

ATHABASCA UNIVERSITY

BARRIERS WHEN IMPLEMENTING MLEARNING AND DIGITAL LITERACY IN  
URBAN K-8 CLASSROOMS

BY

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**Dedication**

I would like to dedicate this study to my wife, Kimberly, my two beautiful daughters Madison and Gillian and my mother Beverly.

### **Acknowledgements**

I would like to express my deepest and most sincere gratitude to all who have helped and supported me to the completion of this research project. Without their guidance I would have been lost in the oceans of wandering personal thought. Dr. Cynthia Blodgett has been my guiding light from the outset of my graduate career and has seen me right through to this point of completion. I have valued her approach to collaboration and insight into a new and wonderful learning experience for me. Dr. Mohamed Ally through his efforts to guide me through this learning process has been commendable and thorough. Without these two professionals and their expertise I would have not made it this far.

To my friends and colleagues, I thank you for countless hours, days and months you have made available to me to navigate my way through this learning process. The collaborative effort by all has been valuable and will continue to do so as I carry on with my life long enjoyment of learning.

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### **Abstract**

This mixed methods study researched the barriers perceived by teachers in k-8 schools in an urban school district when implementing mLearning and digital literacy through the use of ICT devices in the classroom. With 41 elementary schools in the division, 4 were chosen using the convenience sampling principle with a total of 80 teaching staff members. 25 teachers chose to participate, which was a 31% participation rate. This study concluded that implementation of ICT devices and the accompanying training was not made available for teachers in a timely manner. The division has supplied ICT devices for classroom use but failed to fully implement strong pedagogical values and practices among the staff. The devices that have been made available are not enough for classrooms to use on a regular basis with teachers feeling that the current outcome of digital literacy and fluency cannot be met.

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# BARRIERS TO IMPLEMENTING MLEARNING

## Barriers When Implementing mLearning and Digital Literacy in Urban K-8 Classrooms

### Chapter I

#### Introduction

Information and communication technology (ICT) has transformed our Canadian society. In the late nineteenth and early twentieth century instant audio communication were made available with the introduction of the telephone ("Imagining the internet," n.d.). Video transmission started with experimentation in Montreal during the early 1930's with the wide adoption of television during the 1950's ("Canadian broadcasting," 2004). The widespread adoption of the Internet in Canada began in the 1990's with the creation of the Canadian Internet Registration Authority (CIRA) and the dot-com boom beginning in 1995 "where businesses worldwide started going online" (Teksavvy, 2014, para. 5). With this transformation, ICT has reached out to most aspects of our lives, including access and personalization of education.

Over the past few years ICT use in both traditional schools and in the online capacity for education has grown. With this growth, jurisdictions in Canada are struggling to address three components of their education system: (a) balancing demand against cost through the efficient and effective use of scarce resources; (b) increasing collaboration to seek synergy, enable growth and spur efficiency and quality; and (c) encourage and enable innovation (Contact North, 2012).

In Canada education is a provincial responsibility. A national coherent program does not exist. As a result duplication and inefficiencies exist across the country. Nonetheless this does strengthen Canadian education as each province and territory has built a system of education unique to the needs of its inhabitants (Contact North, 2012).

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The current state of ICT usage in Canadian schools is one of great flux and ambiguity. There is no one standard across this country that can be easily adapted into all schools. A study released by Statistics Canada in 2004 shows that in the early 1990's ICT was a challenge in Canadian schools with financing of the technology being the most concern (Plante & Beattie, 2004). "Nearly 67% of principals reported that having sufficient funding for technology was an extensive challenge to using ICT in their school" (p.27). Today it is not much different. Principals are still "balancing demand against cost through the efficient and effective use of scarce resources" (Contact North, 2012, p. 3).

Some similarities of ICT usage exist that are congruent with schools across Canada. For example, pockets of individual teachers, through their own initiative, tackle the ICT issues in their schools quite successfully (Contact North 2012). There are even organizations available for ICT professional development. The Newfoundland and Labrador Teachers Association partnered with the province's Centre for Distance Learning and Innovation to create a Virtual Teachers Centre to use the infrastructure and expertise of the K-12 online learning program to deliver online professional development (Barbour, 2012, p. 16). Educators spend their time and effort through their own initiative to bring ICT into their classroom to enhance the learning of their students.

This study focused on the barriers to implementation of mobile learning (mLearning) in the K-8 Regina Board of Education (RBE) public school system with a focus on the teacher.

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### Conceptual Framework

A model used to guide this study was the Framework for the Rational Analysis of Mobile Education (FRAME) developed by Koole in 2009. “Basically the model is a heuristic; that is, it is a tool, like a lens, that allows someone to critically examine a given phenomenon” (Koole, 2015, para. 2). Koole (2009) succinctly explained that

In the FRAME model, mobile learning experiences are viewed as existing within a context of information. Collectively and individually, learners consume and create information. The interaction with information is mediated through technology. It is through the complexities of this kind of interaction that information becomes meaningful and useful. (p. 28)

Figure 1 below shows a visual model of FRAME created by Koole.

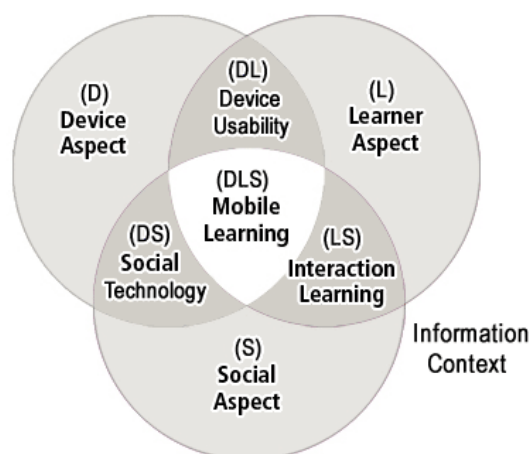


Figure 1. Venn Diagram of FRAME model. Reprinted from *Mobile Learning: Is the FRAME Model still current?* [Blog post]. Koole, M. 2011. Retrieved from <http://kooleady.ca/thoughts/?p=619>  
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As this model shows, there are three sections; device aspect (D), learner aspect (L) and social aspect (S). Each of these three sections intertwine with each other to create device

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usability (DL), social technology (DS), and interaction learning (LS). All three sections merge in the middle with mobile learning (DLS).

The Device Aspect (D) is quite simply hand held or mobile devices available for use such as a smartphone, tablet or other mobile connected device. Characteristics of devices would include portability, input and output capabilities, storage of data, retrieval of data, and the speed of the processor in the device. Koole (2009) refers to all of this as “physical, technical, and functional characteristics” of a connected mobile device that “provides the interface between the mobile learner and the learning tasks” (p. 28). With the popularity of cloud computing, which is the storage of data on a server instead of on the device, and the retrieval of data using wireless connectivity means that storage capacity is no longer a prevalent feature. For example, Google Education’s suite of apps is billed as “free productivity tools for classroom collaboration” (Google, 2016, para. 1). The basic premise of the system is that like Chrome OS, all data is stored on Google’s server using any device to access the data as well as any of the google apps as long as it is connected to the Internet (Marshall, 2014).

Koole (2009) explained that the second aspect of her model, the learner aspect (L) is based on the characteristics of the learner.

It is grounded in belief that the learner’s prior knowledge, intellectual capacity, motivation, and emotional state have a significant impact upon encoding, retaining, and transferring information. Actively selecting or designing learning activities rooted in authentic situations as well as encouraging learners to discover laws within physical and cultural environments are powerful pedagogical techniques. (p. 31)

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Kumar, Jamatia, Aggaarwal and Kannan (2011) agree stating that it is the cognitive abilities, memory, learning preferences, willingness to learn and motivational level of the learner that signifies the features of an individual learner.

Kumar et al. (2011) described the Social Aspect (S) with features suited for collaborative learning. “Social [A]spect points to the features required for conversation, cooperation and social interaction – it means sharing/respecting socio-cultural aspects paving the way for congenial interaction” (p. 3). Koole (2009) designed the Social Aspect insisting that the learner follow the rules of cooperation to communicate, which will enable the exchange of information, acquire new knowledge and adhere to cultural norms and practices within the group or community of learning.

Two of these aspects, Learner and Social, are already part of RBE’s strategic plan (Regina Board of Education, 2014). Though not discussed in the strategic plan, the Device Aspect has been in place with RBE in the form of netbooks and laptops that are easily mobile (S. Harris, personal communication, June 13, 2015). Chromebooks are also available in most schools along with iPads in a few schools (B. Fries, personal communication, February 10, 2016). According to Koole’s FRAME (2009), all three aspects meet at the centre with mobile learning being central. FRAME will be valuable for this research as the focus is mLearning.

Mobile learning is supported by the cognitive and constructivist theory, as it is an active process that requires acquisition, organization, processing and retrieval of information (Keskin & Metcalf, 2011). Sharples, Taylor, and Vavoula (2005) posited that using mLearning can “bridge the gulf between formal and experiential learning, opening new possibilities for personal fulfillment and lifelong learning” (p. 8). The



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strategic plan of the RBE (2014) includes these forms of learning as a desirable outcome for its students. Sharples et al. (2005) also state that “by placing the mobility of learning as the object of analysis we may understand better how knowledge and skills can be transferred across contexts such as home and school, [and] how learning can be managed across life transitions” (p. 2).

### **Rationale for this Study**

The rationale for this study was that RBE has not had a clear picture in the use of mobile technology and mLearning in the classroom. Today, most administrators in RBE do not fully support the involvement of mLearning (S. Harris, personal communication, June 13, 2015). One of many tasks for managers (administrators) is to evaluate their employee’s readiness for change and take steps to ready the adoption of innovations like mLearning (Goolnik, 2012). An administrator should anticipate the impact of change while identifying potential resistance issues and planning accordingly (Keengwe, Onchwari, & Wachira, 2008). Currently this does not happen in many RBE schools (B. Fries, personal communication, February 10, 2016). There has been no formal inclusion of mLearning in the outcomes and strategies listed by the RBE in their strategic plan (Regina Board of Education, 2014).

The meaning of mLearning is not concrete or accepted as a singular definition. Traxler (2005) defines mlearning as “any educational provision where the sole or dominant technologies are handheld or palmtop devices.” Laouris and Eteokleous (2005) go further by defining what mobile is:

Many authors use the term mobile as synonym to mobile phone. This amounts to an over simplification that misses the whole concept, because viewing a telephone

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as a device which operates wirelessly reveals only a very thin aspect of what today's mobile technologies can offer. (p. 2)

Citing Keagan (2005), Keskin and Metcalf (2011) suggest mLearning is restricted to the use of small hand held devices.

However, definitions have arisen regarding mLearning where it is more learner centred rather than device centred. “[M]obile learning is more than just using a mobile device to access content and communicate with others – it is about the mobility of the learner” (JISC Infonet, 2014, para. 2). Traxler (2007) supports this also by stating that the learners’ experiences will emphasize ownership, informality, and mobility of learning taking place, meaning that learner centred activities are more integral to mLearning than the device that is being used.

It has been studied for a few years now and the evidence showing the benefits to mLearning is becoming more pronounced. One perceived benefit is real-time engagement of the content readily available either through the Internet or offline Apps (Ferriman, 2013) where “students can answer polls, tweet questions, and look up information during lectures” (para. 5). Another benefit is the learner centred anytime/anywhere model of learning. In a blended model of learning within a traditional school, the learner can be collaborating with other students as well as professional staff while being engaged in the learning process outside of the classroom in another part of the school. As Ferriman (2013) stated, students can ask and submit questions to teachers through apps such as twitter or even video conferencing while at a distance in real-time.

Mobile learning can happen anywhere: in a classroom, at the dining room table, on a bus, in front of a science exhibit, and anywhere... [with] portability... not [being]

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as important as the ability of the learner to connect, communicate, collaborate, and create using tools that are readily at hand. (Mehdipour & Zerehkafi, 2013, p. 96)

Using RBE's Strategic Plan (2014) it can be seen that the only model of learning is the involvement of literacy and numeracy. With the inclusion of mLearning and mobile devices in the classroom of the teacher and student in RBE, the learning process has the potential to become more collaborative.

### **Problem Statement**

In education the use of mobile technology has great significance. Saskatchewan's Ministry of Education and RBE desires that all students become fluent in digital as well as technological literacy (Regina Board of Education, 2014; Saskatchewan Ministry of Education, 2013). The integration of mLearning into the curriculum can do much more than enable anytime, anywhere learning (Archibald, MacDonald, Hogue, & Mercer, 2013). West (2013) wrote that mLearning "represents a way to address a number of our educational problems. Devices such as smart phones and tablets enable innovation and help students, teachers, and parents gain access to digital content and personalized assessment vital for a post-industrial world" (p. 1).

There has been a lack of evidence present for the teaching staff at RBE to engage in using mLearning and mobile devices along side ICT devices other than to be encouraged to incorporate it into the classrooms. There has been little research examining reasons that teachers do not include mobile devices and mLearning into their classroom routine (S. Harris, personal communication, June 13, 2015). There have been numerous studies completed that show the benefits of mLearning and mobile devices in

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the classroom (Barbour, Grzebyk, & Eye, 2014; Nouri, Cerratto-Pargman, Rossitto, & Ramberg, 2014; Park, 2011; Traxler, 2005; Traxler, 2007).

### **Purpose Statement**

The purpose of this study was to explore reasons that were preventing RBE teachers from employing mLearning and mobile devices in their classrooms.

### **Research Question**

*What are the specific barriers for teachers within RBE in the implementation of mLearning along with the mobile learning devices into their classrooms and teaching strategies?* The succeeding sub-questions are:

1. *With the ICT devices already available for teachers and students to use in the classroom, why are some teachers adopting them while others are not?*
2. *What are the specific issues with implementation of mLearning with teachers employed with RBE?*

### **Significance of the Study**

The Ministry of Education from the Province of Saskatchewan stated that the “PreK-12 education system fosters and promotes digital fluency and the infusion of technology in teaching and learning to improve outcomes for all students” (Saskatchewan Ministry of Education, 2013, p. 1). According to RBE’s strategic plan (2014) there is no direct mention of this as part of their learning outcomes. The significance of this study was that valuable data has been generated for administrators, staff and other stakeholders with the RBE to better inform decisions regarding for the successful implementation of mLearning using available ICT and mobile devices into the classroom. This information

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will help meet the 21<sup>st</sup> Century skill of digital literacy as outlined by the Saskatchewan Ministry of Education (2013).

### **Delimitations**

A delimitation simply put is a factor or factors that are controlled by the researcher (Mauch & Park, 2003). The delimitations of this research have been the size of the study that was undertaken. There are over one thousand teachers currently employed with RBE in varying capacities most of which involve direct contact with students. Another delimitation has been the time factor regarding this study. The process of gathering data from the teachers was undertaken during June 2016.

### **Limitations**

If delimitations are factors that can be controlled by the researcher, then limitations are factors that are out of control of the researcher. “A limitation is a factor that may or will affect the study, but is not under the control of the researcher” (Mauch & Park, 2003, p. 114). One factor of limitation was the availability and willingness of participants for this study. Even though this study at its conclusion will benefit the teaching staff at RBE, it did not pave the way for inclusion of all teachers approached for this study. There was a large pool of responses based on personal answers given. Though similarities were present, there were significant differences in responses that found a communal voice difficult. A barrier present for one staff member was not considered as such for others.

### **Definition of Terms**

Throughout this study various terms and words have been used that could have different meaning for the reader than what was intended by the study author. The

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following will provide a definition for terms that will create a more concrete understanding of the study.

### Administrator

- A principal or vice-principal of a school
- A superintendent of the school division
- A Director of Education (head of the school division)

### Digital Fluency

- “The effective use of the Internet (see ‘*Internet*’) for learning, [which] takes into account the skills that are needed to successfully use digital technologies for learning” (White, 2013, p. 8).

### ICT

- See ‘Information and Communication Technology’

### Information and Communication Technology

- An umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning (Rouse, 2005).

### mLearning

- See ‘Mobile Learning’.

### Mobile Device

- A handheld computing device that enables the user with limited or full connection to the Internet or network.

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- “A mobile device is basically any handheld computer... designed to be extremely portable, often fitting into the palm of your hand or pocket” (GCFlearnfree.org, 2015, para. 1).

### Mobile Learning

- Learning based on an anytime/anywhere model of learning usually associated with using a mobile device.
- “Any educational provision where the sole or dominant technologies are handheld or palmtop devices”(Traxler, 2005).
- Connectivity to the Internet ensures that real time collaboration with other learners is present and available at anytime.

### Outcomes

- The desired learning objective of the learner.

### PreK-12

- Defined grade groupings encompassing pre-kindergarten up to grade 12.

### Principal

- An administrator (See ‘administrator’) at the local school level of a school division in a supervisory role.

### RBE

- Regina Board of Education
- Public school division encompassing the city of Regina, Saskatchewan

### Stakeholders

- All persons involved with the RBE including all staff, students, parents of students and Ministry of Education employees.

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### Student Learner

- Students in Pre-kindergarten, kindergarten and grades one through twelve.

### Teacher

- “A person or thing that teaches something; especially: a person whose job is to teach students about certain subjects” (Encyclopaedia Britannica Company, 2015).

### Technology

- Computer, ICT or mobile devices

### Traditional School

- A 'brick and mortar' building that houses teachers, learners and support staff to facilitate learning.



## **Chapter II**

### **Review of Literature**

#### **Overview of Literature**

Mobile learning has been a very fast growing field in society today. It has changed and elevated informal learning to huge levels of learners in almost all reaches of the planet (Ally, Grimus, & Ebner, 2014; Traxler, 2005; Traxler, 2007). The interconnection and ubiquitous nature of mobile devices and the Internet has made it possible for the anytime/anywhere model of learning to become prevalent in mainstream society. Informally we as a society are picking up our devices to quickly search out new data on whatever topic interests us. Massive Open Online Courses (MOOC) are available for anyone with a desire to learn without having any prerequisite knowledge. People can learn just about anything on their own time (EDUCAUSE, 2015).

Many learners today in the Canadian school system have access to mobile devices, whether it is their own or family members. Since the introduction of the iPhone in 2007 and the iPad in 2010 (Apple Inc., 2014) usage of mobile devices has grown immensely. In 2014, just over half of all Canadians owned a smartphone with connection to the Internet (Melody, 2014). The household mobile usage, which also includes tablets, was at 76%, or 26.2 million people (Melody, 2014).

Most people use their mobile devices for going online, social networking and creation of content such as pictures, videos, or music (Pew Research Center, 2016). Application software (apps) for mobile devices number in the millions that users can download for leisure, creation, and work. Google Play has 1.5 million available apps while the Apple App Store has 1.4 million. Amazon, Windows Phone Store and

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Blackberry World all have 360,000, 340,000 and 130,000 apps respectively (Statista, 2015). This indicates that mobile devices are used quite extensively in Canada.

The formal education setting has yet to fully adopt mobile learning as a replacement of a traditional classroom or in a blended environment. From a survey completed by the company CDW Canada, Czikk (2013) wrote “new data is suggesting that the majority of schools in Canada are lagging behind when it comes to technology in the classroom. Specifically though, mobile learning devices like tablets” (para. 1). Educators in this same survey reported that they would love to have new technology in their classroom. Of those surveyed, 69% would love the technology to be an iPad. Czikk (2013) quoting CDW Canada’s Daniel Reio, “combining the right tools with a well thought out technology-based learning strategy makes all the difference in improved learning outcomes” (2013, para. 3). It seems from the research by Czikk (2013) that mobile devices are used extensively in Canada today. However the same report shows they are not used to their potential in a formal learning setting.

Many reports and studies have been done throughout the past few years espousing the positive attributes of mobile learning throughout the primary, secondary and tertiary education systems around the world (Barbour, Grzebyk, & Eye, 2014; Park, 2011; Traxler, 2005; Traxler, 2007). Self-efficacy for both educators and learners is very well documented. When mobile devices are used in and out of the classroom for various activities relating to education, people report a richer learning experience as well as a deeper understanding of the topic (Nouri, Cerratto-Pargman, Rossitto, & Ramberg, 2014). It is clear that mLearning and mobile devices are a positive addition to education in general.

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There are also many barriers to introducing mobile learning to the general learning public in a formal setting. Studies conclude (Baran, 2014; Traxler; 2007) that barriers of many different kinds hold back the successful introduction. Cost, prohibition of ICT devices in school, limited research on the implementation of mobile learning and devices, accessibility, ongoing support for professional development, and ethical issues that have arisen are some of the categories of barriers (Baran, 2014).

### **Positive Attitudes Towards mLearning and its Associated Devices**

Many studies have concluded that a positive impact on learner motivation and engagement creates an enjoyable learning experience with a richer understanding of the topic (Conradie, 2013; Nouri, et al, 2014; Tagoe & Abakah, 2014; Vazquez-Cano, 2014). The self-efficacy of learners has been positive with mobile devices in the classroom as well as on field trips. For example learners can become immersed in rich learning by using the different functions available on their mobile device on a field trip that is both individual and collaborative in nature. Pictures, recordings (both video and audio), and GPS functions can lead the student to a better understanding of the environment they are in and make a detailed recording of the events for later retrieval (Nouri et al., 2014).

In a different aspect of education, mobile learning can increase a level of understanding in a traditional education setting. Students who have access to recorded lectures still attend classes (Kinash, Knight, & McLean, 2015). Their study showed that absenteeism rate does not fluctuate with the online lectures available. They still attend the lecture then use the recording to check for understanding and ensure correct information was taken. They enjoy having the lecture archived for later retrieval. As well, pre-study online materials give focus of what the lecture or class will be about again

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giving them the opportunity for a more in-depth preparation of the class. Reviewing online archived lectures also give learners a simple study strategy to prepare for exams. Students still attend their classes of a traditional format for the face-to-face didactic structure, but use mobile technology to access multiple aspects of mobile learning (Kinash et al., 2015).

### **Cost as a Barrier to Mobile Learning**

The implementation of a mobile learning system in education facilities does come with a cost. This is one barrier that both learners and instructors desire to overcome. Inequality within any learning system puts hardship on both those with and without. There are many schools throughout Canada that have invested in technology and make it readily available. However there are a disproportionate high number of institutions that do not invest in infrastructure to its fullest extent for success (Czikk, 2013). Most institutions when trying to calculate the cost of mobile infrastructure use a Return On Investment (ROI) formula. An ROI formula weighs the cost and the benefits against one another. The benefits get turned into a dollar amount and then put up against the cost. The cost is higher, and then usually the decision is made not to proceed (Woodill & Udell, 2011).

There is a plethora of costs that are involved in creating and maintaining a mobile learning environment. Being able to not only purchase and keep updated mobile devices in service, but professional development for staff regarding proper usage with strong pedagogical frameworks is included in an ROI formula. Other costs that could be defined as a barrier are payment for connectivity, development of content for mLearning, salaries for overheads and staff working to provide mLearning, and pre-implementation

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costs such as research and development (Woodill & Udell, 2011; Baran, 2014; Fuegen, 2012). These are just some of the costs associated to the implementation of an mLearning experience that are indeed real barriers. Further research is needed to more fully explain the costs to implementing this system.

### **Prohibition of Cell Phone Use in Schools**

The use of smartphones and other mobile devices such as tablets (iPads) and ultra thin laptops (macbook air) are the norm in Canada. However, there are many k-12 learning institutions that have a ban of students using such devices on school property (Czikk, 2013). Many school divisions across North America have strict policies regarding usage that were created at the turn of the century and have not caught up to the reality of today and their ubiquitous nature. They and their leaders see these types of devices as being intrusive and not as a tool for constructive learning (Baran, 2014; Conn, 2010; Bhati, Mercer, Rankin, & Thomas, 2009).

Signal scrambling or jamming has become a tool that some schools and individual teachers use to actively discourage the use of these devices and enforce the prohibition. There are many that see this as a viable option for refocusing the attention of the learner to the teacher and the lecture. According to one company that deals in the procurement of signal blocking devices, “cell phone jammers in the classroom can stop cheating during examinations, end distractions during lectures and put the focus back on education” (TheSignalJammer.com, 2015, para. 7). However, as research shows, the practice of jamming cellular signal is illegal in many North American jurisdictions but is still being done (Conn, 2010; CTV News, 2009; Fox, 2015; Government of Canada, 2015; Industry Canada, 2011). Schools and individual teachers that block signals are

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looking at mobile learning as a negative force and are ignorant of the data available of the positive use of devices in the classroom (Ally, 2013; Palalas, 2014; Park, 2011; Traxler, 2005, Traxler, 2007).

### **Accessibility of mLearning in Schools**

Accessibility is another barrier to mLearning. Even though a large portion of the Canadian population owns and uses mobile devices regularly, there are too many people in the education sector that do not use their own personal devices (Czikk, 2013). With issues of prohibition in some school divisions or the lack of a strong connection signal, many people do not fully embrace using mobile devices for learning. The cost of outfitting schools, students and staff with a mobile device is expensive. For example, the Los Angeles Unified School District earmarked over a billion dollars as it tried to outfit every student and teacher with an iPad (AppleInsider, 2014; Weiss, 2013; Padilla, 2013).

In a positive mobile learning scenario, teachers would all have a device provided to them by their employer. On this device apps would already be loaded that would be required to engage the students in their classroom. This is not a common practice in schools. Many teachers are either using a device of their own (BYOD) or using one that is assigned to their classroom (Baran, 2014; Fuegen, 2012; Hu & Garimella, 2014; Brown & Mbat, 2015). This can create a mixed message of usage for teachers. Many teachers when given the opportunity to use a mobile device in the classroom do not unless there is enough for students. Having to ensure that all students have a device that is compatible with the usage is 'one other thing' that they must deal with. Most will choose to not use scarce resources including time, especially if there is no discernable difference between using mobile devices and choosing a more traditional approach to teaching (Nouri et al.,

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2014). Czikk (2013) reported that 69% of teachers surveyed desired to have a mobile device, preferably an iPad for their use in the classroom. Most do not have this available (Czikk, 2013). This is another area that is in need of further research.

### **Ongoing Support for Professional Development**

Research has shown that many teachers desire a commitment to ongoing PD for the use of mobile devices in their classroom. “If teachers are to incorporate the advantages of mobile technologies into their practice, they need training to improve their approaches to teaching and learning” (Ally, Grimus, & Ebner, 2014, p. 47). When there are devices available for use and no PD to basically show them how to use it effectively, the devices will not get used. Most teachers do not take the time to do the research on their own (Czikk, 2013). Self-efficacy for teachers using mobile devices will increase when given the opportunity to learn about how mLearning and the devices can impact the learner in rich and deep experiences. Without PD, faculty concerns of evolving pedagogical practices including attitude towards usage, anxiety, risk aversion, time commitments and feelings of competency will be prevalent which can lead to an aversion to mLearning (Baran, 2014; Fuegen, 2012; Hu & Garimella, 2014; Brown & Mbat, 2015; Tagoe & Abakah, 2014).

Valuable skills gained from PD opportunities will increase the self-efficacy of faculty if given the opportunity (Main, Pendergast, & Virtue, 2015). Skills needed for the 21<sup>st</sup> century teacher are not easily acquired without some form of ongoing PD. Teachers have been able to research and evaluate materials relevant to their class, but with mobile learning skills such as researching web-based content, social bookmarking and how to annotate webpages are needed. Also, an important 21<sup>st</sup> century form of information on

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the web such as wikis, blogs, vlogs, digital portfolios and social networking sites need to be understood for their usefulness. Social learning, social media, social skills and digital citizenship are vital skills to enhance the collaborative and cooperative effort of students. These skills and many more will aid the successful implementation of mLearning in the classroom when faculty are given proper ongoing PD opportunities to keep up with the technological changes that happen frequently (Ally et al., 2014; Brown & Mbatia, 2015; Kinash et al., 2015; Hu & Garimella, 2014).

### **Ethical Issues Involving Mobile Devices in the Classroom**

Ethical issues revolving around mobile device use in a school is a very large concern for faculty and parents alike. Whether founded or unfounded, this fear remains one of the top issues supporting the prohibition of devices. Signal jamming devices placed in the school by faculty or administration speaks to the fear of mobile devices in an educational setting (Conn, 2010). Cyberbullying is another fear that the public perception seems to dictate policy on the use of mobile devices in a school setting. Fears of cyberstalking, nefarious recordings, breach of sensitive data, online game playing and accessing social media for cheating are discussed as viable reasons for not letting mobile devices into the classroom. However, with proper care and attention through open communication with all involved these problems can be properly addressed (Eden, Heiman, & Olenik-Shemesh, 2013).

There are other ethical quagmires that can debilitate an mLearning initiative. Ungrounded fears of luring and lurking can affect how devices are used in the classroom. Social media sites used properly can keep parents, learners, faculty and administration aware of positive attributes of mLearning. Unfortunately popular media through these



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very same social sites can create a panic of sorts that disable the use of mobile devices in the classroom. However, when due diligence happens with the various stakeholders, this issue can be looked at objectively without any fear (Kim, Jeong, & Lee, 2010; Kim, Jeong, Kim, & So, 2011).

### **Limited Research**

Limited research, in such a new field of learning is a major barrier for the introduction of mLearning for faculty and students. Trying to keep up with an extremely fluid field of study involving the fast paced technology industry and its offerings to education in particular is an ongoing race that never seems to end. Research takes time. It can be a thorough process that produces findings to aid in the development of any field of study. Blending research with technological innovation such as mLearning and its mobile devices is not adequately represented. There is insufficient research on systemic investigations of mobile learning within entire teacher programs (Baran, 2014). More research needs to be undertaken involving mLearning and its impact with faculty, learners and administration (Baran, 2014; Bhati et al., 2009; Brown & Mbatia, 2015; Eden et al., 2013; Fuegen, 2012; Hu & Garimella, 2014; Tagoe & Abakah, 2014).

### **Summary of the Literature**

The literature review shows that among all sections discussed, there is an insufficient amount of research available at this time. More research is needed to better understand this growing field of mLearning in our educational institutions. There are many reports available to substantiate the positive nature of mLearning both formally and informally in the form of MOOC's (Haynie, 2014; UTHSC Educational Technology, 2013). Many educators have embraced technology and have successfully added to their

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classrooms in a blended format to enhance the learning experience. The barriers however still are great. Cost is still a factor for many institutions as they struggle to balance their budgets and allocate funds equally across programs in existence. Accessibility for staff and students is a barrier with unique challenges. Not only does it encompass lack of hardware availability (which easily is affected by cost) it also involves having strong and stable connectivity signals throughout the institutions (again, also affected by cost). Prohibition of mobile devices happens often in many institutions with reasoning that is almost unfounded and most certainly outdated. Creating policy on the fear that something could happen is not productive. All of these findings lead back to the original findings of this literature review, that more research is needed to better understand the barriers to mLearning in education institutions.

## Chapter III

### Methodology

#### Research Design

This mixed methods study undertaken used two phases. The first phase was data collection using a survey. This was an easy format to collect data for a school-based study on mLearning and mobile devices in the classroom and the barriers that prevent their use (Kristjansson, Sigfusson, Sigfusdottir, & Allegrante, 2013). Questions were created (see Appendix 3) with Koole's FRAME model in mind. The survey approach enabled data collecting in three parts. The first part included profile questions that generally identified the respondent age, gender and years of teaching experience. The second part of the survey was a Likert scale. Questions or Likert items, which are statements that respondents are asked to evaluate (Vanek, 2012), were created based on the literature review (see chapter 2) to give the researcher valuable data for future research. The third part of the survey was qualitative in nature where open-ended questions were available for respondents to answer. The intention was to present a clearer picture of why RBE teachers are not using mLearning and mobile devices in their classrooms with strategic planning for meeting outcomes defined by the curriculum.

The second phase of data collection was peer-to-peer conversations that gave the respondents the ability to expand on any answers from the survey. The device, learner and social aspects along with the intersecting areas of FRAME model was used to guide further questions. This interview process also gave the respondents the opportunity to share their perception of the topic. The purpose of the interview according to Gill, Stewart, Treasure and Chadwick (2008) was to "explore the views, experiences, beliefs

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and/or motivations of individuals on specific matters... [and] provide a deeper understanding of social phenomena than would be obtained from purely quantitative methods, such as questionnaires” (para. 7). Using the interview results and its rich immersive data has aided me in the discovery of what teachers with RBE need to begin to fully understand and use mobile devices and mLearning in the classrooms.

### **Participants**

Participants for this study were teachers currently employed with the RBE in k-8 schools. The chosen schools were selected based on the convenience sampling principle. Convenience sampling allowed the researcher to expedite data collection in a matter of hours with the use of the survey. Also, the close proximity of the researcher to the schools allowed for the peer-to-peer interviews to happen without funds having to be dispersed for travel and personnel costs ("Convenience sampling," 2016). The principals of the chosen schools were contacted regarding the participation of teachers for this study with information they presented to their staff. Thirty teachers then decided after viewing preliminary materials related to the benefits and the anonymity of the study gave permission to partake in the online survey. An offer was extended to share the results with the participants upon completion of the study.

### **Preliminary Inquiry**

An informal survey (Appendix 1) was delivered to the staff of a small RBE primary school that attempted to ascertain knowledge of mLearning. It asked only one question regarding the definition of mLearning. Out of the fifteen surveys returned, five similar but distinctly different answers emerged.

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Table 1

<i>Definition of mLearning</i> Answers	Completed Surveys	Teaching staff	Non-teaching staff
Mobile device centred	7	3	4
All technology centred (mobile devices, laptops, and desktops)	4	2	2
Learner centred without physical/geographical barriers (no mention of technology)	2	2	0
Learner centred without physical/geographical barriers (technology is mentioned)	1	1	0
Learner centred, anytime/anywhere (technology not mentioned)	1	1	0
Total	15	9	6

As the results show, seven participants viewed mLearning as specifically mobile device centred with four seeing it as all technology (mobile devices as well as laptops and desktops) centred. The remaining four participants regarded mLearning as learner centred with or without the use of technology. The diversity of the answers from this survey indicated that there were many variations to what a definition of mLearning could be even amongst a small group of people working in an educational institution. This survey also showed that much work is still needed to bring the level of understanding with mLearning the technology required to where a common definition can be shared amongst the stakeholders in RBE.

A definition of mLearning for stakeholders was introduced first through the survey and again through the data analysis and results. Mobile learning is quite simply a learner centred, device dependable approach to anytime anywhere learning. Connectivity

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to the Internet ensures that real time collaboration with other learners is present and available at anytime.

### **Data Collection**

The data was collected in two forms; (1) survey and (2) peer-to-peer interviews. Prior to the data collection, a letter of an invitation to participate (Appendix 2) was distributed to the teaching staff of the schools that chose to participate. This document outlined the study, the steps involved as well as approximately how much time was needed for their participation. Also, a time frame of when the study took place was listed giving the participants all required information needed to make an informed decision to participate in this study.

The survey (Appendix 3) was made available to participants online. LimeService was used to house and distribute the survey for two reasons. Firstly it is secure. Confidential surveys can be run with the activation of SSL encryption (Limeservice, 2016). Secondly, all confidential data collected will be stored on servers based in Canada (Limeservice, 2016).

The survey was divided into eight sections. The profile data (first section) included the age bracket, gender and the role of each of the participants. The second section asked about how personal devices were being used at work. The third, fourth and six sections focused on RBE ICT devices in the classroom and their usage. The focus of the fifth section was mLearning in the classroom. The seventh and eighth sections concentrated on IT services in the school and Bring Your Own Device (BYOD) issues respectively. Questions in the eight sections were quantitative in nature using the Likert scale, with Likert items generating specific answers. There were qualitative questions

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accompanying the quantitative ones that gave the study a richer and immersive look into why mLearning and devices are not being used and what is desired by teachers to begin the process of using mobile devices.

The peer-to-peer interviews gave the participant another chance to enhance their answers from the survey giving the research a more in depth understanding of the data being collected. This took place during the following fourteen days after the survey was completed. The availability of time was based on the schedule of the participant to ensure sufficient and thorough interview written points will be recorded as well as the session being audio recorded for later transcription. The questions for this process were generated from the answers given on the survey. This gave the opportunity for participants to reiterate their response in greater clarity.

### **Treatment of Data**

Both qualitative and quantitative answers from the study were analyzed to check for correlation of data and to better interpret the results. The mixing of the data according to Creswell (2014) has provided a “stronger understanding of the problem or question than either by itself” (p. 215). It has been desirable to identify and match the qualitative answers to their quantitative counterparts from the survey.

Based on a mixed method approach, this study offered the benefits of both a qualitative and quantitative approach to methodology. Using the explanatory sequential mixed method design (Creswell, 2014; Creswell & Plano Clark, 2007), this study collected data in two phases; (1) the quantitative survey and (2) the follow-up peer-to-peer interview. As suggested by Creswell (2014), this methods design approach involved two stages of data collection. The first was the collecting of quantitative data through the

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survey and then using the available analytic tools that accompanied LimeSurvey, the chosen online survey tool, to filter and analyze the collected data. LimeSurvey's statistics function has allowed for the expedience of data analysis with visual representation in the form of graphs (LimeSurvey, 2017).

The qualitative data that was collected from the peer-to-peer interviews was coded using manual techniques. Computer programs such as NVivo could have been used for the analysis of the qualitative data, as it "is a software tool that complements the work of human researchers working on qualitative and mixed methods research" (Hai-Jew, 2014, p. 2). However, the data collected was from six participants and was not a time constraint to manually code using Koole's FRAME model as a guide.

Using Koole's FRAME model, responses from the survey and the peer to peer interviews have been collated in the six categories; device aspect, learner aspect, social aspect, context learning, social technology and interaction learning. The data was then interpreted involving the final convergence of Koole's FRAME model, which is mobile learning. The identification of issues surrounding mobile learning resulted from this process has begun the process as to how present solutions to the barriers of implementation of mLearning in RBE classrooms.

### **Ethics**

Prior to the beginning this study, permission from Athabasca University's ethics board was granted. Permission from RBE was also given through their ethics committee. Permission from the participants themselves was required prior to beginning the study with full disclosure and understanding that withdrawal from the study did not bare any repercussion at all (Appendix 2).



## Chapter IV

### Results Quantitative

#### Participants

Initially, there were a total of thirty (n=30) participants in this study. However, five participants chose not to complete the survey leaving twenty-five (n=25) remaining for complete analysis. Four schools within the RBE were randomly chosen using the convenience sampling principle with the participants being on staff. Of all the participants, twenty-three defined themselves as females (92%) and two defined themselves as male (8%). Table 2 shows the ages of the participants along with the minimum and maximum, first, second and third quartiles. Also included is the range.

Table 2

<i>Age of participants</i> Calculation	Results
Count	25
Sum	982
Standard deviation	10.06
Mean	39.28
Minimum	23
1 <sup>st</sup> quartile (Q1)	29
2 <sup>nd</sup> quartile (Median)	40
3 <sup>rd</sup> quartile (Q3)	44
Maximum	59
Range	36

Participant age range, youngest to oldest, was 23 to 59 years, with a mean of 39.28 and a standard deviation of 10.06.

Table 3 shows the number of years teaching by all participants.

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Table 3

<i>Years of teaching</i>	
Calculation	Results
Count	25
Sum	339
Standard deviation	9.52
Mean	13.56
Minimum	1
1 <sup>st</sup> quartile (Q1)	3.5
2 <sup>nd</sup> quartile (Median)	13
3 <sup>rd</sup> quartile (Q3)	20.5
Maximum	36
Range	35

The minimum of years teaching was one with the maximum being 36. The mean is 13.56 with the range being 35 years. The standard deviation is 9.52 years.

Table four illustrates each participant's years of experience with the RBE.

Table 4

<i>Years of experience with RBE</i>	
Calculation	Results
Count	25
Sum	279
Standard deviation	8.26
Mean	11.16
Minimum	2
1 <sup>st</sup> quartile (Q1)	4.5
2 <sup>nd</sup> quartile (Median)	10
3 <sup>rd</sup> quartile (Q3)	14
Maximum	36
Range	34

An anomaly with this table in comparison with the previous one is that one participant has only been teaching for one year but has been employed with the board for two years. There are many different positions available with the RBE. A common practice is to be employed as an educational assistant (EA) while working towards the requirements for being a teacher. This anomaly is an outlier that did not have an affect on the data

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collected. Barriers to the implementation of ICT devices within the RBE would not have been affected with a staff member working for the board prior to being a teacher.

Table 5 shows the specific teaching roles of participants within RBE.

Table 5

*Teaching roles within RBE*

Answer	Count	Percentage (%)
Classroom	19	76
Itinerant/specialist	2	8
LRT	3	12
EAL	1	4
SLC	0	0
Teacher librarian	0	0
Other	0	0

The chart shows that the 25 participants fill multiple positions that are needed within the classroom as defined by the RBE. Not represented are the structured learning classroom teacher (SLC) and the Teacher Librarian as none were available or desired to participate.

### **Personal Device Usage**

For this study, it was deemed important to understand what ICT devices were being used by the participants. ICT devices that are ubiquitous in the personal lives of the participants are being used in a professional matter. Table 6 shows the varied amount of ICT devices owned by the participants.

Table 6

*Personal devices owned and used by the participants*

ICT device	Count	Percentage (%)
Android smartphone	8	32
iPhone	17	68
iPad	10	40
iPad mini	5	20
Android tablet	3	12
Chromebook	1	4
Ultra laptop	8	32
Other	2	8

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The results also show that many participants own and use more than one ICT device.

The final category shows two listed, which were defined by participants as a laptop and a MacBook Pro.

When asked about what they (participants) enjoyed about their personal ICT device, 23 (92%) of the 25 participants responded (see Appendix 4). Using FRAME as a model, 15 responses were coded as Device Aspect (D) and two responses for both Social Aspect (S) and Social Technology (DS). The largest set of responses coded as Device Usability (DL) had 28 responses. Broken down further, three responses focused on their devices being compatible and six responses focused on the portability as an enjoyable feature. Ease of use (easy) was the largest category with 15 responses.

Participants were asked what could be improved with their ICT devices. Out of the 25 participants, 19 (76%) responded with six (24%) abstaining. Software issues (six responses) were the most mentioned with battery life and speed/faster (2 responses each) being next. Both Device Aspect (D) and Device Usability (DL) had coded responses of nine each. No other aspect from FRAME had responses. However, there were seven responses categorized as non-answers. This is of some note because participants chose to answer the question but didn't know exactly what response to give or were fine with how their devices worked (see Appendix 5).

Table 7 shows that all but three participants (12%) use their personal device to complete work related tasks.

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Table 7

<i>Personal devices for work related purposes</i>		
Response	Count	Percentage (%)
Always	2	8
Usually	3	12
About half the time	6	24
Seldom	11	44
Never	3	12

When asked how they use their devices for work related tasks, 88% of participants responded with multiple answers while 12% abstained. Of those responses, 26 were coded as Learner Aspect (L), 19 under Social Technology (DS), 12 for Device Usability and three for Device Aspect (D). There was one response that involved Interaction Learning (LS) and two non-answer responses.

In the Learner Aspect (L) category 10 responses were based on research. Respondents were using their personal device for access to many different types research for their duties at work, from fact checking while actively teaching a lesson to checking the weather forecast prior to going outside (see Appendix 6). Eleven responses involved the participants using applications (apps) native to their device (photo, timer). Organization apps also stood out with five responses focusing on this function. The Social Technology Aspect (DS) was further coded down to two categories. Searching using the devices received seven responses and sharing digital data received five responses.

### **RBE ICT Devices**

Table 8 lists all the devices that are permanently stored in the classroom of the participants. Fourteen classrooms had permanently stored iPads and Chromebooks for student and staff use.

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Table 8

*RBE ICT devices permanently stored in the classroom*

Device	Count	Percentage (%)
iPod touch	1	4
iPad	14	56
iPad mini	3	12
Chromebook	14	56
HP Laptop	12	48
Desktop PC	0	0
Other	0	0

Of some note, participants indicated that no desktop PC's are in their classrooms. They are not classified as a mobile device and therefore not included in the study. However, not having at least one always-connected device in the classroom could be considered out of the norm (Dotterer, Hedges, & Parker, 2016).

Asked for availability of devices that aren't stored in the classroom, respondents answered with varied results. Table 9 below shows that Chromebooks and HP laptops are not normally stored in the classroom.

Table 9

*RBE ICT devices not permanently stored in the classroom*

Response	Count	Percentage (%)
iPod touch	0	0
iPad	6	24
iPad mini	0	0
Chromebook	20	80
HP Laptop	14	56
Desktop PC	0	0
Other	0	0

Interestingly with table nine is that it does not fully match the table preceding it.

Fourteen respondents said Chromebooks were stored in their classroom permanently while another 20 responses were that these were not stored in the classroom on a

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permanent basis. HP laptops had 14 respondents answering that they were not stored in the classroom on a permanent basis while 12 respondents answered they were.

Tables 10 through 12 list the responses regarding the availability of ICT devices for student use. Responses in table 10 ranged from never (40%) to always (0%).

Table 10

*There are enough ICT devices for students to use in the classroom.*

Response	Number of Participants	Percentage (%)
Always	0	0
Usually	2	8
About half the time	6	24
Seldom	7	28
Never	10	40

Question: Do you have regular access to the ICT devices that are not stored in your classroom?

Table 11

*Do you have regular access to the ICT devices that are not stored in your classroom?*

Response	Count	Percentage (%)
Always	2	8
Usually	7	28
About half the time	9	36
Seldom	6	24
Never	1	4

Question: Are there ICT devices available for your classroom need at a moments notice?

Table 12

*Are there ICT devices available for your classroom needs at a moments notice?*

Response	Count	Percentage (%)
Always	0	0
Usually	1	4
About half the time	4	16
Seldom	17	68
Never	3	12

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When asked about training on the proper use of school owned ICT devices and the accompanying apps respondents mostly agreed that they are not receiving adequate training initially and ongoing.

Table 13

*How often have you received training regarding the use of school owned devices?*

Response	Count	Percentage (%)
Always	0	0
Usually	2	8
About half the time	1	4
Seldom	16	64
Never	6	24

Table 14

*You regularly receive ongoing training regarding the use of school owned devices and the accompanying applications (apps).*

Response	Count	Percentage (%)
Strongly Agree	0	0
Agree	0	0
Undecided	2	8
Disagree	13	52
Strongly Disagree	10	40

### **How ICT Devices are used in the Classroom**

In their classroom teachers are expected to use the technology made available for professional use. Responses ranged from Always to Never.

Table 15

*In your classroom, you use RBE ICT devices for your professional needs.*

Response	Count	Percentage (%)
Always	13	52
Usually	8	32
About half the time	0	0
Seldom	3	12
Never	1	4



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Participants also used RBE ICT devices for personal use. Responses ranged from Usually to Never.

Table 16

*In your classroom, you use RBE ICT devices for your personal needs.*

Response	Count	Percentage (%)
Always	0	0
Usually	1	4
About half the time	3	12
Seldom	12	48
Never	9	36

Students use the RBE ICT devices for their assigned classroom work or assignments.

Table 17

*Your students use RBE ICT devices for their assigned classwork or assignments.*

Response	Count	Percentage (%)
Always	4	16
Usually	9	36
About half the time	4	16
Seldom	7	28
Never	1	4

Respondents have assigned classwork that required the use of ICT devices.

Table 18

*You assign classwork that requires the use of ICT devices.*

Response	Count	Percentage (%)
Always	1	4
Usually	1	4
About half the time	7	28
Seldom	10	40
Never	6	24

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Respondents have used ICT devices as a reward system for their students.

Table 19

*You use the RBE ICT devices as a reward system for students.*

Response	Count	Percentage (%)
Always	0	0
Usually	0	0
About half the time	8	32
Seldom	12	48
Never	5	20

Respondents have used ICT devices as a 'time filler' in their classroom.

Table 20

*You use ICT devices in your classroom as a 'time filler'.*

Response	Count	Percentage (%)
Always	0	0
Usually	0	0
About half the time	1	4
Seldom	9	36
Never	15	60

With proper use of ICT devices in a classroom setting it is imperative that sound pedagogical guidance be incorporated (Jimoyiannis, 2010). The responses in table 21 ranges from Undecided to Strongly Disagree.

Table 21

*The RBE board has provided sound pedagogical guidance regarding the use of ICT devices in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	0	0
Agree	0	0
Undecided	2	8
Disagree	13	52
Strongly Disagree	10	40

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### **mLearning in the Classroom**

The following definition of mLearning was provided to the respondents-“Mobile Learning or mLearning is based on anytime/anywhere model of learning usually associated with using a mobile device. Connectivity to the Internet ensures that real time collaboration with other learners is present and available at anytime” (see Appendix 3, section 5).

Participants were asked if any incorporation of mLearning was attempted in the past school year and at any point in their RBE career.

Table 22

*With this definition, written above, have you been incorporating mLearning into your classroom this past school year?*

Response	Count	Percentage (%)
Always	0	0
Usually	0	0
About half the time	1	4
Seldom	9	36
Never	15	60

Table 23

*You have incorporated mLearning into your classroom anytime previous to this past school year.*

Response	Count	Percentage (%)
Always	1	4
Usually	2	8
About half the time	2	8
Seldom	11	44
Never	9	36

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When asked about RBE giving any direction regarding mLearning, responses ranged from agreement to strong disagreement.

Table 24

*The RBE board has given you direction regarding the use of mLearning in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	0	0
Agree	1	4
Undecided	4	16
Disagree	13	52
Strongly Disagree	7	28

### Use in the classroom

At the time of the survey deployment, there were three main ICT devices deployed in the RBE K-8 classroom: full-size HP laptops, Chromebooks and iPads. Rules defining the usage of all three types of devices were easily understandable for teachers to follow and administer.

Table 25

*The rules for usage of ICT devices are easily understandable for you to follow and administer.*

Response	Count	Percentage (%)
Strongly Agree	0	0
Agree	12	48
Undecided	5	20
Disagree	8	32
Strongly Disagree	0	0

Time efficiency in the classroom for both teachers and students is desired. Using ICT devices are beneficial if they allow an efficient use of class time. For this survey an efficient use of time was defined as the ICT devices were quick and responsive and did not require a long time to boot up and login to.

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Table 26

*The use of these ICT devices provided by RBE meet the needs of staff and students by allowing efficient use of time (efficient use of time simply means devices are quick and do not need a long boot up time and are easy to login to).*

ICT Device	Response	Count	Percentage (%)
HP laptops		n=25	
	Strongly Agree	2	8
	Agree	6	24
	Undecided	2	8
	Disagree	9	36
	Strongly Disagree	6	24
Chromebooks		n=25	
	Strongly Agree	4	16
	Agree	5	20
	Undecided	5	20
	Disagree	11	44
	Strongly Disagree	0	0
iPads		n=25	
	Strongly Agree	7	28
	Agree	11	44
	Undecided	7	28
	Disagree	0	0
	Strongly Disagree	0	0

Connectivity in the classroom is important for staff and students and has the expectation of always being on and fully functional for ICT devices. Table 27 illustrates the responses that ranged from usually to seldom. Interesting, no respondents reported that it was always on or never functioning.

Table 27

*The Internet connection in my classroom is always strong and fully functional when needed.*

Response	Count	Percentage (%)
Always	0	0
Usually	9	36
About half the time	13	52
Seldom	3	12
Never	0	0

When using ICT devices in the classroom, is time being devoted to the lesson at hand with no troubleshooting student/device issues?

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Table 28

*When using ICT devices in the classroom, my time is devoted to the lesson at hand with no troubleshooting student/device issues.*

Response	Count	Percentage (%)
Always	0	0
Usually	6	24
About half the time	11	44
Seldom	6	24
Never	2	8

The next set of tables report about student behavior and the ability of teacher monitoring and control of proper ICT device usage in the classroom.

Table 29

*You believe that cheating by the students is easier with ICT devices in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	1	4
Agree	5	20
Undecided	9	36
Disagree	8	32
Strongly Disagree	2	8

Table 30

*Negative behavior (bullying) will be promoted with the increased use of ICT devices in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	0	0
Agree	3	12
Undecided	4	16
Disagree	13	52
Strongly Disagree	5	20

Table 31

*As a teacher, you feel you can effectively monitor and control the proper use of the ICT devices in your classroom.*

Response	Count	Percentage (%)
Strongly Agree	0	0
Agree	11	44
Undecided	7	28
Disagree	7	28
Strongly Disagree	0	0

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Focusing on the ICT devices, respondents were asked if they were needed to achieve the learning outcomes set out by the Saskatchewan Ministry of Education, if they are well suited for classroom use and if they were important for students to have and use. Responses ranged from a strong agreement to strong disagreement.

Table 32

*You believe that ICT devices are necessary for students to achieve the learning outcomes set out by Saskatchewan's Ministry of Education.*

Response	Count	Percentage (%)
Strongly Agree	2	8
Agree	15	60
Undecided	3	12
Disagree	3	12
Strongly Disagree	2	8

Table 33

*ICT devices are well suited for learning in your classroom.*

Response	Count	Percentage (%)
Strongly Agree	3	12
Agree	17	68
Undecided	2	8
Disagree	3	12
Strongly Disagree	0	0

Table 34

*It is important to have and use ICT devices in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	9	36
Agree	13	52
Undecided	1	4
Disagree	2	8
Strongly Disagree	0	0

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Table 35

*There are incentives for you and your students to use ICT devices in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	1	4
Agree	6	24
Undecided	8	32
Disagree	6	24
Strongly Disagree	4	16

The next series of questions centred around the collaboration with other staff and pedagogical experts during various times throughout the year focusing on ICT usage along with available and applicable apps.

Table 36

*Time is made available to collaborate with other staff regarding ICT usage along with available and applicable.*

Response	Count	Percentage (%)
Strongly Agree	0	0
Agree	1	4
Undecided	2	8
Disagree	15	60
Strongly Disagree	7	28

Table 37

*There should be dedicated time made available to collaborate with other staff regarding ICT usage along with available and applicable apps.*

Response	Count	Percentage (%)
Strongly Agree	6	24
Agree	15	60
Undecided	2	8
Disagree	2	8
Strongly Disagree	0	0



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Table 38

*There should be dedicated time on an ongoing basis for Professional Development (PD) with pedagogical experts regarding ICT usage along with available and applicable apps.*

Response	Count	Percentage (%)
Strongly Agree	7	28
Agree	15	60
Undecided	2	8
Disagree	1	4
Strongly Disagree	0	0

Table 39

*In one school year, what frequency do you feel is sufficient for this type of PD?*

Response	Count	Percentage (%)
Once a week	0	0
Twice a month	0	0
Once a month	3	12
Three times a year	11	44
Two times a year	5	20
Once a year	6	24

### IT Services in the School

IT services are needed for the ongoing usage of ICT devices in the classroom by both staff and students. The following tables represent the answers given by respondents involving procedures to IT access and repair time.

Table 40

*Trained IT experts need to be in the school to help when technology/device problems arise.*

Response	Count	Percentage (%)
Strongly Agree	7	28
Agree	8	32
Undecided	2	8
Disagree	7	28
Strongly Disagree	1	4

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Table 41

*There are knowledgeable staff members at your school that take care of technology/device issues when they arise.*

Response	Count	Percentage (%)
Always	2	8
Usually	15	60
About half the time	6	24
Seldom	1	4
Never	1	4

Table 42

*You know the procedures in regards to getting ICT devices repaired by the board.*

Response	Count	Percentage (%)
Strongly Agree	4	16
Agree	16	64
Undecided	1	4
Disagree	3	12
Strongly Disagree	1	4

Table 43

*On average, how long is the process of getting ICT devices fixed and back to working order and in the hands of staff/students?*

Response	Count	Percentage (%)
1 school day	0	0
2 – 4 school days	4	16
5 – 7 school days	5	20
7 – 10 school days	2	8
11+ school days	1	4
Don't know	13	52

Table 44

*The average wait time for ICT devices to be repaired and in the hands of students/staff is acceptable to you.*

Response	Count	Percentage (%)
Strongly Agree	1	4
Agree	8	32
Undecided	10	40
Disagree	5	20
Strongly Disagree	1	4

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### **Bring Your Own Device (BYOD) Policy**

The RBE is looking at the BYOD policy for ICT devices for staff and students to use in the classroom as outlined in their Technology in Teaching and Learning (2015) strategic plan a possibility to deal with the proliferation of ICT devices available. The responses below range from Strongly Agree to Strongly Disagree.

Table 45

*You feel RBE should adopt BYOD (bring your own device) as the main source of ICT devices for staff and students.*

Response	Count	Percentage (%)
Strongly Agree	1	4
Agree	5	20
Undecided	6	24
Disagree	7	28
Strongly Disagree	6	24

Table 46

*BYOD is a great model to adapt for ICT usage in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	1	4
Agree	7	28
Undecided	9	36
Disagree	4	16
Strongly Disagree	4	16

Table 47

*Equity in the classroom should be paramount. BYOD is not a good policy, as RBE should be supplying ICT devices for use in the classroom.*

Response	Count	Percentage (%)
Strongly Agree	5	20
Agree	11	44
Undecided	8	32
Disagree	1	4
Strongly Disagree	0	0

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Table 48

*A fair and equitable balance of RBE provided and BYOD ICT devices is desirable for classroom use.*

Response	Count	Percentage (%)
Strongly Agree	5	20
Agree	13	52
Undecided	4	16
Disagree	2	8
Strongly Disagree	1	4

### Results Qualitative

Following the completion of the ICT survey, six of the twenty-five participants agreed to take part in a more in-depth look at the barriers to ICT devices in the classroom. Interviews were set up with each participant at their convenience. The interview was based on questions from the survey they all completed. It was explained that this one-on-one forum was designed to elicit more in-depth answers from them, to help better understand their answers as to the barriers if any at all. The interviews were audio recorded for the purpose of transcribing to text for analysis. Using Koole's FRAME model, coding was completed organizing the transcriptions from the six participants into the six vectors.

#### Device Aspect (D)

All six participants owned ICT devices. All had smartphones and laptops. However, two expressed laptops may not be considered portable. They mostly just sat on a desk in their home. Four also owned tablets. There were no other devices brought up in the conversation.

All participants use their own devices at work for personal reasons such as texts, emails, phone calls and personal time accessing social media apps such as Twitter, Instagram and Facebook. They also performed professional duties and tasks in

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classrooms with their devices. Taking photographs and videos for data retrieval at a later date, accessing the Internet for a quick search of data, and accessing social media like Pinterest and Teachers paying Teachers for ongoing professional development. When asked, none of the participants used devices (laptops) provided to them from RBE for personal use.

RBE has three main types of devices available for staff and students to use; full size HP laptops, smaller Chromebooks and iPads. The Chromebooks were deemed as updated technology available for students to use. The participants enjoyed these devices over the larger HP laptops. One mentioned that the Chromebooks were “so much faster, much more efficient”. Another responded that the Chromebooks were “ a lot quicker, but not the quickest. The iPads are really quick”.

Participants all commented on the frustration of the HP laptops. They all considered this device as old technology and therefore not the most efficient. One commented that “they’re old and clunky, they don’t work very fast [and] half of them are broken and not replaced”. A similar comment from another participant echoed that the HP’s “are the slowest” of the three devices. “Loading, making sure the Internet is working, making sure there’s server access, making sure the kids can log in” were all issues that caused frustration with the use of the HP’s.

They all did agree that when these devices work, they are suitable for learning. However the evidence with the participants is the perception that regularly the HP laptops were not all working at an acceptable level for use in the classroom. The Chromebooks as well as the iPads all were perceived to have instant access to the Internet and therefore

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much more desirable to use. There seemed to be almost no issues with connecting to the Internet regularly with these devices over the HP laptops.

### **Learner Aspect (L)**

Training and experience with ICT devices in the classroom dominated the discussion with the participants. All participants agreed that there has been very little training made available to them for the inclusion of ICT devices in the classroom for students and staff. Participants felt they were left on their own to research how to properly use them. The sense of incompetence with ICT devices was very strong with another participant. She stated, “I don’t have a lot of experience and that’s one of the reasons I do not use computers”. Another participant was quite proficient at using ICT devices. When asked regarding PD training the response was that he needed no training for the use of ICT devices, but did acknowledge that others may struggle and need that type of training.

Time was another factor for usage of ICT devices. With the perceived lack of PD or training available, it seems that self-directed learning was the expectation. One participant explained that there is not enough time during the year needed to research and learn about how to use ICT devices in the classroom in a meaningful matter. “It would be nice if we’re given all these tools, what apps are available, rather than spending all of our extra hours outside the school trying to track down new apps”. Another participant commented that she was given some training on “how to access Kurzweil [a speak-to-text program] when Kurzweil was around, [but now] it’s been absolutely minimal”. All participants agreed that very little training has been offered for them or their students.

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Support with the devices mostly came from staff and students that had pre-knowledge of ICT devices and available apps or programs.

### **Social Aspect (S)**

Awareness of how to use devices and available apps are two main issues that all six participants commented on. They all mentioned that very little if any at all professional development has been recently made available regarding ICT usage in the classroom. One succinctly stated, “it’s been absolutely minimal” with another echoing, “it was inadequate”. What was available was the different knowledge and experiences that staff members and students have. Participants mentioned that certain staff members are known to have technical knowledge that can problem solve or troubleshoot issues that arise. Four participants use quite regularly social media (texting, messaging, Facetime) to contact other staff members at different times of the day for advice.

### **Device Usability (DL)**

Access to connectivity was a major theme with all interviewees. Wi-Fi invariably failed at one time or another for all participants in their workspace. It was a regular occurrence when trying to access the Internet that connectivity was unavailable. Participants regularly changed teaching strategies when connectivity failed. However, one participant stated that “if the Internet is crappy... I’ll use [my phone] as a hotspot”. When she could not access the Internet, she would use her own personal device to ensure that her teaching remained unaffected. Another participant mirrored the same comment saying she uses her personal device when she needs to tether to the Internet when the school Wi-Fi is down.

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Connectivity for the students using RBE ICT devices creates delay in accessing data on the devices or on the Internet. Using the HP's for students is not as fluid as the Chromebooks or iPads. Four participants commented that lesson time is taken away from them when trying to troubleshoot issues. One commented that the Internet connection "can be hit and miss sometimes, depending on the time of year". Getting the students on and ready to go can take anywhere from five to twenty minutes depending on which device they are using.

For logging on the students have to use different techniques depending on which device they have. The older HP laptops have more problems relating to logging on than the Chromebooks. One participant noted that "they [HP's] take forever [to log on] and they seem to constantly be... saying there's no login services available". Others have echoed the same sentiments regarding the HP's with one stating, "The boot up is usually slow, especially if a kid hadn't been on before because they have to go through the whole profile thing". Another commented, "Those things, those things are slow" when asked about the HP's. When the iPads are used all participants said there were no issues with them. They were very quick to turn on and gain connectivity access. One participant stated "in my classroom I use iPads all the time" with another saying the "Chromebooks [are] so much faster, much more efficient".

IT services provided by RBE was talked about in the interviews. In order for device usability be at its greatest, they must be functional. Out of the three types of devices supplied by RBE, the HP's caused the most frustration with the participants. When asked how long the average wait for the HP's to be serviced back to working condition, the reply from participants was seven to ten days on average. When asked if



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they knew the procedure for getting broken devices serviced, the five knew it. Only one participant did not know the procedure for getting the devices fixed. When asked, it was a concise “no” that was offered as a response.

### **Social Technology (DS)**

All three types of ICT devices provided by RBE are wireless in nature. This is preferable as “wireless networking is, perhaps, the most significant feature of mobile tools within the social technology intersection” (Koole, 2009, p. 36). All participants report significant issues with connectivity. One participant answered that the Internet connection was terrible. Voicing her frustration she replied when asked about Internet connection in her that it was non-existent last year. It was “terrible last year. I think I don’t know how many times IT was here”. However she did mention that the problem this year has been resolved so far. Another participant commented that devices would have an error message (no logon servers available) and would not connect to the Internet. Another noted that when trying to connect to the Internet, “it takes 25 minutes at least to get the entire class logged on and that’s before we start the lesson”. The common theme with all participants is that throughout various times of the day and year, the Internet is slow.

### **Interaction Learning (LS)**

All participants agreed that with PD pedagogical experts in the ICT device and accompanying apps field would be beneficial. This type of learning would enhance the collaboration that is already happening between them. Participants do collaborate with other staff members who are known to have knowledge with technology in the classroom,

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but they desire more. They all commented that the lack of direction with collaboration is the norm and that they want this to change.

### **Chapter V**

#### **Discussion**

At the time of the survey, there were 80 teachers on staff in the four schools chosen using the convenience sampling principle. Twenty-five teachers completed the survey, which was a 31% participation rate. The survey was designed to begin to look at barriers when trying to implement digital literacy and mLearning in an urban k-8 school. The accompanying interviews with six participants were designed for an expanded forum for a more in depth look into the barriers.

#### **Personal ICT device usage**

The diversity of the teachers that participated showed commonalities in the personal ICT devices they owned. All participants own and use a smartphone, three quarters own and use a tablet, and just under half own and use a laptop. Not asked was the ownership of desktop or stationary computers as they are not mobile. Even though this represents just 2% of the teacher population, it can be postulated that the majority of staff own a smartphone and that they can use its basic functions. Also, many staff members own a secondary device such as tablet or laptop that again, they will know basic function usage.

This is important as it shows the ubiquity of these devices and their use in the school. Most teachers used their device for personal tasks while at work. An equal amount of the tasks were also work related. The line between personal and professional use is getting blurred according to the data collected. Whether checking the weather forecast, quickly searching up information for class related tasks or for personal planning

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of time outside of work it seems that the separation of the two are becoming more vague. Personal ICT devices have become commonplace and almost invisible in their use.

However, as discussed earlier, many schools still do not allow the use of smartphones in the classroom. Many parents and staff still see smartphones as devices that should not be used for education in the traditional sense. There is a tugging of this dividing line as the data has shown that teachers do use their own devices in the classroom for work as well as personal reasons. There does not seem to be a clear policy backed up with data proving that personal smartphones should or should not be allowed in the classroom.

### **RBE ICT device usage**

The RBE generally has three types of mobile ICT devices for staff and students, HP laptops, smaller Chromebooks, and iPads. The results showed that all the devices were in use on a regular basis. It was unanimous among participants that the iPads were the most usable devices for students and staff. The instant connectivity function was most desirable along with the ease of logging on. The Chromebooks were next in line as desirable with their connectivity. The HP laptops were not desirable at all due to their age, connectivity and logon issues.

The overall theme regarding the RBE ICT devices is that the older they are, the less desirable they are to use in the classroom. The HP laptops that have been in circulation among the schools for the most time are the ones that cause the most frustration. The instant connectivity does not exist with these machines compared to the other two types. The Chromebooks still have logon difficulties with the students, but do not have connectivity problems with the same frequency as the HP's. In both the survey

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and the interviews it was reported that the iPads had no issues with connectivity. Instant connection was available along with no logon issues.

The results of the survey show that participants agree that there are not enough devices in the classroom for students. This is important because of RBE's desire to have digital literacy in teaching and learning infused in the classroom to coincide with regular curricular activities (Regina Board of Education, 2015). This task has been made difficult because of the lack of devices for all students. Devices must be booked in advance with no guarantee of availability at the time needed. Interesting enough the devices that participants desired to use were the iPads. The devices that were available most often and in somewhat of a larger quantity for students (though still not enough) were the HP laptops. The tablets are the most useful and easiest to use but in short supply.

Devices are not being used to their full potential, including the less desirable older HP models. Sound pedagogical practice for ICT usage in the classroom has not been shared with teachers. RBE has supplied the devices, but no pedagogical training. This perception is what the majority of participants in this study shared. The expectation of using the devices was evident with the best practices being left to the individual. Professional development for the teachers was not made available. The consequence of this was that word processing and Internet searching has become the main function for students and the majority of their teachers.

Even though the perception of professional development was almost non-existent, there was learning that took place. Collaboration did happen with various staff members, but only if they had time. All participants in this study owned personal ICT devices with

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the majority using them at school for work related tasks. Some participants were more comfortable with this and were able to transfer that knowledge to the usage of RBE ICT devices among colleagues. All desired a more formalized notion of collaboration to help better use ICT devices in the classroom based on sound pedagogical practices. If best practices and sound pedagogical training were provided to teachers, ICT usage in the classroom will increase and grow beyond how they are being used now.

Student behavior with device usage was looked at in the survey. Cheating in the classroom has the potential to become easier with the introduction of small mobile devices that can conceivably be hidden from view. This is the concern of only a quarter of the participants. The majority either didn't know or didn't feel it was an issue. When asked about cyber bullying, the majority felt it was a non-issue. This does not mean that it doesn't happen. It means that the teachers do not see it as an issue they need to focus on and monitor in the classroom. Negative behavior is not a large issue with the participants. Their focus is more to do with functioning devices with proper pedagogical training to help increase digital literacy in the classroom. It can be deduced that with functioning devices and meaningful pedagogical training regarding the use can lead to positive digital literacy and behavior skills among the students.

### **IT Services in the School**

The IT services within RBE are centralized to one location. When an issue arises that needs attention with Wi-Fi, an IT support specialist is dispatched to the school for diagnosis and eradication. ICT devices are shipped to the centralized IT department when problems arise with them. This procedure is known and followed by most staff. However, when asked they all desired someone on staff in their school to deal with minor

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issues as they arise. The perception of wasted time is apparent with the participants as simple issues that could be fixed very quickly that can render the ICT device operable again for students rather than the week it normally takes for the devices to become fully functional.

### **Bring Your Own Device (BYOD)**

There has been no widespread use of BYOD within RBE. Over half of the participants did not see this as a viable option for their classroom. The majority agreed that equity in the classroom is important and that the board should be supplying the ICT devices for use. However, balancing the present day situation of not enough devices for students and the desire to integrate digital literacy in the classroom has participants understanding that a mixed-use policy would alleviate some of the issues raised with RBE ICT devices. Participants have spoken through the survey, the interviews as well the reporting of their own device usage that students should be able to use personal ICT devices in the classroom to coincide with the RBE ones. If a strong equitable policy of mixed use is in place then teachers would be able to further enhance digital literacy for all students at a quicker pace.

## Chapter VI

### Conclusion and Recommendations

Digital literacy is an important skill that the RBE desires for its learners. Their document *Technology in Teaching and Learning (2015)* states that this and digital fluency is the goal for 21<sup>st</sup> century learners. The rationale for this study is that the RBE has not had a clear picture regarding the use of mobile technology and mLearning in the classroom. The RBE has invested time and money into creating a positive learning space for students and teachers over the past several years. They have provided ICT devices for teachers and schools as well as directed PD training including the infrastructure needed for such an undertaking. Are teachers in the RBE embracing this?

The purpose of this study was to explore reasons that were preventing RBE teachers from employing mLearning and mobile devices in their classrooms. With the devices available, why were some teachers adopting them and other not? What were the specific issues with implementation of mLearning and mobile devices in their classrooms? This study proved that indeed some teachers were using ICT devices and using mLearning theories and practices with their students. However this was a minority, as a majority of participants were not using devices to their full potential.

This study was a mixed methods design undertaken in two phases. The first phase was an online survey generating quantifiable results. The second phase of data collection was peer-to-peer interviews and conversations, which gave participants the ability to expand on answers given from the survey. A model that was used to guide all of this was the Framework for the Rational Analysis of Mobile Education (FRAME) developed by Koole in 2009.



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This study concluded that implementation of ICT devices and the accompanying training was not made available for teachers in a timely manner. The participants of this study shared this common theme through the survey as well as the interviews. The RBE has supplied ICT devices but failed to fully implement strong pedagogical values and practices among the staff. The devices that have been made available are not enough for classrooms to use on a regular basis. Teachers feel that the current goal of digital literacy and fluency cannot be met with current ICT devices in the classroom. There is not enough. Some of the devices (HP laptops) do not function well on a regular basis and that too much instruction time is being taken away to troubleshoot machines and connectivity issues. The exception of this is the iPads that are in the classrooms. They have not failed nearly to the extent as the other devices have instant connectivity.

Time has not been made at the local level for staff to engage in the learning of strong pedagogical practices involving ICT devices. There has not been much Professional Development (PD) made available for staff to understand and importance of ICT device use in the classroom. Pockets of staff with pre-knowledge have been able to answer a few questions from colleagues regarding this, but this has been proven inadequate. Again the goal of digital literacy and fluency is what the RBE is trying to reach, but without proper training being made available to staff it will not be attained with any widespread success.

There are practical benefits to this study. The data that has been collected and analyzed can be used to improve professional development for staff. Tailored sessions can be introduced to staff with varying levels of expertise with ICT devices delivering knowledge on use in the classroom as well sound pedagogical guidance. IT departments

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can benefit from the data by understanding the practical needs of learners and teachers in the classroom with ICT devices and that this sometimes does not seem congruent with their current practices. School divisions can use this data to implement changes in policies to lift and possibly avoid barriers to ongoing implementation of ICT devices in their classrooms for staff and students.

Though not mainstream, the use of mLearning in the classroom is happening in small pockets depending on the teacher and classroom. Through their own desire and research, some teachers are trying to present a blended classroom environment using ICT devices and apps that give the learner the ability to be somewhere else in the building while being connected to the classroom. However most teachers who participated clearly indicated that the concept of mLearning was not a focus in their classroom. A more familiar traditional classroom model of learning is what the majority of staff are employing.

It is clear that more research is needed in this area. The literature review section of this study has revealed that not enough research is available for review. This study attempted to shed light on the subject in regards to gaining insight into the barriers of ICT usage in the classroom. More participants in the study would have been able to tell a more accurate story of ICT usage in the classroom. It is the recommendation of this author to expand the participant numbers to solidify the known barriers to ICT usage and mLearning in the classroom. Then a more complete picture will be seen with the hopes that these barriers can start to be taken down to allow a more rich and robust learner to succeed in the 21<sup>st</sup> century.

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# BARRIERS TO IMPLEMENTING MLEARNING

## Appendix 1

### Survey for Davin School Staff October 3, 2014

Thank you for participating in this survey. There is only one question that needs to be answered. Please answer in a way that is most comfortable for you (in your own words).

1. What is your definition of mobile learning (mLearning)?

Thank you very much for completing this survey.

I would also like to request two small bits of data from you for classification of this survey.

M/F \_\_\_\_\_

Years of teaching experience \_\_\_\_\_ or

Years of in-school work experience \_\_\_\_\_ (for non teaching staff)

## Appendix 2

### Letter of Invitation to Participate

Colleagues:

My name is Chris Engen and I am the Arts Ed Specialist at Davin School as well as a graduate student at Athabasca University's Med in Distance Education Program.

This letter is to invite you to participate in a study that I am conducting for my thesis. The following information is provided for you to decide whether you wish to participate.

The purpose of this research is to examine your experiences in dealing with technological advancements within your classroom. Specifically I am researching the barriers to mobile learning (mLearning) in the classroom. The benefit gained from participating in this research is to identify specific and unique barriers to advancing technology use in the classroom mLearning within the Regina Public Board of Education (RBE).

To participate, you need to be:

- A teaching employee of RBE that has access to various mobile technologies in the school or classroom (laptops, netbooks, tablets, smartphones or other handheld devices that can connect to the internet).

The amount of time it will take you to complete this two part study is a maximum of 30 minutes (depending on the length of some of your answers). The first part will be a survey will take approximately 15 minutes to complete. The second part will be a peer-to-peer interview with me giving you the opportunity to expand on your responses.

Please be assured that your involvement in this research is completely voluntary. The data collected will include no identifying information and your name will not be presented on any document. There will be no consequences from deciding to withdraw your participation and no need to explain your withdrawal. You have the right to refuse to participate and to withdraw at any time during this research, without prejudice.

There are no known risks and/or discomforts associated with this study. This study has been reviewed by and received ethics clearance from the Athabasca Research Ethics Board. Should you have any comments or concerns regarding your treatment as a participant in this study, please contact the Office of Research Ethics at 1-800-788-9041, ext. 6718 or by email to rebsec@athabascau.ca

If you any questions regarding this study, please contact Chris Engen either by email (engenc@gmail.com) or phone/text (1-306-533-9640).

Thank you in advance for your interest in this project.



## BARRIERS TO IMPLEMENTING MLEARNING

Sincerely,  
Chris Engen  
Arts Education Specialist  
Davin School

**Researcher:** Chris Engen; engenc@gmail.com; 1 (306) 533-9640

**Appendix 3**

**ICT Usage and mLearning in the Classroom**

I would like to thank you for agreeing to participate by completing this short survey. The purpose of this research is to examine your experiences in dealing with technological advancements within your classroom. Specifically I am researching the barriers to mobile learning (mLearning) in the classroom. The benefit gained from participating in this survey is to identify specific and unique barriers to advancing technology use in the classroom via mLearning within the Regina Public Board of Education (RBE).

Please be assured that your involvement in this research is completely voluntary and anonymous. The data collected will include no identifying information and your name will not be presented on any document. There will be no consequences from deciding to withdraw your participation and no need to explain your withdrawal. You have the right to refuse to participate and to withdraw at any time during this research, without prejudice.

This survey consists of eight sections. Sections one and two ask for information about yourself. Sections three through eight consist of forty-four questions that range from what devices are used in class to how they are serviced and maintained. Also, these sections will give you a voice in the involvement and effectiveness of mLearning and information and communication technology (ICT) devices in your classroom.

Throughout the survey there is a mixture of scale and short answer questions. The scale below is used for your reaction to statements in the survey.

**5=Strongly Agree**

**4=Agree**

**3=Undecided**

**2=Disagree**

**1=Strongly Disagree**

**5=Always**

**4=Usually**

**3=About Half the Time**

**2=Seldom**

**1=Never**

This entire process, based on the brevity or length of your answers, should take you no more than fifteen minutes to complete.

**Section 1: Tell Me About Yourself**

1. Male or Female? *Please circle your response.*

**Male**

**Female**

**Prefer not to Answer**

## BARRIERS TO IMPLEMENTING MLEARNING

2. How old are you? *Please circle your response.*

**20 – 24**

**45 – 49**

**25 – 29**

**50 – 54**

**30 – 34**

**55 – 59**

**35 – 39**

**60 – 64**

**40 – 44**

**64 +**

3. How many years have you been teaching? *Please write your response below.*

4. How many years have you been employed by the Regina Public Board of Education (RBE)? *Please write your response below.*

5. What is your role at your school? (classroom teacher, Itinerant – French, Arts Ed, math, gym, or a combination of either, librarian, LRT, SLC, administrator).  
*Please write your response below.*

### **Section 2: Tell me about your Personal Device**

6. What type of ICT devices do you own? *Please circle your answers. There can be more than one.*

**Android smartphone** (Samsung, HTC)

**other OS tablet**

**iPhone**

**netbook**

**Windows Phone** (Nokia, Lumia)

**Chromebook**

**iPad**

**ultra laptop** (Macbook air, Levono, HP, Dell)

**iPad mini**

**iPad Pro**

**any other device that is not on this list**

**android tablet**

7. What do you like about your personal devices? *Please write your answer below.*

## BARRIERS TO IMPLEMENTING MLEARNING

8. What do you think could be improved on your personal devices? *Please write your answer below.*

9. Do you use your own personal devices at work to complete work related tasks? *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About half the time**

10. How do you use your personal device at work? *Please write your answer below.*

### Section 3: Tell me about the RBE ICT Devices (work devices)

11. Please circle the RBE devices you have in your classroom that are permanently stored there?

**iPod touch**

**HP laptops**

**iPad**

**Desktop computers**

**iPad mini**

**Other (please list)**

**Chromebooks**

12. Please circle the RBE devices you have in your school available for you to use (that you know of) that are not kept in your classroom.

**iPod touch**

**HP laptops**

**iPad**

**Desktop computers**

**iPad mini**

**Other (please list)**

**Chromebooks**

13. There are enough devices for all students in your classroom. *Please circle your answer.*

**5 = always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

14. How do you gain access to those devices that are not stored in your classroom? *Please write out your answer.*

## BARRIERS TO IMPLEMENTING MLEARNING

15. Do you have regular access to the ICT devices that are not stored in your classroom? *Please circle your answer.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

16. There are ICT devices available for your classroom needs at a moments notice. *Please circle your answer.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

17. How often have you received training regarding the use of school owned devices?

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

18. You regularly receive ongoing training regarding the use of school owned devices and the accompanying applications (apps). *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

### Section 4: How do you use the Work Devices?

19. In your classroom, you use the RBE ICT devices for your professional needs. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

## BARRIERS TO IMPLEMENTING MLEARNING

20. In your classroom, you use the RBE ICT devices for your personal needs. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

21. Your students use the RBE ICT devices for their assigned classroom work or assignments. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

22. You assign classwork that requires the use of the ICT devices. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

23. You use RBE ICT devices as a reward system for students. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

24. You use these devices as a “time filler” for students. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

25. The board has provided sound pedagogical guidance regarding the use of ICT devices in the classroom. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

## BARRIERS TO IMPLEMENTING MLEARNING

### Section 5: mLearning

Mobile Learning or mLearning is based on an anytime/anywhere model of learning usually associated with using a mobile device. Connectivity to the Internet ensures that real time collaboration with other learners is present and available at anytime.

26. With this definition, as written above, have you been incorporating mLearning into your classroom this past school year? *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

27. You have incorporated mLearning into your classroom anytime previous to this past school year. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

28. The board has given direction regarding the use of mLearning in the classroom. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

### Section 6: How well did the devices work for you and Students in the classroom?

29. The rules for usage of ICT devices are easily understandable for you to follow and administer. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Agree**

**3 = Undecided**

## BARRIERS TO IMPLEMENTING MLEARNING

30. The HP laptops provided by the board for you and your students meet the needs of efficient use of time (efficient use of time simply means devices are quick and do not need a long boot up time and are easy to login to). If this device is not available in your school, please circle **0 = Not Available**. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

**0 = Not Available**

31. The use of Chromebooks provided by the board meet the needs of staff and students by allowing efficient use of time (efficient use of time simply means devices are quick and do not need a long boot up time and are easy to login to). If this device is not available in your school, please circle **0 = Not Available**. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

**0 = Not Available**

32. The iPads (including iPad mini's) provided by the board for you and your students meet the needs of efficient use of time (efficient use of time simply means devices are quick and do not need a long boot up time and are easy to login to). If this device is not available in your school, please circle **0 = Not Available**. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

**0 = Not Available**

33. The Internet connection in my classroom(s) is always strong and fully functional at all times it is needed. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**



## BARRIERS TO IMPLEMENTING MLEARNING

34. When using ICT devices in the classroom, my time is devoted to the lesson at hand with no troubleshooting student/device issues. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

35. You believe that cheating by the students is easier with ICT devices in the classroom. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

36. Negative behavior (bullying) will be promoted with the increased use of ICT devices in the classroom. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

37. As a teacher, you feel you can effectively monitor and control the proper use of the ICT devices in your classroom. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

38. ICT devices are necessary for students to achieve the learning outcomes. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

## BARRIERS TO IMPLEMENTING MLEARNING

39. ICT devices are well suited for learning in our classroom. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

40. It is important to have and use ICT devices in the classroom. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

41. There are incentives for you and the students to use ICT devices in the classroom. *Please circle your response.*

**5 = Strongly agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

42. Time is made available to collaborate with other staff regarding ICT usage along with available and applicable apps. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

43. There should be dedicated time made available to collaborate with other staff regarding ICT usage along with available and applicable apps. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

## BARRIERS TO IMPLEMENTING MLEARNING

44. There should be dedicated time on an ongoing basis for Professional Development (PD) with pedagogical experts regarding ICT usage along with available and applicable apps. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

45. In one school year, what frequency do you feel is sufficient for this type of PD? *Please circle your response.*

**Once a week**

**Twice a Year**

**Twice a month**

**Once a Year**

**Once a month**

### Section 7: IT Services in your School

46. Trained IT experts need to be in your school for help when technology/device problems arise. *Please circle your response.*

**5 = Strongly agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

47. There are knowledgeable staff members that take care of technology/device issues when they arise. *Please circle your response.*

**5 = Always**

**2 = Seldom**

**4 = Usually**

**1 = Never**

**3 = About Half the Time**

48. You know the procedure in regards to getting ICT devices repaired by the board. *Please circle your response.*

**5 = Strongly agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Disagree**

**3 = Undecided**

## BARRIERS TO IMPLEMENTING MLEARNING

49. On average, how long is the process of getting ICT devices fixed back to working order and in the hands of students/staff? *Please circle the best answer.*

**1 school Day**

**2 to 4 School Days**

**5 to 7 School Days**

**8 to 10 School Days**

**11+ School Days**

50. The average wait time for ICT devices to be repaired and in the hands of students/staff is acceptable to you. *Please circle your response.*

**5 = Strongly Agree**

**4 = Agree**

**3 = Undecided**

**2 = Disagree**

**1 = Strongly Disagree**

### Section 8: Bring Your Own Device (BYOD) Issues

51. You feel RBE should adopt BYOD (bring your own device) as the main source of ICT devices for staff and students. *Please circle your response.*

**5 = Strongly Agree**

**4 = Agree**

**3 = Undecided**

**2 = Disagree**

**1 = Strongly Disagree**

52. BYOD is a great model to adapt for ICT usage in the classroom.

**5 = Strongly Agree**

**4 = Agree**

**3 = Undecided**

**2 = Disagree**

**1 = Strongly Disagree**

53. Equity in the classroom should be paramount. BYOD is not a good policy, as RBE should be supplying ICT devices for use in the classroom. *Please circle your answer.*

**5 = Strongly Agree**

**4 = Agree**

**3 = Undecided**

**2 = Disagree**

**1 = Strongly Disagree**

## BARRIERS TO IMPLEMENTING MLEARNING

54. A fair and equitable balance of RBE provided and BYOD ICT devices is desirable for classroom use. *Please circle your response.*

**5 = Strongly Agree**

**2 = Disagree**

**4 = Agree**

**1 = Strongly Agree**

**3 = Undecided**

55. Please add any additional comments regarding technology use in the classroom.

Appendix 4

What do you like about your device?

	Answer	Browse	23	92.00%
<ul style="list-style-type: none"> <li>Q -they are all compatible with each other</li> <li>-user friendly interface</li> <li>Q Keeps me up to date on the weather, news and other current events. Technology at my finger tips. Social media</li> <li>Q Accessibility</li> <li>Q Access to data, email, messaging at any time.</li> <li>Q Ease of use/accessibility</li> <li>Q Easy access to information.</li> <li>Easy and quick contact with loved one.</li> <li>Being able to take photos whenever I want to.</li> <li>Dictionary</li> <li>GPS/Google maps</li> <li>Q ease of portability</li> <li>Q They all cloud together</li> <li>Q The camera and the quality of pictures it takes.</li> <li>Q I can access google drive. It has many features and easy to navigate</li> <li>Q ease of use, touchscreen, portability</li> <li>Q As I have a Samsung phone, I appreciated the similarities in a Samsung tablet.</li> <li>Q Everything is at my fingertips</li> <li>Q They are linked. - messages, photos</li> <li>Easy to use.</li> <li>I control what is downloaded.</li> <li>I can print at home.</li> <li>Battery life</li> <li>Q convenience</li> <li>Q -easy to use and navigate through</li> <li>-loads easy</li> <li>Q Easy to operate.</li> <li>Q easily accessible; multi-functional</li> <li>Q fast, easy access to information I need</li> <li>Q -Easy of use</li> <li>-apps</li> <li>-speed of device</li> <li>-always personal, easy to access</li> <li>Q apps. their freedom and ease of use</li> <li>Q I can check things online at any time. I like the convenience.</li> <li>Q My ipad mini and iphone are similar to each other, and easy to use.</li> </ul>				
	No answer		2	8.00%

BARRIERS TO IMPLEMENTING MLEARNING

Appendix 5

What could be improved on your ICT device?

Answer	Count	Percentage
<p style="text-align: right;">Answer <input type="button" value="Browse"/></p> <ul style="list-style-type: none"> <li>Q -longer battery life on the phone</li> <li>Q Nothing...I like it the way it is</li> <li>Q size, speed</li> <li>Q no idea</li> <li>Q Making the device have a longer life - too breakable</li> <li>Q The storage space.</li> <li>Q Battery life, ease of personalizing</li> <li>Q ?</li> <li>Q -</li> <li>Q Youtube still plays when its closed.</li> <li>Q Faster</li> <li>Q They don't support Flash</li> <li>Q n/a</li> <li>Q I don't know</li> <li>Q Cost of the actual device always seems high.</li> <li>Q better voice recognition (for SIRI)</li> <li>Q organization of programs</li> <li>Q some stock apps clash with other downloads; over customization can be confusing to other users</li> <li>Q screen freezing</li> <li>Q glitches - shutting down while still using the app</li> <li>Q quality of camera on devices</li> <li>Q Not sure. They work for me, as they are.</li> </ul>	19	76.00%
No answer	6	24.00%

## BARRIERS TO IMPLEMENTING MLEARNING

### Appendix 6

#### How do you use your device at work Coding

There are 22 (88%) responses with 3 (12%) abstaining.

#### **Device Aspect (D) 3 responses**

- (12) I only use my phone at work – to create a hot spot when the school wifi isn't working
- (19) related to speed of device
- (22) I use my phone as a hotspot if my wifi connection is weak

#### **Learner Aspect (L) 26 responses**

- (5) photos
- (5) dictionary
- (5) googling info to show a student quickly
- (5) planning lists
- (7) looking something up
- (8) Remind service
- (8) update information
- (8) schedule organization
- (8) kahoot app
- (8) timer
- (9) attendance
- (10) timer
- (10) looking up information in small groups
- (11) timer
- (11) information
- (12) seesaw app
- (15) check weather
- (17) timer
- (17) lesson planner
- (17) occasionally attendance
- (17) finding resources
- (18) during staff PD
- (19) often use phone to check weather
- (19) check facts when teaching in class
- (20) personal research
- (21) Pinterest

#### **Social Aspect (S)**

#### **Device Usability (DL) 12 responses**

- (1) looking things up on the internet when our net is down.
- (3) search data
- (4) pictures for documentation



## BARRIERS TO IMPLEMENTING MLEARNING

- (8) one touch internet access for on the fly student questions
- (11) pictures
- (12) take photos or videos
- (16) internet access
- (16) file sharing
- (18) to take pictures
- (19) no logon
- (19) faster internet service
- (22) I use the Rogers data from my phone if I need internet

### **Social Technology (DS) 19 responses**

- (2) email
- (2) texting
- (2) calling parents
- (3) during breaks to check messages
- (4) communication with parents
- (5) phone calls to parents
- (6) text admin
- (7) texting a colleague
- (8) contacting parents
- (9) reminders
- (9) texting
- (9) contacting parents
- (9) emails
- (12) check messages
- (12) twitter
- (14) use it to access email
- (15) facebook
- (20) texting
- (22) I take pictures of students for purpose of recording seating plans, and such

### **Interaction Learning (LS) 1 response**

- (21) looking up new ways to teach

### **Non-Answers 2 responses**

- (13) n/a
- (22) I do not take my iPad mini to school

## Appendix 7

### Ethics Approval



June 21, 2016

Mr. Christopher Engen  
Centre for Distance Education\Master of Education in Distance Education  
Athabasca University

File No: 22254

**Ethics Expiry Date: June 20, 2017**

Dear Christopher Engen,

Thank you for providing the email approval for your research entitled, 'Barriers When Implementing mLearning and Digital Literacy in Urban K-8 Classrooms' from the Regina Board of Education.

Your application has been **Approved** and this memorandum constitutes a **Certification of Ethics Approval**. You may begin the proposed research.

This REB approval, dated June 21, 2016, is valid for one year less a day.

Throughout the duration of this REB approval, all requests for modifications, ethics approval renewals and serious adverse event reports must be submitted via the Research Portal.

To continue your proposed research beyond June 20, 2017, you must apply for renewal by completing and submitting an Ethics Renewal Request form. Failure to apply for **annual renewal** before the expiry date of the current certification of ethics approval may result in the discontinuation of the ethics approval and formal closure of the REB ethics file. Reactivation of the project will normally require a new Application for Ethical Approval and internal and external funding administrators in the Office of Research Services will be advised that ethical approval has expired and the REB file closed.

**When your research is concluded**, you must submit a Project Completion (Final) Report to close out REB approval monitoring efforts. Failure to submit the required final report may mean that a future application for ethical approval will not be reviewed by the Research Ethics Board until such time as the outstanding reporting has been submitted. At any time, you can login to the Research Portal to monitor the workflow status of your application.

If you encounter any issues when working in the Research Portal, please contact the system administrator at [research\\_portal@athabascau.ca](mailto:research_portal@athabascau.ca).

Sincerely,

Debra Hoven  
Chair, Centre for Distance Education Departmental Ethics Review Committee  
Athabasca University Research Ethics Board