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## The experiences of virtual kindergarten educators in technology-enhanced virtual classrooms: A guide to providing effective virtual teaching

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A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Education

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## **Abstract**

With the threat of future global pandemics and the possible necessity to mandate schools to transition to temporary online learning, it is imperative to provide kindergarten educators with effective pedagogical practices with the use of technological devices and resources in virtual classrooms. This study examined how kindergarten educators are currently implementing learning through digital screen-based devices in a way that promotes purposeful, meaningful, efficient and effective learning for FDK students virtually. Through qualitative and quantitative analyses examined what are the attitudes and beliefs towards digital screen-based technologies and digital resources by FDK educators, what educators need to know to effectively integrate technology into their virtual pedagogical practices, the benefits of virtual teaching, the challenges of virtual teaching, and how are digital screen-based technologies used to document in FDK virtual classrooms. This study provides a practical guideline for future virtual educators in FDK classrooms. Future research should look into the effectiveness of digital resources, games and activities that augment students' abilities to learn, retain, understand and make connections without excessive amounts of screen time.

*Keywords:* virtual learning, virtual teaching, remote learning, kindergarten, technology

## **Summary for Lay Audience**

With the threat of future global pandemics and the possible necessity to mandate schools to transition to temporary online learning, it is important to provide kindergarten educators with effective teaching practices with the use of technological devices and resources in virtual classrooms. This study examined how 11 kindergarten educators and 1 teacher-researcher are currently implementing learning through digital screen-based devices in a way that promotes purposeful, meaningful, efficient and effective learning for FDK students virtually. This study examined the attitudes and beliefs towards digital screen-based technologies and digital resources by FDK educators, the benefits of virtual teaching, the challenges they encountered, the technological devices and resources they used, how are digital screen-based technologies used to document in FDK virtual classrooms, and what educators need to know to effectively integrate technology into their virtual pedagogical practices. This study provides a practical guideline for future virtual educators in FDK classrooms and all stakeholders in kindergarten education. Future research should look into the effectiveness of digital resources, games and activities that augment students' abilities to learn, retain, understand and make connections without excessive amounts of screen time.

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## Chapter 1

### Introduction

‘The Net Generation’ (Tapscott, 1998) and ‘Digital Natives’ (Prensky, 2001) are the first terminologies used to characterize the first era of children developing in a world engulfed with progressively preeminent and omnipresent digital screen-based devices. These current generations of children, especially Gen Alpha (2010-present) and Gen Z (1995-2009), receive information and interact with technology at an unimaginable rate than children from previous generations, whose prior direct experiences and information from individuals, places and objects in the real-world operated as the initial exposure to acquiring knowledge (Kabali et al., 2015, Twenge et al., 2019). Children spend a more significant amount of time in front of screen devices (Canadian Paediatric Society, 2017; Seguin et al., 2021). In classrooms, smartboards, iPads, digital games or software and educational videos are increasingly implemented (Flewitt et al., 2015; Magen-Nagar & Firstater, 2019; Ponticorvo et al., 2017; Preston & Mowbray, 2008) and educators, principals, school administrators, and governments have been advocating for more technology use in the classroom (DeCoito & Richardson, 2018; Groff & Mouza, 2008; Kim & Xing, 2019; Leung, 2003).

Mindful of these accelerated advancements in information communications technology (ICT) and becoming more accessible to young children, questions emerge about introducing virtual teaching and using technological devices or resources in kindergarten classrooms (Konca et al., 2016; Preradović et al., 2017). With the increasing availability of technology and immediate introduction in classrooms at a very early age, children may be prevented from learning and reinforcing fundamental skills. As a result, preliminary research indicates that technology interferes with vital physical, psychosocial, and developmental domains. Furthermore, children are not given the opportunity to learn essential skills such as problem-

solving, self-regulation and less time exposed to imaginative play, physical play and real-life social interactions, which are important for healthy development (Canadian Paediatric Society, 2017; Radesky et al., 2014, 2015a, 2015b). With the drastic increase of ICT in classrooms, especially with a new virtual learning environment because of COVID-19, further exploration into how educators use digital screen-based technologies and resources in play-based Full-Day Kindergarten (FDK) virtual classrooms is required.

The purpose of this study is to understand how kindergarten educators are implementing teaching and learning through digital screen-based devices in a way that promotes purposeful, meaningful, efficient, and effective learning for FDK students virtually. The goal of this study, within its limitations, is to determine what attitudes and beliefs educators have towards digital screen-based technologies, why they have these presuppositions towards digital screen-based technology or resources, discover what educators need to effectively integrate technology into their virtual pedagogical practices, the benefits and challenges of virtual teaching and learning, and how digital screen-based technologies are used for documentation in FDK virtual classrooms. This study has implications for all individuals or groups involved in the development of kindergarten students, the upkeep of the Ontario Ministry of Education (2016b) Kindergarten Program, teachers, early childhood educators, researchers, and policymakers on the implementation of virtual learning and teaching to attain pedagogical and curriculum goals that align with the play-based learning philosophy without prolonged screen time.

### **1.1 Research Questions**

This study addresses the following research questions:

1. What are the attitudes and beliefs towards digital screen-based technologies and digital resources by FDK educators; and the benefits and challenges of teaching and learning in virtual kindergarten classrooms?

2. What digital screen-based technological tools or resources are FDK educators currently implementing, and how are they used to document play-based learning virtually?
3. What do educators need to effectively integrate technology into their virtual pedagogical practices?

## **1.2 Research Problem and Why There is a Need for This Research**

With this new phenomenon of virtual teaching and learning, the overall direction of learning via technology in Ontario (Chen et al., 2014, Ontario Ministry of Education, 2020, 2022) and potential increases of similar lockdown situations (i.e., COVID-19) with the threat of viral infections where educators are mandated to teach synchronously from their homes or school (sometimes within 24 hours), it is imperative to understand how kindergarten educators are currently teaching virtually, what are the benefits, what are the challenges, and how they continue to teach through a play-based philosophy without constant screen exposure. This research hopes to provide suggestions for future virtual educators, school boards, policymakers and other stakeholders in kindergarten education.

## Chapter 2

### Literature Review

#### 2.1 Introduction

In education, it is common practice to implement cutting-edge technologies in schools to ameliorate student learning and provide educators with effective teaching practices. Throughout the years, educators have witnessed a plethora of technological devices enter and leave, applied, revamped or omitted from schools. Fundamentally, this phenomenon has been occurring globally in most developed and developing countries, and many curriculum documents worldwide promote the use of digital technology (Bassi, 2011; Voogt & Roblin, 2012). However, as ICT use increases in kindergarten classrooms and specifically virtual classrooms locally, nationally, and globally due to the pandemic, and its potential contributions or adverse consequences to student learning, it has made educators, parents and medical professionals concerned with its effect on child development (Flewitt et al., 2015; Merga & Williams, 2016; Petkovski, 2014; Radesky et al., 2015b). As technological growth continues to increase exponentially in our interconnected, globalized world and the flooding of digital screen-based learning into our homes and schools for the foreseeable future, can educators find a middle ground with the utilization of digital screen-based devices or resources, especially in virtual classrooms?

Virtual learning, also known as remote learning or online learning, refers to students learning from home and virtual teaching or virtual instruction refers to educators teaching from their home or school (Kim, 2020; Ontario Ministry of Education, 2020). This mode of learning incorporates synchronous (learning and teaching in real-time) and asynchronous learning (learning and teaching not delivered in real-time) (Ontario Ministry of Education, 2020). Also, within this virtual learning and teaching, it is without question that technologies and resources are required for both students and educators. Technologies such as digital screen-based devices

(e.g., laptops, iPads, tablets, smartphones), video communication technologies (e.g., Zoom, Google Classroom), and digital resources (e.g., websites, YouTube, application software) are necessary for this mode of learning and teaching (Thornburg et al., 2021).

## **2.2 Attitudes and Beliefs towards Technology**

Discrepancies of attitudes among educators towards digital screen use in classrooms range positively and negatively. Constructing a meaningful, creative, and engaging milieu for students with digital screen-based technologies remains problematic for many educators. A pivotal component of education is to determine and introduce innovative technological devices into schools to improve student learning (Groff & Mouza, 2008). However, school boards unceasingly aggrandize technology and motivate educators to incorporate technology use in the classroom causing additional stress for educators, especially veteran educators (Al-Fudail & Mellar, 2008; Dever & Falconer, 2008; Kim, 2019b, 2021b). Furthermore, the lack of unanimity and ambivalence of the merits or disadvantages of digital technology in classrooms has influenced educators' ideologies, preferences and opinions towards digital screen-based technology's role in learning and pedagogy. Research indicates numerous reasons why educators are reluctant to incorporate technology in the classroom. Many factors such as availability of devices, the number of devices provided, outdated devices, access to software applications, the absence of guidance of potential use and low confidence using digital screen-based devices effectively prevent educators from utilizing ICT technology to its potential (DeCoito & Richardson, 2018). Other factors include the ambiguity in policy support, skillfulness to operate a computer, the quality of the equipment and attitudes are further rationales that prevent educators from utilizing technology in the classroom (Dever & Falconer, 2008).

## **2.3 Technology in Kindergarten**



Screen-based technological use continues to increase in our homes and the classrooms we send our young learners to each day (Flewitt et al., 2015; Hawi & Rupert, 2015). Educators have seen new technological devices or resources come and go, actualized in practice, substituted or omitted from the classroom. In kindergarten, there are many different technological resources and devices, both utilized by students and educators, to augment learning and effective pedagogical tools in FDK classrooms. These devices consist of but are not limited to desktop computers, laptops, tablets (e.g., iPads), smartboards, educational games or videos, and ebooks (Flewitt et al., 2015; Magen-Nagar & Firstater, 2019; Ponticorvo et al., 2017; Preston & Mowbray, 2008; Schriever, 2018). Digital screen-based devices can be beneficial tools and great extensions for students and educators. Moreover, many positive and negative attitudes and beliefs towards technology use in classrooms support its utility or question its developmental appropriateness to learning (Galloway, 2009; House, 2012; Miller, 2005; Neumann & Neumann, 2017). Despite attitudes towards screen-based technologies, its incorporation in teaching sheds new light on its actualization in 21st-century learning and teaching.

Studies administered to kindergarten students with technology have demonstrated positive results in early cognitive development (Kalaš, 2010). Technology use in early learning environments enhances “the quality of young children’s play and learning by promoting creativity, curiosity, exploration, collaboration and problem solving” (as cited in Magen-Nagar & Firstater, 2019, p. 166; Judge et al., 2006). In addition, research suggests that ICT devices stimulate interactions and strengthen children’s colloquial skills between their educators and among their peers (Hsin et al., 2014). According to Saharon and Kerlitz (2011), “ICT has been found to improve children’s cognitive functions, such as visual, analogical, abstract, and mathematical-logical, and their creative thinking, memory, literacy development, motor-visual

coordination, vocabulary, and metacognition” (as cited in Magen-Nagar & Firstater, 2019, p. 166).

On the other hand, health research reveals that extended consumption of digital screen-based devices negatively affects children's overall health and development (Merga & Williams, 2016). ICT researchers are apprehensive about children’s overindulgence of heavy screen time use, and recently medical professionals have released guidelines for parents on how much screen time children should spend per day (Canadian Paediatric Society, 2017). The convenience of screen-based devices becoming more portable and accessible to children may diminish vital human interactions and other critical physical activities. Physical play through sensorimotor activities (i.e., climbing, building, and physical manipulation of objects) is necessary for developing visual-motor skills, which are inhibited when children use screen-based devices. These introductory skills have demonstrated a significant influence on future success in math and science subjects (Radesky et al., 2015b). Furthermore, early learning through unstructured play, investigating the natural world and face-to-face communication with peers and adults to a high degree stimulates growth in problem-solving skills, empathy, self-regulation and social skills prior to academic learning. Therefore, the effects of prolonged consumption of digital screen-based devices and lack of care and nurture from educators are not apparent until much later (Lynch, 2014; Merga & Williams, 2016).

## **2.4 What do Kindergarten Educators need to know?**

### ***Early Concepts***

Learning in the FDK classroom has a powerful influence on future academic success (Duncan et al., 2007; McClland et al., 2007; Romano, 2010). Many factors impact the content taught in kindergarten, including “theory, research, practice and policy” (Gullo & Hughes, 2011, p. 323). The kindergarten curriculum encompasses many multifaceted factors. Gullo and Hughes

(2011) explored how “developmentally appropriate practice, intentional teaching, and assessment” are implemented in a kindergarten classroom. They suggest, “kindergarten classrooms must be able to serve the developmental, social and academic needs of all children... [by providing] variations in curriculum content and teaching strategies, that take into account the varied needs of individual children” (p. 325). In the provided vignette, the kindergarten teacher, Mrs. Wiseman, encourages students’ initiative and natural curiosity through opportunities to independently read, collaborate on projects and explore math, language and science experiences. Mrs. Wiseman believes opportunities for active engagement and dialogue foster “language, cognition, social competence, and self-regulation” (p. 326). Furthermore, Gullo and Hughes (2011) suggest that kindergarten students' learning goals and expectations have increased over the years, and they are far more capable of extending their learning beyond the curriculum guidelines. This study presented many practical concepts for teaching young students. Further research should build on how theory and practice can help educators identify what content knowledge will support students’ learning process and goals.

### ***Pedagogy in Kindergarten***

Pedagogy is simply “the activity or profession of imparting knowledge or instruction” (American Psychological Association, n.d.). The emergence of kindergarten was initially pioneered for children to grow, learn and develop (Hoskins & Smedley, 2016). However, in kindergarten, these pedagogical practices differ from subsequent grade levels, and there is increased accountability and pressure on kindergarten educators to ensure that students reach certain academic milestones (Pyle et al., 2018). As Pyle and colleagues (2018) describe that “one result of this shift is a tension between an emphasis on academic learning and the use of developmentally appropriate practices” (p. 117) which is play. Kindergarten learning is predicated on two fundamental learning processes or drivers: play and inquiry (Ontario Ministry

of Education, 2016b). With virtual learning and teaching occurring remotely, can educators facilitate learning through play and inquiry when educators are not in the same physical environment as their students?

**Play-based learning.** What is Play? “*Play is a vehicle for learning* and rests at the core of innovation and creativity” (Ontario Ministry of Education, 2016b, p. 20). During play, children are afforded the most receptive opportunities and milieu for learning. Academic work and play are not mutually exclusive categories to children; instead, interacting physically in the real world and learning are intricately linked for a child’s development (Pyle et al., 2018a; Pyle et al., 2018b). Through research, it supports the claim “that there is a strong link between play and learning for young children, especially in the areas of problem solving, language acquisition, literacy, and mathematics, as well as the development of social, physical, and emotional skills” (Ontario of Ministry of Education, 2016b, p. 20).

Numerous fields researching learning – early childhood studies, neuroscience, education, developmental and social psychology and medical research – unanimously agree that play-based learning has proven benefits for learning among children of all ages, and indeed among adolescent and adult learners (Ontario Ministry of Education, 2016b). In addition, play-based learning can be facilitated in many approaches. It can range from a more structured play where educators have the opportunity to take a direct role, a guided role, a collaborative role, or it can follow a child-directed role (Pyle & Danniels, 2017). In the Ministry of Education (2016b) Kindergarten program it outlines recurring themes in research on practical pedagogical approaches, precisely the fundamental principles of play-based learning, which state:

- (1) Play is recognized as a child’s right, and it is essential to the child’s optimal development;
- (2) All children are viewed as competent, curious, capable of complex thinking and rich in potential and experience;
- (3) A natural curiosity and a desire to

explore, play, and inquire are the primary drivers of learning among young children; (4) The learning environment plays a key role in what and how a child learns; and (5) In play-based learning programs, assessment supports the child's learning and autonomy as a learner. (p. 12-13)

Children, ever since birth, actively and subconsciously explore and learn interacting with animate and inanimate objects in their milieu (Skar et al., 2016). "When children are exploring ideas and language, manipulating objects, acting out roles, or experimenting with various materials, they are engaged in learning through play" (Ontario Ministry of Education, 2016b, p. 18). As children develop in the real world, their past experiences influence their perception, ideas and theories of reality (Pollak, 2008). They use that observable knowledge via schemas and heuristics to contextualize their learning and build upon it through play. As a result, the role of play has a crucial role in a child's growth and learning, specifically in all areas of FDK (Ontario Ministry of Education, 2016b).

**Inquiry.** Children instinctively build, wonder, explore, create, manipulate, ask questions and seek information - which is called inquiry. Inquiry is a fundamental part of the kindergarten experience and is promoted in each specific subject area. However, it is not contingent on a specific time, project, topic, subject or student. "Educators observe and document the children's thinking, ideas, and learning; interpret and analyse what they have noticed; and express their thinking and wondering as they interact with the children" (Ontario Ministry of Education, 2016b, p. 18). In order to facilitate this innate learning, educators and students embrace a philosophy of inquiry and co-construct the learning environment in the classroom (Ontario Ministry of Education, 2016b). Also very noteworthy in the Kindergarten program it states, "inquiry is not a set of processes and skills but a pervasive approach or... [inculcation], a habit of

mind that permeates all thinking and learning throughout the day” (Ontario Ministry of Education, 2016b, p. 18).

**Child Directed vs. Educator Guided vs. Educator Directed.** Kindergarten educators continue to face the challenge of balancing traditional developmental programming (e.g., prescriptive curriculum, explicit instruction) and contemporary play driven programming (e.g., emergent curriculum, explorative unstructured play), with many educators reporting conceptual and pragmatic challenges when integrating the two (Pyle et al., 2018a; Pyle et al., 2018b; Pyle & Bigelow, 2014). The three overarching categories, adapted from Pyle and Daniels (2017), to describe the different play-based kindergarten pedagogical approaches are: (1) Child Directed; (2) Educator Guided; and (3) Educator Directed.

How these three types of pedagogical approaches are adapted in a virtual learning environment with young children comes into question. Virtual learning consists of asynchronous (off-screen learning where educator facilitates discussion boards and students complete the work on their own time) and synchronous (real-time learning and instructor-led) time (Kim, 2020). Kim (2020) conducted a study that explored how a preservice educator course in early childhood education was adapted in a virtual learning platform. Kim (2020) found that virtual learning limits interactions between educators and children. As a result of the transition to virtual learning and the barriers to student-initiated inquiry experiences, educator-directed instruction has increased. For example, only one person can speak at a time, and children cannot be placed in small or individual groups with their peers as they will be unsupervised. Many factors have influenced how children learn virtually, as educators also need to consider their students' various developmental needs and interests (Kim, 2020). This study found incorporating hands-on activities challenging because not all students had access to the same materials and presented videos to students presented the challenge of delayed sound. However, play and hands-on

activities continued to be children’s favourite parts of learning as it would be in person. Students also engaged in peer-to-peer interaction engagement with manipulatives and had more time to build on their educator-guided inquiries when in person. Educators’ intentions should remain the same whether students are in-person or virtual. Kim (2020) suggests that “interacting with children, building rapport, keeping their attention, encouraging, listening and questioning” are still valuable skills in a virtual learning environment (p. 154-155).

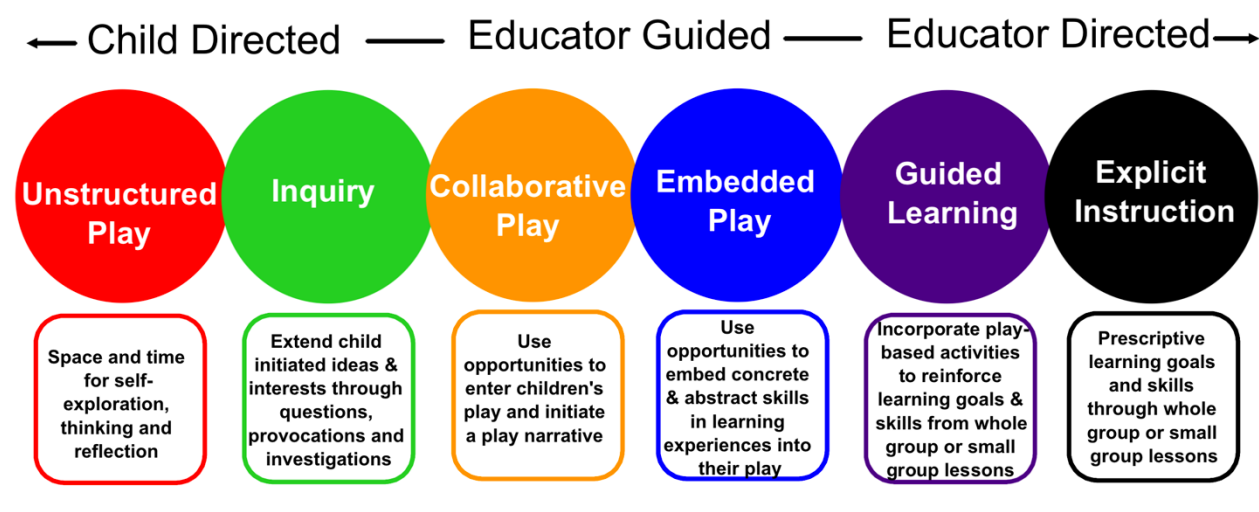


Figure 1. Continuum for play-based learning (adapted from Pyle & Daniels, 2017)

**Child Directed.** Unlike educator-directed, child-directed provides students with opportunities for freely chosen learning at their own pace through play, inquiry, and social peer interactions (Van Oers & Duijkers, 2013). The incorporation of uninterrupted play kindergarten classrooms can be an efficacious approach to strengthen a whole gamut of developmental competencies and domains, such as social, emotional, cognitive, language, spatial, mathematical and self-regulation (Blair & Raver, 2015; Ontario Ministry of Education, 2016b; Pyle & DeLuca, 2017; Vogt, 2018).

***Educator Guided.*** The alliance between educators and students is a symbiotic relationship, and the development of learning ought to be co-constructed. As a result, educators can amalgamate purposeful and specific learning goals or skills within students' play, which is habitually addressed as guided play (Pyle et al., 2018a). "During guided play, the educator can engage in a variety of practices to embed or scaffold academic learning within children's play activities such as providing comments or questions, becoming an active ... [co-player], or leading games and activities that address curricular content in a playful manner" (Pyle et al., 2018a, p. 222). In addition, research indicates that the educator-guided approach promotes a more valuable reinforcement for children's academic learning (Fisher et al., 2013; Weisberg et al., 2013).

***Educator Directed.*** Educator-directed, contrary to child-directed, "is often considered to be a didactic instructional mode in which teachers explicitly transmit academic content at a pace that they themselves set, typically followed by guided or independent work by students" (Pyle et al., 2018a, p. 221). Explicit instruction from an educator is a universal approach to teaching, with no exception to kindergarten. Kindergarten students receive highly structured lessons of early-year academic content. This explicit instruction is typically conducted in whole-group lessons (i.e., circle time) and or small group lessons (e.g., provocations) (Pyle et al., 2018a).

## **2.5 Integrating Technology into Pedagogical Practice**

Technology in kindergarten can be used as a tool, extension, resource or facilitator in the classroom by students and educators. These digital screen-based technologies are used to teach many subjects such as math, science, language, social studies, art and are frequently conducted through play-based learning and or inquiry (Ontario Ministry of Education, 2016b).

The presence of technology in home environments has increased due to the pandemic (Danniels et al., 2020; Seguin et al., 2021). This increase brings into question how technology



can be used to support virtual learning environments in collaboration with the Kindergarten curriculum, pedagogy and assessment. Preliminary research explored how technology supported student learning and assessment in 20 kindergarten classrooms. The purpose of integrating technology into assessment practices was to “improve the ease, speed, or efficiency of these assessment of learning practices” (Danniels et al., 2020, p. 7). Technology can also be used to support student learning in play. Danniels et al. (2020) found that “visual methods of assessment afforded by technology help to capture the learning processes that occur when children are engaged in play-based activities” (p. 9). The challenges of capturing visual forms of student learning for educators are organizing and interpreting the various forms of data. Educators in the study stated it was essential to understand “assessment of learning (what a photo/video is actually capturing) and assessment for learning practices (what the next steps are for that student’s learning)” (Danniels et al., 2020, p. 9). Danniels et al. (2020) further propose developing a partnership between developers who create applications for educators. In addition, researchers and educators should collaborate to make technology accessible and practical for educators to use. This study demonstrated how technology could be an effective tool for instruction and assessment practices and documenting children's meaningful learning experiences.

Various online apps can support young children’s learning experiences in open-ended ways. The role of educators is shifting in kindergarten classrooms from educator-led to learner-centred (Ontario Ministry of Education, 2016b). Prensky (2010) recommends that “young people (students) need to focus on using new tools, finding information, making meaning, and creating. Adults [educators] must focus on questioning, coaching and guiding, providing context, ensuring rigor and meaning and ensuring quality results” (p. 10). Prensky (2010) also describes a partnering pedagogy where students are the researchers and critical thinkers and educators are

the designers. In this sense, students play an equal role in their learning process and take responsibility for what and how they learn. When students are provided with access to technology such as audio podcasts, games, or blogs and given opportunities to explore, navigate and overcome technological challenges, they build valuable skills and confidence with technology. In the partnering pedagogy, educators differentiate activities for students through the arts, music or oral presentations to allow varied student perspectives to emerge.

## **2.6 Gaps in the Literature**

The scope of this study in conjunction with the three research questions was to see educators' attitudes and beliefs towards digital screen-based technologies and digital resources in virtual kindergarten, the benefits and challenges of teaching and learning in virtual kindergarten, the technologies and resources educators used in virtual kindergarten, how educators documented play-based learning virtually, and what educators require to teach kindergarten virtually. Presently, there is little or emerging research regarding the beliefs and attitudes towards virtual teaching and learning in kindergarten, the challenges and benefits of virtual kindergarten teaching and learning, the technologies and resources used in virtual kindergarten, and recommendations for kindergarten stakeholders (Kim, 2020; Spadafora, 2022; Thornburg et al., 2021).

A case study about kindergarten educators' experiences teaching and learning virtually based on the study's research questions is warranted. Therefore, this study addresses these gaps as it will provide updates on the types of resources educators used, specifically in the virtual classroom and insights into the benefits and challenges in virtual kindergarten classrooms.

Moreover, as virtual learning is a new phenomenon, this study will add to the literature on how educators navigated this new teaching milieu.

## Chapter 3

### Theoretical Framework

The Kindergarten Program (Ontario Ministry of Education, 2016b) was the theoretical framework used in this study.

#### 3.1 The Kindergarten Program

The overall plan for the Ontario Ministry of Education (2016b) Kindergarten program was to provide more children from 3- to 5-years of age with a solid introduction to school, which would later translate to rewarding and successful lives. Typically in most FDK programs, it employs one teacher, however in Ontario, the FDK program involves a partnered approach involving an Ontario certified teacher (OCT) and a Registered Early Childhood Educator (RECE); also known as a Designate Early Childhood Educator (DECE) (Youmans et al., 2018).

#### *Vision, Purpose and Goals*

According to the Ontario Ministry of Education (2016b) Kindergarten program, “the purpose...is to establish a strong foundation for learning in the early years, and to do so in a safe and caring, play-based environment that promotes the physical, social, emotional, and cognitive development of all children” (p. 8). The Ontario Ministry of Education (2016b) Kindergarten program’s fundamental aims are: (a) to inaugurate a well-built basis for learning, (b) facilitate a smooth transition for children from preschool, child care, or home, (c) encourage children to learn through relationships, play and inquiry, (d) inspire lifelong learning and (e) foster competencies so that our children may succeed in the present and future.

#### *The Four Frames*

The Kindergarten Program is divided into four broad areas or frames of learning and utilized to organize a child’s assessments and learning. The four frames - **Demonstrating Literacy and Mathematics Behaviours, Self-Regulation and Well-Being, Problem Solving**

**and Innovating, and Belonging and Contributing** - were formulated and integrated to support children's natural learning process and the different facets of learning. These aspects of learning are vital for young development during inquiry and play in kindergarten (Ontario Ministry of Education, 2016b).



*Figure 2.* The Four Frames of the Kindergarten Program (Ontario Ministry of Education, 2016).

### ***Technology in the Kindergarten Program***

ICT is encouraged intermittently in the Kindergarten Program (2016b) curriculum document. ICT is conceptualized as useful research tools and extensions for creative media. The curriculum program provides examples of technological tools for kindergarten educators to augment pedagogical methods. The ICT tools for students and educators include the Internet, specialized software, databases, digital cameras and multimedia resources. Additionally, the

curriculum program advocates technology to facilitate conversations about global issues, connect with other schools all around the world and represent a natural augmentation of learning (Ontario Ministry of Education, 2016b).

Concerning technology in FDK learning, The Kindergarten Program (Ontario Ministry of Education, 2016b) document states, “Whenever appropriate, therefore, students should be encouraged to use ICT to support and communicate their learning” (p. 105). However, with the implementation of the FDK program in 2016, the curriculum document is outdated in what and how current technologies are used, especially in virtual classrooms.

### **3.2 Summary**

Therefore, by analyzing the attitudes, beliefs, influences, pedagogical practices, experiences, and types of technological devices and digital resources, and scoping the Ontario Ministry of Education (2016b) The Kindergarten Program, I will be able to provide educators with explorative recommendations on how to implement effective teaching and facilitate play-based learning in this new virtual learning environment. Also, with the help of evidence-based research conducted by academics and medical professionals on the effects of digital screen-based technologies used by early learners, in accordance with the Kindergarten Program’s philosophy, educators can effectively increase students’ abilities to learn, retain, understand and make connections without excessive amounts of screen time. In addition, I hope, as a by-product of this study, educators will understand the importance of promoting more active learning than passive learning in their virtual classrooms. My goal, not only as a researcher but also as an educator, is to be transparent with FDK stakeholders regarding the concerns and recommendations with digital screen-based technologies and resources actualization in FDK virtual classrooms in Ontario.

## Chapter 4

### Methodology and Methods

#### 4.1 Introduction

This chapter explains the decision to use a qualitative case study and why it was the best choice to answer the research questions. Chapter 4 discusses the research design, data sources, collection methods, data analysis, ethical considerations, and the trustworthiness and reliability of the study.

#### 4.2 Research Design

This study aims to examine and understand the experiences of educators teaching virtually in kindergarten. A qualitative design, also known as a naturalistic inquiry, is preferred to this particular research as it offers a pragmatic in-depth research approach with contextualized insights of qualitative research coupled with multiple forms of evidence from both qualitative and quantitative data (Stringer, 2008).

Qualitative research described in Creswell et al. (2011) focuses “on the contexts and meaning of human lives and experiences for the purpose of inductive or theory-development driven research” (p. 4) and “allow for identification of previously unknown processes, explanations of why and how phenomena occur, and the range of their effects” (p. 5). Creswell et al. (2011) discuss the following:

“Qualitative data help researchers understand processes, especially those that emerge over time, provide detailed information about setting or context, and emphasize the voices of participants through quotes. Qualitative methods facilitate the collection of data when measures do not exist and provide a depth of understanding of concepts. (p. 4)

Contrary to, at first glance, qualitative research or naturalistic inquiries can be presented with quantitative findings (Patton, 2015; Stake, 2011). “Naturalistic inquiry focuses on

understanding the way people interpret events in their everyday lives. It makes use of qualitative methods that use both qualitative and quantitative information to gain insight and understanding of issues and events” (Stringer, 2008, p. 29).

As virtual learning is a new phenomenon, this approach provided a more in-depth look into how educators navigated this new teaching milieu.

### **4.3 Case Study**

The following research was conducted as a qualitative study through a case study design (Creswell et al., 2011; Patton, 2015; Stake, 2011). This case study followed first a qualitative analysis of educators' interviews and teacher-researcher reflective notes followed by a follow-up educator ranking question as “it involves the intentional collection of both quantitative and qualitative data and the combination of the strengths of each to answer research questions” (Creswell et al., 2011, p. 5). Many case studies are both qualitative and quantitative (Patton, 2015; Stake, 2011). This case study design (Cohen et al., 2018) analyzed digital screen-based pedagogical practices, the attitudes and beliefs towards technologies used in virtual classrooms, what digital screen-based technological tools or resources are FDK educators currently implementing, and how are they used to document play-based learning virtually, and what do educators need to effectively integrate technology into their virtual pedagogical practices. “A case study requires in-depth data, a researcher’s ability to gather data that address fitness for purpose, and skills probing beneath the surface of phenomena” (Cohen et al., 2018, p. 389) and case studies rely on multiple sources of evidence (Yin, 2009). The purpose of a case study is to deepen our understanding and provide greater awareness about a specific phenomenon (Cohen et al., 2018).

### **4.4 Research Participants**

A total of 11 female educators (i.e., Ontario of College Teachers and Registered Early Childhood Educators) and one male teacher-researcher from the South and Central regions of Ontario that taught kindergarten virtually at the start of September of 2020/2021 or transitioned periodically throughout the school year due to government mandates participated in this study. The participants' ages ranged from 25 to 53. The mean age was 37.2 ( $SD = 10.9$ ). The participants' teaching experience ranged from 2 to 30. The mean years of teaching were 14.1 ( $SD = 10.1$ ). Four participants from the original recruited sample ( $n = 15$ ) were excluded because they had withdrawn from the study, or did not respond after signing the consent form. The following paragraphs describe each educator's age, level of education, specialization, qualifications, and the number of years teaching.

Participant 1. The educator is a 33-year-old female RECE. The educator's current level of education is a B.A. in Family Study, and an Early Childhood Education Diploma qualified to teach in early childhood settings and kindergarten. The number of years teaching is 11.

Participant 2. The educator is a 28-year-old female OCT. The educator's current level of education is a B.A. in Sociology, Childhood and Social Institutions and a Bachelor of Education qualified to teach grades in the primary and junior divisions. The number of years teaching is 2.

Participant 3. The educator is a 52-year-old female OCT. The educator's current level of education is a B.A. in English, and a Bachelor of Education qualified to teach grades in the primary, junior, intermediate, and senior divisions. The number of years teaching is 17.

Participant 4. The educator is a 51-year-old female OCT with a specialization in music. The educator's current level of education is B.A. Honours and a Bachelor of Education qualified to teach grades in the primary and junior divisions. The number of years teaching is over 25.

Participant 5. The educator is a 53-year-old female RECE. The educator's current level of education is an Early Childhood Education Diploma, and an Early Childhood Administration



Certificate qualified to teach in early childhood settings and kindergarten. The number of years teaching is over 30.

Participant 6. The educator is a 42-year-old female OCT. The educator's current level of education is a B.A. Honours Psychology and a Master of Teaching qualified to teach grades in the primary and junior divisions. The number of years teaching is 17.

Participant 7. The educator is a 27-year-old female OCT. The educator's current level of education is a B.A. Honours Sociology and a Bachelor of Education qualified to teach grades in the primary and junior divisions. The number of years teaching is 2.

Participant 8. The educator is a 25-year-old female OCT. The educator's current level of education is a B.A.Sc and a Bachelor of Education qualified to teach grades in the primary, junior, intermediate, and senior divisions. The number of years teaching is 2.

Participant 9. The educator is a 26-year-old female OCT. The educator's current level of education is a B.A., and a Bachelor of Education qualified to teach grades in the primary, junior, intermediate, and senior divisions. The number of years teaching is 2.

Participant 10. The educator is a 39-year-old female RECE. The educator's current level of education is B.A.Sc Honours in Early Childhood Studies and an Early Childhood Education Diploma qualified to teach in early childhood settings and kindergarten. The number of years teaching is over 27.

Participant 11. The educator is a 43-year-old female OCT. The educator's current level of education is a B.A., and a Bachelor of Education qualified to teach grades in the primary and junior divisions. The number of years teaching is 20.

Convenience sampling and snowball sampling were used in this study to recruit virtual educators, as it can be challenging to reach this particular cohort (Cohen et al., 2018; Mann, 2003). One source was from one virtual school in Southwestern Ontario, with four educators

from three virtual FDK classrooms. Also, participants were recruited from public social media forums (i.e., Facebook groups). This approach will provide all stakeholders with a deeper understanding of how educators taught in this new virtual classroom environment and develop a future guideline for continued virtual learning or future occurrences of mandated virtual learning.

#### **4.5 Data Sources and Collection**

Data sources included typed transcripts from interviews with kindergarten educators, teacher-researcher reflective notes, and a ranking question. The educator interviews consisted of open-ended questions asking educators a variety of aspects about virtual teaching and learning in kindergarten (see Appendix A). The teacher-researcher notes consisted of my reflections as a teacher teaching kindergarten virtually. Our research team (1 MA student, 1 PhD student, and my supervisor) observed my virtual class during synchronous times and posed open-ended questions on a knowledge forum (KF6). The questions posed examined my experiences as a virtual teacher including my pedagogical approaches, knowledge about the kindergarten curriculum, role of different stakeholders (i.e., teacher, early childhood educator, parents, students), the role of technology, challenges (e.g., technology and curriculum), and personal reflections or insights during the year. The ranking question was first drafted from my experience as a virtual kindergarten teacher and then posed to educators at the end of the interview. Afterwards, educators were asked whether they would add another important facet about what is required to teach kindergarten virtually. At the end of the study, a final ranking question was constructed via Qualtrics and it was sent to educators to rank from the most important to least important facet required to teach kindergarten virtually. The final set of facets included: collaboration with teaching partner, support from families, strong, reliable, and fast internet connection, strong, reliable, and fast technological devices, strong understanding of kindergarten document, pedagogy and how learning happens so it can be supported virtually,

support and clear communication from school boards and administrative supervisors with virtual teaching, and extensive and quality professional development for virtual teaching.

Data sources were stored on a secure Western OneDrive with access limited to the research team. Copies of study records (e.g., ranking question and educator interviews types transcripts) will be kept on file for seven years (in accordance with Western University's Faculty Collective Agreement) and after destroyed.

Methods of data collection for kindergarten educators (n = 11) included an interview approximately 35 minutes in length and ranking question (n = 10) from most to the least important by educators on what is required to teach kindergarten virtually.

#### **4.6 Triangulation**

Data triangulation is vital when collecting qualitative data, such as a ranking question, interviews, teacher-researcher reflections, and coupled with persistent observations and peer debriefings strengthened the validity of this study (Guba & Lincoln, 1982). Triangulation in this study consisted of “a variety of data sources, different perspectives” and “different methods pitted against one another to cross check data and interpretation” Guba & Lincoln, 1982, p. 247). In addition, multiple methods of data collection in qualitative research can establish shared perspectives (Denzin, 1978 as cited in Campbell et al., 2020), and the data gathered and compared in quantitative research may contribute greater confidence in the validity of the results (Campbell & Fiske, 1959 as cited in Campbell et al., 2020).

#### **4.7 Data Analysis**

This study used both qualitative and quantitative methods. The qualitative data was analyzed using NVivo 12 software (NVivo, 2018) which analyzed the written transcripts of the educator interviews (63 pages) and the teacher-researcher reflection notes (14 pages). The quantitative data was analyzed using Microsoft Excel (Carlberg, 2014) which analyzed the

ranking question. Descriptive statistics reported educators' sex, education level, specialization, qualifications, and years of teaching.

### *Qualitative*

In an inductive method, a thematic content analysis was used to analyze the semi-structured interviews of written transcripts and teacher-researcher reflective notes (Cohen et al., 2018). Each evidence of data collected was analyzed using the following seven steps:

- 1) Defining the units of analysis; 2) Paraphrasing the relevant passages of text; 3) Defining the level of abstraction required of the paraphrasing; 4) Data reduction and deletion (e.g., removing paraphrases that duplicate meaning); 5) Data reduction by combining and integrating paraphrases at the level of abstraction required; 6) Putting together the new statements into a category system, and 7) Reviewing the new category system against the original data. (Flick, 2009, p. 326, as cited in Cohen et al., 2018)

The coding analysis began with careful, line-by-line coding of the first few transcripts until there was no need to develop new codes, as the existing codes could entirely cover the newly inputted data. After coding the first five transcripts, 79 classifications were created. These codes were scrutinized before coding the data from the subsequent interviews in order to aggregate the classifications. Next, the codes were visually analyzed after reviewing and re-reading all of the coded interviews numerous times. The purpose of this phase was to ensure that the created codes precisely described the coded data. In addition, there were no duplicates or codes that covered the same topic but were phrased differently.

Afterwards, these descriptive codes were organized into a "parent-child" relationship, a term used in NVivo to refer to the hierarchical organization of codes (NVivo, 2018). Following that, each code was reviewed, and duplicates (codes that covered the same type of material but were separated by a tiny difference in language) were removed by "merging" two or more codes

into one. Some of the codes were also becoming more inclusive at this point. Then these codes were then utilized to code the subsequent interviews in a process known as focused coding. As more transcripts were reviewed and processed, the analysis required more and more analytical thinking and elucidation. Thus, the codes were gradually altered by merging from line-by-line, descriptive codes predominantly expressed in gerund forms and used to sort the data into more inclusive and conceptual codes used to further classify, synthesize and conceptualize the current coding framework. The number of codes in the final thematic framework was reduced to 61 due to these processes.

Throughout the data analysis, the steps mentioned earlier occurred regularly. Although the preponderance of subsequent interviews was classified using the same codes, new codes were developed occasionally. Simultaneously, the analysis of combining and re-naming the codes was ongoing, with the goal of revealing a final set of themes and sub-themes that would be presented and debated in this study.

### ***Quantitative***

The quantitative component involved analyzing the ranking question. Educators rank ordered 7 facets of virtual teaching and learning (1 – most important, 7 – least important) on what virtual educators require to teach kindergarten virtually. Each theme was organized in Microsoft Excel and within each theme organized the total number of educators ranked in each facet. Next, the ranks were weighted (i.e., Rank 1 = 7, Rank 2 = 6, Rank 3 = 5, Rank 4 = 4, Rank 5 = 3, Rank 6 = 2, Rank 7 = 1). Afterwards, the total in each rank was multiplied by its weighted score and combined to receive the total score in each facet (See Figure 6)

## **4.8 Ethical Considerations**

The proposed study duration was from March 2021 to July 2021. There were no recognized liabilities to participate in this study. Regardless, some educators could have felt uncomfortable from researcher evaluations on pedagogical practices, kindergarten curriculum knowledge and attitudes or ability towards implementing technologies. Consequently, educators may have thought that a principal or administrator would discipline them due to the results of the study. To ensure the participants' confidentiality and privacy concerns, pseudonyms were used, and the names of educators were redacted in the data. Also, the data sources such as the interviews (35 min) and ranking question (2 min) were constructed to honour educators' busy schedules and limited time. The collective time is substantially less than the 240 minutes of preparation time per week allotted for teachers and consideration of the 60 minutes of preparation/break time per week allotted for early childhood educators.

#### **4.9 Trustworthiness and Reliability**

In order to protect the validity, reliability, and trustworthiness of the study, two methods were used to safeguard against a loss of credibility. The methods included persistent observations and peer debriefings. Persistent observations involved members from our research team (i.e., 1 MA student, 1 PhD student, and my supervisor) consistently observing my virtual class. From these observations, the research team proposed questions through a knowledge forum (i.e., KF6) and I would respond to these questions. These responses would be the data from the teacher-researcher reflective notes. Peer debriefing sessions from our research team were conducted to strengthen the objective evaluation of the study and data analysis. Peer debriefing involved an “opportunity to test [my] growing insights against those of uninvolved peers” and “to receive advice about important methodological steps in emergent design” (Guba & Lincoln, 1982, p. 247). Therefore, cautiously employing these precautions with data triangulation ensured a more valid, reliable and trustworthy study (Guba & Lincoln, 1982).

## Chapter 5

### Findings

#### 5.1 Introduction

This chapter presents the findings from the ranking question, interviews, and teacher-researcher reflective notes. I have organized the findings by each research question and, within each research question, present the use of different data sources through qualitative and quantitative analyses.

#### 5.2 Attitudes and beliefs towards digital screen-based technologies and digital resources; and the benefits and challenges of teaching and learning in virtual kindergarten classrooms *Benefits of virtual learning and teaching*

Though the participants devoted more time conferring the diverse challenges, nevertheless educators were cognizant of the specific *benefits of virtual learning and teaching* (see Table 1). These, in turn, were differentiated into benefits for educators themselves and those regarding the students.

**Educators.** The most acknowledged benefit of virtual learning and teaching, as seen in Table 1, is that it is *convenient and efficient*. The participants expressed that it “provides a flexible schedule for educators” (Participant 1) and it is “less physically taxing and mentally taxing than in the classroom” (Participant 5). This sub-theme leads to another advantage: it is *good for mental health and a sense of safety*. This form of labour, according to Participant 5, is less psychologically exhausting, which may be due in part to the fact that the “element of care [is] with the parents” (Participant 3). However, the majority of educators who mentioned this advantage of virtual teaching mentioned the lack of “covid stress” (Participant 2), which includes the stress of being infected and the stress of having to adhere to restrictions and policies.

Another benefit stemming from the previously mentioned convenience and efficiency is that virtual teaching can facilitate a *good work-life balance*. Those that commented, for example, stated that educators could save time since “transitions are shorter” (Participant 8) and educators eliminate the time to commute.

The benefit of virtual education, according to three participants, is that it is simple to *communicate with individual children*. In addition, educators complimented being able to “call on children individually without other distractions” (Participant 5), which can be best utilized with virtual breakout rooms.

Finally, two participants stated that the ability to *connect with parents* was simple, stating that “we are more accessible to one another” (Participant 5) and that engaging with parents is “easier than in the classroom” (Participant 11). This finding represents the critical role of parents, which will be discussed several times throughout this study, as it emerged in relation to each of the major themes.

**Students.** In regards to student benefits, *convenience and efficiency* were also discussed, indicating “shorter days for students” (Participant 5) and that children have a “more flexible schedule” (Participant 1) as a result. This sub-theme was part of a broader benefit of merely being in *the comfort of own home*, which was seen to be less distracting and stressful than the in-person classrooms. “Students are able to work quietly in their homes,” according to Participant 3, and are “more attentive in some ways than a typical kindergarten classroom.” Thus, a few believed that virtual learning is *less distracting* in general. Most significantly, being allowed to stay at home is *better for kids with anxiety* since it is a “far more comfortable environment” (Participant 7), particularly for children who “have social anxiety when going to school” (Participant 1) or are “shy” (Participant 7).



As previously stated, parents play an essential role in their children’s education, and virtual learning provides additional options for parents to participate. Participants who mentioned this benefit believed that “parents are much more actively involved in their children’s learning than in bricks and mortar” (Participant 5) and that “there is the opportunity for more parent engagement and support” (Participant 1).

Finally, the benefit mentioned above for educators who can readily communicate with individual students is that this ability can provide students with more *individual attention* from their educator or educators.

**Table 1**

*Interview thematic framework*

Theme name	How many participants discussed it	How many times it was discussed in total
<b>Benefits of virtual learning and teaching</b>	<b>11</b>	<b>51</b>
Educators	10	25
- <i>Convenient and efficient</i>	5	7
- <i>Good for mental health and a sense of safety</i>	5	5
- <i>Good for work-life balance</i>	5	5
- <i>Easy to communicate to individual children</i>	3	4

- <i>Easy to connect with parents</i>	2	4
Students	9	27
- <i>Being in the comfort of own home</i>	7	9
- <i>Convenient and efficient</i>	4	6
- <i>Better for students with anxiety</i>	4	4
- <i>More opportunities for parents' involvement</i>	4	4
- <i>Individual attention from the educator</i>	2	2
- <i>Less distracting</i>	2	2
<b>Challenges of virtual learning and teaching</b>	<b>11</b>	<b>150</b>
Students	10	47
- <i>Challenging for low socio-economic status families</i>	8	15
- <i>Difficult to stay motivated to attend and learn</i>	6	9
- <i>Lack of socialization</i>	6	7

- <i>Overall distracting and difficult environment</i>	5	7
- <i>Lack of consideration for individual differences</i>	5	6
- <i>Lack of physical activity</i>	3	3
Educators	11	70
- <i>Difficult to control and monitor the students</i>	9	16
- <i>Lack of knowledge and skills in virtual teaching</i>	7	9
- <i>Lack of institutional and governmental support</i>	7	7
- <i>Difficult to replicate physical classes</i>	4	9
- <i>Difficult to build connections with students or support them individually</i>	4	4
- <i>Lack of training</i>	4	4
- <i>Stressful to have parents nearby</i>	3	5
- <i>Workload</i>	3	5
- <i>Difficult to keep documentation</i>	3	4
- <i>Not enough interaction and collaboration with other educators</i>	2	3

- <i>Overall stressful</i>	2	3
- <i>Difficult to read non-verbal cues</i>	1	1
Both Educators and Students	10	33
- <i>Technological failures and limitations</i>	10	18
- <i>Lack of parents' involvement and support</i>	8	10
- <i>Timetable too intense for virtual learning</i>	3	3
- <i>Parents disrupting the teaching</i>	2	2
<b>What is needed for effective virtual teaching and learning</b>	<b>11</b>	<b>157</b>
Creativity and adaptability in teaching	11	54
Making the most of the available software and technology	11	25
A structured way to monitor and keep documentation	11	11
Regular communication with the parents	9	18
Institutional support and professional development opportunities	8	16

Engaged and supportive parents	5	9
Balanced use of technology	4	8
Access to digital resources, internet and technology	4	6
Collaboration with colleagues	4	6
Collecting and considering parent feedback	3	4

### ***Challenges of virtual learning and teaching***

Participants offered more comments regarding *the challenge of virtual learning and teaching* than they did about the benefits, as discussed in the introduction. Hence, these issues are listed in Table 2, with the asterisked sub-themes indicating that they were also mentioned in the teacher-researcher reflections.

**Students.** As seen in Table 2, the most discussed challenge was that this learning mode could be challenging for low socio-economic status families. For example, such families may have inadequate access “to the internet and devices” (Participant 2) and may not have or be able to afford additional resources. In other cases, there may also be a general “poor family dynamic” (Participant 8).

Another discussed challenge is that it may be *difficult to stay motivated to attend and learn*. Although learning at home may be, as previously stated, a convenient and safe environment for students, some children may find it difficult to adhere to the routines as rigorously as they would in bricks and mortar schools. Some participants expressed worry about “struggle with certain students coming late” (Participant 1) and “student not coming prepared to

class [and] not knowing or having the supplies” (Participant 4). The majority of people who replied on this issue raised concerns about “tough” and “inconsistent” (Participant 7) virtual class attendance.

Another issue in virtual classrooms is the *lack of socialization* among students. The children are “alone without peer interactions (Participant 4) and do not “get the benefit of socializing and being physically active with their friends” (Participant 1). Furthermore, as Participant 3 pointed out, there is a “lack of modelling from stronger students when grouped by academic ability,” which is an aspect of “socialization” that directly relates to academic achievement.

While staying at home offers many potential benefits, particularly for students who may be anxious about going to school, it may also prove to be a challenge under certain circumstances. As a result, five participants raised concerns that learning at home may be *an overall distracting and difficult environment*, citing a variety of “home distractions” (Participant 2), such as siblings, parents and various sorts of “background noise” (Participant 10).

*Lack of consideration for individual differences* was a challenge identified both during the interviews and teacher-researcher reflections. The main issue was that virtual learning might not be appropriate for students of all ages and abilities. As the teacher-researcher reflected in the journal about the use of presentation slides (i.e., Google Slides) posted by the FDK team for students, for example, “the implementation of interactive software is very difficult in kindergarten,” and because “children’s [fine motor] development ranges, only about one-third of my students would be able to participate in an interactive virtual activity [during the first half of the year]. I can see these interactive games being used in older grades...but not in kindergarten.” Similar concerns were raised by a few who commented in the interviews, with the main concern being that “virtual learning environment is not best suited for early learners” (Participant 7). One

of the reasons for these worries is that educators found it challenging to apply play-based learning in the virtual environment. The *lack of physical activity* was another challenge of virtual learning.

**Educators.** The most commonly stated challenge relating to educators is how it is *difficult to control and monitor the students* in a virtual setting. Reflecting on the previously discussed finding that students may find it challenging to stay motivated and attend, the main concern was about absences and tardiness, as well as about “students not coming prepared to class” (Participant 4). The latter, rather just a behavioural issue, might also result from certain families’ low socioeconomic status, as previously mentioned. The educators were also concerned that it is generally difficult to “engage students” (Participant 3) and control some “inappropriate behaviours” (Participant 6), such as not turning on the camera. Overall, students’ engagement “has been rough” (Participant 7) to the point that Participant 7 felt that “I don’t know what to do anymore [to] try to engage students.”

This issue is partly related to another acknowledged difficulty, namely the overall *lack of knowledge and abilities in virtual teaching*, which was addressed both in the interviews and the teacher-researcher reflections. “It looks like educators, specifically more veteran educators, struggle with implementing technology and digital resources,” stated the teacher-researcher. Virtual teaching in general, is “not transparent with educators” (Participant 2), and educators suffered especially in the early months of virtual teaching when they were still “learning new technology” (Participant 5) and “changing and inventing on the fly (Participant 6).

The *lack of institutional and governmental* support made adjusting to this new mode of teaching much more challenging. Some educators expressed concerns that the school boards did not provide enough physical resources and that “the government wasn’t as supportive as I thought it would be” (Participant 2). Others, on the other hand, believe that there is a lack of

training. Although most of the interviewees responded to be content with their training, some believed it was insufficient. The unpredictability of the pandemic and lack of support result in a sense that virtual teaching contributed to an *overall stressful* experience. In terms of stress, three participants mentioned that having parents nearby may be wary, to the point that Participant 11 felt “overwhelmed by the parents.” Another cause of stress might be the workload, as several participants stated that while teaching virtually, “you always had to have three backup plans” (Participant 7) and that one must “over-plan” constantly (Participant 2).

In the virtual teaching environment, four participants believed it was *difficult to replicate physical classes*. Many things are “not the same as [in] the classroom,” according to Participant 7, such as incorporating inquiry, play and doing “science experiments” (Participant 4).

Although, as argued previously, four participants expressed concern that it is *difficult to build connections with students or support them individually*. It is challenging to work with “kids that require hands-on learning” (Participant 8) and to “build connections with students” (Participant 7). It is also challenging to understand non-verbal cues, as Participant 11 pointed out, which makes building relationships with students more challenging.

Another problem, according to three educators, was that pedagogical documentation differed from in-person classrooms, stating that “documentation was tougher” (Participant 7), and therefore *difficult to keep documentation*. Thus, coupled with other discussed challenges, it makes the task of monitoring student development more complex.

Finally, two participants raised concerns about not enough interaction and collaboration with other educators, noting that they “felt isolated” and there is no sense of community with educators between classes” (Participant 2).

**Both Students and Educators.** As previously stated, several difficulties affected both students and educators because they entailed external factors that impacted both groups. For



instance, *technological failures and limitations* were the most cited difficulty in both the educator interviews and the teacher-researcher reflections data. A prevalent issue was that “technology doesn’t work” (Participant 10) and that “poor-quality internet connection and students having poor internet connections makes online teaching very difficult” (Teacher-researcher). Several particular technological failures were communicated, but the underlying theme of these dialogues was that having to depend on technology and internet speed is what makes virtual teaching and learning difficult and stressful.

Another major issue affecting both students and educators is the *lack of parents’ involvement and support*. The critical role of parents has been evident throughout this report. Parents play a vital role in children’s education, especially in virtual learning, and “family cooperation” (Participant 6) is a crucial factor that can make or break the success of virtual education. “Different commitment levels of parents” (Participant 3) make a significant impact, and “if you have parents that do not read everything provided, ...their children are not prepared” (Participant 1). On the contrary, having uninvolved parents is having parents disrupting the teaching. Two participants raised concerns that some parents tell their children the answers or correct them every time they say anything wrong.

Finally, three participants brought up the problem of the *timetable being too intense for virtual learning*.

**Table 2**

*Challenges of virtual learning and teaching*

Theme name	How many participants discussed it	How many times it was

		discussed in total
Challenges of virtual learning and teaching	11	150
Students	10	47
- <i>Challenging for low socio-economic status families***</i>	8	15
- <i>Difficult to stay motivated to attend and learn</i>	6	9
- <i>Lack of socialization</i>	6	7
- <i>Overall distracting and difficult environment</i>	5	7
- <i>Lack of consideration for individual differences***</i>	5	6
- <i>Lack of physical activity</i>	3	3
Educators	11	70
- <i>Difficult to control and monitor the students</i>	9	16

- <i>Lack of knowledge and skills in virtual teaching***</i>	7	9
- <i>Lack of institutional and governmental support</i>	7	7
- <i>Difficult to replicate physical classes</i>	4	9
- <i>Difficult to build connections with students or support them individually</i>	4	4
- <i>Lack of training</i>	4	4
- <i>Stressful to have parents nearby</i>	3	5
- <i>Workload</i>	3	5
- <i>Difficult to keep documentation</i>	3	4
- <i>Not enough interaction and collaboration with other educators</i>	2	3
- <i>Overall stressful</i>	2	3
- <i>Difficult to read non-verbal cues</i>	1	1
Both	10	33

- <i>Technological failures and limitations***</i>	10	18
- <i>Lack of parents' involvement and support</i>	8	10
- <i>Timetable too intense for virtual learning</i>	3	3
- <i>Parents disrupting the teaching</i>	2	2
- <i>No breakout rooms in Microsoft Teams</i>	Teacher-researcher reflections only	

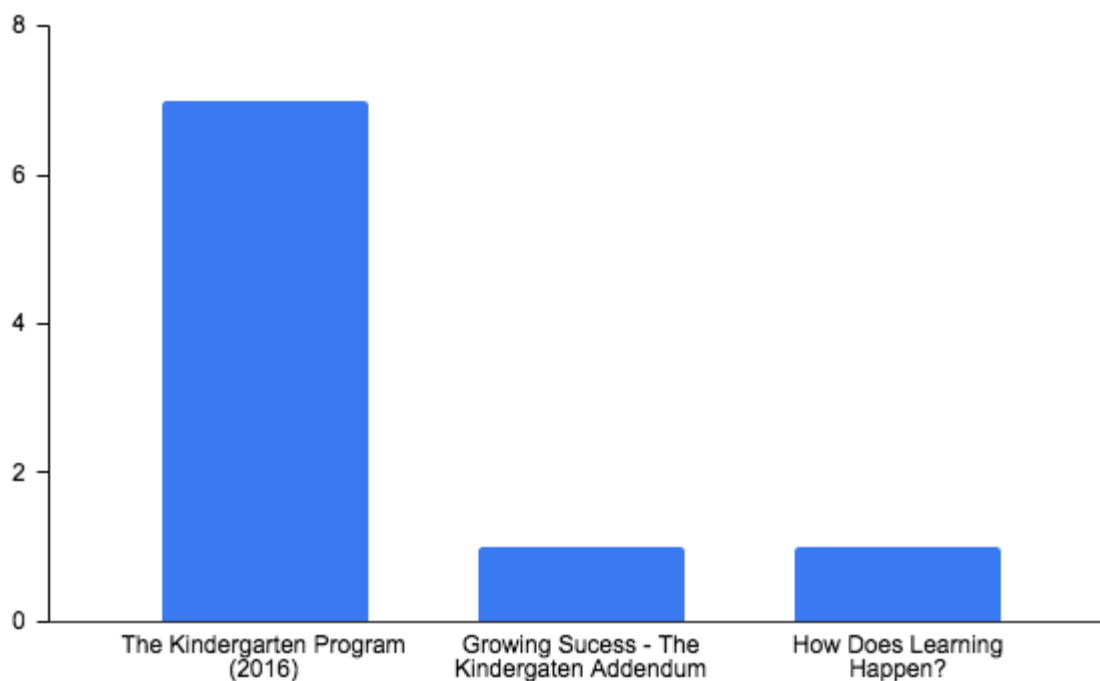
### **5.3 What digital screen-based technological tools or resources are FDK educators currently implementing and how are they used to document play-based learning virtually?**

The overall curriculum framework resources used by kindergarten educators are ‘The Kindergarten Program’ (Ontario Ministry of Education, 2016b), with some references to the ‘Growing Success - The Kindergarten Addendum’ (Ontario Ministry of Education, 2016a) and ‘How Does Learning Happen?’ (Ontario Ministry of Education, 2014) documents. The physical devices or materials include laptops, tablets (i.e., iPads), phones, desktop computers, whiteboards, external monitors, document cameras, studio spotlights, and webcams, and the digital resources that were mostly used are Microsoft Teams, Google Drive, Google Docs, Google Meet, Google Slides, YouTube, Pinterest, Facebook, Twitter, Instagram, and virtual organizers. Students and families were provided digital resources for learning through their learning platforms (i.e., D2L, Google Classroom) from school boards including TVO mPower, Mathletics, Raz-Kids (e.g., Headsprout), Epic!, PebbleGo, educator created interactive games

(i.e., Boom cards, PowerPoints, Google Slides), online websites or games (e.g., ABCya, Teach Your Monster to Read, Lalilo, Kodable) and educator created choice board play-based activities. The devices and digital tools or resources are involved in the facilitation of learning or supplementary items to reinforce the learning in kindergarten.

### Figure 3

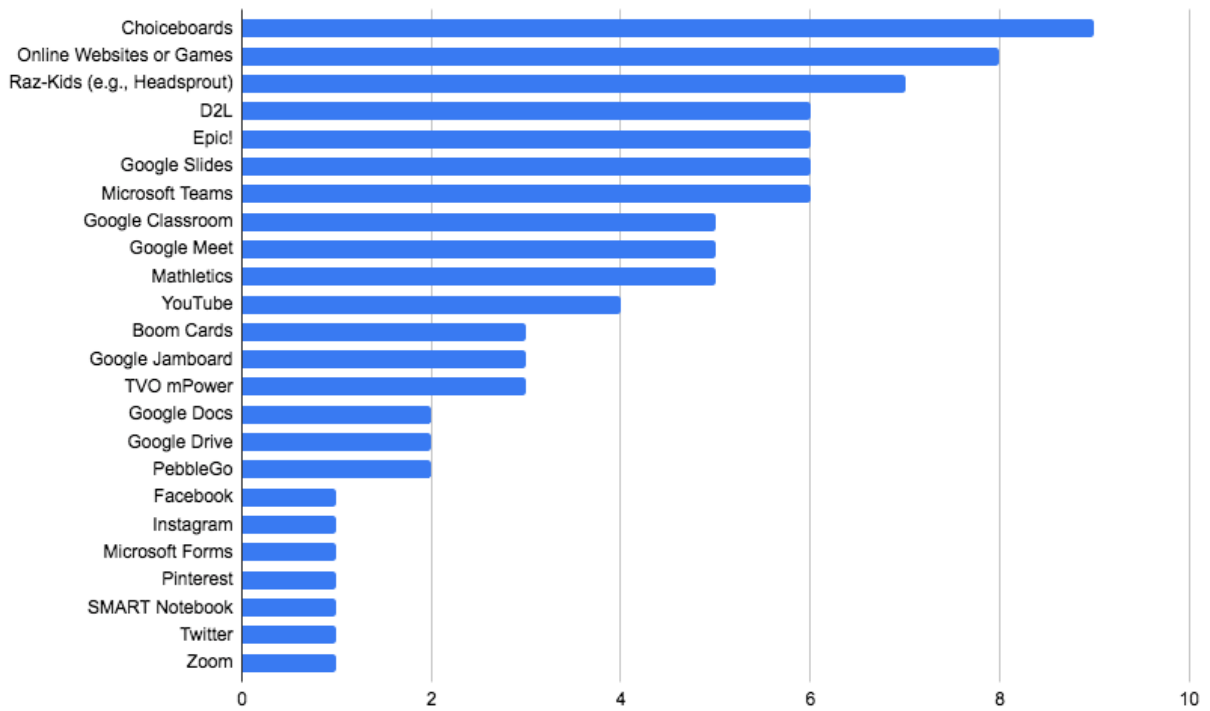
*List of Curriculum Program and Ministry of Education Documents used by Educators*



*Note:* This figure portrays open-coding analysis from the educator interview transcripts indicating the number of educators used these specific resources during their time teaching kindergarten virtually.

### Figure 4

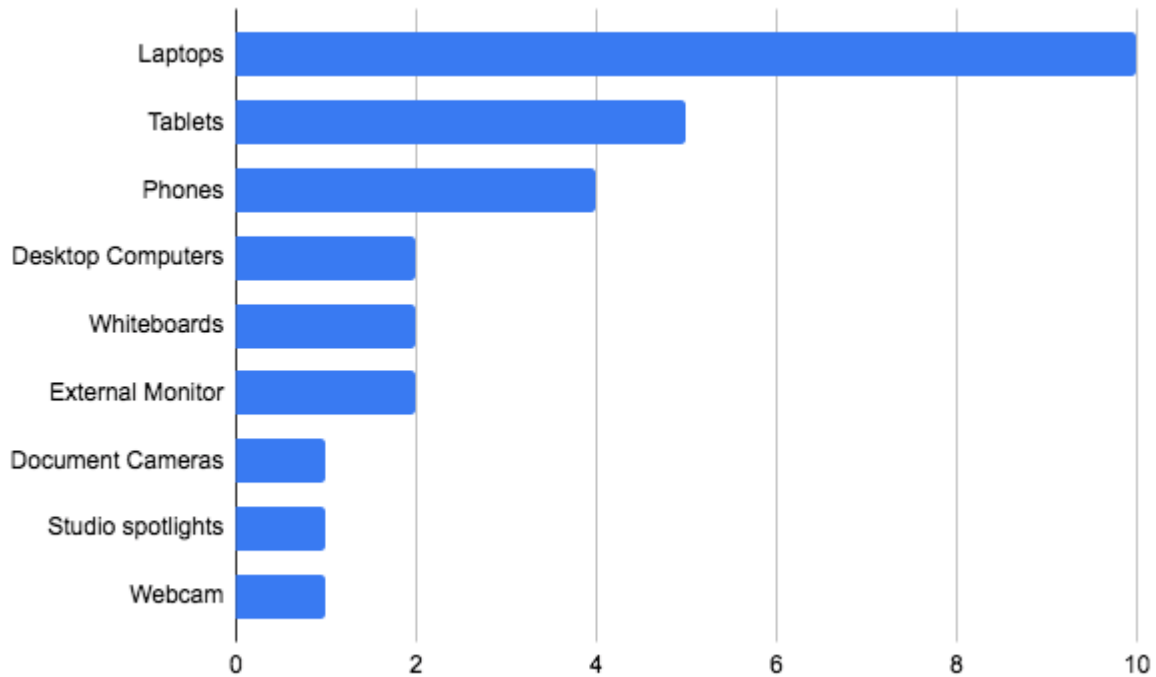
*List of Technological Resources used by Educators*



*Note:* This figure portrays open-coding analysis from the educator interview transcripts indicating the number of educators used these specific technological resources, such as software, websites, and applications during their time teaching kindergarten virtually.

### **Figure 5**

*List of Physical Devices used by Educators*



*Note:* This figure portrays open-coding analysis from the educator interview transcripts indicating the number of educators used these specific technological devices during their time teaching kindergarten virtually.

One of the responsibilities of an educator is to document students' growth and learning in the classroom. With learning occurring remotely, these responsibilities have changed to a shared responsibility between educators and parents. Educators disclosed a variety of different ways to document learning, including pictures, videos, portfolios, anecdotal notes, individual meetings, observations, screenshots, audio recordings, checklists, assessments and weekly reports by the parents. The submissions mentioned above were sent to educators by parents through a board-approved learning management software. Some submissions did involve student agency in their learning by providing audio recordings with their submissions.

## 5.4 What do educators need to effectively integrate technology into their virtual pedagogical practices?

### *What is needed for effective teaching and learning*

With the collected data, it is feasible to determine *what is needed for effective teaching and learning*. On several occasions, the participants explained what they do to facilitate effective learning and reflected on various appropriate pedagogical practices for virtual teaching. The themes reflect both the interviews and the teacher-researcher reflections data, described in the subsections below.

#### **Educator interviews.**

**Table 3**

*What is needed for effective virtual teaching and learning – educator interviews*

Theme name	How many participants discussed it	How many times it was discussed in total
<b>What is needed for effective virtual teaching and learning</b>	<b>11</b>	<b>157</b>
Creativity and adaptability in teaching	11	54
Making the most of the available software and technology	11	25
A structured way to monitor and keep documentation	11	11
Regular communication with the parents	9	18



Institutional support and professional development opportunities	8	16
Engaged and supportive parents	5	9
Balanced use of technology	4	8
Access to digital resources, internet and technology	4	6
Collaboration with colleagues	4	6
Collecting and considering parent feedback	3	4

Educators' *creativity and adaptability in teaching* (see Table 3) were the most discussed facilitator of effective teaching and learning. This theme centred on educators' efforts to compensate for the limitations of the virtual environment by adapting lessons flexibly to emulate in-person classrooms and ensure students' growth and development. Table 4 encapsulates these diverse initiatives by educators.

**Table 4**

*Examples of creativity and adaptability in teaching*

<b>Creativity and adaptability in teaching</b>	<b>11</b>	<b>54</b>
Use of play and appealing to children's interests	11	22
Small groups and short lessons	8	13

The use of break out rooms	3	4
Adjusting the mimics and voice	3	3
Engaging community helpers	3	3
Replicating classroom environment and dynamics	2	3
Inquiry based learning	2	2
Screen sharing	1	2
Collaborative learning	1	1
Assigning virtual names	1	1

The theme of *making the most of the available technology and software* is partly related to *creativity and adaptability in teaching*. Here, the educators identified several physical devices and virtual resources they utilize in teaching. The physical devices or materials include laptops, phones, iPads, whiteboards, professional studio spotlights, cameras, and desktop computers, and the digital resources that were mostly used are Microsoft Teams, Google Drive, Google Docs, Google Meets, Google Slides, YouTube, Pinterest, Facebook, Twitter, Instagram and virtual organizers. Given those resources mentioned above, it should come as no surprise that *access to digital resources, internet and technology* is another factor that contributes to successful and practical teaching that educators discussed and that in order to utilize the available resources fully, one requires “a really good computer” (Participant 2) and a fast internet connection.

Educators need access to the above-mentioned technological resources and the ability to teach in virtual classrooms. Therefore, *institutional support and professional development opportunities* are also required. Although most participants appeared to be content with the help received from their school board, some expressed concerns and considered that more should have been done to support educators.

Although competent use of technological resources is a component that contributes to the quality of virtual teaching and learning, several educators pointed out that a *balanced use of technology* is also necessary. “Digital technology is [only] the medium” (Participant 10), and “it shouldn’t be the only tool used” (Participant 6). As a result, digital technology should be utilized “always in moderation” (Participant 7) and “there should be a balance using technology and physical items” in the virtual classroom (Participant 1).

*A structured way to monitor and keep documentation* is another factor that reflects the previously discussed challenges with monitoring the students and obtaining pedagogical documentation. The educators mentioned an assortment of ways to keep documentation, including pictures, videos, portfolios, anecdotal notes, individual meetings, observations, screenshots, audio recordings, checklists, assessments and weekly reports by the parents.

This analysis leads to another factor of successful virtual education emerging throughout this analysis: *engaged and supportive parents*. Those educators who positively evaluated their experience with virtual teaching frequently commended the “motivated parents, engaged in their children’s learning” (Participant 1). As previously stated, “parents’ support is needed” (Participant 10), and Participant 8 felt “lucky that my parents are very responsive, and we communicate on many platforms.” These quotes, in turn, emphasize the significance of *regular communication with the parents* since it is the educator’s responsibility to “guide parents through the online learning platform and make sure they know where to go” (Participant 1).

Setting “clear expectations for families at the beginning” (Participant 6) is also necessary to ensure that parents support the student’s learning and not obstruct the teaching. In order to educate parents and “keep communications open and transparent” (Participant 1), educators commented on this topic mentioned several methods of communication with parents, including direct emails, newsletters, and specific communication platforms (i.e., Microsoft Teams or Google Meets). Furthermore, collecting and considering parent feedback was discussed to extract “honest opinions” (Participant 6) and ensure that the educators “don’t waste time” (Participant 10) creating resources or distributing resources that parents do not use. Overall, participants agreed that “as much dialogue [as possible] between educators and families” is required (Participant 11).

**Teacher-researcher reflections.** Effective virtual teaching and learning factors that emerged from the teacher-researcher’s reflections are listed below (see Table 5). The themes that overlapped with those found in the educator interviews are noted with three asterisks and are not mentioned in the following discussion.

**Table 5**

*What is needed for effective virtual teaching and learning – teacher reflections*

Theme name	How many times it was discussed
<i>What is needed for effective virtual teaching and learning</i>	26
Providing the students with agency	5
Regular communication with parents***	3

Support for parents	3
Engaged and supportive parents***	2
Keeping documentation***	2
Small groups	2
Institutional support and professional development opportunities***	2
Clear understanding of the benefits and importance of technology	1
Collaboration with colleagues***	1
Individual meetings with students	1
Play-based activities	1
Providing socialization opportunities	1
Skills in virtual teaching	1
Teaching flexibility and adaptability***	1

As demonstrated in the table above, *providing students with agency* was the most discussed aspect found in the teacher-researcher’s reflections, explaining that “it is very important to incorporate student agency via student ideas or inquiry topics because it allows students some responsibility and facilitates their interest in their learning.” The teacher-

researcher also enlightened how his FDK team “formulated an array of questions of the day to gather children’s interests and ideas” and how the responses from the students were later analyzed to provide a list of topics to choose from. As the teacher-researcher further explains in the reflections, parents were also informed of the procedure, as regular communication with parents was also an important element.

The necessity of having involved and supportive parents were also highlighted, but most significantly, the teacher-researcher mentioned the need for *support for parents*. As previously stated and evident several times through the reflections, the teacher-researcher makes it a common practice to inform parents of what is happening in the classroom and explains the purpose. What emerged from the teacher-researcher reflections is that a prerequisite for having engaged and supportive parents, which, as noted several times in this analysis, is one of the key factors to successful learning, is having *well-informed parents*. Hence, the teacher-researcher suggested that “a basic outline of what parents should be looking for and types of questions to ask when their child is playing would be greatly beneficial to incorporate in virtual learning. [The teacher-researcher and FDK team] did provide a very basic understanding of prompts and questions that parents can ask when their child is playing or in ordinary situations or occasions” (Teacher-researcher).

In the reflections, the teacher-researcher discussed several other factors that involved specific pedagogical approaches and practices, such as teaching through *small groups*, using *play-based activities* to reinforce learning concepts, *providing socialization opportunities* and having *individual meetings with students*.

Besides, the teacher-researcher stated specific qualities or attributes that educators require, such as having a *clear understanding of the benefits and importance of technology* and

having *skills in virtual teaching*. These two sub-themes are explained in the following two abstracts, respectively:

“As a virtual teacher for the last 3 months, it is more evident than ever the importance for educators to understand how important a technology integration framework is needed.

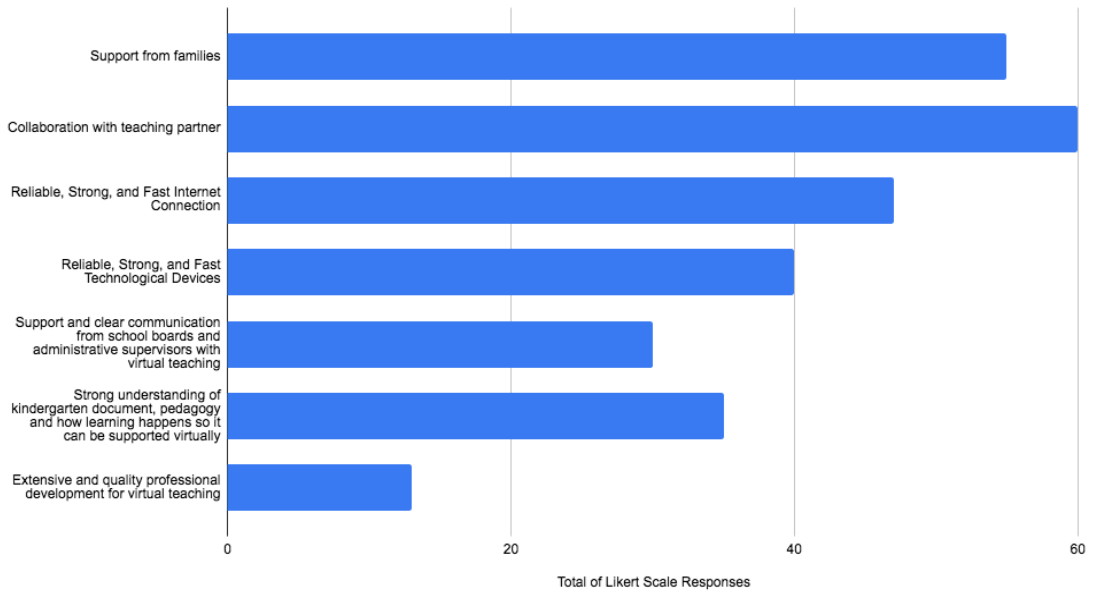
Technology, pedagogical content and knowledge are an integral part for educators to incorporate technology appropriately with meaning and purpose.” (Teacher-researcher)

“The whole underlying teaching experience is predicated on the quality, utility and consistency of technology in an educator’s pedagogical ability.” (Teacher-researcher)

**Ranking Question.** The ranking question (see Figure 7) demonstrates what educators rank-ordered from most important to least important of what they require to teach virtual kindergarten. From most important to least important they ranked the following as 1) **Collaboration with teaching partner**; 2) **Support from families**; 3) **Strong, reliable, and fast internet connection**; 4) **Strong, reliable, and fast technological devices**; 5) **Strong understanding of kindergarten document, pedagogy and how learning happens so it can be supported virtually**; 6) **Support and clear communication from school boards and administrative supervisors with virtual teaching** (i.e., providing resources, technological devices and appropriate streamlined teaching platforms, etc.); and 7) **Extensive and quality professional development for virtual teaching**.

## Figure 6

*Ranking Question*



*Note:* This figure demonstrates from the ranking question what educators ranked from most important to least important that they require to teach kindergarten virtually.

**5.5 Summary**

This chapter summarized educators’ attitudes and beliefs towards digital screen-based technologies and digital resources, the different types of digital screen-based technological tools or resources are FDK educators currently implementing and how are they used to document play-based learning virtually, the themes that emerged from the benefits and challenges of teaching and learning, and what do educators need to effectively integrate technology into their virtual pedagogical practices in virtual kindergarten classrooms.



## Chapter 6

### Discussion & Implications

#### 6.1 Introduction

The intention of the present study was to explore the experiences of kindergarten educators (i.e., OCTs and RECEs) teaching in virtual kindergarten classrooms in order to provide educators, school boards, and government stakeholders on what is required to provide purposeful, meaningful, efficient and effective learning for kindergarten students and support our virtual FDK educators. The discussion in the following section is organized according to the three research questions: 1) What are the attitudes and beliefs towards digital screen-based technologies and digital resources; and the benefits and challenges of teaching and learning in virtual kindergarten classrooms? 2) What digital screen-based technological tools or resources are FDK educators currently implementing, and how are they used to document play-based learning virtually? 3) What do educators need to effectively integrate technology into their virtual pedagogical practices? The subsections below will discuss the main findings.

#### **6.2 Attitudes and beliefs towards digital screen-based technologies and digital resources; and the benefits and challenges of teaching and learning in virtual kindergarten classrooms**

The results from this study revealed that attitudes, beliefs and experiences towards virtual learning, digital technologies and digital resources varied. This result aligns with some prior research that reported a wide discrepancy in the attitudes and beliefs educators behold towards the incorporation of technology in kindergarten and early childhood settings (Magen-Nagar & Firstater, 2019, Preradović et al., 2017). These attitudes and beliefs continue out of the physical classroom and into virtual remote learning. As this study suggests that our educators generally demonstrate a positive attitude towards technology in kindergarten or early childhood education as demonstrated in other countries such as Australia, Belgium, Chile, China, Greece, Israel,

Malaysia, Portugal, Singapore, Slovakia, Sweden, Turkey, and the United Kingdom (Konca et al., 2016; Preradovic et al., 2017).

In early childhood education, as the founder of Reggio Emilia's educational approach, Loris Malaguzzi (1994) identified four important aspects in early childhood education, which involve the overall health of the child, relationships between educator and student, child-to-child learning, and especially the environment. Specifically, the learning environment is often referred to as the "third teacher" (Biermeier, 2015; Callaghan, 2013). However, with technology ever more present in the classroom and the necessity in remote learning, technology can be considered the 'fourth teacher' that influences and impacts a child's growth and learning. From the educator interviews and teacher-researcher reflective notes from this study, the impact technology has on student learning and engagement (i.e., greater individual attention from educators, more opportunities for parental involvement, greater efficiency) is evident. Educators were adamant and agreed that if technological devices and resources were used in brick-and-mortar classrooms, especially now in virtual classrooms, they need to be used appropriately in a meaningful and purposeful manner. With the pandemic forcing many school boards to adapt and provide remote learning, educators needed to become creative and adapt to teaching by making the most of the available technological resources and harmonizing the learning opportunities with a continuum play-based approach (see Figure 1). Therefore, it is essential for educators to carefully blend the role of technology in an evidence-based practice without diminishing the other important skills learned in kindergarten (Galloway, 2008; Kim, 2019a; Magen-Nagar & Firstater, 2019; Schriever, 2018).

Further, the educators in the study acknowledged the benefits of virtual learning and teaching for educators and students. The benefits for students included being in the comfort of their own home, convenient and efficient, better for students with anxiety, more opportunities for

parental involvement, individual attention from educators, and a less distracting environment. Providing students or, more likely families, with the opportunity to choose which mode of learning best suits their child could give this cohort specific benefits mentioned above. In addition, the educators indicated more time for individual attention during 1-to-1 meetings with an educator. This time could be used to improve on certain skills and build relationships with students. Finally, research in differentiated instruction has highlighted the positive impact of pedagogical practice on improving student performance with virtual learning (Mavidou & Kakana, 2019).

Besides student well-being, occupation well-being, particularly educators, is another aspect that needs to be addressed and supported (von der Embse & Mankin, 2021). The benefits for educators teaching virtually were convenient and efficient, good for mental health and a sense of safety, good for work-life balance, and ease to communicate to individual children and parents. As mentioned previously about giving students and families choice in the mode of learning that best suits their needs, educators may also benefit from the aforementioned benefits of teaching virtually.

Also, themes of challenges and concerns did emerge with virtual teaching and learning for both educators and students. These themes included technological failures and limitations, lack of parental involvement and support, some timetables could be too intense for virtual learning and parents disrupting the teaching. Educators stated that virtual learning might not suit all learners and that screen time should be monitored, as the pandemic has exacerbated screen time use (Seguin et al., 2021). With excessive screen time and technologies utilized in the classroom, it becomes difficult to harmonize the purposeful incorporation of digital technologies or digital resources. Many educators expressed the same concerns of implementing technological

devices and digital tools or resources as previous research, such as pedagogical issues, didactic issues, and developmental appropriateness (Magen-Nagar & Firstater, 2019).

### **6.3 The digital screen-based technological tools or resources currently implemented by FDK educators and their utilization to document play-based learning virtually**

With previous research literature, many government agencies and organizations (e.g., ‘The Kindergarten Program,’ Ontario Ministry of Education, 2016b) were outdated with what physical devices and digital resources are currently utilized in FDK classrooms, particularly now with the emergence of virtual teaching. This study provided all stakeholders with a preliminary update of current digital screen-based technological devices and digital resources used in FDK classrooms and how educators used them to document play-based learning, particularly in the virtual milieu. Future research should consider the effectiveness of digital screen-based devices and software to increase academic achievement. Moreover, researchers and health professionals need to consider the ramification of excessive screen time and its effect on gross motor skills, fine motor skills, self-regulation skills, specific neuro-level anatomy, brain development, and overall healthy development of the child (Canadian Paediatric Society, 2017).

With learning not occurring in the confines of a classroom and occurring in students’ homes, educators relied on parents to submit evidence of learning through their school board’s approved software platform (i.e., D2L, Google Classroom or Google Drive). Previously within the classrooms, educators would use an assortment of pedagogical documentation approaches (whether paper or pencil or with the use of technology) to document, assess, and report kindergarten students’ growth and learning (Kim, 2019b; Ontario Ministry of Education, 2016a, 2016b). These approaches would include anecdotal observations, anecdotal written notes, checklists, assessments, student artifacts, photos, videos (DeLuca et al., 2020).

In the current study, educators incorporated all of these approaches and added formal and informal assessments, audio recordings of students by educators or from students via submissions, and quotes from either students' responses or students shared their learning during synchronous blocks as other options specifically to virtual kindergarten. As highlighted by DeLuca and colleagues (2020), this study also shows that there is a "lack of systematic documentation of assessment" (p. 474). Educators require a systematic way to document, store, and access student growth and learning to make learning visible to all stakeholders (i.e., students, parents, educators, school boards) (Kim, 2021a). Therefore, steps need to be taken to ameliorate educators' ability to systematically document learning or provide software applications to ease the documentation burden.

#### **6.4 Technology integration into virtual pedagogical practices**

The start of the 2020 to 2021 school year proved to be a pivotal movement for educators and school boards as they were required to create virtual classrooms and for those in-person to pivot multiple times throughout the year due to the pandemic. Educators in this study discussed the different adjustments, approaches, strategies, abilities, and resources educators require to teach and effectively integrate technology into their virtual pedagogical practices.

Educators noted that if virtual classrooms exist in the future, educators would require additional quality training and professional development workshops, especially for more veteran educators or educators that lack technological skills. Typically, veteran educators are less acquiescent to introduce and learn technological schools due to availability or number of devices and software, ability or competency of educators, quality of the equipment, and absence of guidance at the board or policy support, which can all amalgamate into stress (Al-Fudail & Mellar, 2008; Dever & Falconer, 2008; Kim, 2019b, 2021b). Many veteran educators in our

study regularly stated that it was a very stressful time working as a remote educator, however, they learned an exorbitant amount during that period about technological devices and resources and in regards to their pedagogical practice. Andrew Huberman discusses on his podcast, website, and on YouTube how learning occurs and how educators (e.g., incremental learning - short intervals of focused learning for smaller bits of information and errors stacked over time) and students (e.g., neuroplasticity super protocol, inter-practice rest - taking short random breaks throughout the learning) can optimize their learning (Buch et al., 2021; Logitech, 2021; Huberman, 2021a, 2021b). From these findings, FDK stakeholders can provide educators with an appropriate time to prepare, quality technological devices and extensive training. As a result, educators will receive physical and emotional support, a reduction in stress, increased virtual engagement of students, and increased learning for their students and themselves.

## **6. 5 Contributions and Recommendations for Practice and Policy**

With the possible threat of future global pandemics and the possible necessity to mandate schools to transition to temporary virtual remote learning or future full-time modes of virtual learning, this study suggests the following recommendations based on the findings (i.e., the experiences of the 11 educators and the teacher-researcher) and current research about virtual teaching and learning for educators, school boards, policymakers, and parents.

### ***Educators***

Educators, you have the most arduous task of all. Providing an exceptional educational experience for your students without you physically there will be challenging. Here are a few recommendations from educators, a teacher-researcher, and current research that can benefit you in the future if you teach virtually or transition to temporary remote learning. 1) **Harness your inner creativity and adaptability in teaching.** Make the most of what you have, keep it simple, and adapt lessons flexibly to emulate in-person classrooms to ensure growth and learning in your

students. 2) **Collaboration with your teaching partner.** Teachers and Registered Early Childhood Educators must create an honest, transparent, and cohesive relationship to provide the best educational experience for their students. 3) **Create a structured timetable that incorporates whole groups, small groups, 1-on-1 meetings, and breaks with dance, music, and movements embedded into the learning.** Providing students with a structured timetable with different group settings and embedding dance, music, and movement into your synchronous teaching will provide students with a safe expected routine, engagement, accountability and mitigate the sedentary aspect of virtual learning (Thornburg et al., 2021, pp. 97-98). 4) **Harmonize play-based learning activities with technological digital devices and digital resources with evidence-based practices.** Educators find harmony with play-based learning and technology with the continuum for play-based learning (see Figure 1) (Thornburg et al., 2021). 5) **Provide students with an agency in their learning through children's interest and inquiry.** As always, incorporate students' interest in the learning by asking them what they want to learn about and incorporate it into the learning.

### ***School boards and Policymakers***

Educators have identified that the localized success of virtual classrooms heavily relies on the support and collaborations between teachers, early childhood educators, and parents. However, as identified in the findings, school boards and policymakers fell short to provide educators with the quality tools and training to execute teaching in kindergarten virtual classroom. Educators require quality internet connection, quality technological devices, digital resources, and quality professional training or workshops. With your support, it will mitigate the overall stressful experience of virtual teaching.

### ***Parents***

Parents, what we require from you as educators is your support. We need your support with submitting evidence of learning, having your child ready with all the carefully thought out necessities your educators ask, monitoring your child's attentiveness, refraining from interjecting in the lesson or prompting your child with the answer, providing encouragement or consequences, and most importantly, be a part of the learning journey. Remember, education begins and continues at home; not at school.

## **6.6 Conclusion**

Virtual learning is not a one size fits all educational experience. As the American economist Thomas Sowell says, "There are no solutions, there are only trade-offs; and you try to get the best trade-off you can get, that's all you can hope for." To put it differently in an educational context, all modes of learning complete the task, but in different ways and with benefits, challenges and drawbacks. For example, education in brick and mortar schools provide students with all the benefits of in-person learning (e.g., community, more hands-on learning, greater socialization, more physical activity), but are not dynamic enough for real-time responses, such as a pandemic. In contrast, remote learning can provide practical benefits (e.g., greater individual attention, more opportunities for parental involvement, greater efficiency), but lack certain aspects of in-person learning. Thus, educators, parents, and FDK stakeholders must rigorously weigh the advantages and disadvantages of each mode of learning in the context of their specific situations, objectives, desired goals, and most importantly, if it is best suited for the child.

## **6.7 Limitations of the Study**

There were a few limitations to this study. These limitations were due to the fact of the time frame of this master's program, the nature of the study, challenges from the global pandemic of COVID-19, and low participation due to educator burnout (Pressley, 2021; Robosa



et al., 2021). A qualitative case study was selected as a research method when an experimental design was not suited or feasible for this particular study. From the interviews and informal conversations with educators, many are burnt out from the pandemic and its consequences within their educational vocation. Therefore, this may have impacted the recruitment of participants in this study. Regarding the number of participants in the study, a greater number would have inferential statistics that could have been used and possibly produce greater objectivity and generalizability of experiences from educators in Ontario. The findings from this study in conjunction with other current research are more practical recommendations for virtual kindergarten educators, parents, school boards, and policymakers rather than theoretical recommendations. Future research studies need to be completed to extend the generalizability to state, country, and international levels.

### **6.8 Recommendations for Future Research**

Future research should look into the effectiveness of digital resources, games and software that augment students' abilities to learn, retain, understand and make connections. These supplementary learning opportunities may benefit kindergarten students with extra opportunities to practise certain skills in kindergarten, such as literacy and mathematics behaviours (Flewitt et al., 2015). However, as previously mentioned, medical professionals, parents, educators, and researchers are concerned with the possible consequences of excessive screen time, despite students already receiving a staggering amount at home (Canadian Paediatric Society, 2017; Merga & Williams, 2016; Seguin et al., 2021). It is imperative that researchers look into the effects on children as research and monitoring trends are underway with health concerns from excessive screen time and social media (Domingues-Montanari, 2017; Twenge et al., 2019; Zhao et al., 2018).

As discussed previously, virtual learning may not be suitable for all learners. Therefore, future research should also look into which personality traits are more apt for virtual remote learning (i.e., HEXACO model or Big 5 model) (Ashton et al., 2004; Audet et al., 2021; Fariba, 2013). This type of research would provide both school boards and parents with information on whether their students or children would do well in virtual learning for their benefit.

## **6.9 Significance**

Virtual pedagogical practices can be purposeful, meaningful, efficient, and effective in virtual FDK classrooms with kindergarten educators who are proficient in their aptitude of the subject content, competent in their use of technology, and skillful in enacting teaching methods to meet educational goals expectations. In order to achieve a broader understanding of the pedagogical practices of kindergarten educators through digital technologies on FDK students, it is imperative to examine as a whole and individually, all current technological tools and digital resources utilized to augment learning and competencies in virtual FDK classrooms. Digital screen-based devices are beneficial tools and great extensions for both students and educators. With the intentions of digital resources to improve student learning in education, as educators, we must be cognizant of the overindulgence of digital screens for early years development and whether educators are implementing effective pedagogical practices through the use of virtual platforms. We need to understand how we can incorporate it safely with the support of evidence-based research in all subjects and, particularly in kindergarten, through a hands-on play-based philosophy. As digital resources and virtual learning become more prevalent in a new milieu of virtual classrooms and schools, it is vital to consider how kindergarten educators are incorporating kindergarten pedagogical practices, kindergarten curriculum content and their technological knowledge to teach early years students. These and future findings will make significant contributions to our understanding of ICT in kindergarten education. Also, this study

informs educators, parents, researchers, policymakers and other stakeholders in Ontario as to the benefits, challenges, and necessities of implementing ICT in virtual FDK classrooms.

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## Appendices

### Appendix A: Educator Interview Questions

#### Interview for Kindergarten Educators in Virtual Classrooms

**1. Please tell me about yourself.**

- a. Educator's biological sex:
- b. Age:
- c. Number of years of teaching:
- d. Teaching specializations:
- e. Number of students in the classroom:
- f. Number of support staff:
- g. What post-secondary degrees have they completed (e.g., undergraduate, masters, Ph.D):
- h. What division(s) are you qualified to teach:

**2. Approaches and Resources to Instruction**

**2.1 What are your attitudes and beliefs towards online learning, the use of digital technologies, and the use of technological resources?**

**2.2 Describe your experiences of teaching in a Virtual Kindergarten Classroom this year?**

- a. How long of synchronous instruction do students receive and how your class timetable structured?
- b. Are there advantages of teaching in a virtual classroom?
- c. Are there any challenges of teaching in a virtual kindergarten classroom?
- d. How do you deliver your lessons? (Ex. Google Classroom, MS Team, Zoom?)

- e. Are students and parents provided with access to digital resources for learning and how? (Ex. RAZ kids, Epic, Headsprout, Mathelitics, TVO mPower)

**2.3 Describe the approaches you use to teach? Explain why you use this approach.**

**2.4 What resources or technologies do you use to teach in your virtual classroom?**

- a) Is it a government document (The Kindergarten Program, Growing Success - Kindergarten Addendum, How Does Learning Happen?), personal purchase or a document/resource supported by the school board)?
- b) Through technology, what kind of teaching practice supports authentic activities?

**2.5 What strategies are you using to teach in the virtual classroom? (cross-curricular approaches, read aloud, small groups, inquiry, choice boards)**

- a) How have you adapted your instruction to accommodate teaching in a virtual classroom?

**2.6 How is the pedagogy used within your classroom to promote student growth and play-based learning?**

- a. Describe your experiences communicating with parents and students through an online learning platform.
- b. How is learning documented and who documents it? (who is responsible, students, educators, parents) (pictures, videos, audio, written descriptions, anecdotal notes)

**2.7 Describe any professional development, workshops or courses that are offered within your board or that you have taken related to virtual platforms or digital resources? (e.g., Google Classroom, MS Teams, Brightspace, VLE, Headsprout, Mathletics,).**

**a. What did you think of the professional development, workshops or courses?**

### **3. Reflection or Reflexive thinking**

**3.1 What challenges have you and or your team struggled with virtual teaching?**

**3.2 If you were to teach in an online virtual environment again, what would you do differently?**

**3.3 What would you recommend to educators if they were to teach FDK virtually next school year?**

Please let me know anything else you would like to add.

**Please order from most important to least important in virtual teaching in kindergarten?**

Reliable, Strong and Fast Internet Connection

Reliable, Strong and Fast Technological Devices (e.g., laptop)

Support from families - if families don't send anything we can't do anything.

Collaboration with teaching partner

Board Support with technology devices and resources

**What would you add?**

## Appendix B: Letter of Information



**Project Title:** A pilot study: Understanding the Lived Experiences of Teachers  
In a Technology-Enhanced Curriculum

**Principal Investigator:**

Mi Song Kim, Ph.D. Faculty of Education, University of Western Ontario

**Student Researchers:**

Lian Chang, M.A. Candidate, Curriculum Studies, Faculty of Education, University of Western Ontario

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**Letter of Information for Teachers/School Staff/Volunteer Teachers**

**1. Invitation to Participate**

You are being invited to participate in this pilot study that will explore the experiences of teachers or facilitators with technology-enhanced teaching and learning because you are engaged in technology-enhanced teaching and learning.

**2. Purpose of the Letter**

The purpose of this letter is to provide you with information required for you to make an informed decision regarding participation in this research.

**3. Purpose of this Study**

The purpose of this study is to explore the experiences of teachers/school staff or/and volunteer teachers with technology-enhanced teaching and learning. We will also examine what innovative and effective pedagogical practices are being used in technology enhanced learning environments and what beliefs, experiences, and practices inform teachers in curriculum preparation and implementation.

**4. Inclusion Criteria**

Individuals (teachers/other classroom staff or/and volunteer teachers) who implement technology-enhanced learning activities for promoting student learning are eligible to participate in this study. Your students are also eligible to participate in this study.



### **5. Exclusion Criteria**

Individuals who refuse to give informed consent shall be automatically excluded from research.

### **6. Study Procedures**

If you agree to participate, you will be asked to invite the research team to participate in technology-enhanced teaching and learning. The research team will assist you in preparing and delivering technology-enhanced activities in your classroom from March 29, 2021 to June 30, 2022.

- You will be asked to participate in an interview at the beginning and at the end of the study and may also be asked to complete a survey. The interview and survey questions will ask about your perceptions and attitudes about technology-enhanced curriculum, your role, the role of technologies, and your beliefs about teaching and learning. The interview will take about 15 minutes to 1 hour and will be audio-recorded and transcribed into written format.

The research team will observe in the classroom and take notes. If you agree video recordings will be taken of lessons. Care will be taken to only video record those students and staff who have agreed to participate in the study. If others are inadvertently recorded, their likenesses will be altered so that they cannot be identified.

- The research team will also collect your lesson plans and related documents in order to document your ideas and plans for designing a technology-enhanced curriculum.
- With the consent of parents, students will be asked to complete surveys at the beginning and the end of the study and copies of their work will be collected (with permission of the parents and students).
- Participants will have the opportunity to opt out of video recordings and the survey before, during, and after the study.

### **8. Possible Risks and Harms**

There are no known or anticipated risks or discomforts associated with participating in this study.

### **9. Compensation**

You will not be compensated for your participation in this research.



#### **10. Voluntary Participation**

All participants must provide informed consent before participating in the study. Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on your future employment status.

#### **11. Confidentiality**

The research team will not use your name, the name of the school, the community name, or anything that would reveal the identities of participants in any presentations, or publications of the research.

All data collected will remain confidential and accessible only to the investigators of this study. If the results are published, your name will not be used. If you choose to withdraw from this study, your data will be removed and destroyed from our database.

#### **12. Contacts for Further Information**

If you require any further information regarding this research project or your participation in the study you may contact Mi Song Kim [REDACTED]

If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Research Ethics [REDACTED]

#### **13. Publication**

If the results of the study are published, your name will not be used. If you would like to receive a copy of any potential study results, please contact Mi Song Kim [REDACTED]

*This letter is yours to keep for future reference.*

## Appendix C: Consent Form



### Consent Form (Teachers/School Staff/Volunteer Teachers)

**Project Title:** A pilot study: Understanding the Lived Experiences of Teachers In a Technology Enhanced Curriculum

**Principal Investigator:**

Mi Song Kim, Ph.D. Faculty of Education, University of Western Ontario

**Student Researchers:**

Martin Wolak, M.A. Candidate, Curriculum Studies, Faculty of Education, University of Western Ontario

Lian Chang, M.A. Candidate, Curriculum Studies, Faculty of Education, University of Western Ontario

Fengchao Yu. Ph.D. Student, Curriculum Studies, Faculty of Education, University of Western Ontario

I have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

- |  | Yes                      | No                       |
|--|--------------------------|--------------------------|
| 1. I agree to participate in interviews/surveys related to teaching and learning during this research. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. I agree to video recordings during this research.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. I agree to provide resources and documents I use to teach literacy.                                 | <input type="checkbox"/> | <input type="checkbox"/> |

Participant's Name (please print): \_\_\_\_\_

Participant's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Person Obtaining Informed Consent (please print): \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## Ethical Approval



**Date:** 17 March 2021

**To:** Dr. Mi Song Kim

**Project ID:** 104799

**Study Title:** A pilot study: Understanding the Lived Experiences of Teachers In a Technology-Enhanced Curriculum

**Application Type:** NMREB Amendment Form

**Review Type:** Delegated

**Full Board Reporting Date:** April 9 2021

**Date Approval Issued:** 17/Mar/2021 20:28

**REB Approval Expiry Date:** 18/Feb/2022

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Dear Dr. Mi Song Kim,

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the amendment, as of the date noted above.

**Documents Approved:**

Document Name	Document Type	Document Date	Document Version
Changes to Letter of Information and Consent Form. Consent form for Parents_Students.CLEAN_March9_2021	Written Consent/Assent	09/Mar/2021	1
Changes to Letter of Information and Consent Form. Consent form for TeachersSchool StaffVolunteer Teachers.CLEAN_March92021	Written Consent/Assent	09/Mar/2021	1
Changes to Letter of Information and Consent Form. Letter of Information for Parents_Students.CLEAN_March9_2021	Written Consent/Assent	09/Mar/2021	1
Changes to Letter of Information and Consent Form.Letter of Information for TeachersSchool StaffVolunteer Teachers.CLEAN_March92021	Written Consent/Assent	09/Mar/2021	1

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Kelly Patterson, Research Ethics Officer on behalf of Dr. Randal Graham, NMREB Chair

**Note:** This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).



## Curriculum Vitae

**Name:** Martin Wolak

**Post-secondary Education and Degrees:** The University of Western Ontario  
London, Ontario, Canada  
2019-2022 M.A. in Curriculum Studies  
The University of Western Ontario  
London, Ontario, Canada  
2017-2019 B.Ed.  
The University of Western Ontario  
London, Ontario, Canada  
2012-2017 B.A.

**Honours and Awards:** Joan Pedersen Memorial Award  
2021  
AER Graduate Scholarship for Literacy Studies in Education  
2019

**Related Work** Teacher  
LDCSB  
2019 – present  
Polish Kindergarten Teacher  
Centre for Lifelong Learning, LDCSB  
2018 – present