can't read or can't write or has physical handicaps like a hundred percent technology is their tool for access. The most amazing thing is that it usually takes very little "teaching" for them to understand how to use it. Some of my students even teach me how to troubleshoot the Smart Board when I get stuck.* - Special education teacher, Summerville

To return to the question of student engagement and stratification, what can some of these insights mean for 21st century schooling? It would seem as though technology has the potential to enhance deeper learning and core skills by virtue of it being both accessible and user-friendly for youth. Students of all ages and abilities are likely to benefit from the integration of technology into classrooms. This appeal makes it not only more likely that even the youngest of students will be exposed to technology earlier on, but that they will excel at it too[52]. Whereas older notions of cultural capital theory such as DiMaggio (1982) often related middle-class familial exposure to highbrow culture as a marker of success for children, technology seems to bridge this gap, by providing both access and convenience to information that students are picking up effortlessly. This can give new meanings as to the substance of cultural capital in today's digital world. There is no denying that given the choice between a hardcopy book or being able to use a digital tool, many students would likely gravitate towards technology[53]—in fact, I often witnessed this first hand when in classrooms. On the surface it may seem as though many children find print reading to be a much more uninspiring and disengaging "chore" than using

[52] Thinking about technology use is particularly important when considering young children. For instance, Davies, Janus, Duku, & Gaskin (2016) have found that gross and fine motor skills in kindergarten were significant predictors of Grade 3 EQAO scores, even when controlling for other skills and capacities. If gross and fine motor skills are critical for subsequent success, perhaps it is worthwhile to consider whether tablets and other forms of digital technologies can actually give students with vulnerabilities in gross and fine motor skills an alternative route to learn more advanced skills, bypassing the need to print and write neatly. Studies such as Bedford, Saez de Urabain, Celeste, Karmiloff-Smith, and Smith (2016) have also suggested that earlier exposure to touchscreen technology can in fact be associated with earlier fine motor achievement.

[53] More integration of technology should not be seen as an alternative to text literacy, as the use of digital technologies still requires students to have some basic from of print literacy—knowing how to decode and understand words for instance. This means though, that digital technology may not be able to really impact any disparities in acquiring those rudiments. However, on the other hand, digital technology does seem to deliver texts in a way that appears to engage a variety of learners, more so than print text. In fact, one student I spoke with said he prefers reading on an iPad because if he is stuck on a word, there are more tools available to help him, compared to when he reads a book and is limited to using "his head". Perhaps taken in this way, digital technology can enhance the motivation of problem learners to work on their rudiments.

technology. Electronic text by contrast, seems to much more engrossing and enchanting for many students. Reasons for this could vary—perhaps it is more visually and aesthetically pleasing, given its different sounds, colours, and more game-type elements that make it "fun". However, there could also be another factor at play: perhaps student enthusiasm and engagement towards using technology rather than print lies in the fact that this is a growing part of youth culture. If using technology is essential to group membership and interactions (as the previous chapter highlighted), maybe this can entice students to excel in it, which at the same time, may engage them more in school culture, *and* at the same time reduce SES disparities.

5.5 Ritual Extensions in the Classroom

5.5.1 Student Accountability: Student-To-Student and Student-To-Peer

> *One student approaches the teacher. "I only have daddy's old computer at home, so I don't know how to delete this…can you help me figure it out". Another student overhears and quickly chimes in, "I can help you!". He fixes the problem for the student and explains to the student how to deal with it next time. "I have two computers and an iPad at home, so I know this stuff", she says.* – Field note, Grade 3/4, Summerville

It has become much easier for students to take control of their own learning, and the learning of their peers through technology. More resources are available now at students' fingertips, and with teachers migrating lessons online, there is greater student accountability today. In traditional 20th century classrooms, there was a larger emphasis placed on teachers and parents to take ultimate control for student learning. However, in today's 21st century classroom, students are now also deemed to be the stakeholders in their own education. Teachers often drew attention to the fact that with technology, there were no more "excuses" for students not "completing assignments", or "not finding extra information online". No longer are students bound to the confides of home-provided resources, as technology both in school and out of school, makes it much harder to have "unsolved" questions:

> *Students know they are learning…but they can learn all the time. And if they don't know something, they know how to find the answers. Before, like when I first started teaching, if students couldn't go to the library or read or whatever, they couldn't find the answers. Really, they were always kind of stuck with no answer way back. They had to wait until the next day to come to school to ask the teacher if let's say their parents did not know. Now, there is no reason why you can't find an answer. Just type it into google. They are more accountable for it.* -Itinerant teacher, SDSB

Being able to have students who can "self-regulate" is deemed a huge advantage of

technology to educators. It again, shifts the pressure off of "teaching" as the only way to secure student understanding, and instead, places the focus on student-led initiatives to take control of their own learning:

> *Now, it's so exciting with the VLE. So, in your classroom, you can take everything that you teach and just put it online. And all your kids can access it. I think it's great. VLE is great because you can create this worksheet, or this presentation, lesson, whatever, and then maybe a student might not be able to absorb it at that time, but then at home, maybe with a push from mom and dad, they will be more comfortable. Maybe they think, "oh I wasn't paying attention during class, but now I can go online and check". It's almost like an online course they are taking. You know, like okay we are doing social studies, here's a lesson form that. Here's all the stuff that comes with it—pictures, and videos displayed during the lesson. Now you can see it at home. It makes them more responsible for accessing that information. And you often hear teachers say, "okay I am going to post this up right now…go check". And it's just click, click, click, bang, it's posted!* – SERT, St. Helena

> *I think for me, it takes the onus or responsibility away from me as the teacher. Like it takes the pressure off of me teaching something solely. If I post a link online, and I give you a game to play, and I give you an outline, and I give you a document and you can access that link right away and anytime online, and if I give you all of that as ways to review for your test…and you're still having problems or issues…like if you're not getting the results that you want, that's on you now. It's like, look at all the ways I've tried to prepare you. I try to make a point every morning to pull up the VLE because I want to show the students like, look at all the new things I posted. It might take three minutes out of my day to show them how to do it, but it might mean they are going to be a more responsible student. Maybe, they will make it more of a habit to check on it every night or once or twice a week. And, I can tell when they last logged in. But it does take time to just start getting them used to this idea of taking ownership. I think it's cool, so I am more motivated to learn how to bring it in for students.* - Grade 6 teacher, St. Helena

As the previous chapter outlined, a large appeal to using technology is group membership. Thus, as a tool that has an added "youth culture" value, students are much more likely to gravitate towards mastering it than print text. However, another theme may be at work here. If we consider Collins IR theory, we can again begin to contrast differences between print text and digital rituals, and how they might impact SES gaps. In more traditional sociology of education scholarship, schools in working class or poor neighborhoods were often depicted has either having authoritarian type teachers—teachers who in Collins' framing, were at the center of classroom power and status rituals—or as places where students were highly disruptive and disengaged from schooling altogether. Collins (2004) has written on what he calls "power rituals" that

"power can operate on a micro-interactional level by all those factors that bring together individuals who are unequal in their resources such that some give orders and others take orders, or more generally dominate the immediate interaction" (p. 112). This has long been the case with traditional schooling, whereby teachers arguably have been the ones "giving orders" to students. Collins continues that this can be considered an interaction ritual, insofar as it involves "focusing attention on the same activity and becoming aware of each other's involvement; and it has a shared emotional focus, which builds up as the ritual successfully proceeds (as always, it is also possible that the ritual will not proceed successfully)." (p. 112). We know from resistance rituals that this type of power dynamic has the potential to create conflict and tensions amongst students and teachers. Furthermore, he writes that a successful order-giving ritual coerces a "strong mutual focus of attention and produces a situationally dominant emotional mood. But it is a heavily mixed emotion" (p. 113). Order-takers normally have a more ambivalent attitude towards the dominant symbol, as they have been alienated from them. Order-givers by contrast, tend to identify themselves more with the sacred objects (p. 114). It is possible that with technology, there is a new type of framing of interaction rituals in 21st century classrooms whereby both teachers *and* students share in this power role—and have a strong mutual focus technology. It is probable that with the onset of new digital tools, rituals can now both decenter teacher authority and at the same, engage students and offer them greater responsibility in classrooms. In fact, teachers frequently stressed that technology has given students greater "independence", the ability to self-regulate, and in a sense, self-teach:

> *I think that it's easier for students to access information and I think just with that, like you can give them an assignment, and then have them do their own thing. And it gives you a sense in terms of their independence, organization, their research skills. You give them a push and then they take off with it* – Grade 7 teacher, St. Helena

> *I just think it's amazing what we can do now. It's giving us the skills to have students self-advocate and regulate. And for them to take charge of their own learning a little bit. Like I just think it's so incredible what I've seen students do without being held back by teachers.* – Itinerant teacher, SDSB

These examples bear a striking resemblance to classic ideals found in progressive pedagogy discussed in the previous chapter (see Kohn, 2015). If we consider for a moment the parallels between traditional and progressive ideals, we can begin to unravel the full extent of technology in 21st century classrooms. Recall that in traditional schooling, knowledge was very much unilateral—the method of transmission was either from teacher to student, or parent to child. Students were not seen as bearers of knowledge. Yet, with technology use, students are increasingly transmitting information to and from their peers, while taking control of many classroom rituals. Notions of progressive pedagogy thus seem to go hand in hand with technology use—perhaps unintendedly. In fact, a large number of teachers witnessed the back and forth exchanges

between students when it came to manipulating technology, that seemed to be non-existent with print-text. During these interactions, many teachers were aware of how their own roles had become decentralized:

> *Like students are taking a lot of ownership. They help one another... they are learning from each other how to do things and what to do. Look, I'm fortunate that I have like students that help the younger ones...* – Junior/Intermediate teacher, Robotics Project

> *Some students are more tech-savvy than others. Some are having more tech exposure than others. But, in the end, students are much more well versed in the technology than ever before and more so than most teachers. And those students who do get the exposure, and know more...well guess what, they start to teach their friends, and that's how they are learning.* – Grade 2/3 teacher, St. Helena

> *…this one boy came and did a Prezi for his assignment, which everyone else did your basic PowerPoint. All it took was someone to take a risk, and just pave the way for everyone, then everyone follows suit. Everyone was like "oh I didn't know you can do that…". So, they learn from each other and they get confidence from each other. I just see so much more collaboration with the technology. And I see the real-world benefits. What job do you know that people don't work in collaboration? Not that many. You're always part of a team.* - Grade 6 teacher, St. Helena

> *I find like when we are at the computer lab for example...they work better. Because in a group situation they help each other much more. I noticed this even with my kindergarteners. I'm starting to get them on the computer and some of them are savvier than others. So, it's nice to see those kids who are more comfortable, they will say, "I know how to do that, let me show you". There's a lot more engagement with the students amongst each other. And they're helping each other more. Sometimes I say, "okay you're really good at this, go show him how to do it". Even today in the Kindergarten class, I said to the SKs you need to show the JKs what to do and everything. They're helping each other more… they're interacting more with each other. It's nice because they help each other, then I don't have to go around to help every single one. And it gives student sometimes a sense of purpose. Especially for SKs.* - Teacher librarian, St. Helena

These new types of ritual interactions—student mentorship and greater student authority in the classroom—seem to be centered around the use of technology. Recall that for Collins (2004), group membership required a common emblem or symbol. I propose that technology can be such an emblem. According to Collins, a shared cultural symbol gives:

> …significance in the particular information that people in that network talk about. Entree into and success within a particular occupational network is not only a

> matter of having the generalized cultural capital of that group—that which is known widely among persons who may not be acquainted with each other—but also of having particular knowledge of who did what, who has what track record, who has been connected to whom…. The latter form of knowledge or particularized cultural capital or symbolic repertoire may well be the most important kind, especially for the dynamics of fluidly moving situations, such as business transactions where time is of the essence, or analogously for scientists or other intellectuals attempting to innovate on the cutting edge before someone else does so (p. 86).

In the same way, technology can be seen as that particularized symbol. With technology constantly changing and updating, it is now in student's best interest to master various forms of technology to be able to show off to, or teach, their fellow peers. With more technology in the classroom, students can engage and interact with each other, thereby contributing to their overall engagement with school materials. Returning to the issue of stratification, it is important to stress that as students become more proficient in digital fluency, they may begin to have more options and ways of learning technology. In other words, it is possible that students who may not have had many opportunities for educational reinforcement at home, can benefit from more technology in the classroom—through teacher transmission, peer learning, or even through self-teaching. Again, because of technology's symbolic nature, and importance for group membership, many students are becoming more proficient in digital skills. Unlike print-text, it is much easier to teach yourself or a peer how to navigate an iPad or browse the web, than it would be to show someone how to read. While it is unlikely that the goal of technology manufacturers was to provide a revolutionary school experience, it seems that regardless, the presence of technology is offering a more equalizing experience for students. In doing so, it is also equipping students new valued types of digital skills that are becoming desirable in future job markets.

5.5.2 Digital Skills: New Valued Cultural Capital

> *The teacher announces that today is a special day—a moviemaking group, Directors Cut, is coming into the classroom to teach students how to shoot/film/create/edit videos. The class is beyond thrilled to have this opportunity. Students are working outside in the hallway with a member of the program in which he is showing students how to use the equipment. I overhear a student telling his friend, "this is so cool. I would never be able to do that at home!"* – Field note, Grade 6/7, Summerville

The purpose of schooling has traditionally been to prepare students for the labour force. Normally, this meant creating a literate generation of workers who could be compliant employees. If we contend that the main goal of schooling, even in the 21st century, remains to prepare students for future labour markets, then we need to concern ourselves with how technology plays a role in this. Many educators in this study had reservations about whether classrooms today are truly preparing students for a

technology-fueled world that they are likely to embark on. Digital skills are now being touted as one new type of valued capital that is important for students to acquire. Familiarity with technology in its various forms— from research skills, to coding and programming fluency, to basic Microsoft Office skills are being hyped as important for future job seekers. Teachers are now starting to recognize the need for more digital skills, and as a result, are starting to incorporate technology more into their lessons. There is a growing awareness of the importance of such skills:

> *But a lot of the students, you know, can't afford to bring their own PEDS...or have their own phone. I think, like I look at the age of my students, and I think that research skills really, really, really need to be taught, and taught well. As opposed to like, okay here you go, here's an iPad, give it a whirl, give it a try. I think that is the biggest issue now—that students don't know how to research. They aren't being properly taught research skills that are going to be so important for them in the future.* - Grade 8 teacher, Summerville

> *Kids have to learn a whole new set of skills—research skills. Even if you are looking at a reputable source…it is a skill that needs to be developed more than ever probably, 'cuz you're bombarded with so many sources. How can we teach students to be skeptical or critical of the information they see online? Like some of them may see it as fact or truth when it may not be. You didn't have as many options back in the day, right? These skills need to be taught. We have to teach them how to be good researchers and to have good computer skills. So, technology has changed the content of the focus of a lot of my lessons because I want my students to be better prepared.* - Grade 6 teacher, St. Helena

There is a growing awareness that acquiring digital skills will become valued assets or in other words, valued cultural capital, in future jobs. Bourdieu wrote and theorized during a time when technology and computer use were not as prominent—thus rendering a discussion of technology unnecessary, and even unimaginable. However, my research questions what new technologies might mean for new meanings of cultural capital? According to Paino and Renzulli (2013), students today who possess new knowledges of computers and other digital devices may actually gain new valuable skills—as the middle class might have acquired in DiMaggio's (1982) framing when taking ballet classes, violin lessons, or visiting the museum. More importantly Paino and Renzulli (2013) suggest that it is important that students today present themselves as culturally competent members of our information-age society (p. 126). This has made many educators reflect on what the nature of education really is. If it is to truly prepare students, then this must likely include some aspect of technology. This becomes central to the ongoing stratification literature. If it is true that students need to be taught more digital skills, then having a classroom environment that can facilitate such experiences is key. In this regard, by virtue of attending school, students from different SES backgrounds are being given a greater school advantage indifferent to their home exposure:

> *Like there are so many different ways you can approach education and we're approaching things like the same way we have been doing a hundred years ago or more. But like so many things have changed. We need a revamping of the education system. What field do we want kids to know? I know I was talking to someone who said they got some job in the tech industry and he said like he felt like he wasn't really prepared for it. So, it makes me think…why didn't he learn those skills? Schools are supposed to teach you the skills you need to help with future jobs. But in end, you're learning skills that are now, not really preparing you for what the job market looks like. People don't work the same way they used to. We don't have factories. We don't prepare kids for working in the factory line. If our working world changes, then our schools need to too. If you start elementary kids on technology early, that should continue into high school. But we need to prepare kids for their future jobs, which is most likely going to have something to do with technology.* - Grade 7 teacher, St. Helena

> *…I mean there are jobs now that didn't exist 10 years ago...like I think the history of schools...their whole goal was initially to prepare students for factory work, and that concept does not apply today. Schools are supposed to prepare you for the working world. But it doesn't seem like it is preparing students. They hardly had any hands-on experiences. So, you have to ask, what are schools doing now to prepare students? Can technology help prepare them for better jobs? Hell yah. That is the future, and we need to expose this to students earlier on.* -Itinerant teacher, SDSB

> *Students are learning new digital skills now. As an educator, you want to be sure that you're giving them the best possible opportunity to learn skills that are valuable to their future. And if that involves technology which I believe it does, then that is something we need to do in order to teach our students effectively. And that's the bottom line— they need this in the future, and we need to be able to at least sharpen our skills the best we can, in order to give them the opportunity to explore the technology in elementary school. As they get older, the technology they will learn will get more specific* – Grade 4 teacher, Summerville

Technology is slowly becoming much more than just a new teaching tool—but it has the potential to really alter valuations regarding what skills are necessary today[54]. As the previous chapter highlighted, part of this valued cultural capital has been rooted in group

[54] Collins (1994) has also traditionally distinguished between the kinds of dynamics that take place in traditional fields like philosophy that are slower paced and tradition-bound, to those that take place in what he calls "rapid-discovery science", claiming that sociology and other social disciplines have sever obstacles to being rapid-discovery sciences. He writes, "to become a rapid discovery science, you need to have research equipment which is refined enough so that manipulating the equipment will provide something new to discover" (van der Zeeuw, Keesman, & Weenink, 2017, p. 257). It is worth thinking about whether engaging in technology research has the capacity to switch dynamics across sociological research towards becoming a more rapid discovery science.

membership. Thus, having emotional energy and successful rituals as Collins writes, is equivalent or makes for a "nice symmetry" between membership symbols identified by Bourdieu. In both cases, technology can become a symbolic possession that may be invested in further interactions—the difference being Collins' emphasis on the micro-situational process to Bourdieu's more macro-use of the term (p. 390). Here, I have extended the argument past group membership to argue that a new type of valuation is occurring with technology. According to Ignatow and Robinson, (2017), Bourdieu's development of theories such as cultural capital (along with field and habitus) have informed what is increasingly being termed as "digital sociology"—referring to both research on the social aspects and impacts of digital communication technologies, and to the application of digital technologies to research methodologies across the social sciences (p. 950-951). "Digital sociology" and how it relates to cultural capital is imperative to this research. Whereas Bourdieu and subsequent scholars such as DiMaggio predicted that students with more middle-class alignments, who possessed and exhibited strong literacy passed down from their families, would be more likely to succeed educationally, today the same may hold true for the digital dimension of cultural capital. Paino and Renzulli (2013) propose that the concept of cultural capital can be updated by including a digital dimension. This can increase our understandings of cultural capital in the digital age, and how this may affect student outcomes. As I have attempted to showcase in this section, the accessibility and availability of technology in schools, coupled with the growing emphasis on digital skills, has created a new type of valued cultural capital that was non-existent in print-text classrooms. As more educators become conscious of the growing need for technology skills, more students of diverse SES backgrounds will be exposed to new learning opportunities that could better prepare them for future job prospects. This has important implications for issues regarding the digital divide, as technology is not only limited to what students learn in schools, but with the availability of technology in more households, many of these skills and tools are also easily accessible from just about anywhere.

5.6 Home Extensions

5.6.1 School-Home Extensions

Before the advent of technology, households were greatly disparate in their ability to provide new learning opportunities for school-sponsored skills and knowledge. Depending on many factors such as parental education, income, and so forth, students may have had vastly different home lives. Some may have been able to have well-stocked home libraries that students could access when in need, or likewise, be able to afford family vacations or trips to a museum. Other families may have had bedtime rituals that included being read to everyday. Not every child however, could have been fortunate enough to have such exposure to learning outside of formal schooling. Thus, there existed a larger disconnect between home and school during the print media era, as the kinds of learning opportunities that parents could provide for their children varied greatly. While

schools have in fact been found to partially compensate for home-based inequalities (see Downey & Condron, 2016), technology has unquestionably added a new element to this conversation. There are more opportunities for students to access information with technology in ways that may further minimize home inequalities. Access to learning today does not necessarily stop when school ends. In effect, children from different upbringings, children of illiterate parents, and children of lower SES are likelier to be able to "keep up" with privileged households through even the most basic type of technology. Popular apps, websites, and games that are being used in many Ontario classrooms (some examples include *Prodigy, Raz-Kids, Dragon*), can be easily accessed at home, often times for free, and without parental guidance or even parental awareness. This is an important point of consideration, as even if there continues to exist some degree of a digital divide today, getting a tablet into one's home is much easier than it would have been to maintain a well-stocked home library, or to have highly literate parents. In my interviews with teachers, many concurred that students were often so engaged and excited when using technology during school, that that enthusiasm carried with them to their home life:

> *You know, I'll show kids something and then they'll be like, "OMG! I'm going to go get the app on my iPad". So, I just tell them okay great. I show them how to use it in school, then they will go home and then download the app I showed them and use it. So, there are so many good apps, like even book reader app for example is great, because students can be read to instead of a busy parent.* - Grade 4 teacher, Summerville

> *What I find is that students are sponges, they just love it! They just keep absorbing. I mean, they just can't wait to go home and try some of the tools we use at school. And then, they'll do it themselves. You know, you see them not just in the moment, but you see them going really farther. They just take it another step. You show them one thing with technology, then the next thing you know, they are telling me like "check out my YouTube channel I created", or "look at this neat thing I learnt online". So, you teach a student one thing, and the next thing you know, they're off doing it on their own, which is really nice to see.* - Teacher librarian, St. Helena

Part of what makes technology favourable amongst youth is that it serves as a mutual focus of interest for students—creating a kind of group membership. The kinds of conversations that students are having with the digital devices, both inside and outside of school, matter for creating successful rituals. According to Collins (2004), since membership symbols are specific to particular groups, some forms of cultural capital do not match up well in some interactions—"perhaps the ritual does not reach a high level of intensity and the EE payoff is low" (p. 151). In those cases, individuals are motivated to move away from such interactions. However, he writes that where membership symbols of the participants match up well:

> … IRs are successful, and the EE payoff attracts them toward such situations. In the micro-situations of everyday life, the process of matching up symbols takes place largely as a conversational marketplace: who talks to whom, and at what length and with what degree of enthusiasm. Talking is determined by participants matching up things they have to talk about. The extent to which they are willing to talk to each other depends also on the comparisons each makes, implicitly or explicitly, to other conversations they could be having with other people in their network, who have varying stocks of symbols. Each conversationalist compares the topics possible in the match-ups offered according to how much they find them interesting, important, entertaining, or culturally prestigious (p. 151).

In much of the same way, the conversations, enthusiasm, and buzz that students have towards using technology makes a difference in not only facilitating more successful IRs, but in maintaining rituals that can be continued outside of school. For instance, students may log on to a game or website at home to sustain conversations with their peers. This can contribute to more in-class engagement. Technology now provides a platform where more online interactions are occurring, as students are likely to continue to participate in rituals that utilize the common emblem of technology to engage with their peers. Teachers in this study were mindful that today, there is a plethora of online tools and resources that are available to students. Oftentimes, this availability allowed students to self-regulate more when doing their work, which occasionally came in handy when teachers were unavailable to assist them. This is starkly different from traditional uses of print media, where students were largely limited only to the resources that were available in the classroom at that time, and perhaps the school library:

> *It's nice to have the iPads. I can be conferencing with like five students where the others are you know, working at their own speed. And for different grades, there are different tools they can use during school, or even at their own time at home, for further probing—like Khan Academy, or continue learning math skills using games like Prodigy.* - Itinerant teacher, SDSB

Some teachers who have embraced and welcomed the use of technology have begun to see it as a natural extension of learning into the home. In fact, many frequently referenced using online platforms for learning as a way for students to "stay engaged at home" as one Grade 7 teacher said. In this way, teachers are able to give students options to extend their learning outside of the classroom:

> *I use the VLE. I like it because students can stay engaged at home. So, they can connect to the classroom when they are home, and it can keep parents involved. And you can tell like, you know, who uses it. Some of them use it on a regular basis. You can provide them this tool, but they have to choose to use it. I know there are a lot of programs that you can use and link with the VLE. Right now, I*

> *put any important work up, assignment and test dates, links and resources that students can access for additional support.* - Grade 7 teacher, St. Helena

> *I always tell other teachers just try to do one thing…that's where you should start. Like for me, I post my lessons and copies of any handouts on the VLE because you know, as long as a kid can say that a teacher never told me that, or never gave me instructions…then kids can wash their hands and parents will believe then. But now, using this technology is a direct link to their home life. So, parents are smart enough to look at this and they could be like "ah, okay it's right here. There are the instructions". This means, no more excuses. It takes away the uncertainty fabric. Even if they go on holiday…boom, I will post it for them. If you use this tool in the primary grades, it will probably be more for the parents. But the way I use it, maybe the parents can model some of that at home, but it is for the students to access on their own with or without parental support.* - Grade 6 teacher, St. Helena

These conversations also allude to another aspect of home-school connections that technology provides: communication with parents. As these quotes indicate, with greater access to technology outside of schools, teachers are able to keep parents in the loop—once again, bridging the home-school connections, and making it easier to stay informed. Compared to the print-text era, where an informed parent would likely be one that scheduled phone calls with teachers, or sifted through their child's homework, today technology makes it easier for parents who want to stay involved to keep track of what is happening in the classroom.

> *…now with parents, like the ones who want that information will use it and take advantage. Like the Prodigy game…they absolutely loved Prodigy! They were obsessed with it…and then like the parents would even be like "oh my God you're not updating us fast enough. We want to keep up at home". And this year, I have my whole kindergarten class signed up to RAZ kids. Only about five out of twenty-five kids are actually accessing at home…but the option is there. And again, I can see who is logged in. I often have parents who ask me what they can do with their child or what their child can do at home. With the tech, I show them the apps and games we use, and I say here you go!* - FDK teacher, Summerville

> *I wanted a different way to communicate with parents. It's going well. I have had parents who never tweeted and now they opened accounts, and they are experimenting with it, so it has been fun actually. So, I get to post pictures of all the activities that the kids to in class. I like it, because it is play and inquiry and I don't think that parents have necessarily seen a lot of what we do or what their kids do during school. Now they can see a lot of the games we play, or the activities that I lead. Like today we did an experiment and they would have never saw that. They are not going to see a handout. Right? Especially in kindergarten. Now they see the pictures and the before and after of what their kids are able to*

> *do. I've documented their thinking and they can see that. I will post to twitter or the class website, I have parents that are constantly retweeting and loving the pics.* – FDK teacher, St. Helena

Many educators, especially those in junior and intermediate classrooms, were mindful of the many ways technology could be utilized in schools. In particular, as more technology becomes accessible, education will likely shift to more digital platforms. In doing so, more responsibility will be placed onto students to engage and access materials at their own pace, including accessing materials outside of school hours:

> *We often sit, like with other educators and look on the internet, blogs, Twitter, even conferences, to see what others are doing. Then, just you try to get creative. Like how can I use this app/program during my literacy block? Numeracy? We are encouraging teachers to make use of that cloud space too, because this way, we can put things there, and kids can access it from anywhere—home, school, car, library whatever. So, we are starting to talk about the elements of a "flipped classroom"[55]. That's the direction we are going in, and so we try to show them [teachers] some of the tools they can use to transition more of their "teaching" to online platforms to really give students as much resourced as possible.* – Teacher consultant, SDSB

We do in fact live in a digital world—almost everything and anything can be retrieved by anyone; but what does that mean for schooling? Unlike the print generation before, technology has opened up new methods of access to information that do not require huge amounts of money, parental investment, or time. For instance, at any point, students can use popular educational websites such as *Khan Academy*[56][57] to "teach" themselves a variety of subjects. They can utilize teacher-led virtual classrooms, such as VLE, to refresh themselves on a previous lesson, or to download a worksheet or talk to fellow classmates. Educators can now introduce programs and games during school hours that might encourage students to play on their own time. Even outside of direct instruction, students can enhance many features of traditional print-fueled rituals, such as reading. For instance, if students do not have a parent who can read to them every night, they are able to supplement by using online guided reading websites like *Raz-Kids* and be read to. Needless to say, there is no shortage of online resources available today that students (and

[55] "Flipped classroom" is a pedagogical approach that reverses traditional teaching methods. This means that usually, students gain first exposure to new materials outside of classroom (via reading or lecture videos), then use the class time to do the harder work of "assimilating that knowledge, perhaps through problem-solving, discussion, or debates" (see Brame, 2013).

[56] Khan Academy is an educational organization which produces short online lectures in the form of YouTube videos that cover a wide array of topics. The goal is to help formally educate students (see https://www.khanacademy.org/).

[57] The motto for Khan Academy is, "a free, world-class education for anyone, anywhere". This is another example of technology's ability to provide opportunities for learning in ways traditional schooling perhaps could not.

parents) can access at their own leisure. These examples question whether technology can in essence, create more "family-proof" schools. In other words, whether the continued integration of technology may facilitate a type of school culture in which parents may have less influence on their children's educational performance. Class differences and home disparities will likely not vanish anytime soon. It is probable that students of more upper-class families will continue to have unique opportunities that might further their school engagement—trips to foreign cities, evenings and weekends spent in libraries or museums. However, with technology, students can now just as easily go online and read about those cities, or those books, or that new exhibit that just opened. While SES class and parental engagement *do* matter, unlike print-media, technology is giving students *more* opportunities to learn at home in ways that may not necessitate parental guidance. Having online resources not only makes learning opportunities available and accessible, but many are trying to capitalize by making them more *engaging* for students—for instance by adding game elements, visuals, sounds, and instilling competition between students. The more engrossed students are in online rituals, the likelier they are to become engaged in school learning.

5.7 Conclusion

This chapter has highlighted the intricate relationship between technology and stratification issues as they relate to student engagement, both inside and out of classrooms. In particular, it has considered the ways in which technology can reduce home-based inequalities in ways that were not feasible in the realm of print media. In brief, the implications for cultural capital theory is that there are less class-based distinctions with technology in terms of access compared to print text literature. Thus, this research maintains that future understandings of cultural capital must consider the role that new technologies offers students and teachers. Likewise, this research suggests that we can also understand how technology and its related features have become valuable types of cultural capital through applying IR theory to student interactions and engagement in classrooms. This research thus suggests that as digital tools grow important to group memberships, successful interactions will be created. Such interactions are likely to create more engaged students—especially when technology aligns itself more with school-sponsored materials.

Compared to older generations that were taught using print media, technology has created a more even playing field that has potential to reduce home SES disparities. Scholars such as Rafalow (2018) have suggested too that digital divides at both home and school are shrinking, as digital skills among youth can now present an ideal opportunity for more cultural mobility amongst disadvantaged students. Whereas there were greater home discrepancies with print-text, digital technologies are more evenly distributed across students of varying SES backgrounds. While traditionally, it is probable that classrooms were equipped with similar resources (e.g. textbooks; reading literature), there remained huge variations that occurred in student's home life. In other words, parents who were literate, likely produced higher-literate children with higher levels of cultural capital that could translate to school success. This was the driver of a lot of inequality.

Framed this way, even though schools might have tried to set-up student learning in similar ways, by the time students approached school-age, there were already huge disparities that existed (recall literature on school readiness of students—Alexander et al., 1993; Davies & Aurini, 2010; Duncan et al., 2007; Entwisle, Alexander, & Olson, 2005; Hart & Risley, 1995; Janus & Duku, 2007). The question I have attempted to examine in this chapter is whether technology has changed this conversation, and perhaps reduced some home-divides that were more prevalent with print-text?

I put forth the argument that technology can be conceptualized as more of an equalizing learning tool than traditional print media. As a result, it has huge potential to significantly increase and equalize student engagement. In particular, this chapter has examined three major components of stratification and student engagement: a) the ease in which technology is accessible today compared to print text, b) the effects of more technology in schools (ritual engagement and new valued kinds of cultural capital), and c) the carryover of learning into households via new digital tools. Since digital literacy is widely and more evenly distributed across social classes (perhaps even more so in lower SES neighbourhoods), an inadvertent result of promoting technology could in theory be the narrowing of the SES gap in engagement. This is the key point: children from less-literate homes can participate in tech-based rituals in ways that are much easier than navigating print-based routines. Today, there are probably far more homes that have iPads, iPhones and the like, than homes that have many books or well-stocked libraries[58]. Considering that it is much easier to garner information online than it is through a book, this generation of new learners is acquiring digital skills at a much more rapid rate than it would have learning to read or write. Thus, I am entertaining the possibility that although stratification does exist in differing degrees, and while technology is not fully institutionalized in schools, technology integrated classrooms may significantly reduce home-based inequalities by providing easier access to information, allowing for more student-controlled routines, and student-initiated learning at their own pace. In this way, students are able to generate more of their own kinds of cultural capital without necessarily needing parental intervention. In short, technology-filled classrooms have the potential to transcend older print-text divides, and as the next chapter will explore, provide new types of ritual inclusions that may engage students of all genders.

[58] Recall that a number of Canadians are now online—CBC news has reported that as of 2015, 2/3rd of Canadians own a smartphone, and that number continues to grow (see Filippone, 2015). Pew Research center has also reported that smartphone ownership rates in emerging and developing rations are rising at an extraordinary rate (see Smith, 2017).

CHAPTER 6

NEW RITUAL CHAINS: THE CASE OF GENDER

I think that if it makes kids' lives easier, regardless if it is a boy or girl, then they are going to be more engaged. Regardless of boy or girl. Yes, boys love to be on the computer and other technology, but even the girls—they enjoy playing the same games and using same apps as their male peers. Like technology seems….it seems to not be gender-specific like a lot of other things in childhood. It seems to bind boys and girls - Grade 2/3 teacher, Summerville

6.1 Introduction and Research Questions

More technology integration in schools has unquestionably created new types of interactions amongst student and teachers, while at the same time, has provided students with ample opportunities to extend educational learning into the home. While the previous two chapters have considered *general* interactions between students and teachers with technology—interactions that may produce newer rituals and generate new versions of cultural capital theory, while at the same time tightening SES disparities—this chapter asks whether the continual use and integration of digital technologies in classrooms can facilitate new types of interactions, specifically across the social category[59] of gender. In other words, *can technology generate successful IRs between boys and girls, thereby providing overlap in terms of their interests? In doing so, can technology serve to become a valued kind of cultural capital that bridges boys and girls learning and play?* Stated otherwise, *can technology reintegrate both girls and boys into a common ritual interaction, and in doing so, create new types of group memberships that consequently generate new types of cultural capital?*

This chapter puts forth the notion that technology as a learning tool has the possibility to produce new types of interactions amongst elementary aged boys and girls—two groups which have in many regards, occupied separate spheres in schools. If we consider older classroom rituals for example, there were perhaps much more rigid divides in place between the experiences of boys and girls in schools. Scholars such as Thorne (1993b) have argued for instance, that throughout much of elementary school years, children's friendships and casual encounters are strongly separated by sex, as gender can often further stratify children's peer cultures. Boys and girls most often play separately, as they seemed to have different cultural symbols of interest, and a lack of overlapping worlds (Thorne, 1993a). As I will explore below, while much of early

[59] Social "category" refers to an abstract entity of individuals who share some sort of similar characteristics, whereas a social "group" is an assembly of people who interact with each other and have some sort of collective identity that can be observable. A social category can become a social group when members interact with each other and identify themselves as a member of such group. The empirical question I offer is whether or not abstract social categories can become actual groups through new kinds of interaction ritual chains and valued cultural capital that become unique to group membership with technology.

childhood has in fact remained largely gender-segregated (i.e. sports, extra-curricular activities, friendships) my findings showcase that technology has provided some sort of budding commonality between boys and girls, largely centered around their knowledge or understandings of digital tools—a new type of cultural capital unique to the 21st century. As new digital tools become integrated into today's classrooms, the question I continue to return to throughout this chapter is whether such new technology can neutralize any gender "differences" in schools. If so, it remains conceivable that technology can then create newer forms of interaction rituals, which can produce new valued kinds of cultural capital. If we consider again what successful rituals mean for Collins (2004), they are rituals that can generate *symbols of group membership,* while at the same time, infuse individuals with emotional energy (EE) that can later be transferred as valued cultural capital. Cultural capital, as we know, has had evolving uses across the discipline of sociology since Bourdieu's original conception (Davies & Rizk, 2018), however, conceiving it in the framing of Collins may present a novel way of understanding valuations in the 21st century. As well, perhaps with new digital tools, symbols of group memberships have changed in ways that reflect technology's presence. If those rituals were once highly divided by gender, then perhaps the latest forms of technology are now generating newer kinds of ritual chains—chains that incorporate boys *and* girls together. In other words, it may be likely that technology can forge a common symbol for both genders, and in the framing of Bourdieu, produce valued kinds of cultural capital.

In short, there remains strong potential that technology can desegregate gender by providing a platform that appeals to both girls and boys alike. In doing so, it is able to generate common symbols and group membership—for example, through digital fluency in games, knowledge of popular websites or cultural pop icons. Such symbols and knowledge are important for extensions of both Collins' IR theory, and Bourdieu's cultural capital theory. Through this chapter I draw on my interviews and observations with educators to suggest that technology is well received across different genders, and as a result, has the ability to produce new rituals that are unique to 21st century classrooms. Boys and girls may find greater commonalities through their uses of similar devices, apps, games and so forth, which may in turn restructure their play, and facilitate a unique type of group association in the classroom. Thus, exploring the interactions of both boys and girls can offer some new forms of ritual engagement that seem to be spearheaded by technology—which has changed what we have come to think of as school rituals, and what can count as "new and exciting" in classrooms.

6.2 Revisiting the Gendered Divide Literature

Over the years, much literature within sociology has dedicated itself to putting gender at the forefront of educational research. Such literature has often proclaimed that many aspects of childhood are "gendered". Historically for instance, some scholarship has suggested that "common schools" initially prepared boys and girls for different roles, and did so overtly (Davies & Guppy, 2018). During this early era of schooling, it was

common for boys and girls to have everything from separate entrances, playgrounds, seating, to even rigorous gender streaming (Webber, 2010). However, it is likely that such depictions of traditional schools reinforcing old-style gender roles are broad generalizations of classrooms, which probably tended to vary considerably in terms of their actual degree of gender segregation (see Gidney & Millar, 2012). More recent scholarship has however, has suggested that girls and boys may continue to receive "gendered" education in schools, but in more subtle ways (Grossman & Grossman, 1993; Stanworth, 1983; Thorne, 1993a; Webber, 2010). Apart from age, Thorne (1993a) has argued that of all the social categories of students, "gender is most formally, and informally, highlighted in the course of each school day" (p. 34). Throughout much of the school day, gender segregation continues to informally occur through many daily rituals such as gendered announcements— "good morning boys and girls"— (Thorne, 1993a) gendered lined ups, bathroom breaks, gendered seating arrangements, and student-teacher interactions that children are often exposed to (Prioletta, 2015). Such rituals can further contribute to gender segregation.

Standard sociological images of gendered classrooms (before the era of technology) often depicted gender segregation in distinctive ways. One such way was through **peer groups**. There has been much scholarship devoted to studying the peer relations of boys and girls, often highlighting young children's preference for same-sex peers and learnt gender type interaction styles (Carbonaro, 1998; Chapman, 2016; Cherney & London, 2006; Edwards, Knoche, & Kumru, 2001; Legewie & DiPrete, 2012; Powlishta, 1995). In fact, rules about gender have been found to be *much* more salient in peer groups (Grant, 1993), as children often learn about gender differences through peer play (Paechter & Clark, 2007; Pawlowski, Ergler, Tjørnhøj-Thomsen, Schipperijn, & Troelsen, 2015; Pellegrini & Bjorklund, 1997; Pellegrini & Bohn, 2005; Pellegrini & Holmes, 2016). Classic studies such as Thorne (1993a) have suggested that despite many children playing with both boys and girls *outside* of school, children often participate in more gender segregated play in school—making a case that organizational features of schools are often times capable of reinforcing and/or undermining social segregation and larger patterns of inequality. Despite children wanting to occasionally cross over into the other sex's activities, students were often rebuked for this, particularly if they were male.

Traditional schooling has also seen more gender segregation in terms of **sports and extracurricular engagements.** Sports have been long thought of as agents of socialization for producing gender conformity and for often creating further divides between males and females (Connell, 2003; Messner, 1995; Shakib, 2003). Research has shown that gender has been a predictor of sport engagement, as boys have traditionally been more likely to participate in sports at higher rates than girls (Pellegrini & Smith, 2008; Perkins, Jacobs, Barber, & Eccles, 2004). Even physical education in schools often remains gender segregated in terms of the activities and interests (Paechter, 2003) and in terms of funding (Davies & Guppy, 2018). At the elementary level, extra-curricular activities such as talent shows, or music programs are heavily skewed in terms of their boy-girl participation. In fact, with the exclusion of sports, girls are more likely than boys to be involved in every category of extracurricular activities (Freeman, 2004; Lorinc, 2010). This has also led some to see boys as taking on more **competitive roles** than girls

(Gneezy & Rustichini, 2004; Pellegrini & Bjorklund, 1997; Pellegrini & Long, 2010), which can be carried into the classroom. Legewie and DiPrete (2012) for instance have noted that early on, boys learn to value competitiveness, activity and aggression, whereas girls are taught to be more cooperative. While traditionally, it was assumed that boys generally dominated the classroom, garnering more attention from their classmates and teachers (Graddol & Swann, 1989; Zhang, 2010), recent literature has debunked this claim, noting that more teacher interaction with boys tend to be largely disciplinary in nature (see DiPrete & Buchmann, 2013; Owens, 2016).

Another feature of traditional schooling—one that I have mentioned throughout this dissertation— is the segregation of genders in terms of their **engagement with print-text.** One of the major features of the pre-tech age has been the notion of male disengagement with print literacy. Scholars have argued that gender is one of the most powerful facets of literacy and reading motivation, as gender stereotypes are evident as early as the first grade (Marinak & Gambrell, 2010). Studies have shown that boys have been more likely to label themselves as "non-readers" than girls, who spend more of their leisure time reading, even when out of class (Marinak & Gambrell, 2010; Shumow & Schmidt, 2014). The Ministry of Education in Ontario has also observed such trends and produced many policy reports such as *Me Read? And How!* (Ontario Ministry of Education, 2009a) to address the gender gap in literacy. They have reported that boys have shown a general lack of interest in print-based reading and writing activities, a perceived lack of purpose and relevance in school work and are overall, much more disruptive and easily distracted within the classroom. Children even seem to hold on to gendered stereotypes regarding what kinds of reading materials they think the other gender prefers (Chapman, Filipenko, Mctavish, & Shapiro, 2007).

Perhaps one of the most interesting features of traditional classrooms has also been the traditional segregation of genders across **STEM fields**. Studies have documented that women pursue STEM degrees at much lower rates than males (Brotman & Moore, 2008; Davies & Guppy, 2018; DiPrete & Buchmann, 2013; Legewie & DiPrete, 2014), as there tends to be more gaps in gendered interests towards science and mathematics during elementary school. Legewie and DiPrete (2014) have proposed that school context—both peers and school environment—play a role in terms of both girl's interest in STEM and in boys overall educational performances. Interestingly, Charles' (2011) research in STEM fields has demonstrated that contrary to popular belief, more affluent countries, like Canada and the U.S., actually have considerably fewer women in STEM careers than poorer ones. Charles suggests that cultural beliefs and stereotypes about what girls and boys are *supposed* to like, play a major role. Framed in this way, girls may freely choose a more feminine typed job, even in the absence of any actual difference in ability or performances, because they may think they are better suited for it or assume they will enjoy it more. Charles and Bradley (2009) have argued that sex segregation in fields of study will continue "as long as persons continue to understand themselves, their competencies, and their educational and occupational opportunities in fundamentally gendered terms" (p. 966). One possible solution for this as outlined by Charles (2011) is to have an education system that exposes *all* students to mathematics and science right through their high-school years. It is worthwhile to consider whether having more

technology experience in early grades (robotics programs for instance), can become a stepping stone towards this.

In short, research within sociology has documented different facets of gender segregation, and how they may occur through many everyday routines such as play, sports, in-class interactions, literacy, and engagement with science and math. While many of these school-related rituals remain, these patterns were often documented *before* the integration of technology into classrooms. In light of this, I offer some new considerations for thinking about gender segregation in 21st century classrooms that often center around technology. In specific, I ponder what new digital technologies might offer in terms of gendered engagement. What new kinds of rituals do technologies foster across and between gendered groups? Can they be understood through Collins' and Bourdieu's frameworks? Is there a gendered digital divide, or is gender unrelated to technology use in classrooms? In my discussions with educators, the relationship of technology and gender often invoked different responses—in some cases, as I will explore below, many educators felt that technology acted as a "neutralizer" to both genders, while some had claimed to not even notice gender when it came to technology (which in itself also elicits an answer). Other teachers had revealed that technology sometimes was used as a tool to reengage boys into learning, but in using it, many recognized the exceptional benefits it could have for female students. Throughout such conversations, it remained clear that technology had in one way or other, altered interactions of boys and girls in ways that differed from traditional classrooms.

6.3 CHAPTER FINDINGS

6.4 Technology as a "Gender- Neutralizer"

I think they're both equally obsessed with it. Girls and boys.
- Grade 3/4 teacher, Summerville

Many educators who utilize some form of technology in their teachings referred to digital resources—tablets, computers, iPads, Smart Boards and the like—as potential "gender neutralizers". In other words, they often spoke about technology and related tools as having the possibility to transcend traditional male/female binaries, and provide instead, both an appealing and alluring option that is received equally as well by boys and girls alike. This was particularly true for those teachers who used robotics in their classrooms, and for those who held robotics/tech clubs in their schools. For them, it was not necessarily a "boy" or "girl" thing—but rather, it was a device that seemed to engross both genders similarly:

> *I had a grade four/five last year, and now I have grade seven…and it didn't matter boy/girl, it didn't matter age, it doesn't matter really. They see the box and they are all like "okay, what are we doing with this…?* – Junior/Intermediate

teacher, Robotics Project

> *…. but there's no difference between the boys and girls. It would be just the same. And the girls are into coding now and the apps and websites and everything, and technology... You'll notice in my classroom, I have tons of technology that I've been able to acquire. But it's the 21st century learner. You need it. That's what keeps them going. But the girls, certainly, they strive just as much as the boys that it didn't make a difference.* – Junior/Intermediate teacher, Robotics Project

The majority of teachers in fact, even the ones who did not participate in robotics clubs or extra-curricular tech activities, saw technology as an attractive option for both girls and boys. From kindergarten to grade eight, educators noticed little, if any, differences in gendered student enthusiasm for using technology in classrooms:

> *I would say that I think if students have technology, they're going to be focused. I don't know if there is a difference. It neutralizes. If I were to survey like the boys…probably like a hundred percent of the boys would choose reading a novel or doing an activity on the computer rather than print. But then again, probably the girls too though. So, I think because it's something they like. Again, it's something that they've been used to. I think it would be interesting to see though, 'cuz I think both genders would choose technology. It is kind of like gender-neutral now that I think about it…I think both genders would choose it equally. I really think both like it. It comes down to comfort—they are comfortable with it regardless of boy or girl.* – Grade 8 teacher, St. Helena

> *In the past, I have noticed that the boys are more likely to read an article online than they would if I were to give it to them on paper…. but then again, even the girls, I find that too. Everyone loves the tech idea. There are visuals. There are all those things kids like. Most of us are visual learners, right? So, I think it equally attracts boys and girls.* – Grade 5 teacher, St. Helena

Other teachers considered gender to be less relevant to how engaged students were with technology. For these teachers, what mattered more were individual student characteristics, mindset, and how they responded to learning in general. In other words, are they willing to try something new? To fail? What are their overall attitudes towards schooling?

> *…But the interest is there regardless of gender. I think it's just more about the willingness to maybe use it in a way that they've never tried to use it before…that's what I see.* – Consultant teacher, SDSB

> *I find that it's not a girl or boy question. Kids are either consistently engaged over the years, or consistently disengaged over the years. I find most kids don't come and go from the engagement piece…like MAYBE boys are more interested with*

> *technology, and they might work harder, but it's not going to be a life-altering experience. Gender doesn't make so much of a difference. Individual differences are what matters. It's more neutralizing.* - Grade 5 teacher, St. Helena

> *In my experience, when I was in the classroom with kids, when it was a good lesson, they were all engaged. Because the pedagogy piece was there…. you were making them all have any entry point into whatever that is. I just think, can I find things for them to connect to, and engage with? If so, then technology is going to amplify that for those who are interested.* – Itinerant teacher, SDSB

> *When I think about that, is that really a gender question or is that really a mindset question? I mean, you're good at the things you put the time into. But I mean, in terms of who is engaged, maybe the boys are more, but who is successful? Usually the girls.* – SERC/SERT, St. Helena

These quotations not only summarize the majority of teachers' thoughts on technology, but they also point to another unintended consequence of having more technology available to students. It is likely that gender issues were not given much, if any, consideration when Apple or Google for instance launched mass market versions of their devices. And yet, with their devices in schools, such technology seems to actually neutralize gender experiences in classroom rituals more so than any formal training on gender equity. How can that be? One possible theory, in the language of Collins, is that technology may generate more common symbols – indeed, sacred objects—that are commonly revered by students—regardless of gender—and that appear to be quite egalitarian. Thus, technology can provide a medium that can produce positive feelings amongst most students (indifferent to their gender), while giving them an active method to stay engaged in learning. It would seem as though technology as a common symbol is helpful in generating a more gender-neutral solidarity, as familiarity with this "emblem" can provide the mutual focus necessary for a successful IR that is inclusive of both genders.

Consider as well, that during my observations in classrooms, I often saw boys and girls equally gravitate toward the technology. From Kindergarten age—when teachers would give students the option to use the Smart Board during center time— to Grade 8, when students had the option to type rather than hand-write their work, it was nearly impossible to witness any noticeable differences between boys' and girls' overall gravitation towards technology. In fact, it was often the case that those who chose technology did so because it was appealing to them, rather than because it was deemed a "girl" or "boy" tool. Thus, student decisions were not dictated by technology's (lack of) inherent feminine/masculine quality, and instead, students engaged with it in more neutral ways. In this way, both girls and boys seem to be participating in an equal manner with technology, and thus minimizing any differences between their acquisition of digital skills. Thus, we may begin to consider technology to be a new type of valued "cultural capital" that has an equal appeal to both boys and girls alike. While the majority of teachers in this study did feel that technology diffused gendered differences to some

degree, others remained a bit more ambivalent—not having "thought" of the "what technology could mean for gendered divides" question. I theorize that this too has implications.

6.5 Ambivalent Teachers

As stated above, some teachers in this study admitted to not having necessarily "noticed" any obvious or blatant gendered differences amongst their students using technology. Many of them attempted to recall specific instances or encounters when gender was at the forefront of technology use, but failed to do so:

> *Everyone enjoys it equally. I haven't really ...yeah...I have not noticed a difference.* – FDK teacher, Summerville

> *I don't really see boys gravitating to it more than girls. I don't see a trend of one or the other. I just don't notice it. I feel like it is integral to both their worlds…* - Special education teacher, St. Helena

> *I have to say that I haven't really noticed anything. Not really. I don't think there is any difference* – Grade 4 teacher, Summerville

When asked about the nature of gendered interactions with technology, a few teachers had to really pause for a second or two to recall their own accounts of gendered involvement. In certain situations, it was not something that they had thought about prior to my questioning, which often led them to conclude that if they have never noticed any gendered differences, then perhaps gender does not matter when using technology:

> *you know I don't know if I have noticed any gendered differences. I'm trying to think…. but, yeah, I think it's probably equal in terms of the excitement. I definitely think that it helps focus the boys…because they're actually doing work and sitting. But you know, I think it can help students who may otherwise give me a hard time, or disciplinary issues. But, it really depends on the kid.* – Grade 6 teacher, St. Helena

> *the fact that I have to think about this question then tells me no, there are no differences in terms of how boys and girls interact with technology. like I look at it from an educator perspective, and I think that what's good for one is good for all.* – Consultant teacher, SDSB

> *I haven't like even thought about that question…. I haven't even given that a second thought. But I think…I think girls and boys, like work the same. It really goes back to the student. I've never asked myself are boys or girls more engaged when they're using the tech because I see them both naturally in it.* – Grade 2/3 teacher, St. Helena

I propose that for teachers to not have "noticed" gender differences in technology engagement, then this likely suggests that technology can in fact neutralize gender experiences more so than other facets of schooling. This is important, for many areas of classroom and school involvements continue to bring awareness to gender. For example, in many of the classrooms I visited, teachers continued to greet students by saying "good morning girls and boys". They often times would use this distinction as a marker to group students— "girls line up first, then boys"—and even sometimes pit them against each other— "okay, let's have the girls against the boys today in dodgeball". These minor rituals perhaps continue to perpetuate the notion that girls and boys are essentially different in schools. However, in the context of technology, teachers hardly, if ever, brought awareness to gender. When technology was being used, boys and girls used it in unison with each other, rather than against each other. I theorize that this can contribute to a greater sense of group solidarity amongst boys and girls. Just as Olitsky (2007c) spoke of successful interactions in science classes as contributing to a more "community-of-practice" type classroom, technology can also enable a community of learners whereby IRs centering around digital tools can foster positive feelings of group membership and an interest in engaging with members of the opposite sex. As the beginning of this chapter highlighted, boys and girls have historically had many segregating school experiences, as much of school learning spaces have traditionally been "gendered". However, it would seem that many teachers today hold a different opinion about gender segregation when it comes to technology—mainly that technology can be less of a gendered socializing mechanism, since it appears to bridge the learning of both males and females in new and important ways. Collins (2004) has described how youth have traditionally had little stock of symbolic membership from their lack of work experience, and how the strength of their friendships can come for their "mutual willingness to talk about their entertainment heroes sacred objects at inordinate length" (p. 384). Perhaps familiarity with technology can now serve as basis for a new type of youth-specific group membership, regardless of gender. Because technology seems to be a "degenderizing" tool so to speak, some educators were also conscious of how this has transformed interactions between boys and girls. This is where we turn to next.

6.6 Gendered Interactions

Technology has not only neutralized interactions and traditional segregations of boys and girls, but it has also factored into the ways boys and girls play and interact with one another. In fact, in the presence of technology, it would appear that girls and boys are finding much more mutual interests in engaging with similar apps, games, and digital platforms. Consider this observation from one school in this study:

> *It is "free choice" time on a Friday afternoon. The teacher tells the students they have this last period to work on an activity of their choice. Since the laptop cart is in their room, a few students ask the teacher to use them. She agrees. Two girls and two boys sit next to each other. "Let's play Prodigy?" the girls say to the*

> *boys. "Yeah! Let's do it!". They begin to login while they sit next to each other on the floor. Throughout their "play" they continually engage with each other about Prodigy— "look at this ", "Hey how'd you get that character", "what's the answer?", "help!".* – Field note, Grade 4, St. Helena

This was one of many examples I observed that really showcased how successful IRs can occur with a build-up entrainment in student conversations surrounding tech use. Technology-related symbols and awareness were important in producing high levels of EE, and for solidifying group membership. Such instances were not rare, in fact, often when I observed students using technology either in classrooms or in computer labs, there were little if any indicators that technology segregated male and female students. Instead, it seemed as though technology invoked a set of "common symbols" across students. Such symbols included things such as—playing the same online games (i.e. *Prodigy, Minecraft, Geometry Dash, Fortnite*), navigating similar websites *(i.e. YouTube, Google),* even knowledge of new kinds of apps, programs, or general navigation of the web—anything in a sense that could translate into a valued kind of capital, and that could further solidify group membership. Stated otherwise, it seemed as though technology fueled rituals can become almost ceremonial-like for both male and female students, as such rituals are equipped with a common set of symbols that can facilitate stronger bonds between those who participate. Educators too have begun to notice the ways in which relationships between male and female students are converging over similar interests with technology:

> *I find that with technology, it is important to both girls and boys. Like, it's not a boy or a girl thing, it has become just a youthful thing—both love it, both play on it. And you see it, right, like kids talking about that Minecraft character, or that latest YouTube star. I think technology is now an important part of childhood—kids are now bonding over techy stuff that didn't exist when you and I were in school.* - Grade 7 teacher, St. Helena

> *It's not like with toys, where you will have boys say "oh that's a girl thing…. or vice versa. Now, it's like a "kid" thing. Kids are the ones who are "experts" in technology, and they are claiming it as their own. I've never heard a boy tell a girl "technology is a boy thing" and vice versa.* - Grade 3/4 teacher, Summerville

> *I know there has been that whole "boy problem" …but generally speaking, I don't think it matters as much in FDK. Boy, girl, it doesn't matter. I see girls just as excited using computers and tablets. In fact, when it is center time, boys and girls are more likely to play together on the Smart Board than in one of the centers like dramatic, or home area.* - FDK teacher, Summerville

> *It's crazy how things change. Nowadays, you see boys and girls interacting more because the technology is central to both their worlds, right? Like it's not like Barbie's for girls and trucks for boys anymore… sure that still exists, but when*

> *you enter the technology sphere, it's like their worlds merge, and they begin to value each other more based on the skillsets they have.* – Grade 1 teacher, Summerville

My own observations supported teacher commentary that technology has the power to not only neutralize interactions between boys and girls, but to produce new sets of interactions that perhaps did not exist in the same degree during the print-text era. Throughout my own observations of students, I noticed *more* interactive encounters when students were using technology than when they were not. For example, students showing each other how to "battle" in a game, how to answer questions online, or even just simple navigation of digital tools. Students seemed to bond more over common digital icons—games, popular YouTube stars, coding knowledge—than they did over books for example. Recently, I observed a group of Grade 8 boys sitting during their snack time discussing the latest game to sweep youth culture— "Fortnite"[60]. Two girls sitting behind them overhear and begin to chime in about how they "knocked" an opponent down. Impressed by their knowledge, the boys now begin to ask the girls questions and the conversation is centered around the topic of "Fortnite". The girls seemed to gain immediate status by the boys for their knowledge of the game. This is one example of how popular trends emerging from the digital world can hook students in, regardless of gender. But, this is also important from an IR theory and cultural capital perspective because it demonstrates the power of technology to formulate new types of group memberships surrounding digital know-how—memberships that seem to lack any rules about "gendered" play. Thus, such energizing feelings around technology can lead students to feel a greater sense of group membership when interacting with one another, that is indifferent to their gender. This seems to be aided with the introduction of technology. These same group of students who were bonding over their experience with "Fortnite", were the same group of kids who during recess, split into gendered groups. The boys usually were the ones playing a game of soccer or basketball, while the girls formed their own cliques—sitting and chatting or walking around the field watching the boys play. Perhaps on the surface, such interactions centering around technology may seem insignificant, however, when we consider that much of childhood and schooling experiences remain largely gender segregated, then it becomes relevant. If boys and girls can bond over their knowledge of technology in a play-type context, imagine the possibilities when it becomes integrated into school lessons and assignments. Collins (2004) has theorized that a mutual connection to an emblem can produce new IRs. Here, we can begin to see how a shared focus on technology can provide both boys and girls with solidarity-building IRs. In effect, while gender issues may become more salient as students get older, there remains good justification for children to be exposed to more neutralizing experiences early on as they develop their gender identity (especially for young girls and STEM, see discussion below). Interestingly though, many teachers had

[60] "Fortnite" is a free-to-play online cooperative game that is the latest "craze". It is also hyped up by many celebrities who have filmed themselves playing.

initially claimed to use technology as a way to first reengage boys into learning, which they found offered some new incentives for male students to participate in classroom rituals.

6.7 Engaging the Boys

> *The teacher gives students the option to read using a book from the class library, or to use one of the few iPads in the classroom to read online. Immediately, three boys dash to the iPads, whereas it seemed more girls were content using books out of the shelves. The teacher smiled at me and said, "thank God for these iPads, I swear if it wasn't for these, those boys wouldn't want to read"* - Field note, Grade 2/3, Summerville

There has been much educational scholarship dedicated to the growing concern of boys and the reverse gender gap in educational attainment and achievement (see DiPrete & Buchmann, 2013; Froese-Germain, 2004; Martino, 2008; Morris, 2011b, 2011a). In fact, the Ontario Ministry of Education has a whole section online dedicated to "boy's literacy" and how to improve it[61]. With this growing consciousness about "the boys", it was quite common for some educators in this study to say that at least initially, their primary interest in using technology arose out of hopes to "reengage" the boys in their classes to learning, by possibly making them more engaged:

> *Any teacher will tell you that like if you could have a class of 30 girls or 30 boys, the girls are just the better learners. Right off the bat. Before, like in the sixties, bookworms were boys. But now that is flipped. The strong students are the females. So now, I think technology is being used to get boys reengaged. Some of them will tell me they don't read, and they are proud of it. But not one of them will tell me they don't use the technology.* - Itinerant teacher, SDSB

> *One hundred percent it makes a difference for engagement, especially with the boys. Boys are so, so hands-on. Boys are completely hands-on and they're very kinesthetic learners um.... You know I'm going to say in general more than the girls because...boys and girls learn differently, and I think the use of technology keeps boys engaged... because when you're looking at a computer program or whatever it is, it's very engaging. There's a lot going on and it provides a lot of stimuli and keeps them engaged all the time. I don't think there's ever a boring moment and because boys are always looking for something different like on a screen…* - ESL teacher, St. Helena

> *I find that the boys like really do kind of gravitate to the tech… to the computers and the iPads, and I feel like they are a lot more engaged. Yeah, I use the tech to reengage the boys for sure.* - Grade 6/7 teacher, Summerville

[61] See http://www.edu.gov.on.ca/eng/curriculum/boysliteracy.html.

> *I needed something in my perspective new for this group…they have heavy social skill challenges. And I have a higher boy ratio than girl ratio. That was the other reasoning. And maybe that was a stereotypical thought of me…*- Junior/Intermediate teacher, Robotics Project

> *It really is engaging the boys. I mean, like I don't have hard data that actually says that. It's just observational. I would think that the tech is very engaging to the boys especially. Girls too, but more boys.* - Grade 7 teacher, St. Helena

Some teachers had also noticed that boys tended to work better with technology than with traditional pen and paper methods. Because students are likely more familiar with the ins and out of digital resources, it often meant that they also worked better in groups and in more collaborative spaces:

> *The boys are all about these online games and online coding, and programming and we've done some coding here. And the boys love it. They will lead the whole class. They just know how to surf the web really well. So just like…like I always feel like girls excel towards language more and boys gravitate more to more math-science stuff. Like even with the tech. So, when you get to the power point presentations yeah, the boys might design and put together all the pieces, but the girls will do the language. So, like those groups can be formed and can do really well* – SERT, St. Helena

> *….so, we're trying to engage boys with very exciting things, and I do believe that like technology can play a role in that. When I'm in a classroom, the kids are always very excited but it's usually always a boy… he'll come up to me and he will want to be the first to use the tech. He will say "I know what you were doing, or I can do that too…" like if I was to ask, you know, can I have five tech buddies to show me some stuff over lunch, I bet you four of them would be boys.* – Grade 6 teacher, St. Helena

The success of such IRs can be seen in the mutual involvement of students together. Thus, more students who participate in tech-related rituals can strengthen feelings of group membership for boys. Compared to girls, teachers often claimed that boy's increase engagement with technology was much more notable, as girls' engagement with school curriculum seemed to remain relatively constant over the years:

> *.... boys are more engaged with technology. I look at some of them like in math…and yeah, one hundred percent they would be the ones who would be bouncing around and want to come up and use the Smart Board let's say. With girls…the engagement stays the same. I found out they were always engaged really...* - Grade 5 teacher, St. Helena

> *I feel like the girls are engaged always. [Laughs]. The boys are more engaged with the technology. because it's tangible. I see that with the boys...* – Grade 6 teacher, Summerville

> *.... I think girls are more engaged either way. Boys are less interested in non-tech stuff, sure. So, boys are more engaged with the tech. I mean girls are excited either way but sometimes with boys like it's harder to get them focused.... And the tech is a good way to bring your focus.* – Teacher librarian, Summerville

One possible reason as to why boys may be more engaged with technology, is that it has added value to peer groups. Legewie and DiPrete (2012) have suggested that boys in particular are influenced by peer culture, which can strongly influence their orientation towards school. Thus, boys who may have been teased in the past for reading or engaging with curriculum because it may have been considered "feminine", are the same boys that today are being praised for their knowledge of digital technologies—again, because this resonates well amongst their peers. Thus, the salience of technology in the peer culture of boys can, in the language of Collins', actually serve to energize ritual interactions in which digital learning has a prominent place. For instance, in Olitsky's (2007c) research in science classroom, she claims that successful rituals could enable students to begin associating science terms and procedures with EE and contribute to feelings of group membership within a classroom science community. Such IRs she continues, may be able to change participants previous associations with particular symbols related to science (p. 37). In this same way, perhaps boys who had negative experiences with reading in the past are now associating literacy with more positive feelings. This could be because they are participating in new invigorating rituals that create new forms of cultural capital through common symbols that bind them and their peers together. Digital technology can hence become a vehicle that is capable of smuggling school-sponsored material into engaging peer rituals that produce new types of cultural capital. Recall once more, images of peer rituals that can actively denigrate school material—the anti-school subcultures and peer resistance documented in Willis (1977) and MacLeod's (1987) writings for instance. Those types of rituals celebrated anti-school sentiment, whereas their cultural capital gave rise to symbols and languages of resentment and irreverence. Today however, it is hard to deny the positive attitudes boys hold towards technology use in classrooms. Like the example of "Fortnite" above, many gaming experiences have allowed boys who perhaps were shyer, introverted, or disengaged, to find a way "in" so to speak with their peers. One teacher had described a young boy in particular who gained immediate popularity with some of his peers because of his knowledge of "Fortnite" and other popular games. A normally introverted student, the teacher explained that this student gained an increase in confidence because of the sudden change in interactions with his peers. Such positive emotional energy drawn from peer rituals allowed this student to feel confident enough to engage further in classroom discussions. While the likelihood of such technology-driven participation is child-specific, I use this example to illustrate the potential of technology to in fact reengage boys into schooling. There exists newer opportunities and options for boys to build their confidence in ways that were

perhaps not possible outside of basic literacy during the print era. One teacher described her own son's journey with technology for example:

> *When he was in grade five he would come home and do this QR code to his game and take it to school and then the other kids would play his game. That is what they are sharing. They are making the games and sharing with one another. –* Junior/Intermediate teacher, Robotics Project

Newer opportunities for boys to find their niches are on the rise. Such examples of boys excelling in technology related domains, can without a doubt, contribute a greater sense of confidence amongst boys whom perhaps had traditionally felt disconnected from schooling process. More confident students are likely to become more engaged students over time. Such experiences of high EE amongst students can translate into successful rituals which students can capitalize on and apply to their everyday learning. It remains feasible then, that more exposure and access to technology may be associated with higher levels of EE amongst boys that may invoke membership in peer groups, while at the same time, engage them in school material. Although many teachers established the benefits of technology to male engagement and interactions in classrooms, few would refute the claim that more digital resources can also greatly impact girls in many respects.

6.8 Benefits to the Girls

> *Yeah, I think …technology is used more as an initiative to get boys reengaged into learning. But from what we're seeing it just seems like the girls are really excelling in this area and perhaps, even more so than the boys…* -Grade 5 teacher, St. Helena

Technology is being hailed as tool to potentially diffuse differences in gendered play and interactions, while at the same time, provide a new way to reengage learners. As highlighted earlier in this chapter, another form of gender segregation has been through the division of gender across STEM fields, as many researchers have documented trends that have shown lower rates of females in STEM fields than males (Charles & Bradley, 2009; DiPrete & Buchmann, 2013; Legewie & DiPrete, 2012, 2014). This has garnered much attention over the years, both through academic scholarship and mainstream media. News outlets such as, *The Globe and Mail* for instance, have recently reported the need for Canadians, specifically girls, to have more opportunities to learn valued digital skills such as coding (Silcoff, 2018), as there remains unmet demands. Familiarity with digital skills are rapidly becoming desirable in the job market, and as such, many initiatives have grown over the last few decades in hopes to expose more young children, especially girls, to greater STEM opportunities[62]. Overall, there is a growing awareness that many future jobs will in fact require some sort of background in STEM, and many have attempted to

[62] For example, a popular trend has been for major universities to offer STEM related workshops on weekends, evenings, holidays and summer vacations. See a) https://uwaterloo.ca/stem-opportunities-girls/); b) https://www.digitalmediaacademy.org/canada-tech-camps/university-of-toronto/ for examples.

gear this towards young girls in hopes to increase exposure earlier on. According to Charles (2011), the most obvious means of achieving greater integration of females into STEM is to avoid reinforcing stereotypes about what girls and boys like, and what they are good at (p. 28). Perhaps with earlier exposure to STEM in elementary schools, more girls may begin to see such fields as potential career paths, and as areas they can excel in. Many classrooms are adopting such logics and are implementing more technology in schooling earlier on—everything from designing a school "makerspace"[63], to incorporating more STEM websites and kits such as Scratch, Makey Makey, Arduino, robotics and so forth in their teachings. In many schools I visited, I often found posters (see below) put forth by the Government of Canada[64] that are geared towards encouraging more young women to pursue STEM related careers— "Choose Science" is their latest initiative.

Figure 5: #ChooseScience Posters from the Government of Canada

Since attitudes towards STEM often begin in schools, perhaps the use of more technology and digital skills early in elementary school can potentially open more doors for young girls. One intermediate teacher introduced robotics in her classroom for that reason alone. She had the following to say:

> *I was just reading something the other day where they say where do girls lose their interest especially? Science and math, and it's in grade seven and eight. I think that if you put that emphasis on those ages, right, where I'm saying like "go females", like "go women in science", they see that. That was my degree [in science]. We had a shop teacher. That was my favorite teacher in high school and my favorite class. Like I loved it. He changed my world. That, to me, was the best.*

[63] Makerspace provide hands-on, creative ways to encourage students to design, experiment, build and invent as they deeply engage in many STEM elements (see http://www.makerspaceforeducation.com/makerspace.html).
[64] For more information, see http://www.ic.gc.ca/eic/site/013.nsf/eng/home.

> *I think if you emphasize that, it will influence the girls. I have my top person in robotics this year is a female.* – Junior/Intermediate teacher, Robotics Project

Quite a few educators in this research were mindful of the STEM gap between genders and believed that introducing girls to technology may open up more STEM opportunities and possibilities at very critical ages. This point in particular was echoed across many teachers who have started robotics/tech clubs in their schools:

> *One benefit, and I think [name] would agree, is that my "STEM Squad" has more girls in it than boys in it, so we're really introducing STEM to girls with this, and it's great to see that. I'm really looking forward to more of the girls coming through... And they're keen. Let me tell you, they are really keen.* - Junior/Intermediate teacher, Robotics Project

> *Yeah, it's sort of that idea that if you start as young as grade 3…then they'll start growing up with that mindset. So, by the time they get to grade 8…they may think "yeah, I am good at science. It doesn't matter if I'm a girl or a guy. I'm good at science. That's what I do". So yeah, that's sort of the –we've seen girls where they take in charge of their group. And seeing it as a potential career is huge.* – Primary/Junior teacher, Robotics Project

> *The fact is… that I thought I was just doing the school a disservice [on robotics] if I don't take it on, then that experience is just left until a grade nine. What's going to happen is less girls probably will go for it. Because if I expose all of my classes to it, then it's not just in grade nine, you're joining the robotics team. Who's going to do that? Probably just the boys.* - Junior/Intermediate teacher, Robotics Project

Using robotics kits as a tangible example, many teachers found that girls seemed to take much pride and excitement when using these resources. Often times, educators suggested that they even showed more initiative and interest than boys when using robotics kits:

> *It has been really great because we have got a lot of girls now that seem really interested in doing these bots even on their own, which is why we are going to look at actually just doing a girls' team and let them go wild with it.* – Primary/Junior teacher, Robotics Project

> *Actually, I've seen in my class that it is more of the ladies than the guys. They're the ones that are right in there, and if they're not working on a specific VEX robot, they're building something else. And they are the ones that actually started going off in the corner and building. It wasn't the guys. The guys are fooling around, playing with the blocks or I want this or it's my turn. Whereas the ladies were the ones that are like, "I want to build this. This is awesome."* – Junior/Intermediate teacher, Robotics Project

Even as an aside from robotics, in many classrooms I observed, I often witnessed many girls rejoicing and leading interactions when using a range of digital devices. Many female-charged interactions often led to more group conversations and interactions amongst both their male and female peers:

> *In a Grade 6/7 class, the teacher has decided on impulse to spend the afternoon "coding". She asks who has any experience with it? A group of three girls raise their hands. "Omg, I love coding!" They take on leading the class how to code—pulling up websites on the Smart Board and breaking it up into steps for their fellow classmates. I asked them, where did you learn to code? They say from friends, from family members in engineering, but mainly, on their own, out of their own interest. It was fascinating to watch them take control over the classroom while the teacher became almost irrelevant and invisible at that point. They walked around the class to help their peers who for some, was their first hack at it. There were countless "aha" moments as students persevered through different levels during an "hour of code"—coupled with expressions like, "hey, how did you do that?", "how did you get there?", "look at this", "Yes! I figured it out, thanks!" The girls were all too willing to take control and facilitate these interactions…* - Field note, Grade 6/7, Summerville

These types of interactions are fascinating for two main reasons. One reason, as I have already established at various points throughout this research, is that technology seems to be producing new kinds of rituals—rituals that are less teacher-dominated, more decentered, and that give students a leading role. Second, if the goal of policy makers and educators alike is to encourage more young girls to see themselves as potential scientists, mathematicians or engineers, then it is important to understand how technology can serve as an element to group membership. Thus, if having "techy" skills is considered "cool" today—in the sense that knowledge of technology on the part of both girls and boys is seen as valuable—then this has huge implications. Educators in this study were convinced that kids today see technology through a different kind of lens than previous generations:

> *…you are the odd man out if you don't have the technology. Kids are not shy about it anymore. They are not embarrassed of saying, "I can do this." If they can code, they say, "I can code". It's different now, it's cool to be nerdy now. –* Junior/Intermediate teacher, Robotics Project

Just as boys may be more likely to reengage themselves in curricula that has a tech-base because their friends are partaking in it, girls just as well, may begin to see value in knowing and understanding different elements and facets of technology if they hold weight with their peers. Something that has a "cool" factor such as technology has great potential to generate collective effervescence in a ritual, at least among some networks within the classroom, and build solidarity for both boys and girls.

6.9 Concluding Thoughts

In the beginning of this chapter, I posed the following question: can new technologies offer a medium that engages both boys *and* girls in learning through interactions together? Are new valuations of cultural capital being borne out of this possible unity? I have sought to explore these questions by considering the relationship of gender to engagement with technology in school. Through this chapter, I suggested that technology has the capacity to desegregate gendered interactions, and in return, create new emotionally charged rituals that center around this common symbol for both boys and girls. My research shows that there is much *more* gender cohesion happening amongst boys and girls when technology is used, thereby suggesting that digital tools can be conceived of as modern-day emblems; emblems capable of creating successful IRs for a group that has often had two different school experiences. In today's digital world, knowledge of technology—everything from the latest apps, games, to just basic tech know-how—is becoming hailed and valued as new types of cultural capital amongst elementary-aged students. This is no doubt, transcending older gendered divides in classrooms that, generally speaking, had a greater tendency to segregate boys and girls rather than make efforts to unite them. In this study, gendered "play" and interactions with technology was a significant theme. My observations and interviews with teachers have suggested that technology can act as a "gender-neutralizer"—bridging both male and female worlds in ways that have facilitated new interactions centering around digital tools. Technology is thus growing to become a common sacred object that can be very gender-neutral, both in the ways boys and girls use it for academic purposes, and through play. This is in stark contrast to some of the elements of school rituals that have remained divided over the years, such as extracurricular programs, play, and school discipline[65]. I have also explored teachers' own perceptions of gender and technology—with many of them regarding it as both a neutral learning tool, and as something without blatant gendered differences in engagement. In addition, I have underscored the insights some teachers have when integrating technology. Many of them initially, using it as a tool to reengage male learners, while at the same time, recognizing the impact that technology can have for females who may not otherwise have STEM-oriented exposures. To summarize, this chapter has put forward the idea that that technology has the capacity to both, create common grounds for more integrated IRs, and in doing so, has developed new ways of conceiving what cultural capital may look like in the digital age. This study has suggested that technology, both formally (i.e. as a learning tool), and informally (i.e. leisurely play) can and does appeal to males and females homogenously—creating a more neutralizing learning tool in elementary schools. The next chapter considers whether the same may be true for students with different learning needs.

[65] Scholarly literature has shown a clear gendered inequity in terms of school discipline. Boys seem to get in trouble far more often than girls (see Gregory, Skiba, & Noguera, 2010; Kaufman et al., 2009; Ladson Billings, 2011; Mendez & Knoff, 2003; Skiba, Michael, Nardo, & Peterson, 2002; Skiba & Peterson, 2000; Skiba & Kimberly, 2014).

CHAPTER 7

SPECIAL NEEDS STUDENTS and NEW INTERACTION RITUALS

7.1 Introduction and Research Questions

Chapter 6 explored the potential of technology to forge a common bonding experience amongst students of different genders—claiming that as a 21st century tool, it has added value to both boys' and girls' play and learning. However, it remains important to continue this line of thinking, and ponder whether *all* types of students are participating in a more or less equal manner with technology? In other words, are all kinds of students equally enthused and engaged when using technology? Are they able to extract similar amounts of emotional energy that can build up to subsequent rituals? This chapter asks whether technology can facilitate new types of ritual interactions among another category of students: students with special needs. *Can technology generate new interaction rituals and new valuations of cultural capital theory amongst special needs students?* The rationale for this is that historically, students with learning disabilities have often been segregated from many mainstream school practices as well as social activities (Atkinson, Jackson, & Walmsley, 1998). In fact, scholars contend that there has often been a stigma associated with students who have learning disabilities or who have been labelled as "special needs", leading such students to develop a negative self- concept (Pijl, Skaalvik, & Skaalvik, 2010). Special needs students have also historically been more isolated from their peers in "regular" education and excluded from more conventional classroom rituals (Lalvani, 2015), But, has this in any way changed with technology? If such students have been more isolated from traditional classroom interactions, then perhaps technology can provide a novel way for special needs students to reengage and interact with their peers and teachers—creating new types of group memberships and IRs. Like the case of gender, it is conceivable that if technology can facilitate new interactions that center around technology, then this can contribute to our ongoing understandings of cultural capital in the digital world. If technology is able to supply students with a tool that can boost not only their engagement, but their interactions in schools, then it is likely student empowerment will rise—which in other words, can translate into more successful rituals with higher levels of EE. Olitsky (2007a) has argued that if classrooms are to function as learning communities, then more attention needs to be placed on whether interactions can provide students with additional opportunities to develop solidarity with their peers. Perhaps technology can facilitate new classroom rituals that further bond special needs students to schooling. In short, this chapter will investigate the likelihood of new ritual chains emerging between special needs students and their teachers and peers, through the medium of technology, and consider the contributions this may have towards cultural capital theory in the digital world.

7.2 Situating Special Needs in the Literature

Special needs students are a growing population in Ontario. In fact, over the last ten years there has been a significant increase in the number of students per school accessing special education resources. As of 2017, around 18% of students are receiving special education support (People for Education, 2017). There has been a long history of labelling and comparative special education services over the years. Traditionally, students with learning disabilities were often characterized as "inactive learners", remaining on the periphery of academic and social involvement in elementary classrooms (McIntosh & Vaughn, 1993). They were often stigmatized—labelled as "different"—and regularly placed in classrooms apart from mainstream students (for a more detailed look, see Ong-Dean, 2009; Richardson & Powell, 2011). Conventional scholarship on special needs students often documented the difficultly special needs students frequently faced when establishing relationships with peers. Studies have found that students with special needs are often less accepted by their peers, although this likely has to do with school-structure and climate towards students with learning disabilities (Bunch & Valeo, 2004; Stone & La Greca, 1990). In more recent years, there has been an increased focus on special education in attempts to reduce the unintended or perhaps unanticipated negative consequences of classification, separation, or traditional segregation, "emphasizing that all learners have needs to be met and contributions to make" (Richardson & Powell, 2011, p.1). With more technology being used in general education classes, it should come as no surprise that an emphasis on technology is also being placed in special needs rooms. In the SDSB for instance, it was standard to walk into a classroom and see at minimum a Smart Board placed somewhere in the room, along with desktop computers, iPads, and various other devices depending on student needs and school resources. In fact, at least within the SDSB, it is safe to say that special education classrooms had *more* technology and perhaps even more access to the latest kind of technology compared to mainstream rooms. With the availability of such resources, it is logical to deduce that incorporating technology in special education rooms can present many advantages for students with varying learning disabilities. Such new technologies normally include many of the tools already described such as iPads and Smart Boards, but can even extend to things such as, communication aids, alternative keyboards, voice recognition software and so on.

An obvious advantage to having assistive technology available for special needs students is that it can facilitate greater school sponsored learning. However, it remains to be seen whether technology can actually change the nature of how such students interact with their fellow peers and teachers. In other words, can technology assist special needs students in both participating in classroom rituals, *and* in creating new rituals of their own? In this section I propose that this may be another feature of technology use in special needs classrooms, and for students with learning disabilities: new interaction rituals for a traditionally segregated group of students. While such students have been often labelled—which can hold very negative connotations amongst peer communities (Ong-Dean, 2009)— and have often received modifications or accommodations to their curriculum, technology can create a very different experience. Many of the digital tools

available in special needs classrooms—Smart Boards, iPads, Chrome Books and so forth—are resources that even students with severe special needs are able to engage with, and often times, even excel at. Below, I will explore a few major features of technology and special needs students. I first explore how the advent of assistive technology has increased engagement amongst special needs students, while making it possible for those students with the most diverse needs to be able to communicate with their peers and teachers—giving them a literal "voice" in some circumstances. From there, I consider how such assistive technology and general digital resources have the potential to create new kinds of interactions amongst special needs students, their classmates, and their teachers.

7.3 CHAPTER FINDINGS on SPECIAL NEEDS STUDENTS

7.4 Benefits of Assistive Technology

7.4.1 Engage with School-Sponsored Materials

The Individuals with Disabilities Education Improvement Act of 2004 (IDEA), has defined assistive technology (AT) as "any tool, device, or piece of equipment that can increase or improve the ability of a student with a disability to perform functions of daily living, including those involved with learning (McLaughlin, 2009, p. 97). These often include laptops with specialized programs, like speech to text, text to speech, graphic organizers and word prediction software. Walking into a classroom today and seeing students manipulating technology is in many ways, the most visible change I witnessed. New assistive technologies have given many students a new way of participating in school-based rituals. Thus, perhaps it is seemingly obvious that a huge benefit to assistive technology is that it can boost special needs students' engagement with schooling in ways that extend beyond the capability of print-text material. In fact, several teachers who work with special needs students, or in special needs classrooms have recognized that certain features of digital tools are increasing student engagement—allowing special needs students to strengthen their connection to school curriculum and processes:

> *I've got two computers and I access the laptops from the mobile cart that's used regularly, especially because I work with students that have learning disabilities and they are on the autism spectrum and they benefit from technology because of like speech-to-text software or like text-to-speech software, seeing things or visually…. this makes it much easier for a student with a learning disability to actually feel engaged with schooling* - SERT, St. Helena

> *I have a girl with a visual processing impairment. Like if you give her a textbook to read, she can't process that visual information at all so it's difficult for her to remember anything that she's read, like she wouldn't even know where to start. But when I scan it to the computer using an app like "kurzweil", which is a piece*

> *of software that is a text to voice software. So, when I do that, it's text to voice, so it makes a difference for someone who has severe processing difficulties. If she hears the information, she can return it in a way that you couldn't visually. This makes her more engaged and connected to schooling* - SERC/SERT, Summerville

What is it that enables special needs students to become engaged with technology? Like their mainstream counterparts, for many special needs students, it is a tool that seems to be easier to navigate than traditional print text—a new type of digital capital that special needs students are beginning to secure for themselves. Especially for students who have significant difficulty with writing or reading, technology has provided a medium to make learning more accessible, as digital skills are easier to acquire than literacy skills. Below I describe an observation of one special needs student's interaction with technology:

> *After morning circle, the teacher proceeds to tell the students it is their "language block". The students all break up and work with a staff member one on one. A few of them use the iPad, some others are doing a language activity game. I sit with a Grade 8 student, "George". He is typing up a sentence about his weekend using the computer. There is a program used that allows him to dictate his sentences instead of him writing them on his own. George is able to communicate his thoughts by speaking into the microphone. George can only read and write basic sight words (i.e. "the" "go") which means he would have struggled trying to write his ideas down on paper. Later, during a math block, George also has the option to work on his iPad to practice his recall of numbers. The iPad will call out a number, and George has to select the right one. When he gets suck, the game gives him hints and probes him further. When he selects the correct number, music and illustrations appear and George is noticeably amused.* – Field note, Special education Room, Summerville

Observations like "George" were very common amongst special needs room, which tended to engage in more interactive technology use than other classrooms. In theory, the same lesson and materials could be done without the aid of technology—a teacher to scribe the student "voice" for instance, and perhaps manipulatives to help the student count. However, George, and many of his peers, were noticeably more engaged when using the technology compared to instances when they were not in use. This has likely to do with both the visually appealing aspect of technology and generally speaking, how much easier it is to learn digital skills than it would be to read or write for these students. Thus, as an added learning tool, technology is giving special needs students another route to reintegrate themselves in routines and rituals, perhaps boosting their class participation, as one teacher said:

> *I think that the engagement piece is obvious with special needs students and technology. We have to consider that the technology is a different way of…like a different medium to present information to kids, right? Like, I think my students are just naturally drawn to the technology…so instead of giving them physical*

> *manipulatives for example, I use apps where it is like you have to touch the screen to put the fridge magnets on the computer…so it is really the same thing as doing it in person, but for some of my kids that is more engaging because something might happen—like a reward, or a sound, or a …just something that may reinforce for them, which you wouldn't necessary get in real-life right?* – Special education teacher, Summerville

One piece of the engagement puzzle also has to with the relationship between technology and gross and fine motor skills, particularly for students with special needs. A few special education teachers referred to technology as a potential aid in helping special needs students develop their gross and fine motor skills:

> *…well because some children, like they have limitations. And those limitations can be met and helped, they can be assisted.... with technology. We have students with Developmental Coordination Disorder (DCD). They have fine motor difficulties and their writing is atrocious. So, they need a keyboard, they need all these different available technologies in order for them to write down something even.* – SERC/SERT, Summerville

> *There's so much more I wish we could do with technology, but like at least with technology that we have, we are able to teach some of these students the fine motor skills just in a different way. I have a student who doesn't show much interest in doing work with his hands…like manipulating physical paper…but like he will use the Smart Board as a visual tool to doodle….in which he learns the skill of pointing his finger to the board-* Special education teacher, Summerville

Even for students who may not have such severe learning needs, but who perhaps struggle with other types of learning disabilities, technology was a tool that could be utilized. For instance, in a few cases where students had difficulties focusing and being attentive to their work, technology was able to keep certain students "on task" and "captivated" as one teacher put it. For students who have traditionally had challenges "sitting still", technology allowed them to focus on their tasks new ways that some educators were noticing:

> *I think… I think it goes without saying that technology makes a difference for kids with special education. I mean it makes a difference between a failing grade in the subject and a C or D. I have one boy in the class...you put a laptop in front of him, he can become hyper-focused… so instead of like, completely focusing on different things, or getting distracted by his peers, he puts the earbuds in and he just focuses. He's got you know, a learning disability and attention issues. So, if you have a piece of technology in front of him, he is able to stay focused. I definitely notice a difference with special needs kids. And initially when I got into this role and tech wasn't there, I felt very frustrated because I thought well, all this*

> *technology is in the other boards, and they're all using it, but where are we*? *Why are we disadvantaging our students?* - Grade 6 teacher, St. Helena

Collins (2004) has argued that successful rituals can focus attention on physical objects, which can thereby become emblems of group membership, and reminders of the mood that the ritual practice had concentrated and intensified" (p. 317). In this same way, perhaps technology can serve as the sacred focus for special needs students as well—allowing them to participate in rituals that were not available to them prior, both individually and in a group setting. What's more, as the next section will explore, it is possible that such technology is also opening up new avenues of interactions by giving students with special needs a "voice".

7.4.2 Technology and Communication: Giving Students a "Voice"

Exploring assistive technology opens up new avenues to envision what interaction rituals for special needs students may look like in a digital 21st century classroom. In many cases, assistive technology was able to give certain students "a voice"—both in the literal and figurative sense. For example, students with learning disabilities, or perhaps those with high anxiety who may feel shy or uncomfortable speaking in front of a large group—students who would have needed more "accommodations" or "modifications" in the classroom—can now use technology as tool to participate. It was quite common for instance, to see teachers allowing certain students to use multimedia as a way to give presentations[66] rather than orally in front of the class. In cases where students had more severe learning needs—conceivably those with autism or other developmental disorders which caused them to be nonverbal—technology allowed them to really "join the conversation" so to speak, by using assistive technology as their method of speech. This is interesting, for on the one hand, assistive technology can be considered nothing more than a mechanical aid. But, on the other hand, it appears to really be transforming traditional rituals, and making them much more participatory for students who may have been more segregated in the past, thereby strengthening feelings of group membership. Teachers in this study who have spent time working with special needs students often highlighted many times throughout our conversations that technology was really a tool for their students to interact with others:

> *There is also a special needs boy in my class and he could just not function without technology. Like his speech, his entire being, his voice, is on the technology. That's how he communicates with his peers, his family, with me even.*

[66] In one classroom I visited, students were asked to give book report presentations to the class. One girl who had not been formally identified yet, was allowed to use technology for her presentation. She recorded herself at home in a "news anchor" type style—having her family members ask her questions about the book, to which the entire class (and teacher) loved. The smile on her face while we watched the video was priceless. She beamed with pride. I wonder if she would have felt that same excitement without the option of technology?

> *That's how he can tell us he wants this or not that. That's how he can express how he is feeling, or if someone upsets him* – Special education teacher, Summerville

> *…Like in the special needs room…technology is not just a fun assessment tool it's like, you know, how they're speaking, how they're thinking. There's no getting away from it. They need it for them to communicate and socialize with other peers and with staff.* – SERT, St. Helena

> *It [technology] can do amazing things for students who have special needs. Like it can give kids a voice, especially those who normally don't have any voice right. It can be engaging to them, like they can find new and interesting ways to communicate that does not involve oral communication.* – Itinerant teacher, SDSB

Assistive technology can facilitate new types of IRs with higher levels of EE that can both provide positive interactions for students with their peers, and at the same time, opportunities to be engrossed and consumed in their own work. Technology can provide a new outlet for students to become engaged in schooling in ways that perhaps were more limited with print text. Many of the staff members in contained special education classrooms often spoke with me about the many changes they have witnessed over the years. As one teacher mentioned:

> *…there was no way to communicate outside of sign language when I first started working with autistic kids. It was a disaster trying to understand each other. Then at one point we would cut out pictures from magazines to try and communicate with students. Up until recent, we have and still do use the PECS program*[67]*. We've only seen technology start to really enter classroom within the last couple of years*". – ESL teacher, St. Helena

Many educators agreed that even within the short time frame that technology has become available, there have been huge strides in terms how students with special needs interact with their surroundings. Assistive technology has, as Collins (2004) would say, allowed marginalized students to participate in the "group emotion of collective solidarity" (p. 111), permitting students to reintegrate themselves into classroom routines and rituals in novel ways. In one special education class I frequently visited, I found myself fascinated with a low-functioning, nonverbal autistic student:

> *This particular boy— "Bobby"—is unable to speak. He often becomes very frustrated when trying to communicate and will become violent to himself. Before recently, his ERW informed me that the way they mainly communicated with through a limited selection of PECS (i.e. pictures of activities throughout the day*

[67] The picture exchange communication system (PECS) is a pictorial system developed for those individuals with social-communication deficits. Students are taught to use pictures to deliver a communication message to the desired person (see Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002).

> *such as "washroom", "snack", "home". In the last few years however, more technology has made its way into the classroom, and Bobby has been given his own iPad device through the school board. Now, there is a program available on his iPad— "Proloquo2Go*[68]*"—which allows him to choose from a variety of expressions and pictures that can be customized, and that allow him to "speak". Throughout my observations, I witnessed him communicating with teachers through his iPad by tapping on a button to say things like, "I want Doritos", "all done", or "I want iPod shuffle please". Even when he was left to his own devices, I would often find him often curled up in a chair near a window at the back of the room, using and navigating his iPad to watch his favourite YouTube videos—Barney or Big Blue Bear—all on his own, with no probing from an educator.*
> Field note, Special education classroom, Summerville

Such examples illustrate how technology has in many ways revitalized the communication of students with special needs, which in turn, has restructured traditional IRs. This notion of giving students a "voice" was perhaps the most common advantage educators mentioned in relation to technology and special needs students. My own observations were filled with such instances that really showcased how such students manipulated technology in classroom settings. This is one new example of how technology can provide new IRs for special needs students—giving them a "voice". In this way, students have the capacity to now more fully engage in rituals in ways that they could not prior to technology. In essence, technology has given special needs students the ability to move from a passive, to a more active participatory role in rituals. For instance, instead of being limited to communication with an educator who has been trained in ASL or in the PECS, special needs students like Bobby, can use a digital tool such as an iPad to walk up to anybody and engage with them, thereby shifting their role from being at the periphery of rituals, to in some cases, the center.

7.5 Change in Interactions

Assistive technology has not only provided a means by which students are able to engage and communicate with each other, and with school materials, but as was the case in the previous chapter on gender, technology also has provided new ways in which students with special needs can interact—finding more commonalities and creating more contemporary exchanges in classrooms. In earlier chapters, I discussed how interactions between student and teachers have begun to change with technology, as teachers were becoming decentered in rituals, and in many cases, have taken a step back as the sole "authority" figure in the classroom. Student-led interactions were starting to become the norm. In much of the same way, the same can be said for the interactions with special needs students—both in the way they communicate with their peers and teachers. As a learning tool, many students with diverse sets of needs seem to take more comfort in

[68] The description of the app is "a symbol-based communication app that gives a voice to those who cannot speak" (see http://www.assistiveware.com/product/proloquo4text).

using digital resources compared to print-based texts. Like their mainstream counterparts, most special needs students were able to pick up technology related skills with greater ease, compared again to learning how to read and write. Moreover, in many situations, they seemed to even respond better to a visual stimulus from a Smart Board than they did with a more traditional teacher-led lesson:

> *Like certain apps on the computer… they have programs that would help them you know, with spelling or reading. It makes a huge difference for me as the teacher. So, having something read to him for example makes it easier. So, yeah it does kind of change my role as a teacher because it, you know… I could just tell him to be like you can read it using the computer instead of me having to do it for him, or me having to scribe for him. I tell him to use the iPad.* - Grade 8 teacher, Summerville

> *Gabby [name changed] is amazing with technology. I call him my "tech support". When it is time to do our morning circle, he gets up, sets up the Smart Board for me and leads the class in calendar and weather. It's been amazing to take a set up back and watch a student who has been identified with autism and fetal alcohol syndrome to now lead the classroom in ways that may not have been as easy before. I've given him the job of tech support, and he responds well to it.* - Special education teacher, St. Helena

In one contained special needs classroom I visited frequently, I observed the extent to which technology was integrated into their everyday morning routine. In doing so, I was also able to witness the unique way students were able to interact with each other, which is arguably a new feature of 21st century schooling:

> *The students sit in their desks watching the teacher turn on the Smart Board. There are seven of them. Each are in their own desk facing the front. The teacher announces that "George" will be the "calendar helper" today. That is his job. "I'll set it up", George says. He goes up to the Smart Board and the teacher sort of steps to the side while he watches George touch the screen to first, interactively drag the names of the students and teacher who are present in the "circle" in the middle of the board. He calls their names one by one as he decides they are present in the room. He says good morning to each one of them. The two non-verbal students in the classroom use their iPad to select the "good morning" and "George" button to say, "Good morning George". Afterwards, he moves to the next page of the screen, where he drags and drops the days of the week, announcing today is "Wednesday" and calls out the day before and after. Lastly, the teacher has hyperlinked The Weather Network in a picture of a cloud. The student clicks on the cloud to be redirected to the weather network where he describes the weather forecast, and then using the interactive Smart Board pens, writes the temperature. Afterwards, he closes the morning circle document, and then clicks on the internet explorer icon to find the bookmarked websites. There,*

> *he selects an interactive story website, "Tumblebooks", where he chooses an interactive story to be read to the class. Throughout this process, his peers watch and encourage George, offering to assist if he gets stuck at a certain point.* -Field note, Special education classroom, Summerville

This seemingly simple morning routine is important for conversations regarding IR theory and cultural capital. Consider the challenges that such special needs students might face in engaging with their classmates—reading out loud for instance or trying to communicate while being non-verbal. With assistive technology available, students in this special education room were able to use technology to create new types of classroom rituals, through for instance, alternating days being the "calendar helper" and leading morning routines without much instruction from the teacher. This is made possible in part because students themselves are placing emphasis on acquiring digital skills—or a new type of cultural capital—that is becoming easier to obtain. Even the students who were non-verbal could still recognize names and sounds and use the technology as a medium to communicate with the peers. Many special education teachers also did not shy away from saying that some of their special needs students "knew more" than them at times. They often used this to leverage more participation and interaction amongst their students. This has certainly changed the nature of some teacher interactions with special needs students:

> *The allure of technology for special education is obvious. Hands down it helps builds skills for special needs students. Hell, some of these kids know more about technology than me... and when I put that responsibility on them, they thrive. So sometimes I let my special needs students set up technology, or instead of me reading a book, I will put it on the Smart Board, because they need those visuals, right? They pay more attention when it comes from the screen, than it does from me* - Special education teacher, St. Helena

Similar to mainstream classrooms, having technology available for special needs students can also produce rituals that special needs students can often initiate themselves, and rituals whereby teachers are placed on the sidelines rather than at the center. Through my own observations of special education rooms, I noticed the centrality of technology in much of how the day unfolds. Special needs students' engagement with their teachers and with their education essentially came from the use of digital tools such as Smart Boards and iPads. I could not help but wonder what such classrooms might have looked like before technology took over:

> *The presence of technology was everywhere. The special education room has a Smart Board right in the middle of the room. It is in the center, and it structures much of the learning that takes place here. This is used throughout the day as students do activities, watch videos, listen to music, and even get their math lesson, through playing games like Bingo or using popular websites like ABC-YA as a class. Rather than the teacher doing a read-a-loud, he picks an animated story online, and the kids sit and watch. Aside from the main Smart Board, the*

> *classroom was filled with computers, iPads, and various other devices that seemed to replace much of the "teaching" that occurred. In fact, the classroom teacher was often found preparing materials, setting up the classroom, or tackling another task while the technology was "teaching" in a sense*- Field note, Special education Room, Summerville

This is yet another example of some of the changes in classroom dynamics and interactions with technology present. In special education rooms, the teacher often sat with the students while the technology was being utilized, creating a mutual focus on the digital tool. Having technology in the room not only altered teacher-student interactions—as it was commonly used an instrument for special needs students to express themselves to their teachers, *and* as a shared tool they were both absorbed in—but it also impacted special need students' interactions with their peers:

> *We have the technology now, and students are now taking a lot of ownership. They help one another, they put them back, they charged them. Like just like little life skills we are teaching them. They are learning from each other how to do things and what to do. I am fortunate in the class because I have the older ones that help the younger ones do things like open a word document, or navigate YouTube…* - Junior/Intermediate teacher, Robotics Project

As discussed in the previous chapter on gender, technology does in fact have a "cool" factor that makes it very appealing to some young students. As new type of cultural capital, digital skills in many forms are becoming an extremely valuable type of capital to draw on. This is true for all types of students—young, old, boy, girl—and even for students with different learning needs. It is likely that many identified students may have a desire to participate in such new rituals surrounding technology usage because of the associated status that comes with it:

> *…the positive part of technology is that it allows students with a different skill set… that might not be the best, you know, at like handwriting, or social life…they for example, like certain high-functioning ASD Students for instance, if they have their tech, they can communicate through technology in a variety of ways, and their expertise with that technology gives them a lot of street cred, right? It gives them a lot of status that they might not have had otherwise. And then, you know, when it comes time to choosing partners, it's like "oh I want to be your partner next time we do an assignment together because you're so good with the tech". It's going to make that special needs student feel so good, you know? It is going to definitely bring up the self-confidence of these kinds of students that maybe were outcasted as "different" or as "nerdy". Now, kids are like "wow, you have some serious skills, some serious* ***valuable*** *skills—can you teach me about that app, because it's cool?". So, if you are tech-savvy, then you are the one that everyone is going to now—and this is true for students with special needs.* – SERT, St. Helena

In theorizing interaction rituals, Collins (2004) writes that in situations where symbols are charged up by crowds, there emerges a unique type of group membership (p. 83). The same can be said of new digital tools that become charged up with emotional energy and are enacted through IRs. The strength in technology lies in its ability to allow students to also become "experts" and excel in securing digital skills which can make them feel confident. This confidence may come from recognizing the inherent value of having digital skills. In contained special education rooms with higher functioning autistic students, students often voiced their confidence when it came to using technology, by saying things like, *"Mr. X, let me help you with setting up the Smart Board. I am really good at it".* Consider as well, this field note during a visit to a junior/intermediate special education class:

> *During my visit in Mr. X's special education classroom (Grades 4-8 students with various learning needs—largely cognitive based), the teacher has made arrangements with a Grade 3 teacher down the hall to have his students go down to her class to "teach" her students how to use the "book creator" app on the iPads for an upcoming project. His special education students each take one or two students around the class, and out into the hallways, and now have become the "expert". They begin to show their younger peers how to use the app—how to film themselves, add voice to their presentations, edit, change fonts, manipulate the images, and so on. The students beamed of pride as they answered their peer's questions about the "hows" and "whys" of the app. They began to bond over their own likes and dislikes for using this app, and it opened up conversations about what kinds of apps they liked to use in their leisure time.* – Field note, Special education classroom, St. Helena

Afterwards, their teacher explained to me that such opportunities for special needs students to become the "experts" or "teachers" have largely been made possible with the presence of technology. In fact, from observing his own students, he found that many often have less difficulty, if any, in mastering technology compared to traditional forms of print media—like reading a book or writing stories by hand. The fact that many students with learning disabilities are becoming extremely proficient at using technology, apps, and related programs, has given such students a new sense of purpose in the classroom, and in turn, is providing new opportunities for interactions and collaborations with peers and teachers. This means that technology is now allowing special needs students to really change their role in some rituals—from traditionally being at the periphery and requiring assistance in work, to now being at the center and offering assistance to their peers. This can certainly facilitate group memberships, for as we saw in the case of gender, knowledge of current and popular technology (i.e. how to use an iPad), is becoming both a valued kind of capital, *and*, a common symbol for youth, regardless of learning ability.

Over the years, the popularity of technology has trickled down to student culture to the point where many students with special needs have begun to acknowledge the

potential of using digital mediums to interact with their peers. For instance, in an interview with a Grade 8 teacher, he spoke about his ASD student who was self-taught when it came to technology. This student in particular often leveraged his skills in PowerPoint as a mechanism to engage with his peers:

> *…like my ASD student just did it on his own…he just created his own PowerPoint. He decided on his own that is what he likes to do. It's still a skill for him just to learn how to present in front of the class. But he did it. The technology helped to facilitate independent work for work for a special needs student. He is self-taught. And he uses the PowerPoint as a way to relate to his Grade 8 peers—like he will present the winners of the Grammys or like he is obsessed with celebrities, so sometimes he will make a Prezi about celebrity gossip, and he uses the medium of technology to really engage and captivate his peers* - Grade 8 teacher, St. Helena

Having the option of technology also allowed students with special needs to become part of a team. This was particularly true for members of the robotics clubs:

> *For one of my teams, I picked someone who has Asperger's and he has social challenges with making friends. It was like the perfect group setting [for him]. … He's made a best friend through robotics. Now they hang out on the yard. It's been great for him….it reaches so many other people in a way that everyone can be included. Because there is so much you can do or not do to be on a team: you can be really good at building LEGO, but not at programming. Or, you may understand the basic concepts of computers so even if you're not good at programming, you can still contribute.* – Junior/Intermediate teacher, Robotics Project

> *Even special needs come into play here because there are some students that have needs that might be on the team, and students might not even recognize it or acknowledge it. Instead, they try to participate and share the responsibility.* - Junior/Intermediate teacher, Robotics Project

Because technology is so wide-ranging, and perhaps because there are so many more options and tools to choose from today compared to traditional print books, technology has diversified itself to students with a range of needs. It not only provides special needs students with a new medium to participate in a common youth ritual, but in many ways, it helps to build their skills, and likely their confidence in school-sponsored material:

> *You have kids who speak through iPads. You have kids who make choice and demonstrate their name you know on the iPad. Bob has pictures to signal when he wants something, he clicks them. Sarah for example, has a switch to make a choice—click for yes or no. It is cause and effect. We are getting her to understand that you know when you hit this, this is what happens. If you want cereal today or you want Rice Krispy squares, then hit this or hit that and that's*

> *what you get. Without the technology that kind of communication would not be possible. With Tony, the Smart Board has become almost a fine motor activity. And like teaching, you know, how to manipulate it because he doesn't know how to point with his finger. So, for them to properly interact with a Smart Board, he has to learn how to bend his finger to point… so for Tony it is a fine motor activity. For Darren, it's a math activity, it's a story… so you know, for me it's cause and effect. Touch and watch the fire trucks move or pop the balloons. Technology suits their individual needs…it builds their skills in different ways.* – Special education teacher, St Helena

Students who feel more empowered and confident are likely to become more engaged in school. In terms of theoretical implications, a sense of "empowerment" can translate into more EE in rituals that utilize technology for students with special needs. Such students who may have been traditionally "marginalized" from rituals—or in other words, have been passive participants in IRs thereby gaining little EE from them—can now begin to identify themselves as members of a group. This can generate solidarity and greater levels of EE for special needs students who can now feel more connected to their peers, and to learning, through the development and use of their digital skills. These skills have become a valued cultural capital that special needs students are increasingly being able to capitalize on:

> *Because all those times that he would be feeling, like you know, not being able to spell the word, or like not having the same kind of stamina to write. Like you know, not having the ability to spell or think of words… that was all gone with technology. He just hit the audio button and just had everything transcribed for him… I saw a change in his confidence and just his overall attitude towards learning…*- SERT, Summerville

Special needs students who may have felt disconnected in the past from school rituals involving their peers and teachers, can now share in these moments of IRs with high levels of EE around technology. More integration of technology in special education rooms, and in classrooms with special needs students, means there is now a greater potential for such students to partake in, and initiate new rituals that employ technology. Developing this discussion of special needs students and technology through the lens of IR theory illustrates how seemingly minor changes in the classroom, such as using technology in daily routines, can be understood in the more macro sense, as fostering new kinds of interactions in a digital world.

7.6 Conclusion

This chapter has explored the possibility that more integration of technology can create new ritual interactions and valued types of capital amongst individuals with special needs. The rise of new assistive technologies has had obvious benefits for students who

struggle with various learning disabilities (i.e. speech impediments, learning delays etc.), and has created huge gains in terms of their academic potential. But, throughout this chapter, I argue that digital tools also have allowed students with different needs to participate in classroom rituals (both in mainstream and contained classrooms) alongside their peers in ways that are unique to 21st century schooling. As more technology becomes available, particularly to students with special needs, such students can find themselves on a more equal playing field with their peers, enabling them to not only excel in the classroom, but to also become "experts" in these non-traditional methods of learning. These positive feelings whereby students become leaders in classrooms can facilitate greater levels of EE and as a result, generate more successful IRs.

In this study, teachers concurred that assistive technology first and foremost had great potential for special needs students to succeed and excel academically. In particular, it has facilitated more in-class engagement amongst students with special needs compared to traditional print text. Additionally, for many students, technology provided them with a "voice" to further integrate themselves in classroom rituals and interactions with teachers and peers. Technology made it possible for many nonverbal students to communicate their thoughts and feelings in new and elaborate ways. Thus, new kinds of interaction rituals for special needs students are being born out of technology. New digital tools have allowed such students to relate to their classmates, and to also communicate with their teachers. Special needs students are now often being called upon to lead classroom rituals with technology, or to help out other fellow students. This has undoubtedly provided a new mechanism of integration, acceptance, and engagement in schooling.

In short, considering how students with special needs engage with technology can provide novel ways of conceiving interaction rituals that can be facilitated with technology, along with further evidence that new valuations are being placed on digital skills. Thus, new technologies have provided a new mechanism for considering *who* may participate in modern day interaction rituals, and in *what* ways. Likewise, a consistent theme in this dissertation has been to push the boundaries in terms of our understandings of cultural capital theory. Interviews and observations with educators in this study have suggested that we must begin to consider the role of technology and digital tools in creating and sustaining group memberships that centers around the acquisition of digital capital—even amongst students with special needs. As I have outlined in this chapter, having some familiarity and background in navigating digital resources, apps, websites, programs and the like—in other words, a new type of digital capital—can create new sets of rituals that go beyond learning ability. Instead, technology can allow for more "role fluidity" in rituals that can allow students more flexibility to switch roles—from student to teacher, to facilitator, and back. This is important to special needs students, who prior to the presence of technology in mainstream education, may have not had such opportunities before. While many aspects of schooling experiences continue to be segregated for students with special needs (i.e. contained classroom, modified curriculum) technology offers a chance for new ritual interactions to appear. An understanding of how to facilitate successful IRs, is as Olitsky (2007c) has argued, important for teachers to consider. Perhaps with the advent of technology, special

education teachers can become more mindful of how to create engaging classroom interactions with special needs students that build upon their knowledge of digital skills.

CHAPTER 8

CONCLUSION

8.1 Summary of Main Ideas

For decades, there have been many reform agendas aimed at increasing student engagement in the classroom—in hopes to transform teaching and learning, to make schools more efficient and productive, and to also prepare students for the future workplace (Cuban, 2001). Increasing technology in the classroom has been one way that policy makers have sought to transform education. Today we are witnessing perhaps the largest wave of technology entering schools, at an enormously rapid rate. Nearly two decades ago, education scholars such as Apple (1991; 2004) and Cuban (2001) warned about the dangers of using technology to reshape our education system. In *Oversold and Underused* (2001) for instance, Cuban argued that despite the push towards technology infused teaching, there had yet to be a technological revolution in the vast majority of American classrooms. As I have outlined in this dissertation, many of the cynical arguments about technology were made during the first wave of technology that hit schools. Almost twenty years later however, much has changed, and many are rethinking what we know and think about technology today. Cuban (2018) for instance has conducted recent research in attempts to revisit the uses and effects of digital technologies in K-12 classrooms. He claims that today, the goal of digital expansion has largely changed, as new devices and software do have the potential to increase student engagement through "personalized learning", while also continuing on with the hopes that students will have skills to march into more high-tech jobs. However, he posits that whether or not classroom teaching has actually changed is another matter, as there is a complexity of teaching that often takes a zigzag path to overall classroom changes (p. 185).

As a timely subject, this dissertation has attempted to contribute to the ongoing conversation surrounding technology use and student engagement in 21st century classrooms in a Canadian context. It offers a micro-analysis of student and teacher interactions with technology in various classroom settings. As a framework for understanding technology's role in reshaping today's classroom interactions, I utilized both extensions of Bourdieu's (1973, 1986) cultural capital theory (see Collins, 2004; DiMaggio, 1982; Lareau, 2003) and the writings of Randall Collins on interaction ritual theory (2004). Exploring variations of cultural capital theory as they relate to engagement with technology use were integral to conceptualizing what is becoming valued in terms of peer culture, digital literacy, and schooling. Each "branch" offered distinctive features of cultural capital theory that became important for conceptions of technology use and engagement. Discussions of DiMaggio (see DiMaggio & Mukhtar, 1985) for

instance provided insights into how traditionally, more cultural participation in highbrow culture could influence student engagement with school material. Exploring Lareau's (2003) conception of cultural capital provided awareness as to how home-cultivation could impact student activation of cultural capital in schools. Collins (2004) was used to suggest how derivations of "cultural capital" can be seen as "membership symbols", which Collins himself has referred to as "all the items of culture charged up by interaction rituals which can shift in local significance with situational processes over time" (p. 390). Collins' IR theory (2004) was also used as a method for recognizing the possibility of technology becoming a 21st century "symbol" or "emblem" amongst youth that could facilitate group memberships through positive interaction rituals. I posited that such interactions could further engage students into classroom learning.

This research employed a qualitative methodology in two different sites: a) interviews with teachers and staff, along with observations of K-8 classrooms in two schools in the SDSB, and b) observations and interviews with K-8 teachers and students utilizing robotics programs in nine Ontario school boards. This dissertation has begun to unravel some of the intricacies surrounding interactions with technology both inside, and outside of the classroom. In particular, I have grouped findings from my field work into three major themes. The first theme looks at new interactions and rituals that have begun to emerge with the introduction of technologies. In **Chapter 4,** I discussed how elements of traditional classrooms are beginning to shift as new technology makes its way into classrooms. In particular, the roles of students and teachers have begun to take more fluid forms, as progressive ideals regarding the nature of student-teacher relationships have opened up new avenues for learning—particularly, more student-centered classrooms that place value on the acquisition of 21st century learning skills. As well, more technology use has arguably facilitated new kinds of ritual interactions between students and teachers that could have potential to boost student engagement. Strong group memberships centering around technology were also mentioned as potential routes to peer acceptance and engagement.

In **Chapter 5,** I suggested that the increased availability of technology in general, has likely reduced many of the home variations in different SES neighbourhoods that were evident in the print-text era. Stated otherwise, it is probable that technology has now made it significantly much easier to garner information at unparalleled speeds compared to books or encyclopedias in the past. In addition, this chapter discussed the potential of new technology in schools to again facilitate more ritual engagement across peer groups, thereby generating new types of cultural capital unique to the digital world. Furthermore, I reflected on the possibility that as more Canadian youth begin to access technology, there will be greater home extensions of learning. In other words, students from a variety of SES backgrounds will likely be able to participate in more tech-based educational rituals at home in ways that were unimaginable with print text. This perhaps hints at technology's ability to narrow the SES gap in classroom engagement.

Lastly, **Chapter 6** and **Chapter 7** established the possibility that new technologies in classrooms can provide newer opportunities for students to engage in rituals—students who may have found themselves either segregated or on the periphery of many rituals in the past. I make a case for both gender and special needs students as social categories for

which technology has provided a new medium for learning and interacting. In **Chapter 6,** I proposed that technology has largely merged the worlds of boys and girls together, creating new kinds of interactions amongst and between them. As a common symbol for both genders, technology seems to offer a unique type of membership that centers around knowledge of digital skills. In this regard, technology can serve as a gender-neutralizer, relative to many elements of elementary school that continue to segregate students based on their gender. In much of the same way, **Chapter 7** argues that a similar situation has emerged for special needs students. Such students, who have traditionally been more segregated from mainstream rituals compared to the rest of their grade level peers, are finding innovative ways to reclaim interactions through technology. I provide examples to illustrate that for many special needs students, assistive technology has supplied students with a new tool that can potentially boost their engagement, while giving them a "voice" to participate in ongoing classroom rituals. In many cases, students have benefited from acquiring digital skills to engage with their peers, teachers, and in overall learning.

Scholars have argued that the growth of the internet and digital tools along with the potential of such computer-mediated communications should be considered in relation to the nature and quality of social interaction amongst youth (Brignall & Van Valey, 2005). This dissertation has attempted to consider just that: the potential of new technologies to transform classroom interactions and rituals amongst youth aged 5-13. The remainder of this chapter will emphasize some of the policy implications that arose out of this research—key issues that educators voiced were imperative to integrating technology into present-day classrooms, and for considering how best to move forward with technology. This chapter will conclude with a discussion on some of the limitations to this research along with some musings as to areas future research on technology in classrooms should consider, followed by a few final remarks.

8.2 Policy Implications

While technology integration remains an important piece to 21st century learning, it is not without its concerns and challenges. Interviews with educators across Ontario school boards have shed light to many policy implications that are important for those concerning themselves with technology's presence in today's classrooms. The following section will address some of the issues and obstacles teachers have highlighted in their quest of navigating technology. A fundamental question I consider throughout this dissertation is: *can digital technology push teacher-student relations in a progressive direction? In other words, can it foster successful interactions and engagement that can facilitate longevity in learning?* My interviews with teachers and observations of classrooms suggest that the answer to this question is *maybe.* In this chapter I argue that from a policy perspective, technology's ability to really transform student engagement depends largely on a number of *contingencies.* In other words, I argue that digital technology can effectively reduce engagement gaps depending on technology's ability to, among other things: be embedded in a mindful pedagogy; be adequately supported by

teacher training; be used to promote group collaboration; and lastly, be rolled out uniformly or at least, equally in schools across the board.

8.2.1 Contingency #1: Technology and Teacher Pedagogy

Through this dissertation, I claim that technology has great potential to increase student engagement in classrooms through emerging rituals and new conceptions of cultural capital in the digital world. However, I stress here that the strength of technology's ability to transform classrooms hinges upon first and foremost, an informed pedagogy. In my interviews with educators, it became quickly apparent that one of the main driving forces forecasting whether technology would be utilized to create new classroom experiences and interactions was based largely on teacher pedagogy. In other words, *why is the teacher using technology in the first place? Do teachers have a plan and/or purpose when introducing the new technology? Do they have learning goals and expected outcomes for students, or is technology just used to pass the time or perhaps used as a reward for students?* Teachers in this study noted that only when educators really embrace technology can it truly "shift" the teacher role. As one teacher said, technology does have the potential to move teacher pedagogy forward— "moving them away from the worksheet syndrome". However, the most important piece to the puzzle was *how* teachers planned to use the technology in the first place, or in other words, the pedagogy piece:

> *You have to think in terms of that TPACK model*[69] *…and creating that, you know, pedagogy with tech. We're still on the shift. I think it could be overwhelming because of the nature of choices. And people who are hesitant or resistant, if they hit a roadblock it is kind of like they just shut down. We really have to start thinking of technology just as logical thinking. So, what's the next step? How do I get around the roadblock? Just to start. I get it, it's time consuming, but there so many options to start.* – Consultant teacher, SDSB

> *I mean if tech is used thoughtfully, it will change interactions for sure. Not like always used to do a research project or just like bring your own devices for fun, or do a PowerPoint etc. If there's more thought to the inquiry and all those other pieces that are going on, it makes a difference. But, I think the type of teacher who's doing that is already a teacher who's thinking outside of the box. So, in that case, it runs really well with technology. I think it's more thoughtful. It's not just like okay just type this out on Word and hand it in. That type of teacher will use*

[69] The TPACK model, developed by Mishra and Koehler (2006) is designed around the idea that content (or in other words, what you teach), and pedagogy (how you teach it), must be the basis for any technology plan used in classrooms to enhance learning.

> *technology more for inquiry, like what is the purpose of the technology you are using?* – Literacy support teacher, SDSB

> *But if your classroom is setup for a collaboration regardless if tech is there or not, then you are going to see collaborations and more student interactions in that kind of classroom. Like alternative seating groupings. Like kind of that coffee shop approach. It depends on the pedagogy. And then bringing tech won't change that. Like it's not technology necessarily, it's a more of the progressive piece. Pedagogy is still more important. Pedagogy makes a difference. I think it's more important to first talk about pedagogy and then the technology. So, if you have a teacher who is like really techy themselves and maybe that will help them get to pedagogy. But you know, you got to build up first and then bring in the tech piece.* – Grade 6 teacher, St. Helena

While technology has encouraged many changes in the classroom, it alone cannot be conceived of as the "holy grail" to transforming 21st century classrooms. Thus, it is not enough to merely introduce technology with the expectation that it will magically transform classrooms overnight. A traditionalist teacher will still likely still honor a traditional classroom even in the face of new technologies. While it may encourage a more progressive attitude, without the right mindset, it alone may not be enough to truly make a difference for student engagement in the long term. As one teacher stated:

> *I can give my kids a really engaging lesson without tech and they'll be super engaged. Because it would be meaningful and purposeful. And then, I can do the same thing with technology, and for sure, they will be more engaged, but the technology only helps you give that push forward.* – Grade 5 teacher, St. Helena

Proper pedagogy perhaps is required for successful rituals to last beyond the immediate moment—moving away from just momentary bursts of excitement towards long-term engagement or "deep learning" in classrooms. Thus, if teachers would like to facilitate successful IRs, then as Olitsky (2007) suggests, they may benefit from considering how various instructional approaches and classrooms conditions can influence whether interactions (with technology in this case), can allow for more emotional and physical entrainment and be experienced by students as successful (p. 54). In the context of science classrooms, Olitsky (2007c) has argued that it is worthwhile for teachers to ask themselves questions as they implement their pedagogy. Some of these questions can also apply for educators considering digital tools: *which (digital) symbols serve as a mutual focus? Is there sufficient challenge, time, and opportunity for entrainment to develop? Does the division of labor between teacher and students allow for peripheral participation of all students? Do students' contributions in this activity involve digital discourses and procedures and are they considered substantial by their peers? What kind of knowledges or skills are seen as valuable?* Thus, teachers must first recognize digital skills as a new kind of cultural capital that can strongly benefit student learning and interaction rituals. In order for teachers to consider such questions however,

many educators were also mindful of how important adequate training and experience can be in facilitating proper technology use.

8.2.2 Contingency #2: Adequate Teacher Training

Implementing a mindful pedagogy rests heavily on the type of teacher training that is being provided to teachers. As technology integration begins to make its way into classrooms, it is important to ask, *are teachers given proper technology training?* In other words, *in the face of new technologies, are teachers being provided with enough training sessions, resources, and overall support to foster successful interaction rituals?* While the majority of teachers in this study did relish and embrace technology, there still remained a level of concern and awareness that perhaps not all teachers are in fact already comfortable with utilizing technology, particularly if it places them in a position of uncertainty with their students:

> *I don't know if I am ever going to be as much of an expert as some of our students who really take off with it. The kids that are interested and motivated just on their own are able to fly and learn. I think most of the teachers are just afraid to do it. A lot of the teachers are afraid of all the pieces when using robotics…* - Junior/Intermediate teacher, Robotics Project

> *…but you're putting yourself in a situation where I don't think a lot of people are willing to do…like making yourself, you know, feel like you're not the expert. It can be humbling, however. You are learning from students. But not everyone will feel this way.* – Primary/Junior teacher, Robotics Project

> *I don't feel confident enough with the technology to use it, especially to have 20 kids who don't know what they're doing and trying to attend to 20 different people at a time. As soon as one person has something wrong I can see myself spending the whole time just trying to figure out that one kid's problem. And then have six other kids that are waiting to get their problems sorted out. Especially in primary. It seems too overwhelming for me and I am just not comfortable not knowing.* - Grade 2/3 teacher, St. Helena

These same teachers however, expressed a willingness to tackle technology, and an eagerness to attempt to integrate it more if they had "proper" training beforehand—training that could demonstrate for instance, links to curriculum, appropriate apps, or lesson plans teachers could use that would alleviate some of the burden they feel venturing in this new direction:

> *But I'm open to it if I had the right training. And I knew what I was doing. If someone could teach and could show me what I'm doing. But I'm not really*

> *open to trying to figure it out on my own. I'm trying to figure it out through hours and hours of work because technology is not part of my daily life. It's not something I'm accustomed to. So, for me, proper training would be critical. Like how can I connect technology to the unit I am teaching for example?* – ESL teacher, St. Helena

> *So, the whole thing with technology is like, I am open to it, but they just can't expect everyone to already know how to use this stuff, and to just be a naturally tech-savvy person. Like I don't use technology often. So, I don't know how to utilize a lot of the resources other teachers do. And it is just too much time consuming to learn on my own. I would need proper training—like, how do I use a proxima or Smart Board? What apps can I use? How do I access them? What is good for this lesson? I feel like often times they are just throwing us in. And as a busy teacher, I don't have hours and hours to try and spend figuring this out. I don't know where to start. I have to teach. I have to plan lessons, like I already give my own time to coaching and volunteering, so I feel like they should really give us proper training in technology* – Grade 2/3 teacher, St. Helena

One of the most reoccurring responses regarding teacher concern with technology was the need for implementing more professional development or "PD" days, to give teachers the chance to learn about technology. Between the teachers I spoke with at SDSB, and educators in the robotics project, many suggested that "good" PD days are essential for teacher's personal development with technology—learning to feel more comfortable with methods to properly integrate digital tools:

> *I think more time in PD sessions where we learn how to use technology, and how it can relate to our lessons would make me feel more comfortable with using it in my own classroom* – Primary/Junior teacher, Robotics Project

> *Allow teachers the time to feel comfortable with technology. Give them the funds to release the teacher, their experts, to work together and build capacity within the board.* – Junior/Intermediate teacher, Robotics Project

> *Good PD has to be structured, like it can't be "come down, sit and watch me do? this". You have to do it and it has to be intense enough that you can come away with some kind of knowledge that you can take back with you. So, it might not be able to be done in one day, two days…it might be a series of sessions that build on each other. But to send somebody, give them a manual, and talk about the manual and say go back and do it, that's gonna fail….* – Junior/Intermediate teacher, Robotics Project

Many of these teachers urged for more interactive PD with technology that could allow them the time to actually manipulate and "play" with different tech-devices, apps, or programs before bringing them into their classrooms. Some even suggested having

designated "tech" staff at each school to support those beginning their journey with technology:

> *It would be helpful to have a teacher who is already in the school…someone you can connect with all the time. Like a classroom teacher or an expert in the school that knows technology. This way, you are not waiting for that one person from the board to show up. That could take weeks, and then they come for a day, and then you are left alone again. If you had someone who is always there—like a resource teacher, but for technology—then maybe you see them in the halls or recess or the staff room and you can just talk to them then and there.* – Grade 4 teacher, Summerville

Taking this even one step further, many educators advocated for changes to occur at the Ministry of Education level. Some for instance, suggested creating a mandate for technology. In this way, there would be fewer inconsistencies between teachers who use technology and those who do not. This could ensure that teachers are properly trained with technology. Some suggested that tweaking technology into the curriculum—linking it with grade level expectations or providing examples of technology throughout the curriculum—could help entice more educators to use it:

> *Honestly, I think it should be Ministry mandated. Like when we were kids, in the early nineties, computers were one of the mandatory programs we had. And I think like there are teachers who tend to use computer time…as unfortunately, like a free time to let the kids play and the teacher catch up. And that's not to "diss" anyone, but like if technology was included in the curriculum and teachers were taught to use it properly, that would benefit everyone more. They would know how to connect technology to the Ministry expectations* – Grade 2/3 teacher, Summerville

> *I think the problem is because teaching is not regulated, right? Like technology is expected kind of…but not forced. So, you will have some teachers tell you like what is the point? There is just so much inconsistency between the kind of technology being used right?* – SERT, St. Helena

> *…. they should make it part of the curriculum. I know that there are some provinces, like BC, for example, that has coding now as part of their curriculum. But even a way to integrate it into our existing curriculum can be through when we're looking at the math curriculum, for example, when it says to learn a concept through exploring, or to put robotics as one of the e.g. or ways to do that. It doesn't have to be rewriting an entire new area of learning but simply just showing teachers where robotics could fit into some of the existing curriculum.* – Primary/Junior teacher, Robotics Project

> *I think it would help to integrate it into the curriculum. Like in Grade 9, keyboarding was part of the curriculum. Now, more tech-related things like robotics or programming should be included, or at least have some sort of guidelines or manual that links new technologies to the existing curriculum* – Grade 8 teacher, St. Helena

While it remains to be seen what the future of technology development for teachers may look like, some educators suggested that more teachers do need to be self-motivated when using technology today—being their own advocates in locating resources and training, especially as we move forward with education:

> *The biggest thing I've heard with teachers is that there is a lack of training. Which is true. It is not regulated, but there is training out there, and it's all voluntary though. We have luncheons, we have optional PDs, like you can go online and get trained on a variety of programs. But you have to be willing to do it. I think a lot of people just assume that technology training will be a given...but it's not like that. If we want money to be spent on technology, then we are not going to have money to be spent on training right away. I think it is something that we have to be aware of, like making more time for teachers to get out of the classroom for a day and see what other teachers are doing with technology. This is essential, but it is also critical that teachers start taking their own steps now, so they don't get left behind. Because tech is not turning around. It's all online from here…*- Itinerary teacher, SDSB

Policy makers should continue to consider the extent to which technology is being given to teachers, and whether teachers are properly trained, and/or given the option to become more proficient in using these digital tools. If we contend that digital skills are becoming a new valued type of cultural capital, then it is reasonable to assume that boosting teacher training with technology can be seen as a way to nurture educator's own kind of cultural capital and allow them to use that knowledge to facilitate successful interaction rituals amongst their students. Perhaps without the necessary skills or awareness of technology's various uses, many educators have suggested that there becomes a greater risk for negative group interactions with digital tools to occur.

8.2.3 Contingency #3: Technology and Group Collaboration

Technology, as described throughout this dissertation, certainly has the potential to foster what Collins (2004) would claim are successful and positive interaction rituals with high EE—rituals in which students are highly engaged and motivated to learn, and rituals in which students participate in group settings. However, if digital technology is truly to be effective in facilitating deep learning amongst students, it must then, whenever possible, become embedded into more group activities as opposed to isolated rituals.

Otherwise, there is a strong likelihood that rituals guided by technology can become negative. This could be due in part because of insufficient teaching training or pedagogy, or as well, because of how connected students have become to the internet today, leading some to become very dependent on digital tools. This dependency has created new issues surrounding online bullying and other negative social experiences. Collins (2011) himself has addressed the "dark" side to technology in regards to cyber-bullying. He writes;

> *Although a set of people linked only through their computers or hand-held media devices lack the physical co-presence that I have argued is a precondition for a successful interaction ritual, it can generate a high level of collective effervescence when participants ramp up their sending and resending of messages to a rapid rate* (para 36).

When group solidarity or membership is used to target victims, this can certainly be classified as a negative effect of technology. Unlike successful interaction rituals, such negative interactions that are filled with periods of collective effervescences are limited in time. In classroom settings, educators remained cognizant of how important it becomes to monitor *how* technology is used amongst students, in particular, when used in isolation from their peers:

> *I find sometimes students are just more on their own...they are on an app or doing their own thing when you just tell them to use technology. They are not really playing together. The loss of social skills is there when you give students the option to just sit on their phones*— SERC/SERT, Summerville

> *...through my own experience, a lot of them don't have the ability to or know how to engage sometimes with peers. Some do, but some don't. I wonder if it's because they are isolated using tech? And imagination.... I find that different than it used to be. There is a lot of pretend-play that I find is not there. So, that is why tech in my classroom is limited, because they do need to learn their social skills and how to self-regulate, and how to be able to develop the inquiry skill. It's a skill that won't develop if they are always in front of the tech. If I do use technology, I make sure that it is in a purposeful way* - FDK Teacher, Summerville

> *Sometimes the most technologically advanced kids have become the less social…so it is important that as a teacher, you think about the ways in which technology is being used* – Grade 8 teacher, St. Helena

Many educators stressed that if students relied too heavily on technology, there remains a strong possibility that social skills may become compromised as a result. One negative effect of using technology *without* a guide or purpose in mind, is that there is an increased risk of students deviating from the task at hand and searing up inappropriate content for example. Clement and Miles (2017) for instance have said that you can't always trust kids to use these incredibly entertaining and addictive tools for educational purposes. Which

means, teachers really need to think long and hard about *how* and *why* they are using technology.

> *I'm always kind of worried about what students are doing. You never know like, when they have the technology in front of them… you don't know what they're doing. Especially with students. Like you want to make sure that they're doing the right thing with technology, but you can't watch them 24/7….and that's what makes me, you know, a little uncomfortable…even though I definitely think that the future is all tech... but like you know, I don't think all teachers are comfortable with technology yet* - Grade 8 Teacher, Summerville

> *There's good and bad with technology but it largely depends on how you use it. it's a tool, how you use it is up to you. It's like a screwdriver… you can use it properly or you can stab somebody and hurt them. So, with technology you can use it in good and bad ways…just like anything. So, as a teacher, you have to just be kind of careful and monitor... Because if you're not monitoring the kids and what they're doing, then they're going to get off topic and go into the wrong way. So, you have to watch them. Because sometimes the teachers aren't watching them and they're going on web sites or doing inappropriate stuff. So, you just got to watch them.* – Grade 6 Teacher, Summerville

In a similar manner, educators mentioned many instances when inappropriate material would find its way into the classroom when using technology in group discussions, however, many teachers have reasoned that such moments can serve as an optimal learning experience—or "teachable moments" for all:

> *…And learning how to filter through things that are not appropriate, or quality sources is key. I mean I think those things are super important as well and if something pops up when you or the kids are searching…like you can't always control the pop-ups…you can talk about that and have a conversation. I've noticed over the years that there is an increased maturity with kids when something pops up…because it happens so often.* – Grade 6 teacher, St. Helena

> *Like we had instances where we were watching a video online and an ad popped up and I mean, it was a girl dressed in a bathing suit so of course, I get a reaction from the students. But, I used this as an opportunity to talk about the importance of filtering content and you know, if you are on your computer and an ad pops up, don't make it a big deal and call your friends to come over and look at it. Just keep going…advertisements happen but we need to teach kids to be critical of them.* – Grade 6 teacher, St. Helena

In a recent *Globe and Mail* piece, Buck (2018) has referred to such instances, where a subversive mashup of video content (i.e. when watching an episode of *Caillou* quickly intercuts with endorsements for junk food for instance), "YouTube Poop". In her piece,

she urges us to consider how digital classrooms can "fail"—instances where ads appear, teachers become distracted by computers on their phones, or use class time to mark or clean up the classroom. Without proper support to integrate technology, Buck (2018) suggests that the use of devices remain *shallow*— "they use today's digital technologies the same way they would have used a DVD player a decade ago—to show a video for instruction, for a break, or as a reward—rarely exploiting their creative and interactive potential (p. 3). In fact, during my own classroom observations, I quickly became aware of the discrepancy that existed in terms of *how* technology was used—from engaging lessons that could deepen student understandings, to a mechanism to free up teacher time. Such instances as described by educators can be understood in terms of what Collins (2004) has identified as "failed" interaction rituals. In this regard, these are instances when digital technology can in fact have the downside of being insufficiently social. Collins (2004) writes on failed rituals or rituals that can "fall flat" that:

> …most immediately, there is a low level of collective effervescence, the lack of momentary buzz, no shared entrainment at all or disappointingly little. There are further signs of failure on the output side: little or no feeling of group solidarity; no sense of one's identity as affirmed or changed; no respect for the group's symbols; no heightened emotional energy—either a flat feeling unaffected by the ritual, or worse yet, a sense of a drag, the feeling of boredom and constraint, even depression, interaction fatigue, a desire to escape. These imply a continuum of just how badly rituals fail, from mildly missing the mark down through strong ritual abhorrence. These strongly negative states are as important as the highly positive ones (p. 51).

Instances where students are using their electronic devices in isolation can certainly be considered a type of failed ritual—for there is no mutual focus on the "emblem" of technology, no excitement or build-up of emotional energy, no bodily co-presence. In these regards, students are the opposite of engaged—they are disengaged and even withdrawn to the technology. These kinds of occurrences are not just limited to classrooms. Consider how common it has become to see young children in public places, such as restaurants for example, become completely mesmerized or immersed in a trance-like state while starring at a screen in isolation from the group? These are instances where technology can fail—from as young as an unsettled baby who may need the soothing visual stimulus of a screen to stop crying, to a teenager who perhaps is disengaged and bored in their present state. The same can apply in educational settings. Not every encounter with technology will necessarily facilitate a positive or successful ritual where learning extends beyond the immediate moment. Below is one such observation from an FDK classroom:

> *This kindergarten classroom was described as one of the most "challenging" classrooms by the staff members. There are about 30 students in the classroom with one teacher, one ECE and one ERW, as there are a few students with identified special needs (and a handful with behavioural issues who have not been*

> *formally identified). The students are currently at different "centers" around the classroom. The noise level in the classroom is almost piercing—these kids are loud to put it mildly. There is so much happening that I can barely capture it all. There are kids screaming because they are upset that their friends won't share toys, there are students running around the classroom despite the teacher reminding them to walk, there are students constantly asking the teachers for something—they need the washroom, they need food, they need a toy etc. After a while, the teacher asks the students to tidy up and meet on the carpet. I watch in awe as she struggles to have 30 students attempt to sit quietly, in rows, on the carpet in preparation for a lesson. These kids are not having it—they are fidgeting, squirming, talking to their neighbours, wandering about. She must have said "boys and girls settle down" over a dozen of times. As her attempts to regulate students fail, she immediately turns to the Smart Board and begins playing a Sesame Street counting video. Like a magician waving his hands in an attempt to hypnotize their subject, so too does the Smart Board captivate its audience in the same way. Almost immediately, the "hustle and bustle" of these young students begins to subside, as their attention immediately turns to the screen in front of them. These kids are on the surface at least, "engaged"—their eyes locked, mouths dropped, staring without missing a beat—the presence of technology certainly has regulated their behaviour to an extent. The teacher looks relieved for a second, as she is able to gain some control over the class again…. that is, until the video ends and another one begins to play automatically that the students do not seem particularly amused with. "This is boring" one kid begins to say, and once again, she has lost the attention of her students.* – Field note, FDK, St. Helena

On the one hand, the teacher explained to me that she saw this occurrence as a success because it allowed the students to almost instantaneously settle down and contain their energy and give her a sense of control. Yet, on the other hand, the teacher was quite aware that the attention of young students outside of technology was a growing concern:

> *Isn't that something? Look at them sitting there, just staring at the screen not moving a muscle. What else could have that same level of control over them? It is a bit unsettling that these kids have attention issues and sometimes they need that instant stimulus to just get them to focus.* – FDK Teacher, St. Helena

While for the immediate moment, the teacher may have been able to reclaim her classroom, the long-term effects of such interactions are questionable. Ideally, we should be striving to use technology to engage our learners, not to control them. But, how can a teacher compete with the visually appealing aspect of technology that students know all too well is available to them? This is an issue that plagues all grade and age levels. I can say with some certainty that if students were given the option to go outside during recess time and play, or the option to stay in and use their personal electronic device or computer, many students would likely choose the latter. In fact, I often heard students ask

their teachers numerous times before recess, *"can we stay in? I don't want to go outside, it's boring. There is nothing to do!"* Thus, how we introduce and use technology and digital resources in general to young children are important considerations, as such tools can play a major role in the type of interactions that students experience. The important question to consider is again, *how* and in *what* ways is technology being used in classrooms? Is it used in a way that engages students together? Is there an element of interaction and cooperation involved? Is there a purpose in mind? As stated above, it seems as though proper teaching pedagogy is key to facilitating successful IRs. Positive rituals largely stem from proper implementation of technology. As one educator claimed:

> *if it is just the student and the tech, then they won't be interacting with one another. But if you use that tech tool for group work, for projects, for research, for whatever…it makes a difference. It's not just the tool, but how you use the tool* – Grade 6 teacher, Summerville

In short, depending on how we employ technology in the classroom, it can have the potential to strongly engage students, used as a tool to regain control over students, isolate them, or even lead them to experience more failed interaction rituals. Technology does have the power to become socially isolating, and less oriented towards deeper learning than absorption in print text if not used appropriately. Like the observation in the FDK classroom, learning can become entrainment that promotes merely diluted content rather than any kind of deeper learning. However, the potential for technology to offer engaging rituals is there, as it can be an interactive learning tool that can facilitate new interaction rituals. However, as I have attempted to describe, this is contingent on the manner in which we expose and employ technology to youth. Even if teachers are relatively successful in promoting engaging classrooms with a strong pedagogical focus and a collaborative element, there still remains concerns regarding access. Oftentimes, one of the barriers that impacted educator's ability to properly engage students and use technology in a purposeful manner was concerns with access. The next section will unpack some educator qualms regarding the lack of institutionalized technology across schools.

8.2.4 Contingency #4: Equal Division of Digital Technologies

In Chapter 5 I proposed that more technology available in schools can mean greater possibilities to minimize home-generated disparities. However, it remains imperative to consider how technology is divided in schools. In other words, *are all schools granted equal access to technology? How are schools securing technology?* Thus, the final contingency I present in this chapter is that in order for teachers to properly plan informed and engaging lessons that engross their students in a collaborative manner, there must be some uniform access across schools and grade levels. Coleman's (1966) classic report argued that much of the inequality imposed on children by their home, neighbourhoods, and peer environments were carried into school contexts.

However, a host of research over the last decade has documented schools' roles in essentially narrowing learning discrepancies (see Alexander, Entwisle, & Olson, 2007; Alexander, Pitcock, & Boulay, 2016; Davies & Aurini, 2010, 2013; Downey et al., 2004 for work on summer setback). Downey and Condron (2016) have for instance claimed that there is now more convincing empirical evidence to suggest that schools are actually more compensatory when considering educational inequalities. In other words, they are not great producers of inequality, as previously thought. As I have made the case throughout this research, digital technology has the potential to narrow the "engagement gap". Whereas in the past, print media may have failed to engage many lower SES kids, today's digital media is able to more broadly engage kids of various SES, at similar rates. Just as schools in the past could expose kids from homes with fewer print texts to more books and boost their print literacy, today schools can expose kids to digital tools and boost their digital literacy. However, since the use of digital technologies is relatively new, it has not yet become fully institutionalized (i.e. embedded into funding formulae and standardized curricula). This can (and does) have some implications, as new technologies are currently being rolled out unevenly across schools.

8.2.4.1 Unequal Distribution of Technology

Ontario school boards have long relied on funding from the Ministry of Education for additional support to aid in student learning, which has been increasing over the years to support growth of new programs (Ontario Ministry of Education, 2008, 2009b, 2010; 2012b, People for Education, 2006, 2012). However, since technology is a relatively recent addition to modern day schooling, there is less regulation surrounding technology's placement and funding in schools, as some schools are capable of securing more technologies than others. This "unequal distribution" of resources was certainly not surprising to educators, as many of them were cognizant of the challenges to making the transition to the digital world without the appropriate resources in place:

> *Another challenge that we encounter with that is, with these robotics, you need devices, you need the iPads and the laptops to do the coding and the programming, and the ratio of student to device is in my opinion too low. Especially in a school like ours, low socio-*economic *status. These students cannot bring in their own – they don't have their own devices to bring in. –* Primary/Junior teacher, Robotics Project

> *But I think the problem is that…not all the schools have money. If you don't have the money, how can you say to teachers, use the technology? How can you say that it's an expectation of every school without being given the same resources? Like in the [other] school board, every teacher has their own iPad and laptop, whereas here, some classrooms don't even have a Smart Board.* - Grade 2/3 teacher, Summerville

> *Access to technology in this school, our neighborhood, is not an issue. These kids already have the familiarity and the skill sets coming into the classroom when using the tech, but I can't same the same for other schools.* - Grade 7 teacher, St. Helena

> *I think in our neighbourhood, access is not really an issue anyways. These kids already have familiarity with the tech when they get in the classroom. But I know first-hand, that schools in different cities, not even, schools in different postal codes…having tech could definitely help close the SES gap for sure* - Grade 8 teacher, St. Helena

In the Spencer District School Board for instance, the initial "roll-out" of technology provided some difficulties for teachers wanting to get their hands on proper equipment. Since this is a new territory that schools are embarking upon, there is bound to be some issues with the initial institutionalization:

> *So, different people and their ingenious wisdom decided to allow people or schools to choose their first piece of tech. So, there were iPads, or Dell tablets. And like they didn't give us like an idea or suggestion of what would work, they just said okay make a choice and schools had to quickly decide which one. And like honestly, the tablets we got are a piece of crap. They were useless. Half of them are broken now, and they won't replace them. So, they have this empty cart just sitting there. I don't like it. Some of the other schools I went to, the carts were kept under lock and key. I couldn't take them without asking for someone's permission. It is just not standardized. All these rules. It's ridiculous. And then last year, they came in said okay here's another $10,000 if you have extra money and you want to put in school money you can, you know, get another iPad cart or get the Dells. But then, I go to other schools who could not afford… like they can't afford another $10,000 to put in for iPads.* - Grade 2/3 teacher, Summerville

The discrepancy in the amount of technology available was another concern for some educators, as many found it created some difficulty in terms of sharing or scheduling appropriate times to use technology across grades:

> *I mean it is great in some ways...students are definitely excited to use it. The only problem is it's difficult to ...like if you have ONE cart, it's not enough for everyone. You can't get access to them all the time... so many people want them. I try to plan lessons around the tech, but the problem is if you come in and they are signed out...that's a big problem* - Grade 7 teacher, St. Helena

> *…and then the problem especially in big schools is like you have one iPad cart, and then one Chromebook cart, and then you're trying to divide it amongst all these people, right?... So, you're trying to find the time. You might sign them out*

> *Thursday and then Friday, and never get them again for a whole other week and that's a tough thing. Access is hard.* – Grade 1 teacher, Summerville

> *If you only have like a 45-minute block with the iPads, you have to make it count. You can't drag the lesson on. Whatever has to be done has to be done now. If you don't finish it, you might have to wait like another two weeks to get them. So, it's definitely an access issue, even amongst individual schools. Once the access issue is dealt with, and technology is at teacher's disposal, it really isn't much work from that point on.* – Itinerant teacher, SDSB

> *Access to technology is hard because they are often booked a lot. So, sometimes, I wish I could just be in the computer lab all day, or just have my own technology in my room, so if they are working on an assignment, it's ready for them to use. But the lab and the carts are always booked! And then the fact that you have to lug that cart around, it is a waste of time. Like, if every child could have their own laptop, I think that would be ideal. Now, it's just a matter of access* - Grade 6/7 teacher, Summerville

For others, it was more of a physical challenge to not be able to have class-sets that could be stationed in their rooms:

> *I haven't used the iPads yet because they're a pain in the ass to get them out here to the portable* - Grade 5 teacher, St. Helena

> *Most school boards are different. Like my son's school has like 7 or 8 computers in the classroom. And they have everything. But if I want the computer cart here, I gotta go down to the office, sign it out, go find it upstairs. Then I have to bring it up from the elevator, get it in here, roll it in.... It's just a pain in the butt.* - Grade 6 teacher, Summerville

While most schools do have access to technology in some capacity, it is worth considering what steps could be taken to ensure that teachers are able to access technology when needed more readily. Thus, there remain some concerns regarding the amount of technology available in different schools. Since technology is currently unregulated, this has caused some educators to grow fearful of private funding that may occur in individual schools.

8.2.4.2 Technology and Fundraising

> *And as a school, we are allowed to buy equipment for kids who do have learning needs. Every school has a tech plan—and where the money goes, and if it goes to providing students with their own laptops of whatever—depends on what the school values.* - Itinerant teacher, SDSB

A central concern for educators is the continued disparity in use of, and access to technology, as more affluent schools may be able to provide *more* enhanced experiences for their students, and a richer variety of skills that could not only positively impact a child's education, but also enhance outcomes for an already advantaged social group (Froese-Germain et al., 2006; Milani & Winton, 2016). Recent media coverage has documented how more out-of-school fundraising is now challenging publicly funded education by perpetuating SES gaps, as wealthier neighbourhoods and schools are able to raise substantial amounts of money (Froese-Germain, Hawkey, Larose, McAdie, & Shaker, 2006; Milani & Winton, 2016; Ontario Ministry of Education, 2009b; People for Education, 2012, 2013). This phenomenon can widen the divide between schools which "have" and "have not" (Alphonso & Hammer, 2014; Dolan, 2016; Froese-Germain et al., 2006; Mackenzie, 2011; People for Education, 2012, 2013; Ricci, 2009). While there exists a host of potential sources, everything from local community members to not-for-profit organizations (Winton, 2016), parent-teacher organizations (PTOs) have been found to play a large role in giving upper-middle class communities an advantage for new educational resources and opportunities (see Addonzio, 2000; Cutler, 2000; Evans, Newman, & Winton, 2015; Lareau & Muñoz, 2012; Posey-Maddox, 2013; Wells, 2002). With disparities between the highest and lowest fundraising schools, Ontario's richest neighbourhoods are able to utilize fundraising dollars to equip their students each with laptops, Chromebooks or iPads, and can garner more money for the latest technologies that their students can be trained with (Alphonso, 2017). Teachers in this study recognized that funding disparities could be a potential barrier in providing students with similar educational-technology training. They were mindful that while they may be fortunate to be placed in a school with adequate technology and training, this may not be the case for everyone:

> *I think it just depends on how the board wants to spend their money. I know our old principal, she was technology-based. She bought the iPad cart, bought the Dell carts too. She was willing to spend school council money on the new technology. Other schools…well it depends on the admin. It depends on what they see as their priority. The other schools like in lower-income areas have different focuses, right? They run a breakfast club for example, so they would have to spend money in those areas.* – Grade 2/3 teacher, Summerville

> *…the biggest problem is those students who don't have access, how do you accommodate for those students? I don't know what the solution is to that. Unless we provide every student their own device. I think that is where we are going...but I don't know who this burden falls on.* – SERT, St. Helena

> *And I've got a pet peeve with the distribution of resources, and I already mentioned that. It's not – it's not like every school receives the same. It's not fair and equitable. You have to look at the population and you have to look at parent councils who, you know, supplement. We don't have that here, and these are, the students, if we really want to break the poverty cycle for our kids, they need to*

> *have all these experiences that their parents may or may not be able to afford for them. You know, with my four-year-old granddaughter, I tried to teacher her how to do code, but I have the devices, you know? And so, I think about our students who don't – you know, we have students here who come from Nepal, from refugee camps.* – Primary/Junior Teacher, Robotics Project

Without a standard set of funds, teachers were concerned about how to best deal with technology that may break or become quickly outdated, as is often the case with new digital tools:

> *To an extent, I think if you really want to close the divide like you have to have the same technology for all students. So, like everyone gets an iPad or something. But then, where does that cost lie? Is that on the board? And then what happens when you are like in a year into your technology and they are almost obsolete? So, I don't know who or where the blame goes. Like technology is going faster than anything else. And then, if your iPad or Chromebook breaks, what are we going to do? We're chasing just a tale of technology. You can use an old history textbook, it won't change that much…but you can't use a computer from 2000, right?* - Grade 7 teacher, St. Helena

> *If you have machines that constantly have to be maintained and upgraded…that is a problem. How do we stay on top of technology?* - SERC/SERT, Summerville

This discrepancy in funding also meant that more teachers resorted to using their own, out-of-pocket funds to secure technology. This has led some to also self-advocate for new digital devices, through for instance researching and applying for grants that may not necessarily be common knowledge:

> *And I don't have a computer in my classroom. And even if I learned how to use the Proxima, I'm not going to go out and buy a laptop now. I can't afford it, and I am not willing to pay out of pocket. Even taking out iPad carts from the library are not always accessible, so what am I supposed to do?* - Grade 1 teacher, St. Helena

> *We have got a wonderful staff and a great principal, and we all work together. And teachers spend a lot of their money to buy things for the kids*- Junior/Intermediate teacher, Robotics Project

> *There are Board-wide grants, and I think if you don't take advantage, you might miss the opportunity. Other stuff are pilot projects, so schools can apply for it. I had to go to all these in-services for my grant. Sometimes it comes down to you and your luck, and it can depend on how aggressive your administrator is, and maybe if you have a superintendent that offers things to you. Where do they put their money, you know? For instance, all Kindergarten rooms have Smart Boards*

> *now because that was a big grant from the government* – Grade 2/ 3 teacher, Summerville

In conversations, many teachers discussed fundraising concerns in relation to PTOs (parent teacher organizations), which are increasingly being hailed as creating new forms of school disparities. Scholars such as Rafalow (2014) for example have documented how PTO groups can place pressure on educators in more prosperous schools to teach new digital skills and remain up-to-date with the most current technologies. Teachers in this study were also beginning to note the effects of strong PTOs on technology in schools:

> *At the beginning, all schools had a choice about what technology to get. But everybody could have gotten that first round, it didn't matter what income the neighborhood was in. But, did some schools purchase extra? Yes, of course. We should really be working together so that all schools and students have equal opportunities.* - Grade 2/3 teacher, Summerville

> *Yeah, and so like some schools, the principal has access to what we call discretionary funds through parent council. But, some parent councils are basically, using that money to band aid other stuff in the school* – Junior/Intermediate teacher, Robotics Project

> *We pitch the proposal to parent council. Yeah, if they have the funds available and they find it useful for the school and the students, they will purchase it. They have in the past.* -Primary/Junior teacher, Robotics Project

While concerns regarding funding issues and equitable distribution of technology are justified, it is important to remember that in general, technology is in fact becoming more accessible today, than print text was at one point. As such, it remains much more of a convenient and available tool for learning than traditional print text. However, it is still worthwhile to begin to understand how access to technology and fundraising can contribute to discrepancies across schools in terms of *how* much technology is available, and the ways in which it is utilized. As more jobs of tomorrow will require digital skills and 21st century competencies that are thought to come with increased technology use (i.e. creativity, perseverance), such discrepancies in access to technology and proper training could have serious implications for divisions among youth. Not only are technological skills (i.e. coding, programing) important kinds of capital that are required for many employment opportunities (Paino & Renzulli, 2013; Peng, 2017), but research supports the notion that it is essential for students to be equipped with digital skills early on that will be required of them in prospective job markets (Trilling & Fadel, 2009; van Laar, van Deursen, van Dijk, & de Haan, 2017). If future professions increasingly necessitate digital skills, it is important that we address the extent to which such opportunities are being given to *all* students and consider the various ways in which this can occur.

8.2.4.3 Equity Issues

Alongside concerns about access and fundraising new technology, some teachers expressed their worries about being able to provide students with enough resources so that even those without any access at home can benefit. Some school boards in Ontario have been mindful of this and have begun to take steps. For example, to mitigate potential disparities between schools and home access, the Toronto District School Board (TDSB) has addressed such gaps by producing an annual "learning opportunities index" (LOI), where they rank each school based on measures of external challenges affecting student success and achievement (e.g. median income, lone-parent families, social assistance, and the like). Based on where schools fall on the list, the TDSB attempts to afford more equitable academic opportunities to students of designated schools by providing additional funding and resources for those in lower income neighbourhoods (Alphonso & Grant, 2013; Toronto District School Board, 2017). Other boards, like SDSB, continue to allow students to bring in their own devices, which some educators worry may single out students more:

> *Because if you start saying how many of you can bring in your own iPad tomorrow and like only ten hands don't go up… that puts those students in a bad position because they don't have that choice.* - Grade 5 teacher, St. Helena

> *Our Board is pushing PEDS because they think that financially that's the way to get the devices in their hands because we can't afford to do it ourselves. It's going to be the "haves and the have nots". We can't put this much money into this, but yeah, we need to move forward. So, this is how we're going to do it and it really depends on the kids.* -SERC/SERT, Summerville

> *Some kids just don't have access to technology. So, we have to provide it for them, otherwise we could create a further divide too. So, we can't always require kids to bring in their own technology because they will have different ones.* – Grade 8 teacher, Summerville

> *The problem with allowing students to bring their own devices is that it highlights who can't afford it and who doesn't have it. Kids know who "have" and "have not". Like day one, if they bring back the form that allows them to have their PEDS, like the whole day they are bragging, bragging, bragging… "oh I have a laptop, I have a computer". So how does that make kids or families who can't even afford food feel like? That's why having access in schools is important because it can break that home divide* - Grade 2/3 teacher, Summerville

Many educators suggested that what is needed is a full implementation of technology in classrooms—proper funding, resources, access, and training—in order to truly achieve an equitable arrangement in Ontario schools:

> *I'll talk about the one that we always get—the money bombs. The reality is if you want this done, fund the whole thing—full implementation. Make every school, every board equitable. If one school has a fantastic parent council who can raise hundreds of thousands, they're gonna get the best. If you have a school, wherever it might be, no parent support, they're not getting anything. When I say full funding—PD, release time for staff to work together. We have champions across the province. Let them work together, create—you gotta fund the whole thing. –* Junior/Intermediate teacher, Robotics Project

> *… If you want a true sense of how this [robotics] will work with math, with literacy, with STEM, with coding, the Ministry's gotta come up with the funds and allow for everybody to get it across the province. And I don't mean just robots. It could be for coding, numeracy, whatever it might be. And I know there is a little bit of money out there…* - Primary/Junior teacher, Robotics Project

While these remain reasonable fears, I attempt to reframe these concerns under a different light. If we consider firstly, the print-text inequality of the past, it had two major components: 1) the sheer availability of books and other print resources, and 2) the availability of literate parents who could read and exposure their children to necessary skills. In contrast, digital technologies today are less demanding in that they only require some form of availability. Compared to print text, they are becoming a greater part of youth culture, and do not necessitate prior familial knowledge. To quote a Grade 8 teacher, "a tool is still a tool". In other words, regardless of whether a student owns that latest iPhone 8 or an "outdated" iPhone 4, at the end of the day, both forms of technology can still be an instrument of value if used appropriately. This is imperative—for divides between digital devices today are *much* smaller than the divides of those who had literary collections during the print-text generation. In other words, inequalities in the print era were much more pronounced than digital inequalities of today. For instance, the difference between owning an iPhone 6 and iPhone 8, or owning a tablet from 2010 compared to the latest version, is much more insignificant than between having a well-stocked home library and having no books or literary skills. A student in the print-text era would likely need literate parents to really be able to navigate their way through a large home library. Today however, that same child probably would need little parental assistance to navigate a piece of technology. Thus, learning to read and write is a much more profound difference than being able to traverse the web on an older smart phone or tablet. Any difference between the make, model, or year of digital tools can likely be considered a status symbol more than anything else[70]. Regardless, there remains a much smaller gap between students who are able to access *some* basic form of technology, compared to being able to access a collection of books, *and* be able to read and comprehend the literature. That being said, as we move forward with technology, it

[70] "Status" differences are no stranger to sociological literature and will likely continue as part of student culture regardless of whether the focus is on technology or not. Other examples could include clothing, shoes and so on (for a more detailed discussion on peer culture, see Milner, 2004).

remains imperative for policy makers to consider how to best create an equitable division of technology across all Ontario schools, so that all students may gain the proper digital skills for their future.

8.3 Limitations and Future Research

While this study has contributed to the literature on digital technologies in classrooms, it is not without its limitations. First and foremost, my research within the SDSB was limited to only two schools in a roughly middle-class neighbourhood where I had previously held occasional teaching positions, and therefore, knew the majority of staff and students. Thus, the results may not necessarily be generalizable to *all* middle-class schools across Ontario. In a similar fashion, the robotics phase of this study, while including nine different school boards across Ontario, was also limited to only those boards that the Ministry of Education had distributed robotics kits to. They were thus not comprehensive by any means of *all* schools using robotics and/or variations of technology. As such, more studies that can tap into diverse school neighbourhoods—schools that vary in their amount of technology use across Ontario—would do well. In fact, future research should consider the degree to which technology is utilized amongst schools in different SES pockets. For instance, recently the New York Times (NYT) has reported that the *real* digital divide today is not between children who have access to the internet, and those who do not, as we know that most students are able to access technology in some capacity. However, what remains a critical issue is between the *amount* of screen time kids are exposed to—the difference between "children whose parents know that they have to restrict screen time, and those whose parents have been sold a bill of goods by schools and politicians that more screen screens are key to success" (Riley, 2018). While it remains to be seen whether more screen time is necessarily a bad thing for students, future research would do well to understand *how* technology use can vary depending on multiple factors— SES being one of them. Rafalow (2014) has suggested that attempts to curtail digital inequality by providing simply just access to technology may not sufficiently address disparities across schools that vary by social class. He argues that teacher beliefs about students' race and class, and institutional perceptions about the value and purpose of technology can structure classroom teaching practices with educational technology (p. 96). He urges research to consider the role that school context serves in shaping the use of innovative technologies in classrooms. Likewise, he suggests that teachers' shared beliefs about students can inform whether digital skills students bring to school can be transformed into valuable cultural capital for achievement (Rafalow, 2018, p. 1445). Given the rapidly ongoing arrival of technology, it becomes essential for future research to understand how, and in what ways, technology is divided across Ontario Elementary schools (K-8).

Secondly, this research has largely tapped into the classroom engagement gap in schooling—asserting that is likely that more technology integration could lead to an increase in student engagement. While this remains an important area of research for policy makers, future research may wish to consider as well what new technologies can mean for measures of student achievement and success. Though the classroom

engagement gap is undeniably related to measures of achievement—it is likely for instance, that more engaged students in the classroom will be more likely to succeed academically—this research cannot conclusively argue that more technology can improve student grades, in the same way that it can boost student engagement in the classroom. While I observed in-class engagement, the main limitation here is that I was unable to observe any home-based engagement that may also facilitate achievement in schools (much like Lareau unearthed in *Unequal Childhoods* [2003] through her depictions of "concerted cultivated" parents versus those who abided by the "accomplishment of natural growth"). In other words, by focusing solely on classroom engagement gaps, I cannot examine, nor claim, with any certainty what kinds of home-experiences may account for the "engagement-learning "equation, as this remains a difficult venture to study. Thus, it would be ideal for future studies to quantitatively measure student achievement with technology—exploring whether employing digital tools can impact student's academic success. Taking a more longitudinal approach that could explore student academics before and after technology interventions, along with their varied home advantages would be ideal.

Finally, my goal in this dissertation was to explore technology's presence in classrooms today and begin to understand some of the impacts that digital resources may have on classroom interactions, rituals, and routines. However, it is worth considering whether technology can in fact enhance learning. In other words, future research should ask whether 21st century classrooms, and accompanying digital tools, are oriented towards "deep learning" as opposed to perhaps, the form of learning that may be more easily measured on standardized tests. Mehta and Fine for instance, have defined "deeper learning" as a kind of learning that involves "...processes that sit at the top of the traditional learning taxonomies: analysis, synthesis, and creation, as opposed to recall and application…. deeper learning requires understanding not just the content but also the structure of how disciplines work" (Mehta & Fine, 2012, 2014). In recent work, Mehta and Fine (2012) have suggested that some of best schools of today are bringing their own versions of progressive education into the present—taking after John Dewey who argued that schools should be places that leverage natural curiosities into deep learning, and that can build the inter-and intra-personal skills required for successful participation in social, economic, and civic life—as such ideas have received renewed and broadened interest today. However, they contend that such approaches to teaching and learning are in fact still very rare in American public education. In fact, according to Mehta and Fine (forthcoming), only about 1/5 classrooms actually create learning spaces in which students are actively creating, evaluating and analyzing rather than focusing on just understanding and remembering. I propose that if the contingencies I have discussed in this chapter are met, then there is a stronger likelihood that technology can aid teachers into really facilitating deeper learning amongst their students. In fact, Mehta (2017) has argued that features of deeper learning classrooms include teachers who, among other things, "view knowledge as uncertain rather than certain, who view failure as critical for learning rather than as something to be avoided, and view students as creators of knowledge, rather than a receiver". Such features parallel some of the elements I have suggested earlier as features of ideal 21st century classrooms that embrace technology.

Furthermore, some of these attributes Mehta has claimed, are often found on the periphery rather than the core of learning—in extracurriculars such as robotics clubs for instance. If true, then it would be worth studying whether the continued integration of technology into the curriculum, teacher pedagogy, and daily routines can extend into deeper learning. Dede (2014) has argued that while it may be possible to teach for deeper learning *without* technology, "it is hard to imagine how our schools will scale up such instruction without support from digital tools and media" (p. 4). Assuming that technology is, from here on in, a mainstay in Ontario education, it is imperative for future research to continue to probe how, and in what ways, technology can assist in fostering progressive classrooms in which deep learning is evident. As a relatively new domain in today's schools, there remains much to explore with regards to digital technologies in the classroom.

8.4 Significance and Concluding Thoughts

"Technology can amplify great teaching, but great technology will not replace poor teaching"- OECD, 2015, p.4

What will the future of education look like with more technology integration? Selwyn and Facer (2014) have argued that there remains a need for serious and sustained research on the relationship between "sociology of education and technology"—which I have attempted to shed light on throughout this dissertation. Studying technology as it is unraveling in schools is a stepping stone for additional research to dedicate itself towards exploring digital technologies and student learning. This research in particular has significance for both the disciplines of sociology and education. Studies in the sociology of education have yet to apply Randall Collins' IR theory (2004) to educational research on technology. While there has been some research dedicated to studying IR theory in different classroom contexts (see Olitsky 2007a; 2007b; 2007c for instance), to my knowledge however, classroom experiences with technology as a focal point is an area that has yet to be understood through Collins' framework. Thus, this research presents a novel attempt to apply IR theory to classrooms that engage with technology, which can have high stakes for student learning. Throughout, I consider what features of technology use may contribute to successful rather than failed rituals. Likewise, discussions of cultural capital within education have been largely limited to classrooms in which technology was almost non-existent. This dissertation thus interrogated what digital skills may mean for cultural capital theory—suggesting that digital capital is a new type of valuation in modern day schooling. I contend throughout this dissertation that when teachers and students are equipped with successful cultural capital, this can have huge implications for their learning. Rather than mis-aligning students with school goals, acquiring digital capital today seems to have the opposite effect—creating a generation of symbols and meanings that can align students with school expectations and rewards. This seems to inevitably engage students into academics.

The big question however, remains: *can, technology transform student engagement in 21st century classrooms?* My short answer is yes; however, I suggest throughout this dissertation that it largely depends on *how* technology is utilized—the various contingencies that I have highlighted. Such contingencies can be seen as a way to ensure that teachers avoid failed digital rituals and ensure that they are able to align rituals utilizing technology and digital cultural capital with school goals. Thus, the real marker of difference lies in the ways technology is being integrated and accessed. This will ultimately define whether students become more engaged or not, for as one teacher said:

> *Apps and technology in general are only as good as the lesson that the teacher brings into it. It really comes down to how you use it. So, if you tell the kids just to take out a piece of paper and write about their weekend, you can see most of their eyes roll. But, now introduce an iPad and tell them to go onto the Book Creator app, tell them to go find me a picture that represents their weekend, and then superimpose it, and type up a paragraph choosing their fonts and colours, and then all of a sudden this becomes fun, you know? The excitement goes up, the fun goes up, but that is because the teacher introduced it with a purpose in mind. It was not like here play on the iPad…it was here, let's do this lesson on the iPad. The difference is in how you use technology.* – Itinerary teacher, SDSB

In short, it is not enough to simply provide access to technology without effectively considering the different ways in which it can be applied to learning. This can encompass many factors, but as I have stressed in this chapter, teacher pedagogy and philosophy, training, proper implementation and availability of resources seem to be among the most important contingencies in this study. While examining the extent to which such factors can truly impact technology integration, and whether proper implementation can facilitate "deep learning" (Mehta & Fine, 2017) remain beyond the scope of this dissertation, I have attempted to provide some preliminary thoughts concerning student engagement and technology. In addition, this research has probed issues relevant to both sociological and educational fields—creating new efforts to understand where educational practices and processes may be reconfigured by new technological practices along perhaps, more empowering lines. It is my hope that future research continues to unpack the intricate relationship between technology and education in 21st century classrooms.

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APPENDIX A

OBSERVATION PROTOCOL

Focus: Technology in the Classroom

Date:	**School:**	**Setting(s):**

I. Classroom Observations

Room description

Consider the following:

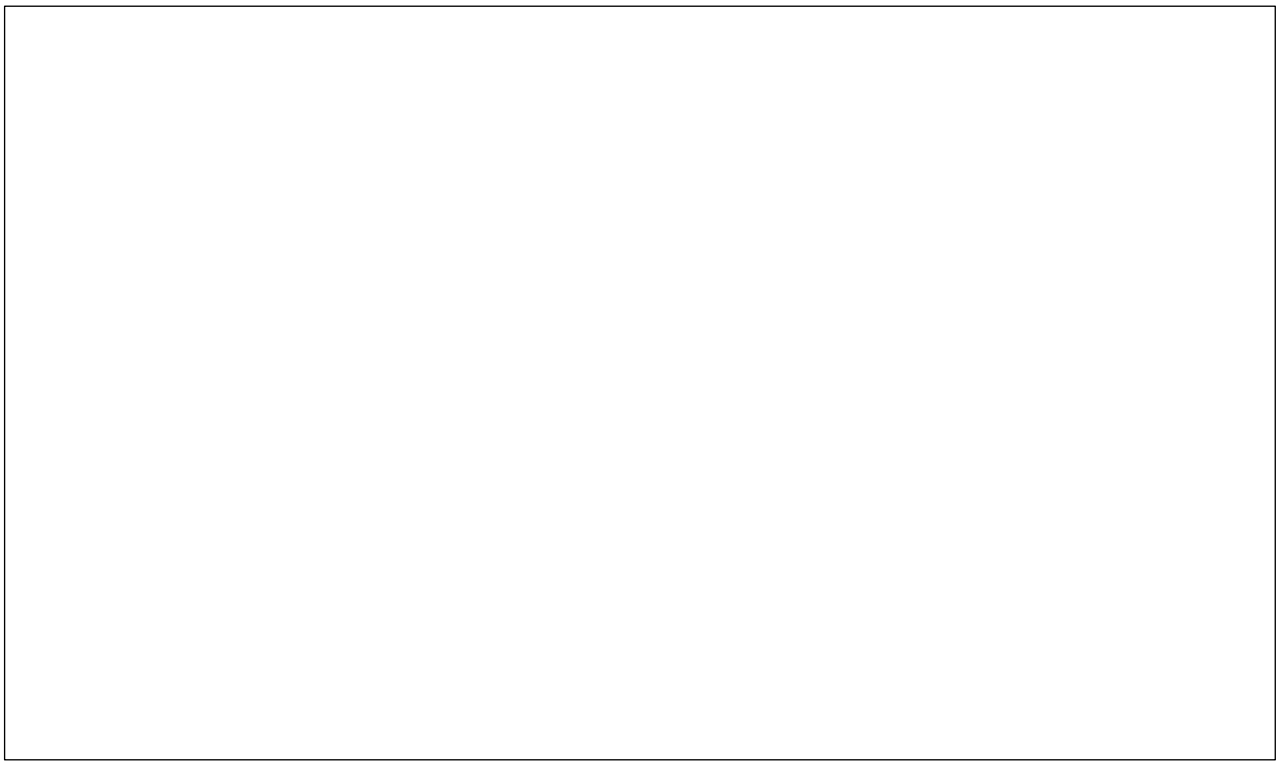
- Description of the classroom [learning environment]
- Teaching aids/materials used
- Time devoted to using technology
- Classroom set-up [where children sit, where teacher stands etc.]
- Where is technology placed?
- What stands out? What do I notice?

II. Student Observations

Student Characteristics

Consider the following:

- Number of students
- Gender of students
- Are students on task/off task?
- Do students interact with one another?
- What kinds of things to students say to one another?
- How do boys interact? Girls? Is there a difference in terms of the interactions between genders?
- How are students grouped?
    - Individual
    - Small groups
    - Student pairs
    - Whole class
    - other



III. Teacher/Instructor Observation

Teacher role

Consider the following:

- What is the role of the teacher? (i.e., facilitator, coach, lecturer, etc.)
- Where does the teacher spend most time?
- Do they facilitate classroom use?
- Are they the main source of knowledge in the class?
- How do they interact with their students?
- How do they respond in instances where students have questions?

IV. Technology Observations

Use of Technology

Consider the following:

- What kind(s) of technology are used?
- Does the teacher initiate technology use?
- Do students seek out technology on their own?
- How is it used?
- Is technology used for learning of for leisure/play or combination of both?
- How long is the technology used for?

APPENDIX B

TEACHER INTERVIEW QUESTIONS

1) Can you tell me what grade you are **currently teaching**? How long have you been teaching for and what grades?
2) How do you **organize/structure** your classroom? What strategies do you use?
3) As you may know, my interests are in technology and classroom interactions. Could you tell me a little bit about your **experience with technology?** When you began to use it? Why?
4) What are your thoughts about **using technology in the classroom**?
5) Can you give me an **example of how you integrate technology**? What kinds do you use? How do you use it? Have you ever tried to "gamify" the curriculum or your teachings?
6) In what ways, if any, have your **teaching methods changed since** you began using technology?
7) Has technology **changed classroom dynamics**?
    a. **Classroom interactions** you may notice?
    b. Amongst student-student
    c. Teacher to student?
8) How have students in your class (or past classes) **reacted to technology**? Can you think of times when technology you used went really well? Can you think of times when technology failed?
9) What do you think are the **benefits** to using tech in the classroom? The **consequences**?
10) In recent years, there has been a lot of talk about the "boy problem" with technology seen as a tool to reengage boys. How do you feel about that? Do you notice any difference with regards to **gender and tech**? (interest, enthusiasm?)
11) Has it impacted students from **lower SES backgrounds**? Students who may not necessarily have access to technology at home?
12) In your experience using technology, do **the initial effects fade?** September vs. June? Is the enthusiasm lost over time?
13) Would you agree that technology engages students? If so, does that engagement translate into **academic learning?**
14) How would you characterize your **teaching style?** (i.e. relaxed, strict, fair, fun etc.) Has it changed since using technology?
15) What do you think the **future of schooling** will look like? Will technology continue to change the schooling process?
16) Is there anything else you would like to add?