

Exploring Teachers' Experiences of Teaching Online During the COVID-19 Pandemic:

A Mixed Methods Multi-Phase Study

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Abstract

This is a mixed methods multi-phase study that measured teachers' sense of efficacy for teaching online at the initial stages of the COVID-19 pandemic in the spring of 2020. As the pandemic persisted into the 2020-21 school year, the study was expanded to include a second phase that sought to understand teacher efficacy and experience of teaching online one year into the transition to emergency remote online teaching during the pandemic. The aim of this research was to better understand how to best support teachers as they adapted to online teaching and to use the data to build ongoing and professional learning support for effective online teaching. The study examined the impact of prior experience teaching online, experience teaching online during the pandemic, and access to online training on teacher self-efficacy as teachers adapted to online learning in the context of the pandemic. What became clear was that teaching remotely online under emergency measures is different from normal online teaching. The results of the study in the initial phase found correlations between teachers' sense of efficacy for teaching online with using a learning management system (LMS) before transitioning online. Having had online training and access to virtual tech support were also associated with a higher sense of efficacy. In the second phase, teachers' collaboration with colleagues to solve issues and learn affected teacher efficacy. The study also found that access to technical and pedagogical support resources impacted teachers' sense of efficacy and experience teaching online. One outcome of this study is support for the argument distinguishing between emergency remote teaching and learning and online teaching and learning. Further, the findings emerge from this study support recommendations for dedicated teacher professional development that addresses the challenges and opportunities of designing and implementing emergency remote teaching and learning environments.

Keywords: Teacher Self-efficacy, Professional Learning, Online Teaching, Pandemic

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CHAPTER ONE: INTRODUCTION

In the first wave of global spread of the novel coronavirus (COVID-19) in the spring of 2020, K-12 teachers and students, as well as post-secondary students and instructors, rapidly transitioned to fully online teaching and learning. With a return to classrooms in the fall of 2021 in many jurisdictions in Canada and internationally, school authorities offered several modes of teaching and learning. In Ontario, elementary schools offered virtual learning as well as in person learning. Ontario's secondary schools offered in person learning with hybrid learning as well as virtual schools. The hybrid model had students in cohorts, with one cohort learning in person and the other cohort learning from home online. The challenges, frustrations, successes, and failures experienced by teachers throughout these first two years of the pandemic provided an opportunity to better understand how to support novice online teachers as well as more experienced teachers as they transition to new approaches to teaching that include digital spaces and online environments. The transition to remote teaching during the pandemic was different than prior shifts to alternate modes of instruction and pedagogy (Barbour, 2022). The transition during the pandemic had the added challenge of navigating social and health concerns associated with the pandemic as well as the need for all teachers and students to rapidly learn new technology in an online context.

The Problem

Prior to the transition to emergency remote learning due to the COVID-19 pandemic in the spring of 2020, the Ontario Ministry of Education (Ontario Ministry of Education, 2020), through Ontario policy program memorandum (PPM) 164, had implemented a requirement of two eLearning course credits for the secondary school diploma. The initial transition to online teaching and learning due to the COVID-19 pandemic exposed several challenges and

shortcomings of online learning capabilities across the province and the country. These challenges and shortcomings related to the availability of educational technologies, robust and reliable IT bandwidths in rural and urban communities, students' access to appropriate technologies, parental capacities for supervision of students during online learning periods, and teachers' efficacy instructing in online environments. Teachers who transitioned to online teaching in the spring of 2020 reported a low sense of efficacy for online teaching in the context of the pandemic and the restrictions imposed by the Ontario government (Dolighan & Owen, 2021). These restrictions during the initial transition to online teaching and learning included constraints on assessments and grading that were designed to mitigate the impact of stress and anxiety on students, many of whom were new to online learning. Marshall et al. (2021) reported that teachers felt a loss of perceived control, professional autonomy, and the ability to hold students accountable, which impacted their sense of efficacy.

The return to face-to-face classrooms in the 2020-2021 school year, the second year of the COVID-19 pandemic, brought additional challenges for teachers and administrators professionally and personally. In Ontario, in person classrooms were divided into cohorts to reduce class sizes and follow social distancing protocols set by the Ontario Ministry of Health and Long-Term Care, the Ontario Ministry of Education, and school districts. Some school districts established virtual schools for secondary and elementary students. These schools were staffed with teachers who chose, for personal or health reasons, to teach virtually as well as teachers who were placed in these virtual school to meet school district staffing requirements. School boards also adopted hybrid learning models to meet the needs of students who had to quarantine or remain at home for personal or family reasons. As COVID-19 case numbers continued to rise during the 2020-2021 school year, all schools in Ontario once again pivoted to

fully emergency remote online teaching and learning (ERT&L) by the spring of 2021. The need for real-time and ongoing training and support for online teaching only increased.

The Ontario Ministry of Education distinguished between virtual online learning or remote learning and eLearning. The latter has been part of education in Ontario since the emergence of the internet in the late 1990s (Barbour & LaBonte, 2018). The Ontario Ministry of Education defined secondary school eLearning courses, also known as distance learning courses, as courses that are delivered entirely using the internet and do not require students to be physically present in the classroom (Ontario Ministry of Education, 2020). Such courses are delivered asynchronously and school services such as guidance, mental health, and well-being supports are intended to be accessed by students in person at their home school. As the pandemic began to take hold, the Ontario Ministry of Education introduced a requirement for secondary students to complete two credits of online secondary learning to be eligible for their Ontario secondary School Diploma (Ontario Ministry of Education, 2022). The challenge for schools and ministries in Ontario and elsewhere was to seize the opportunities that the rapid change and adaptation to online teaching and learning presented to better serve students and to support teachers in that task. One such opportunity is providing ongoing opportunities for professional learning for online teaching. I used the term professional learning as it pertains to teacher learning for online teaching that is active, collaborative, and ongoing. In contrast, professional development refers to teacher training that is traditionally passive, top down and a one size fits all approach. The aim of my study was to inform provincial and district school authorities as they provide customized PL and supports for teachers to teach effectively online. Furthermore, the benefits of planning and designing online learning opportunities can also enhance in class

learning using online technologies and online teaching strategies that align with 21st century learning and transferable skills (Ontario Ministry of Education, 2022).

The Purpose of This Research

The focus of my thesis was to better understand teachers' experience transitioning and adapting to teaching online during the pandemic and to transform such understanding to support teachers who teach in online environments. This research was unique at the outset in that it investigates teachers' perceived efficacy and experience transitioning to and teaching online in the context of the pandemic in a particular Catholic school board in the Greater Toronto Area. This study sought to better understand how to improve teacher efficacy and support teacher PL for designing and implementing effective online learning experiences for students. This research investigation incorporated a multi-phase and multi-method research design to better understand the impact of the response to the pandemic on teacher self-efficacy for teaching in online spaces in an emerging "new normal" (Barbour et al., 2020). As education in Ontario emerged from the emergency measures of the pandemic and as school leaders and teachers looked to the future of schooling, understanding the challenges faced by teachers adapting to online learning environments can help inform a way forward that seizes the opportunity and learning provided by the pandemic to improve online teaching and learning, and to consider how assessments of online teaching and learning, including emergency remote teaching and learning, can improve face-to-face instruction.

Method

This study employed a mixed-methods, multi-phase design, based on Creswell and Plano Clark (2017), to investigate teachers' sense of efficacy for designing online learning experiences

and teaching online during the unprecedented shift to online teaching and learning due to COVID-19 public health measures in Ontario. The study explored teachers' experience of teaching in online settings.

This study was conducted in two phases. The multi-phase design allowed for an examination of the ongoing challenges teachers experienced as the pandemic persisted, including how resources were initially needed to support the emergency transition to online teaching but then evolved as teachers adapted to multiple new modes of teaching and learning.

In Phase 1 of the research, the intention was to better understand how teachers perceived their efficacy for teaching online and engaging students during the initial transition to online schooling. The following research questions were developed:

1. How confident do secondary teachers feel preparing, conducting, and evaluating online courses?
2. Is there a difference in online teaching efficacy in relation to the variables:
 - (a) age,
 - (b) gender,
 - (c) number of years of face-to-face teaching experience, and
 - (d) number of years of online teaching experience?
3. In what ways does experience with online teaching, completing an online Additional Qualifications course (AQ), taking professional development, and perceived support from experts or instructional designers influence teachers' reported self-efficacy for online teaching?

The second phase of this study sought to measure and understand teachers' sense of efficacy one year into the transition to ERT&L during the COVID-19 pandemic. Specifically, in

Phase 2, I investigated the relationships between prior experience teaching online and self-efficacy and also between access to online training and self-efficacy amongst teachers as they adapted to online learning in the context of the pandemic. In addition, I investigated the relationship between teacher self-efficacy and collaborating with colleagues to solve issues and learn new technology. Finally, the second phase of the study investigated the impact of access to technical and pedagogical support from technical support teams (e.g., tech support, instructional designers) on teachers' self-efficacy. During Phase 2 of the study, the following research questions were asked:

1. How confident do teachers feel preparing, conducting, and evaluating online courses?
2. Is there a difference in online teaching self-efficacy one year into the pandemic compared to the initial transition?
3. In what ways do teaching assignments, the choice to teach virtual or face-to-face, and willingness to continue teaching online impact teacher self-efficacy?
4. In what ways does experience with online teaching, collaborating with colleagues, and training, resources, and support from the school board influence teacher-reported self-efficacy for online teaching?

Definitions

It is important that I provide clarity of terms used in this dissertation. During the pandemic, for example, terms such as online learning, emergency remote teaching, hybrid learning, and hyflex teaching were used interchangeably by administrators, teachers, and students. However, for this dissertation and drawing on the scholarly literature, these and other terms often have precise meanings. These terms are defined below.

In-person learning is the traditional model of learning where students are enrolled in a

brick-and-mortar school and engage in their learning with teachers located at their school in a typical classroom setting (Nagle et al., 2021).

Online learning is teacher-led education that takes place over the Internet, with the teacher and student separated geographically, using a web-based educational delivery system that includes software to provide a structured learning environment. It may be synchronous (communication in which participants interact in real time, such as online video) or asynchronous (communication separated by time, such as email or online discussion forums). It may be accessed from multiple settings (in school and/or out of school buildings).

Supplemental online programs provide a small number of courses to students who are enrolled in a school separate from the online program (, 2015).

Fully online schools, also called cyberschools, work with students who are enrolled primarily (often only) in the online school. Cyberschools typically are responsible for their students' scores on state assessments. In some American states, most full-time online schools are charter schools. In several studies, virtual learning has been used to reflect the movement to emergency remote learning and remote learning during the pandemic (Marshall et al., 2022; Neiss & Gillow-Wiles, 2021). Virtual schools are fully online modes of learning where students are enrolled in the online school and teachers dedicated to that school are responsible for instruction, assessments, and grades.

Blended learning is a formal education program in which students learn, in part, through online delivery of content and instruction with some element of student control over time, place, path, and pace. In blended learning environments, students also are supervised at a brick-and-mortar location away from home (Barbour, 2015).

Hybrid learning was a model where one group of students, or a cohort, learned in-person in their classroom some of the time while another group of students were learning at home, both instructed by the same classroom-based teacher. The two cohort groups alternate between in-person and at-home learning (Nagle et al., 2021).

Emergency Remote Teaching “involves the use of fully remote teaching solutions for instruction or education that would otherwise be delivered primarily face-to-face and that will return to that format once the crisis or emergency has abated. The primary objective in these circumstances is not to re-create a robust educational ecosystem but rather to provide temporary access to instruction and instructional supports in a manner that is quick to set up and is reliably available during an emergency or crisis” (Barbour et al., 2020, p.6).

Remote teaching is described as true contingency planning for remote or distance delivery of instruction based on the realities of the pandemic at a given point in time. In contrast to ERT, the distance delivery of instruction includes planning and strategies to ensure instructional continuity (Nagle et al., 2021).

Teacher self-efficacy refers to “the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context” (Tschannen-Moran et al., 1998, p. 233). In this study, teacher self-efficacy was examined as one’s belief of competency with regards to the process of teaching, instruction, classroom management, student engagement, and use of computers and technology. For teachers, self-perception of teaching competence and beliefs about the task requirements in a particular teaching context contribute to teacher efficacy (Tschannen-Moran et al., 1998).

Additional Qualification (AQ) courses are courses accredited by the Ontario College of Teachers (OCT) that qualified teachers can take to upgrade their knowledge and skills and gain qualifications in a certain teaching division or subject.

Professional Learning (PL) refers to ongoing learning about teaching content knowledge, pedagogy, and processes that lead to effective practice. PL is active, collaborative and supports a constructivist understanding of learning (Scherff, 2018).

Professional Development (PD) refers to teacher training that is passive, “happens to” teachers, is often associated with one-time workshops, seminars, or lectures, and is typically a one-size-fits all approach” (Scherff, 2018, paragraph 2)

Assumptions and Limitations

This study sought to better understand the process and learning that teachers who are new to online teaching go through to help those developing effective training and targeted supports. The unique context of the pandemic posed several research challenges that affected access to teaching staff and influenced the timing of the data collection. In my data collection, I assumed that the sample of teaching staff in both phases of the study was representative of the teacher population in the school board. Access to teachers was limited by health protocols. The personal stress and anxiety that teachers experienced may have had an impact on how many teachers responded to the survey, especially in Phase 2, where 265 out of 1631 teachers (16.25%) employed at the board responded.

In this study, COVID-19 provided an opportunity to study online teaching in the context of a pandemic. In 2003, the severe acute respiratory syndrome (SARS) outbreak closed four schools in Canada’s largest jurisdiction – the Toronto District School Board. The school board did not implement full scale virtual learning but did put material online to supplement student

learning (Barbour, 2022). Previous to SARS, the polio pandemic of the 1950s and the flu pandemic of 1919 also closed schools (Mlynaryk & Makovac, 2020). Unfortunately, despite experience with school closures and the need for continuity of learning, the lessons learned and documented were not heeded and Canada was unprepared for the March 2020 COVID-19 pandemic (Barbour, 2022). The opportunity to expand understanding of how teachers transitioned to online teaching also extended to understanding the impacts of restrictions to the learning environment and parameters to teaching and assessing students that do not exist in a non-pandemic context. Although there is extensive research that links teacher efficacy to student achievement (Armor, 1976; Bruce et al., 2010; Ross et al., 2006) and higher levels of student engagement (Good & Brophy, 2003; Martin et al., 2012), it was unknown what impact the pandemic has had on teachers' perceived self-efficacy for teaching, especially in the uncharted context of ERT&L. The research for teachers' self-efficacy for online teaching is not as extensive as teacher self-efficacy for classroom setting, especially in the K-12 context (Martin et al., 2021). While there is emerging research on teachers' experience during the pandemic, at the time this study was initiated, other Canadian and international researchers had just begun to try to understand the impact of the pandemic and teachers' experience and efficacy for teaching online in the pandemic context. In my case, I also recognized the difference between normal online teaching and the ERT&L that teachers were engaged in during the pandemic (Hodges et al., 2020).

All data were collected during the first two years of the COVID-19 pandemic. Analysis of the data was in a bounded context of the population studied and statistical comparison to efficacy scores from previous studies was impossible. Even within this study, the population was expanded in Phase 2 and the design was anonymous so any comparative analysis between self-

efficacy scores is not possible. A longitudinal design using the same participants in both phases would have been necessary for statistical comparison. I made the decision to have teacher anonymity to encourage participation and ease teachers' concern for potential reprisal from their employer for any negative responses.

Another limitation is the nature of self-reporting of efficacy that can be affected by self-promotion or social desirability. Self-reported efficacy is a perceived competence in one's ability to complete a task successfully and not an actual measure of competence or performance. The voluntary and anonymous component of the questionnaires was designed to mitigate some of these limitations as well as protect the participants.

The initial response to the pandemic in the spring of 2020, with the sudden transition to online teaching and learning, also influenced the research design and implementation. The research design was modified and the timeline for acquisition of research approval from both the university and the school board were accelerated due to the sudden and fluid response to the pandemic by the Ontario government and school boards across the province. In this case, the timing of the initial survey depended on receiving research ethics clearance (Appendix D) and took into consideration teachers' levels of stress and lack of time to complete a survey. At the same time, the intention was to investigate the perceived self-efficacy level of secondary teachers as they transitioned to online teaching in the initial stages of the pandemic. Although the response of secondary teachers in the first phase was 31%, as the population was expanded for Phase 2 one year later to include both secondary and elementary school teachers in one school board, the rate of response was much lower at 16.25%. While the number of secondary panel respondents remained almost the same ($n = 130$), the number of elementary panel respondents was $n = 135$ or 11% of the elementary teachers invited to participate. Further research into

differences in workload or familiarity with technology between secondary and elementary teachers or other unknown factors related to the pandemic could account for the difference in response rate.

In the context of the pandemic, teachers who were teaching face-to-face before the pandemic had to transition to an online setting with little to no experience or training for online teaching. After examining various teacher self-efficacy measures, the decision to adapt the Michigan Nurse Educators Sense of Efficacy for Online Teaching (MNESEOT) survey to reflect K-12 teachers' experience was made and several questions were changed to customize the survey to the K-12 environment. (See Appendices A and B). Although the instrument used is reflective of important traditional tasks that teachers must master and is general enough to still apply to the teaching context today, the way technology is used and reflected in the subscale *use of computers* may warrant revisiting to reflect current online design and online learning strategies more accurately (Blayone et al., 2017; Garrison, 2017).

Dissertation Outline:

In this chapter, I provided a summary of the research project's inception, importance, and methodology. In Chapter 2, I provided an analysis of existing research literature on K-12 online teaching and learning and the research on education's response to the global pandemic. Chapter 3 provided the methodology and research design for the multiphase mixed methods study. Chapter 4 detailed the quantitative results and analysis of the data in Phase 1 and Phase 2. Chapter 5 reported the qualitative findings and analysis of the data from Phase 2 of the study. In Chapter 6, I provided recommendations on how to support teachers who are new to online teaching and learning as well as supports for teachers' ongoing professional learning for teaching in online and blended learning contexts.

CHAPTER TWO: LITERATURE REVIEW

The purpose of this literature review is to bring together relevant research that examined teachers' ability to effectively design and implement online learning for K-12 students and provide a framework based on the literature of teacher efficacy for online teaching. This research study was done in the context of the pandemic and the impact pandemic restrictions had on the transition to online teaching and the continuing professional learning (PL) for teaching and designing online learning. The main question of interest was how to best support teachers in this transition with ongoing professional learning for teaching online.

Understanding teachers' online teaching self-efficacy beliefs are useful to develop support and resources to best meet online teaching development needs. Hence, analyzing troublesome knowledge and barriers to learning to teaching online encountered by teachers can provide insight into their self-perceptions of and confidence levels about how well they understand online education and perceive their own practical skills and learning needs (Northcote et al., 2015). Research suggested that teacher anxiety about online teaching could result from the negative impact that barriers, such as a perceived lack of knowledge and lack of practical and technical skills, have on self-efficacy (Shepherd et al., 2007). The added stress of continually changing teaching contexts and coping with the stress produced by the pandemic also affects teachers' confidence and self-efficacy for teaching online (Panisoara et al., 2020). My study considered what skills and resources teachers identified as needed for effective online teaching. I employed a constructivist approach as a philosophical standpoint to provide a framework for examining how some teachers were able to effectively transition to online teaching in the difficult circumstances of a global pandemic. This literature review explored relevant literature on teachers' efficacy for teaching online and how to best support teachers who

faced challenges and barriers to online teaching, as well as successful practices adopted by teachers as they learned to teach in online contexts during the pandemic.

Theoretical Positioning of the Research

Social constructivism is a theoretical framework that provides a philosophical standpoint to examine teachers' beliefs about teaching and learning that address the individual perceptions and beliefs about reality and learning. The theoretical framework proposed by Garrison (2016) described a "collaborative constructivist" perspective that recognizes the relationship between the social environment and personal meaning making, and that "collaboration and constructivism correspond respectively to the teaching and learning responsibilities of an educational experience" (p. 9). Garrison attributed the work of John Dewey, an influential early 20th century educational thinker, to the philosophical perspective in that meaning is constructed through iteratively sharing thoughts and ideas (Garrison, 2016). Dewey described educational experiences as a "transaction taking place between an individual and what, at the time, constitutes his [sic] environment..." (Dewey, 1938, as cited in Garrison, 2017, p. 10) Garrison also incorporates the contribution of Lev Vygotsky (1978) who saw high level cognitive function as happening through interactions from which the individual constructs personal meaning. Learning activities needed to be rooted in experiment, inquiry, creativity, and critical thinking so that as meaning is constructed by the learner, deeper rather than surface learning occurs. Vygotsky (1978) emphasized the importance of the learning environment and the learner's interaction with it. For Vygotsky, artifacts were seen as transforming mental functioning in fundamental ways. According to Cole and Wertsch, Vygotsky (1981, as cited in Cole & Wertsch, 1996) argued that,

[t]he inclusion of a tool in the process of behavior (a) introduces several new functions connected with the use of the given tool and with its control.(b) abolishes and makes unnecessary several natural processes, whose work is accomplished by the tool.(c) alters the course and individual features (the intensity, duration, sequence, etc.) of all the mental processes that enter into the composition of the instrumental act, replacing some functions with others (i.e., it re-creates the whole structure of labor operations) (p. 252).

During the pandemic, the tools in the case of teacher PL were the digital tools that are required for the learning to take place in the online context. The digital space recreated and mediated social interactions that are part of the learning process.

In terms of teachers' PL, the use of technological tools in online learning, social constructivism provides a useful framework for this study. If learning is not passive or done in isolation but includes a social aspect, teacher professional learning should be examined with the view that learning is a constructivist and socially and culturally situated process (Bandura, 1989). Garrison (2017) argued that we never learn in isolation and that we cannot avoid being influenced by our environment. In his social cognitive theory, Bandura (1977) distinguished between self-efficacy and locus of control. Bandura (1977) describes self-efficacy as an individual's perception of their ability to achieve a particular outcome. According to Bandura (1977), perceived self-efficacy is "a judgment of one's capability to accomplish a given level of performance, whereas outcome expectation is a judgment of the likely consequences such behavior will produce" (p. 391). Bandura (1993) asserted, "teachers' beliefs in their personal efficacy to motivate and promote learning affects the types of learning environments they create and the level of academic achievement their students achieve" (p. 117). Teacher self-efficacy is a construct that represents confidence in one's ability to facilitate learning in students through the

development of students' knowledge, abilities, and values and the dynamic interaction of the person, environment, and behavior (Bandura, 1989). Self-efficacy beliefs are correlated with the effort people are willing to expend to attain a goal and how persistent they are in the face of adversity and in their recovery from setbacks (Bandura, 1986, 1993). The pandemic provided numerous setbacks and adversity that was an interesting context to investigate teacher self-efficacy as they transitioned to online teaching and learning contexts.

Appropriate digital tools can be effective tools for learning specific content. Salomon and Perkins (1998) suggest that tools play dual roles as devices *for* learning as well as devices *of* learning. For example, the authors point out how a smartphone is used as a tool to communicate and how its use must be learned. They examined the effects of tools on the learner in a particular task and found that as the learner uses and becomes familiar with a particular tool, the cognitive load for the task is redistributed between the learner and the device (Perkins, 1993), and the capacity of the tool is expanded. As teachers integrate and use technology for learning, they learn to use various instructional tools. In a systematic review of studies that examined teachers' pedagogical beliefs and their use of technology for learning, Tondeur et al. (2012) revealed that learning experiences with technology have the potential to change teachers' beliefs towards more student-centered, constructivist beliefs. Similarly, teachers with constructivist beliefs are more likely to use technology in student-centered ways. Tondeur and colleagues' review showed teachers' pedagogical beliefs that were more teacher-centered or traditional hindered or prevented effective technology integration. It is worth noting that this is consistent with other findings (Donnelly et al., 2011; Ertmer et al., 2015) that suggested constructivist beliefs lead to the use of technology that supports 21st century learning, and transferable skills and beliefs lead to action that reaffirms beliefs. Researchers have demonstrated that teacher efficacy and self-

efficacy is reflective of teachers' beliefs regarding teaching and learning (Park & Ertmer, 2008). In an online teacher learning context, the digital space that is used in a collaborative learning experience can also be *for* and *of* learning when specific technologies are chosen as part of the learning process (Blayone et al., 2017). The professional learning for online teaching that takes place as collaborative inquiry supports a social-constructivist model of learning that challenges traditional content driven and siloed online learning experiences (Blayone et al., 2017; Garrison, 2017)

Bandura's (1986, 1997) social cognitive theory provides a basis for understanding how teachers can learn through interactions and experience in a particular social context. Northcote et al. (2015) connected Bandura's contextually appropriate social experiential learning with the tension of cognitive dissonance that teachers might face when they transition from face-to-face to online teaching. Bandura (1997) emphasizes that individuals are agents of their own change. Pintrich et al. (1993) described how efficacy beliefs played a role in mediating conceptual change, which suggests teachers can change their beliefs about online learning versus face-to-face learning by building self-efficacy through experience and appropriate professional learning opportunities. The online learning context and pedagogy are sufficiently different from face-to-face learning and warrant a distinct examination of the relationship between teacher self-efficacy and student success in the online context (Corry & Stella, 2018). Novice online teachers often face barriers to developing the skills they need to be effective online teachers. Northcote and her colleagues conducted a multiphase study with teaching faculty in an Australian university who were transitioning to online teaching. Northcote et al. (2011) connected novice teachers' sense of efficacy with the barriers and challenges they faced as they learned how to teach in online settings. The study examined the use of threshold concepts, introduced by Meyer and Land

(2003), and how self-efficacy for online teaching can be improved by identifying and addressing troublesome knowledge that teachers encounter as they develop online pedagogical and technological skills. As teachers engage in learning about how to teach online, they encounter barriers and troublesome knowledge that act as thresholds for learning and building knowledge and skills for online teaching (Kilgour et al., 2019; Northcote et al., 2015).

Teacher Self-Efficacy and Teaching Online

Teacher efficacy has been studied extensively (Armor et al., 1976; Berman et al., 1977; Tschannen-Moran et al., 1998). Teaching self-efficacy is a construct that represents teachers' confidence in their ability to facilitate learning in students (Bandura, 1989). Self-efficacy beliefs, (as noted in Chapter 1) are correlated with the effort people are willing to expend to attain a goal and how persistent they are in the face of adversity and recover from setbacks (Bandura, 1986, 1993). Previous studies have found teacher self-efficacy is negatively associated with teacher burnout and positively associated with commitment to teaching (Pas et al, 2012; Skaalvik & Skaalvik, 2007; Sokal et al., 2020a; Zee & Koomen, 2016). Teachers with higher self-efficacy are more likely to try new teaching methods and are more persistent in the face of challenges (Pressley et al., 2018). Additionally, previous research has found teacher self-efficacy impacts student outcomes and instructional quality (Klassen et al., 2010). Teachers with higher self-efficacy are more likely to build relationships with students thus increasing student engagement (Good & Brophy, 2003; Martin et al, 2012; Tschannen-Moran et al., 1998).

Studying teachers' perceived efficacy for online teaching, Corry and Stella (2018) conducted a systematic review of the literature on teacher self-efficacy in online education. The authors found that researchers have examined the balance of technological and pedagogical knowledge that supports the development of teacher self-efficacy, the role of learner self-

efficacy, and whether teacher self-efficacy differs fundamentally in online education. Further, Corry and Stella suggest that the association of teacher self-efficacy and student success has yet to be empirically validated. The authors conclude that the literature supports further research investigating the construct of teacher self-efficacy in online education and possible correlations between self-efficacy and student success in the online learning environment. Corry and Stella (2018) advocate for additional research that ties together teacher self-efficacy and technology integration with online teaching and learning. While the link between teacher self-efficacy and integrating technology into the classroom is made by researchers (Kopcha & Alger, 2011; Mishra & Koehler, 2006), the role this link plays in how confident teachers are teaching online needs to be studied further.

Research into how K-12 teachers' self-efficacy influences their development of online instructional expertise is not extensive. However, studies such as Northcote et al. (2011; 2015; 2019) found that a multi-phased approach to professional learning programs based on identifying threshold concepts for online teaching abilities and pedagogy increases efficacy of teachers in their design and delivery of online learning. The authors conducted a mixed-methods, three phase study that used quantitative data from the Online Teaching Self-Efficacy Inventory (OTSEI; Gosselin, 2009) and qualitative data from questionnaires and reflective journals given to both novice and experienced faculty members teaching online to identify threshold concepts that are crucial to learning how to teach online effectively. The data were used to identify threshold concepts and barriers that were used to inform professional development for staff who were transitioning from face-to-face to online teaching.

For K-12 teachers, studies examining self-efficacy for online teaching is sparse. Corry, Dardick, and Reichenberg (2021) refer to the lack of research on teacher self-efficacy in K-12

online learning environments compared to face-to face environments. Research on teacher self-efficacy for K-12 online teaching has emerged in the context of the forced transition and restrictions imposed by the pandemic (Dolighan & Owen, 2021). Using the self-efficacy measurement that was developed by Tschannen-Moran et al. (1998) and then modified for online instructors by Robinia and Anderson (2010) provides a familiar framework of K-12 teaching tasks such as instructional strategies, student engagement, and classroom management with the inclusion of measures for technology use and online instructional strategies. Dolighan and Owen (2021) sampled 132 secondary teachers and measured their self-efficacy for teaching online during the pandemic. In this study, which was conducted during initial stages of the pandemic, the authors found that teacher self-efficacy for online teaching was positively correlated with previously online training or completion of an online Additional Qualifications (AQ) course. Accessing virtual technical support and using a school board provided learning management system (LMS) were also correlated with higher self-efficacy, which supports the similar findings of Cardullo et al. (2021). Dolighan and Owen (2021) found no relationship with experience teaching online and overall efficacy scores. Tschannen-Moran et al.'s (1998) model emphasizes the strong cyclical nature of teacher efficacy, which is enhanced by mastery experiences encouraging greater effort, persistence, and performance on task. Both Robinia and Anderson (2010) and Horvitz et al. (2015) found that higher education faculty who had more experience teaching online courses reported higher self-efficacy. Although the study by Dolighan and Owen (2021) did not find a relationship between self-efficacy and online teaching experience for secondary teachers in the context of the early pandemic, experience was still strongly related to self-efficacy in teaching face-to-face (Tschannen-Moran & Woolfolk Hoy, 2001) and the circumstances of the pandemic may have influenced experienced online teachers' sense of

efficacy for teaching online. Since the pandemic was a forced transition, the stress and challenges may have affected teachers' perception of efficacy, even if they had prior online teaching experience.

Research on teacher self-efficacy during COVID-19 is emerging (Pressley, 2021). Several researchers who studied the impact of the pandemic on teacher efficacy have examined the impact of the changes in teaching modes and health and safety restrictions imposed during the pandemic on teacher efficacy (Dolighan & Owen, 2021; Pellerone, 2021; Pressley, 2021; Pressley & Ha, 2022; Rabaglietti et al., 2021). Rabaglietti et al. (2021) found European teachers' self-efficacy decreased when teachers faced more difficulty with distance learning. The authors also found that self-efficacy acted as a mediator for teachers' perceived stress associated with distance learning (Rabaglietti et al., 2021). Sokal et al. (2020a) found that exhaustion and stress negatively impacted teacher efficacy and performance during the pandemic. They define exhaustion "as perceptions of having not enough resources to meet demand" (Sokal et al., 2020a, p. 6) and suggest mitigating exhaustion can avert teacher burnout. According to Kilgour et al. (2019), an individual who transitions into an online pedagogical environment may encounter new concepts and confront barriers to effective teaching in an online context even if they have in person teaching experience. For school districts, developing capacity and competence for online pedagogy and design may involve overcoming barriers of technological knowledge and pedagogical knowledge for online environments as well as barriers caused by stress and exhaustion. Teacher efficacy provides a measure for determining how to assess teachers' comfort and competence using online technology for designing professional learning and professional development but also may be useful, given the relationship to exhaustion, for developing measures to address negative thoughts and feelings that lead to burnout (Sokal et al., 2020b).

Emergency Remote Teaching and Learning

The COVID-19 pandemic demonstrated that being prepared to transition quickly to remote teaching and learning is no longer a hypothetical option but is an imperative that school boards and teachers needed to address during and following the COVID-19 pandemic. The distinction between emergency remote teaching (ERT) and online teaching and learning is key. In this study I refer to ERT as emergency remote teaching and learning (ERT&L) to reflect the relationship between teaching and learning. This distinction between online teaching and learning and what came to be known as ERT was first identified by Hodges et al. (2020). Barbour et al. (2020), in the first in a series of reports for Canadian eLearning Network (CANeLearn), found that teachers' experience with emergency remote teaching during the pandemic revealed a need for far more planning and intentional design around teacher preparation, digital infrastructure, education policy, and learning and teaching resources if teachers were to provide quality instructional continuity during a crisis. The CANeLearn report made recommendations on how schools can be better prepared for teaching in person and remotely during a crisis. In the same series from CANeLearn, Nagle et al. (2021) reviewed how Canadian provincial and territorial educational jurisdictions prepared for and implemented learning strategies for the reopening of schools in the fall of 2020, the second school year of the pandemic. This latter report by Nagle and colleagues identified teaching modes that were employed across jurisdictions in Canada:

- In person learning, where students engage with their teacher in a traditional classroom environment.
- Distance/online, where the teacher and student are separated physically and temporally (also referred to as eLearning)

- Hybrid learning, where one cohort of students learns in person while another learns online with the same teacher. In this case cohorts alternated days in person and at home.
- Concurrent learning, where a classroom teacher teaches some students in person and some students live online at the same time.
- Remote learning, designed to be temporary, is a variation of distance learning used during school closures where the teacher and students engage live online when in person learning is unavailable (Nagle et al., 2021).

In Ontario, the Ministry of Education required in person learning and remote learning, as outlined in PPM 164. Most school boards in Ontario could not offer a full curriculum via distance education and were required to provide a concurrent hybrid model for students who opted or were required to stay at home. According to Nagle et al. (2021), teachers' experiences in the hybrid and concurrent models used in Ontario reflect how difficult it was to manage the learning environment. Teachers expressed frustration with the hybrid/concurrent model as they had no training for and little experience with navigating the technology and be able to engage and occupy students in their classrooms while managing and engaging students online (Wong, 2021). Stewart (2021) argues that the demands of the hybrid model disrupted the relationship building that teachers do in face-to-face classrooms and encouraged a default to simple, slower paced, teacher-led instruction. Nagle et al. (2021) indicate that while provinces like British Columbia and Nova Scotia that had continuity of remote learning were well prepared for and situated to transition to a "new normal," Ontario was not as well prepared. In January 2021, facing a new surge in COVID-19 cases, schools across Canada were again closed, and teachers and students returned to emergency remote teaching and learning. Nagle et al. (2021)

admonished jurisdictions that failed to put ERT&L plans in place given the lessons that should have been learned during the rapid transition to ERT&L in the spring of 2020.

Acknowledging the difference between ERT&L and online teaching and learning presents a starting point for developing a strategy to allow for uninterrupted continuity of learning (Nagle et al., 2021). Research shows that effective online learning results from intentional instructional design and planning, using a systematic model for design and development (Branch & Dousay, 2015; Martin et al., 2012). A study by Marshall et al. (2020) examining American teachers' experience of teaching during the initial stages of the pandemic identified several concerns and barriers teachers faced that were more related to dealing with the impact of the pandemic than challenges associated with a normal transition to online teaching. Marshall and colleagues surveyed American teachers who transitioned to online teaching. Teachers reported having difficulty providing adequate instruction with the appropriate amount of rigor and lacking the ability to hold students accountable. Other concerns expressed by these teachers were a lack of equity in access to technology and internet service and minimal training of teachers in effective online teaching. Teachers with children of their own also reported difficulties managing teaching while supporting their children who may have been learning at home. Teacher training prior to the pandemic assumed teaching would take place face-to-face. Most of what teachers learned and shared during the initial transition was from their own research or experienced shared by other teachers (Marshall et al., 2020). Marshall et al. (2020) recommended that digital learning days be incorporated into the school year so that future transitions to emergency remote learning will not be as drastic nor as fraught. Digital learning days could include components of at home learning that are graded the same as in person learning so that students see it as important.

Online teaching and learning (OT&L) have two modes of delivery: synchronous and asynchronous. The synchronous mode is delivered in real-time and is interactive. Asynchronous learning refers to online delivery that is not done at the same time and is temporally and physically distant. During the pandemic, in most cases, teachers with no training or experience were required to navigate both modes of delivery (Marshall et al., 2020). During the pandemic, synchronous software such as *Zoom* and *Microsoft Teams*, amongst others, helped teachers and students connect in real time. Most jurisdictions in Canada required set amounts of time teachers and students were to be live online for ERT&L (Nagle et al., 2021). Therefore, distinguishing between remote or virtual teaching and traditional distance education has implications for how understanding how teachers responded to the transition to ERT&L and how jurisdictions could build on and support OT&L beyond the current pandemic.

Asynchronous delivery using affordances such as online discussion boards can be an effective way of promoting critical thinking in online and face-to-face learning environments (Aloni & Harrington, 2018). The temporal distance that asynchronous design supports require structure and planning to be effective (Garrison, 2017). During the 2020-21 school year, Nagle et al. (2021) described a concurrent mode of delivery that had students divided into cohorts, alternating days learning online and in person. The online learning was almost exclusively asynchronous and challenged teachers to plan learning opportunities for students at home and in person. Hrastinski (2008) described the benefits of asynchronous learning designs such as supporting flexible schedules and allowing learners more time for reflection and response. Hrastinski argued that including asynchronous components in face-to-face learning allows for a more effective use of in person time to dig deeper into material as is the case in a flipped-classroom model which involves students engaging the content themselves first (often online)

and then digging deeper in class with the support of the teacher. The potential to enhance learning face-to-face through technology and flexibility and familiarity with digital learning also supported emergency remote transition preparedness (Marshall et al., 2020). The dichotomy between synchronous and asynchronous, referred to as bichronous by Martin et al. (2021), in online learning needs to be studied further, both in the context of ERT&L and online learning.

Although Ontario mandated ERT&L measures that limited assessment and evaluations to promote equity and ease mental health concerns for students, Barbour and Hodges (2021) found that the most common types of assessments used in online learning are possible and appropriate with some adjustments in ERT&L contexts. The authors identify some of those common types of assessments as written assignments, e-portfolios, presentations, and tests, quizzes, and exams. While these are traditional and familiar assessment modalities, flexibility and creativity can be useful in differentiating ways that students can respond and demonstrate learning with video or audio submissions, video and audio conferencing, and self and peer feedback (Martin et al., 2021). These modalities can be effective forms of assessment during ERT&L.

The first step in effective assessment, Croslin et al. (2018) observed, is to consider how assessment is framed for students. Are tests designed to involve students as co-learners and partners in their own learning or to catch students as possible cheaters? Are assessments designed to help with the learning process or serve as a “gotcha!” for students not doing the work? Croslin and colleagues (2018) suggest that the best strategy to promote academic integrity during emergency remote learning may be to use both lower stakes assessments and assessments that require higher order thinking skills. Using assessment for learning and involving students as partners in their own learning through assessment enhances accountability and promotes self-regulatory learning in face-to-face settings (Lock et al., 2017) and, potentially, in OT&L. Using

online tools and involving students in assessment through self-assessment and peer-assessment strategies reflects a collaborative approach to the learning process and fosters student accountability (Galanti et al., 2021). A more authentic approach to online assessment changes the emphasis from the competitive and selective approach of summative assessment of learning to a collaborative and self-reflective assessment for learning (Hughes, 2014)

Mental Health and Well-being

Transitioning to an unfamiliar mode of teaching usually involves a certain amount of stress, even in normal times. Northcote et al. (2011) noted that there is an emotional element of the paradigm shift experienced by teachers as they transitioned from face-to-face to online teaching in postsecondary educational contexts. Anecdotal descriptions of exhaustion and stress associated with increased workloads and a lack of time affecting instructors' ability to work are detailed in several studies of teachers' experiences during the pandemic (Barbour & LaBonte, 2020; Cavanaugh & DeWeese, 2020; Marshall et al., 2020). These findings are supported by Pressley and Ha (2022), who found teacher exhaustion and stress levels directly impacted teachers' sense of efficacy. Research on teacher health and well-being identified anxiety, stress, and feelings of overwhelm as common emotions experienced by teachers during the pandemic (Pressley, 2021; Pressley & Ha, 2021; Sokal et al., 2020b). Stress affected teachers' health and relationships on a personal level. Stress also had a negative impact on teachers' attention levels, performance, and decision-making on a professional level (Barbour et al., 2021). In a longitudinal study of Canadian teachers during the pandemic, Sokal et al. (2020b) examined teachers' attitudes towards change. In the initial stages of the pandemic, the authors reported that teachers demonstrated increasing exhaustion and cynicism but also increased efficacy for classroom management and an increased sense of accomplishment. As the pandemic persisted,

teachers' cognitive and emotional attitudes toward change became increasingly negative, which led to burnout due to perceived increases in job demands versus resources. Burnout may be viewed as one form of poor mental health and well-being (MHWB).

To support teachers' MHWB, Sokal et al. (2022b) recommended that, in addition to required training and resources, supporting teachers as learners and valued members of a community was vital. Poor MHWB can negatively affect student learning outcomes according to Madigan & Kim (2021). Sokal et al. (2020a, 2020b) and Kim et al. (2022) used Bakker and Demerouti's (2007) Job Demands and Resources (JD-R) model to examine the range of job demands and job resources impacting teachers during the pandemic and the impact of these demands and the availability of essential resources had on teacher efficacy. Kim et al. (2022) discussed how job demands such as workload and time spent preparing to teach and teaching increased during the pandemic, putting added pressure on teachers' MHWB. Job resources, according to the JD-R model, are social support and work autonomy that can buffer the effects of job demands. Kim et al. (2022) suggest there needs to be ongoing efforts to balance job demands and resources that affect teachers' MHWB. In their study, Sokal et al. (2020a) revealed that increased workload and lack of resources were strongly correlated with exhaustion, but not as strongly correlated with burnout. The authors explained that most of the research related to the JD-R model predicted that the availability of required resources is most strongly correlated with accomplishment or cynicism (Alarcon, 2011). Sokal and colleagues (2020a) reported that some of the job resources such as personal relationships, learning technology, and sleep behaved more like demands in the sense that they all are correlated positively and most strongly with exhaustion. They postulated that the added attention to personal relationships, learning technology, and attending counselling may be perceived as extra stressors by exhausted teachers

in the context of the pandemic (Sokal et al., 2020a). A review of the research that emerged during the COVID-19 pandemic by Moore et al. (2022) found that 75.5% of published research on this topic they reviewed either commits the correlation does not equal causation error or asserts a causal relationship even when it fails to establish correlations. Moore et al. caution that causal inferences of online and remote learning on mental health is not well established in the research. They further suggest that research that does not assume a direct relationship between mental health and online learning provides the best possible strategies to address mental health concerns. The stress, anxiety and exhaustion experienced by teachers as they transitioned to ERT is different from transitions to teaching online in normal circumstances (Hodges et al., 2020). Distinguishing between ERT&L and OT&L is a critical aspect for identifying and addressing mental health concerns post-pandemic. Effective professional development should consider the balance of job demands and resources and how each impact MHWB. Future research could examine the impact of resources such as collaborative teacher learning communities on perceived job demands and stress.

K-12 Online Teaching and Learning

Prior to the pandemic, K-12 online and blended teaching and learning continued to grow; however, the research base remains narrow and has not kept pace with practice, leaving little evidence-based guidance on designing and implementing effective online learning (Barbour, 2022). The shift to online teaching and learning during the pandemic further widened the gap, with many teachers having no training or support at the outset of the transition and no experience with online teaching experience from which to draw. Research shows that effective online learning results from intentional instructional design and planning that considers how both synchronous and asynchronous modalities are used to enhance student learning in the online

environment (Branch & Dousay, 2015; Martin et al., 2012). Bozkurt and Sharma (2020) argue agency, responsibility, flexibility, and choice are key elements to the online learning experience as are planning and designing with the goal of creating a learning community. The social support and teaching strategies that exist in a face-to-face setting do not necessarily transfer to effective online teaching (Corry & Stella, 2018). Teaching strategies are often constructed on a sense of control over and autonomy in face-to-face settings

Teachers' loss of perceived control was a factor in their sense of efficacy for teaching online (Marshall et al., 2020). One of the factors contributing to teacher stress and burnout, as reported by Kim, Oxley, and Asbury (2022), was a lack of autonomy. In Canada, provincial governments and school boards set policies that were aimed at reducing student stress (Ontario Ministry of Education, 2020). Anecdotally, teachers reported that these policies also reduced student accountability during the initial stages of the pandemic (Marshall et al., (2020). The provincial policy response and its impact on teachers is evident in the research emerging on teachers' experience during the crisis. Researchers found that teachers' sense of efficacy was lowest for student engagement in the initial stages of the pandemic (Dolighan and Owen, 2021) when teachers felt they had little control and found it difficult to hold students accountable (Marshall et al., 2020).

As previously discussed, effective online learning differs from ERT&L in that effective online learning involves intentional design, planning of instruction, learning activities, and assessment that is structured for the online environment (Means et al., 2014). Effective online learning strives to create community, recognizing that learning is both a social and a cognitive process (Hodges et al., 2020; Garrison, 2017). According to Ferrell et al. (2018), pedagogy should be the priority when designing online learning experiences. Effective online learning

requires an engaged learning community centered around learning as a shared goal. Tzavara (2021) describes effective OT&L as students and educators actively engaged to collaboratively create a meaningful learning experience. The teacher's role according to Tzavara is to design the online learning experience as a shared space and to facilitate learning rather than dispense content to students. Teacher PL needs to be structured in a way that considers both the content being taught and the use of technology in the delivery. Mishra and Koehler (2006) offer a useful framework to understand the knowledge that teachers require for effective technology integration, which is key for designing online learning experiences. According to Mishra and Koehler (2006), Technological Pedagogical and Content Knowledge (TPACK) focuses on the connections between technologies, curriculum content, and specific pedagogical approaches, showing how a teacher's understandings of technology, pedagogy, and content interact with one another for effective use of technology that enhances student learning. The framework has three interdependent components of teachers' knowledge: content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK). All are framed within and influenced by contextual knowledge. Pedagogical content knowledge is at the intersection of teacher CK and PK. Classroom pedagogy recognizes the need to differentiate instructional and assessment strategies based on student learning needs. The integration of technology that enhances student learning considers the student's needs in the online context and the need for the student to learn the digital affordances used for learning. TPACK measures teachers' understanding and communicating representations of concepts based on using technologies; pedagogical techniques that apply technologies appropriately to teach content in differentiated ways that reflect students' learning needs. Niess and Gillow-Wiles (2021) examined teachers' TPACK who were teaching virtually during the pandemic. Qualitative observations of two middle school classrooms

revealed teachers' pedagogical knowledge requires developing their TPACK for teaching in both face-to-face and virtual contexts. Furthermore, teaching virtually relies on a social presence that fosters students' sense of belonging, which encourages engagement in virtual learning experiences. Acknowledging that effective online learning differs from ERT&L, Niess and Gillow-Wiles (2021) suggest that research needs to be done to determine how to establish and maintain a K-12 social presence that promotes meaningful communication among students and teachers. Collaborative online learners need to learn how to interact socially in a K-12 online context in ways that they can meet and trust each other as they explore ideas and develop content knowledge.

As teachers and school boards struggled, in the spring of 2020, to rapidly transition to online learning during the first phase of the pandemic, there was no time and few resources in place to consider and support effective and intentional online course design. Face-to-face learning communities that had been previously established dissolved during remote learning; the social element of learning amongst and between teachers and students was lost, which further exasperated teachers and students with the social isolation imposed by the pandemic (Sokal et al., 2020a). To leverage the opportunity provided by and learnings from the experience of the pandemic, building online learning communities must be part of the intentional design for teacher learning and student learning, as proposed by Garrison (2017). The community of inquiry (CoI) model for online learning (Garrison et al., 2010) recognizes learning as a collaborative, constructivist process that happens through the intersection of three dimensions: social presence (SP), cognitive presence (CP), and teaching presence (TP) in the online context. Clark and Barbour (2015) describe the emergence of both online and blended learning in American schools but pointedly noted there is still a need for research in the emerging field of K-

12 distance, online and blended learning. Identifying the role teachers play in facilitating collaborative learning online is important for designing support for teachers in online contexts. One example of the role teachers play in facilitating student collaboration is in a case study by Borup (2026) of a full-time online charter high school in the United States. Borup (2016) examined teacher perceptions of learner-to-learner interactions. The analysis used the adolescent community of engagement (ACE) framework developed by Borup et al. (2014) and identified four student behaviours that have a positive impact on student engagement and learning: befriending, motivating, instructing, and collaborating. This study found that using the ACE framework explained that social presence as an enabling variable since it increased the likelihood that others would positively affect student learning. The author suggested teachers need to establish a conducive atmosphere for learner-to-learner interactions at the start of the course. Further research by Borup et al., (2020) examined two schools that went to remote teaching and learning during the pandemic. The study used the ACE framework to identify communities of support that affected student engagement. The findings supported the need for facilitators of student engagement from both the course community and the personal community with the adolescent learners. Although these studies are based on limited case studies, further research could examine the role teachers need to play fostering collaborative learning in adolescent learners in blended and online learning environments.

Much of the research on teachers' experience teaching online emerging from the pandemic focused on the lack of support and resources (Dolighan & Owen, 2021; Graziano et al., 2023; Marshall et al., 2020; Pressley, 2020; Wyatt et al., 2023). In Ontario, the Ministry of Education provided teachers with access to a virtual learning environment that included free access to the learning management system *Brightspace*. *Brightspace* (formerly *D2L*) also offered

support such as webinars, teaching resources, and virtual learning environment training (Nagle et al., 2021). The degree to which teachers accessed or were aware of these resources was not reported. It is clear that the pandemic accelerated the emergence of K-12 online learning and exposed how unprepared many jurisdictions are to support increased distance, online, and blended learning in education.

Collaborative Online Learning

Collaboration in online learning has been studied extensively (Curtis & Lawson, 2001; Darling-Hammond et al., 2017; Garrison, 2017). The use of a tool as part of the learning of and for the learning process, as introduced by Salomon and Perkins (1998), sets the foundation for understanding the digital space and the technology used in collaborative online learning. The process of learning has an aspect of learning how to use the technology (tool) for learning as well as the learning the technology enables. Garrison (2017) connects the learning transaction to the dynamics of a collaborative and constructive educational experience. The community aspect of the CoI model is “defined by purpose, collaboration and trust” (p.11). Garrison argues that learning is not done in isolation and that learning is influenced through experiences with the physical world and communication with others. Garrison (2017) drew on Dewey’s notion of practical inquiry whereby learning happens by applying ideas and getting feedback on actions taken. For Garrison practical inquiry revealed the connection between the individual and the community. The community of inquiry brings together the personal and social aspects in a collaborative approach to thinking and learning. Garrison (2017) credited the advent of information and communication technologies that holds the possibility of deeper shared learning experience through formal and informal contact of those in the community of inquiry. In terms of teacher PL, collaborative thinking and learning in a community of learners that has purpose,

creates an environment that is conducive to cooperation versus competition (Garrison, 2017). Advancements in communication technologies offers Blayone et al. (2017) described the digital space in which online teaching and learning happens as an integral part of the learning process rather than an externality as is the case with the COI model. Blayone et al. (2017) described the fully online learning community (FOLC) as a “divergent fork” of the CoI model, but resisted reducing digital technologies and competencies as external to the core learning model. In the FOLC, the digital context has mediating influences on the social presence and cognitive presence essential for collaborative and shared learning experience (Blayone et al., 2017). The authors also argued that the FOLC model emphasizes collaborative transactional learning and supports 21st century competencies and transferable skills. The FOLC and CoI models also foster the transferable skills outlined in the Ontario curriculum by the Ontario Ministry of Education (2022). Both FOLC and CoI emphasize community and collaboration as essential elements of learning and are models that can transform K-12 eLearning experiences from individualistic, dissemination of information to a collaborative constructivist experience that builds community (Garrison, 2017).

Collaborative Teacher Professional Learning

Effective collaborative online teacher learning involves active social and cognitive presence (Garrison, 2011). Darling-Hammond et al. (2017) described effective teacher professional development (PD) as both collaborative and active:

[Active learning] incorporates the elements of collaboration, coaching, feedback, and reflection and the use of models and modeling ... activities often involve modeling the sought-after practices and constructing opportunities for teachers to analyze, try out, and reflect on the new strategies. Active learning opportunities allow teachers to transform

their teaching and not simply layer new strategies on top of the old, a hallmark of adult learning theory (p. 7).

In the case of online teacher PL, Blayone et al. (2017) argued that the online learning experience includes a negotiated digital space as described in the FOLC. Online professional learning for teachers can happen within the digital space and with tools teachers are learning to use in the context of effective online pedagogy. The online collaborative learning framework, inclusive of integrated digital space, offers a model for teachers to learn *for* designing online learning opportunities for their students while learning the technology tools they are using. Drawing on both the CoI model and the FOLC model is not without controversy. Garrison (2011) contended that including technology and the competencies required to use that technology in the model make professional learning initiatives too complex. Blayone et al. (2017) argued that TP be absorbed into the other presences to reflect a more democratic process of learning. The digital space, according to Blayone and colleagues (2017), is a negotiated space where educators would choose the platforms and technologies that would support their learning. The FOLC uses the General Technology Competency and Use framework (GTCU) (Desjardins, 2005) that includes, “four dimensions of human-computer-human interaction (technical, informational, social, and epistemological/computational) and their accompanying competencies as prerequisite layers supporting SP, CP, and collaborative learning” (Blayone et al., 2017, p. 6). Interaction and collaboration are core aspects to these models in terms of effective teacher PL.

Garrison (2011) explained that interaction and collaboration in an online learning environment are important elements in a learning process that support a constructivist view of learning. vanOostveen et al. (2019) claimed that a learner-centred collaborative online learning environment for teacher professional development has the potential to change teachers’ beliefs

about learning by changing the online learning experience of teachers. The authors developed a fully online learning experience for teachers that facilitated constructivist aspects of learning, providing an opportunity to experience new pedagogies that challenge traditional notions of teaching while supporting the development of effective online teaching strategies. Collaborative inquiry focuses on the needs of the learner and engages the learner by employing a learner-driven approach through collaborative knowledge construction (vanOostveen et al., 2019). VanOostveen and colleagues attempted to address resistance to research-based PL for teachers by engaging teachers with a series of learning tasks and a video-based case study (referred to as Professional Development Learning Environments) embedded in an online learning environment that required the collaboration of users to solve problems. While the problem-based learning (PBL) is not specific to online teaching, the teachers are exposed to online learning pedagogy that is grounded in the principles of socio-constructivism that can challenge traditional teacher-centred beliefs about learning.

Traditional modes used for professional development required by government directives, guidelines, and policy are done normally on professional activity days or require release time for teachers to attend while classes are in session. Most traditional PD sessions focus on information disseminated from administrators or consultants to passive teacher audiences in one day (Darling-Hammond et al., 2017). In professional development, the teacher is the learner. The CoI framework (Garrison et al., 2000), which provides an understanding of how computer mediated communication can support learning online, enables research on and the implementation of effective online pedagogy and the teacher is a co-creator and co-learner, whether in an online or face-to-face modality. Lock et al. (2017) suggested that the CoI model supports the design and facilitation of self-regulatory learning in online environments, a key component of effective

online learning according to Cho and Schen (2013). Lock et al. (2017) described the online learning environment as an opportunity for learners to take responsibility for and control of their own learning. A study by Shea and Bidjerano (2010) identified that learning presence within the CoI framework reflects elements such as effort, self-efficacy, and self-regulation, which support successful online learning. These authors suggested that focusing on the active roles of the learner may help facilitate knowledge construction in a technology mediated learning environment. While Garrison (2011) rejected the addition of elements to the model making it too complex for practical application, Anderson (2017) argued that by including learning presence as an identified and interdependent element of the CoI model “allows the CoI to evolve beyond a teaching model to a teaching and learning model” (p. 5). Whether the model needs to include learner presence or it can be identified within the interaction of SP and CP, recognizing learner presence in the collaborative learning process in teacher PD connects teachers as learners to teachers as designers and facilitators of online learning environments.

Online Professional Learning Communities

Being required to use educational technology during a pandemic induced transition to online learning reinforced the need for and importance of effective and targeted teacher PL. PLCs are compatible with the CoI framework and can take advantage of the online learning affordances. Hughes et al. (2021) emphasized the importance of virtual professional learning networks (VPLN) for sustaining and building connections in a wider community of learners within the CoI. The authors described how the VPLNs extended the network beyond physical time and space constraints to foster continued idea sharing. Hughes and colleagues (2021) studied PL for maker approach as a student-centred, inquiry-based tool used for science, technology, engineering arts and math (STEAM) teaching and learning. The study’s findings

reflected previous research that characterizes PL as a) active, b) collaborative, and c) sustained over an extended period. The authors added that in the case of maker PL, the structure is similar to what students experience in the classroom or online environment. Teachers as active agents in their own learning encourages motivation and investment in the process (Hughes et al., 2021). PL is optimized if teachers direct their learning and are agents in their own learning. PL is ongoing, continually updated, and extends the professional knowledge and beliefs of teachers in the context of their work (Kopcha, 2012 Tondeur et al., 2017). Professional learning communities (PLCs) focus collaborative learning and problem solving around learning directed by teachers to meet their self-identified needs (Donohoo, 2017). Moore-Hayes (2011) compared self-efficacy for technology integration of pre-service and in-service teachers, finding a significant difference between the two groups for technology integration. In contrast to pre-service teachers' responses, Moore-Hayes noted that in-service teachers' responses to open ended questions about examples from practice revealed that teachers experienced feelings of low self-efficacy related to technology integration. This finding reinforces other researchers' distinction between instructional self-efficacy and technology self-efficacy (Horvitz et al., 2015; Robinia & Anderson, 2010). Given that attitudes and beliefs about technology for learning are strong predictors for effective integration and use for learning (Ertmer & Ottenbreit-Leftwich, 2010; Ertmer et al., 2015), teacher PD must enable internal changes in knowledge, attitude, and beliefs, as well as an external culture of collaboration and inquiry that foster and sustain change. These findings confirm that PLCs offer a collaborative setting that promotes cohesion and builds collective efficacy around improving student learning (Donohoo, 2017)

While collaborating with colleagues to solve problems and support student learning in the context of the pandemic affected teacher efficacy positively, structured collaboration within

PLCs is important as teachers and schools move beyond the emergency context of the pandemic. Schein's (1985) research on organizational culture established the foundation for collaborative culture that enhances the learning process and balances stakeholders' interest. Schein's idea of collaborative culture increases participants' sense of self-efficacy to make change as groups are given time for learning, collaboration, and shared problem solving. Tschannen-Moran et al. (2000) employed collaboration strategies to learn adapt and change expectations through the creation of discourse communities with staff. In a midwestern American high school, the researchers found that the problem-solving capacity of the school improved when staff realized the PL would be ongoing. The use of PLCs emerged in education as a derivative of business collaboration training models. Education modified these business-focused practice to fit the needs of teachers and schools and to use PLCs as framework for teacher professional learning in online environments because distance and physical space were no longer obstacles to meeting (Beach, 2012). The PLC framework is also compatible with the CoI framework for online collaborative learning, providing a structure for collaborative problem-solving and reflective practice focused on improving student learning within the CoI elements of SP, CP, and TP (Beach, 2012; Tucker & Quintero-Ares, 2021). Tucker & Quintero-Ares (2021) examined the use of PLCs during the transition to online teaching amongst postsecondary faculty members during the pandemic. The use of PLCs allowed academic faculty "to move from simply learning online teaching tools to engaging in meaningful discussions around online teaching pedagogy and improving student learning" (p. 1). The authors emphasized the importance of community during the pandemic and admitted remote PLCs were different from a typical learning conversation at work. Thus, the pandemic revealed the possibility to create a supportive digital environment similar to in person interactions (Tucker & Quintero-Ares, 2021).

Implications for Future Research

The experience of the pandemic has challenged school boards to look at online teaching and learning differently than had been the case prior to early 2020. Being prepared to transition to online learning involves developing a strategy to build online teaching capacity that values online teaching as a viable mode of effective education as well as integrating online teaching pedagogy and the use of technology in a way that builds efficacy for ERT&L. I argue that it makes sense to move beyond the initial emergency remote perspective and develop remote and virtual learning capacity as a measure that can be used in both emergency and non-emergency situations. Dolighan & Owen (2021) found that using the board provided LMS in everyday teaching practice prior to the pandemic was associated with higher teacher self-efficacy for online teaching in the emergency context of the pandemic. Hoy et al. (2002) found that building collective efficacy reinforced common and shared values. Goddard et al. (2004) describe how collective efficacy beliefs strongly influenced teachers' choices and the ways they exercised personal agency. The CoI framework provides a structure for building online and blended learning capacity that is fundamentally collaborative by nature and could be efficacious at the K-12 level (Garrison, 2017). More recently, Niess and Gillow-Wiles (2021) identified social presence as a crucial element for establishing collaborative online learning environments for middle school students. Integrating technology to the learning framework makes the learning for and learning of digital affordances part of the building of PCK and TK together as TPACK (Mishna & Koehler, 2006). In terms of teacher PD, the CoI framework offers an approach that is disruptive to traditional educational structures and the entrenched view of education as individual and competitive. CoI is consistent with a 21st century view of a connected and dynamic knowledge society (Garrison, 2017). The collaborative emphasis of the CoI framework has the

potential to build a collective efficacy that is consistent with and supports professional learning for teachers that enables internal changes in knowledge, attitude, and beliefs as well as an external culture of collaboration and inquiry (Tondeur et al., 2017). Moreover, the use of a PLC framework, which is complementary with CoI frameworks, establishes a focus on student learning improvements and collaborative problem-solving that builds community and supportive interactions conducive to positive MHWB (Tucker & Quintero-Ares, 2021).

The use of PLCs within the CoI offers teachers a collaborative learning framework that is ongoing and meets their immediate and long-term PL needs for OT&L. Future research could investigate collaborative online PL and PLCs for teachers in various divisions and subject areas

CHAPTER THREE: METHODOLOGY

The context of the pandemic provided an opportunity and presented a challenge to the research design. My aim was to better understand how to support teachers transitioning to online teaching. The real-life context of the pandemic made that transition a unique phenomenon with boundaries between the context and the transition to online teaching unknown (Yin, 2009). The research design evolved from the initial exploration of teachers' sense of efficacy for online teaching at the start of the pandemic in the spring of 2020 to a mixed methods design to explore teachers' experiences teaching in the pandemic as the context of teaching changed one year later.

The convergent parallel design (Creswell & Plano Clark, 2017) employed both qualitative measures of teachers' sense of efficacy for online teaching with details of teachers' experience based on a qualitative semi-structured questionnaire. The case study methodology allowed for taking an interpretivist standpoint to better understand individual and shared meanings of experiences (Stake, 1995). The broader social and political contexts of the pandemic that affected teachers' experiences of transitioning and adapting to online teaching also can be considered within a case study methodology (Doolin, 1998).

Methodology

The research used an instrumental case study approach (Merriam, 1998; Stake, 1995). Stake (1995) described the instrumental case study approach as using a particular case to gain a broader understanding of a particular phenomenon or issue. In this instance, the broader context of the pandemic and the response by provincial and local health officials and the Ministry of Education had unique impacts on a particular school board. The instrumental case study approach was chosen based on the researcher's access to the teaching staff population in a Southern Ontario district school board located in the Greater Toronto Area (GTA) during the

initial stages of the COVID-19 pandemic in the spring of 2020. The case study provides a bounded and detailed perspective on individuals' experiences in a specific context such as the pandemic (Merriam, 1998). A mixed-method research design utilizing both qualitative and quantitative methods within a single study was used (Creswell & Plano Clark, 2017). Specifically, a convergent parallel design was used, in which both quantitative and qualitative data were collected, analyzed and merged as results and then discussed (Creswell & Plano Clark, 2017). I selected this design to synthesize complementary quantitative and qualitative results and to form a more comprehensive understanding of teachers' experiences transitioning to and adapting to online teaching in the context of the COVID-19 pandemic (Doolin, 1998).

Quantitative Methods

The quantitative component for this study used a digital survey developed using Microsoft Forms and was based on the Teacher Sense of Efficacy Survey (TSES) developed by Tschannen-Moran and Woolfolk Hoy (2001) and the Michigan Nurse Educators' Sense of Efficacy for Online Teaching (MNESEOT) instrument (Robinia & Anderson, 2010). The survey, administered twice over a 16-month period to two cohorts of teachers, consisted of 32 questions that asked participants to rate their perceived self-efficacy for online teaching on a Likert scale of 1-9 (1 being *nothing* and 9 being *a great deal*). The mean for each subscale (e.g., student engagement, classroom management, online instruction, and use of computers and technology) was calculated and added together to produce a total mean score. Minimal changes to the MNESEOT were made to some of the questions to reflect secondary teachers' experience with online teaching based. This revised MNESEOT is referred to as Teacher Sense of Efficacy for Online Teaching (TSEOT). Online pedagogies and strategies for online teaching were considered based on the signature pedagogies for e-learning by Eaton et al. (2017). (See appendix A.)

Procedures

After initial ethics clearance (BREB, 19-305) was granted from Brock University and the school board, emails were sent to secondary teaching staff to invite teachers to participate in the TSEOT survey (see Appendix D). The survey is a 32 item Microsoft Forms survey that was set to anonymous and was accessible to teachers through a link on the email. Two follow up emails were sent to remind teachers of the survey. Participation in the survey was voluntary. Teachers could choose not to participate or opt out at any point by not completing the survey. The survey was open for three weeks. (see Appendix A). During the second year of COVID-19 (2020-2021), it was determined that a second administration of the survey would provide additional data on and, potentially, insights into teachers' sense of efficacy of teaching on-line in an emergency situation. Hence, after a second round of Brock University (BREB, 20-328) and school board ethics approvals (see Appendix E), the survey was readministered, using the same timeline of three weeks to collect data, albeit with an expanded population (see below). The two administrations of the survey are named Phase 1 and Phase 2 to allow for comparison and distinction.

Population

The population for Phase 1 (June 2021) included all full-time secondary teaching staff of a Southern Ontario district school board. Of 432 secondary teachers employed at the school board, 132 responded (28.47%). Sixty-one percent of the respondents were female, the average age was 48, 73% had a bachelor's degree (e.g., BA or BSc plus/or BEd), and 70% have been teaching for 16 or more years in public education. Eighty-one percent of respondents reported teaching online five or fewer years. Of those who reported less than five years' experience

teaching online, 88% (or 71.3%) of Phase 1 respondents reported one year or less online teaching experience.

In Phase 2 (June 2021), it was decided to expand the population to include all full-time, part-time and long term occasional (LTO) teachers in the school board to obtain a more comprehensive representation of teachers' experience teaching online during the pandemic. Similar procedures were followed in Phase 2 as in Phase 1. Following ethics approvals from the school district and Brock University (see Appendix E), emails were sent to all full-time, part-time and LTO teachers inviting them to complete the web-based survey using Microsoft forms (see Appendix I). Of 1631 teachers employed at the board, 265 responded (16.25%); the average age was 29. Sixty three percent have been teaching for 16 or more years in public education. Eighty-eight percent of respondents reported teaching five or fewer years online. Fifty-nine percent of respondents reported 1 year or less of online teaching experience. Interestingly, 130 of 432 secondary teachers responded (30%) which is very close to the number (n=132) who responded in Phase 1. Elementary teacher participation was very low, 135 elementary teachers responded out of 1199 employed at the school board (11%).

Qualitative Methods

The qualitative component was designed initially to delve deeper into teachers' experience of teaching online during the pandemic. In Phase 2, one year after the initial transition to online teaching, this aim was adjusted to include a better understanding of experiences teachers had teaching online and if there was any connection to their sense of efficacy for teaching online. The initial research design planned to use face-to-face interviews. That design was abandoned after it was determined, based on discussions with peers and stakeholders at the school board, that teachers' time was an important consideration and

interviews would impose on health restrictions in place due to the pandemic. Video interviews were considered but this approach was determined to be too taxing on teachers' time and stress levels given the different level of experience and competence teachers had with video conferencing at that point. The semi-structured questionnaire was considered less stressful and allowed participants to complete the survey when, where, and to what degree suited them. This approach is supported by Cloke et al. (2004), who suggested that the use of an open ended, semi-structured questionnaire can provide intensive inquiry of experiences in lieu of interviews given the difficulties and restrictions of person-to-person interview approach due to the pandemic experiences.

The questionnaire was composed of four semi-structured questions that focused on the successes or problematic issues and troublesome knowledge associated with learning to teach online in the context of the pandemic (Creswell & Plano Clark, 2017). The guiding questions were:

- Describe the strategies for online teaching you feel worked to promote student engagement and student learning.
- What do you feel you still need to learn to teach online effectively?
- How do you feel the pandemic impacted online teaching and learning?
- Is there anything you would like to add regarding your experience teaching during the COVID-19 pandemic?

The qualitative questions were semi-structured to allow teachers to express their experience in detail.

Population

In the Phase 2, 265 teachers responded to the TSEOT survey. Participants in the TSEOT survey were asked to describe what they feel is the most pressing issue regarding professional learning and support for teachers designing and implementing online learning environments. 233 of 265 participants responded to this question. Responses were coded and organized by themes that emerged from the responses. These data were then merged and compared with the subsequent semi-structured questionnaire.

Participants who were identified as continuing to teach online or hybrid in the new school year were invited to go into greater detail of their experience of teaching online. Out of 30 teachers identified and invited to participate, 19 responded. Eight were secondary school teachers, three were virtual secondary school teachers, two were elementary school teachers and six were virtual elementary teachers. Seventeen of 19 respondents (89.5%) had two or less years of online teaching experience.

Data Analysis

In both phases the research questions were addressed by calculating means and standard deviations of the teacher sense of efficacy for online teaching survey (TSEOT) scores (Horvitz et al., 2015; Robinia & Anderson, 2010; Tschannen-Moran & Woolfolk Hoy, 2001) for the four measures: student engagement, classroom management, online instruction strategies, and computer and technology skills. The Pearson correlation coefficient was used to determine relationships between interval variables that included demographic items and items associated with resources and support. Analysis of variance (ANOVA) was used to assess differences of means of online teaching efficacy scores. An alpha of .05 was used for all tests.

The bounded nature of the case study provided an opportunity to explore the reality teachers were experiencing learning to teach online in the new context of emergency remote teaching and learning (ERT&L) and the wider social impact of the pandemic. Using thematic analysis (de Lucas Ancillo et al., 2021; Lapadat, 2010), the responses to the semi-structured open-ended questionnaire were coded and thematically grouped to identify themes and patterns that reflect their experience of teaching in the online context (Lapadat, 2010). The data collected from the quantitative survey measured the self-efficacy of novice and experienced teaching staff for designing and implementing online teaching and learning experiences in the context of the pandemic. The qualitative and quantitative data were then triangulated to locate areas of convergence (Mathison, 1988) and identify the challenges and barriers that novice and experienced teaching staff encountered as they engaged online pedagogy and gained experience teaching in online environments (Creswell & Plano Clark, 2017). Peer debriefing with stakeholders in the selected board and online teaching experts was conducted. Relevant research literature for online teaching were consulted to identify effective online teaching strategies that can be used to understand the online teaching context teachers experienced. The research and analysis of teachers' detailed experience were used to propose recommendations for PL for teachers teaching online (Creswell & Miller, 2000).

CHAPTER FOUR: QUANTITATIVE RESULTS AND DISCUSSION

This study was a response to the transition to online teaching and learning that happened at the initial stages of the pandemic in the spring of 2020. It was decided that gathering data about teachers' experience in an unprecedented transition to online teaching and learning (OT&L) would be invaluable and that examining teachers' sense of efficacy for online teaching would contribute to better understanding how to support teachers teaching online. Quantitative data were collected during the initial stage of the pandemic in May 2020, several weeks after the initial school closures and forced transition to OT&L. As the pandemic persisted into the following school year, a second phase of data collection was implemented to understand teachers' experience of teaching online in the context of the pandemic one year after the initial transition to online. In year two of the pandemic, the context of teaching had changed significantly with a return to in person teaching, hybrid teaching and learning, and fully virtual learning environments. The scope of data collection in Phase 2 was modified to include both quantitative and qualitative data measures to gain a more detailed understanding of teachers' experience in the unprecedented teaching context of the coronavirus pandemic. The quantitative results from both phases will be discussed in this chapter. The qualitative findings from the second phase of the study will be presented in the following chapter.

Research questions were addressed by calculating means and standard deviations of the teachers' self-efficacy for online teaching (TSEOT) survey scores for the four measures: student engagement, classroom management, online instruction strategies, and use of computers and technology (Horvitz et al., 2015; Robinia & Anderson, 2010; Tschannen-Moran & Woolfolk Hoy, 2001). The initial survey results found slightly higher mean efficacy scores in Phase 2, $M=23.54$ compared to Phase 1, $M=21.89$ (see Table 1). Differences in scores do not demonstrate

growth or change from Phase 1 to Phase 2 given the two sample groups were different. However, Phase 2 participants did have a year of experience with emergency remote teaching and learning (ERT&L) and higher overall scores may be attributed to the experience and intense learning curve of transitioning to ERT&L from the spring of 2020 to the spring of 2021 when the second phase survey was done (see Table 1).

Table 1

Teachers' Sense of Efficacy for Online Teaching Scores Phase 1 and Phase 2

Scale	<i>M</i> Phase 1	<i>M</i> Phase 2	Min P1	Min P2	Max
Student Engagement	4.73 (1.13)	5.23 (1.44)		1.25	9
Online Instructional Strategies	5.76 (0.77)	5.77 (1.51)		1.25	9
Online Classroom management	5.35 (0.83)	5.95 (1.36)		1.50	9
Use of Computers and Technology	6.23 (1.65)	6.58 (1.35)		1.88	9
Overall TSEOT score	22.06 (4.38)	23.54 (5.16)		6.37	36

Note. Standard deviations are presented in parentheses.

Table 2*Pearson Correlation Matrix for Phase 1*

Independent Variables	Student engagement	Online Instructional strategies	Online class management	Use of Computers and technology	Overall TSEOT Score
# yrs. teaching online		$r = .183$, $p = .036$			
Taken online AQ	$r = .230$, $p = .008$				$r = .180$, $p = .039$
Online PD training	$r = .218$, $p = .012$	$r = .241$, $p = .005$	$r = .210$, $p = .016$	$r = .256$, $p = .003$	$r = .262$, $p = .002$
# of online PD sessions		$r = .188$, $p = .033$		$r = .216$, $p = .014$	$r = .194$, $p = .028$
Used expert help $N = 132$	$r = .178$, $p = .041$		$r = .178$, $p = .042$		
Used board LMS	$r = .173$, $p = .048$		$r = .245$, $p = .005$	$r = .301$, $p = .001$	$r = .248$, $p = .004$
Used virtual tech support	$r = .291$, $p = .001$	$r = .270$, $p = .002$	$r = .221$, $p = .011$	$r = .246$, $p = .005$	$r = .291$, $p = .001$

Note. Correlation is significant at the .05 level.

Similarities between Phase 1 and Phase 2 include statistically significant correlations found with the variables having taken an online additional qualifications (AQ) course and having completed professional development (PD) sessions for online teaching. Additional correlations were found with being placed or choosing virtual placement; regularly collaborating with colleagues; teachers who would continue to teach online; and the overall TSEOT scores.

Differences in Phase 2 from Phase 1 did not reveal statistically significant correlations with using a board learning management system (LMS) or using virtual technology support and overall higher levels of self-efficacy. However, significant correlations were found with the use

of LMS and the subscale Use of computers and technology. A confounding result from Phase 1 found no relationship between online teaching experience and overall efficacy scores for online teaching which was contrary to the literature and online teaching (Horvitz et al., 2015; Northcote et al., 2015; Robinia & Anderson, 2010; Tschannen-Moran & Woolfolk-Hoy, 2001). Experience teaching online did correlate with higher efficacy *instructional strategies*, $r=.183$, $p=.036$ (see Table 2). In Phase 2, experience teaching online revealed a significant correlation with all subscales and overall TSEOT scores (see Table 3).

Teachers who teach in primary and junior divisions reported significantly lower self-efficacy for the subscale student engagement. Teachers who were placed in or chose virtual teaching had significantly higher efficacy than those who taught face-to-face. Teachers who reported experience teaching online, having had online training, having taken an online AQ course, or having collaborated with colleagues regularly also scored higher on perceived efficacy in terms of student engagement, instructional strategies, and online classroom management (see Table 3).

Table 3*Pearson Correlation for Phase 2*

Independent Variables	Subscale Student Engagement	Subscale Online Instruction	Subscale Online Classroom Management	Subscale Use of Computers and Technology	Overall TSEOT Score
Teaching Assignment	$r=.144,$ $p=.019$				
Placed in or chose virtual	$r=-.282,$ $p=.028$	$r= -.321,$ $p=.012$	$r= -.326,$ $p=.010$	$r= -.309,$ $p=.016$	$r= -.337,$ $p=.008$
Years teaching online	$r= .214,$ $p=.001$	$r= .198,$ $p=.002$	$r= .148,$ $p=.021$	$r=.186,$ $p=.004$	$r= .206,$ $p=.001$
Taken online AQ	$r= .208,$ $p=.001$	$r= .144,$ $p=.019$			$r= .159,$ $p=.010$
Had online PD training	$r= .165,$ $p=.008$	$r= .145,$ $p=.019$	$r= .138,$ $p=.025$	$r= .156,$ $p=.011$	$r= .166,$ $p=.007$
Collaborate with colleagues	$r= .157,$ $p=.011$	$r=.161,$ $p=.009$		$r=.186,$ $p=.002$	$r= .166,$ $p=.007$
Using LMS				$r=.183,$ $p=.003$	
Willingness to teach online	$r= .481,$ $p=.001$	$r= .497,$ $p=.001$	$r= .386,$ $p=.001$	$r= .394,$ $p=.001$	$r= .484,$ $p=.001$

Note. Correlation is significant at the .05 level

The initial study results revealed correlations between teachers' overall sense of efficacy for teaching online and using the school board provided LMS for teaching, having online training, having taken an online AQ course, and accessing virtual technology support (Dolighan & Owen, 2021).

To discern if each of the independent variables that indicated a significant relationship with the overall TSEOT scores and the subscales were independently affecting efficacy scores, a linear regression test was performed for both phases. The independent variables that indicated a significant correlation in the Pearson correlation test with the overall TSEOT scores and subscale scores are reported in Table 4 for Phase 1 and Table 5 for Phase 2. A p value of .05 was used in all tests.

In Phase 1, using a LMS $t=2.092, p=.042$ and accessing virtual support $t=2.727, p=.007$ variables were found to independently correlate with the overall TSEOT scores. Using expert help, having online training, and taking an online AQ did not show significant independent relationship with the overall TSEOT scores for the larger population (see Table 4). A test to evaluate the effect of the independent variables on each of the subscale dependent variables was conducted. The subscale *student engagement* only showed a significant relationship with using virtual technology support, $t=2.771, p=.006$. No significant relationship was found with other variable that revealed correlations in the Pearson correlation test. *used virtual tech support*, $t=2.534, p=.013$, and number of years of teaching online, $t=2.096, p=.038$, showed significant independent relationship with the subscale *instructional strategies*. Only *used board LMS*, $t=2.041, p=.043$, predicted *online classroom management* scores for the larger population. *Use of computers and technology* shows significant relationships with, used board LMS, $t=2.859, p=.005$, and, used virtual tech support, $t=2.155, p=.033$. The independent variables, had online PD training, taken online AQ, used expert help, and number of online PD sessions, show no significant relationship with the overall TSEOT scores or the subscale scores and were removed from the model. The regression results for Phase 1 suggest that, used board LMS, prior to the transition to ERT&L and being able to access real-time virtual technology support to solve

immediate problems impacted teachers' sense of self-efficacy for online teaching in a measurable way.

Table 4

Regression Analysis Phase 1

Independent Variable	Dependent Variable	βa	t-Value	p-Value	Sr₂
	<i>TSEOT Score</i>				
# of yrs. Teaching online					
Had online PD training		.136	1.526	.130	.015
Number of PD sessions					
Used Expert help					
Taken online AQ		.097	1.096	.275	.007
Used board LMS		.238	2.092	.042*	.031
Used Virtual tech Support		.228	2.727	.007*	.049
	<i>Student Engagement</i>				
# of yrs. Teaching online					
Had on line training		.108	1.005	.317	.007
Taken online AQ		.128	1.389	.167	.013
Used Expert Help		.128	1.439	.153	.014
Used board LMS		.103	1.180	.240	.010
Used Virtual Tech Support		.238	2.771	.006*	.053
	<i>Instructional Strategies</i>				
# of yrs. Teaching online		.181	2.096	.038*	.031
Had online PD training		.126	1.163	.247	.009
Number of PD sessions					
Taken online AQ		.098	1.064	.157	.008
Used Expert Help					
Used board LMS		.115	1.324	.188	.012
Used Virtual Tech Support		.219	2.534	.013*	.045
	<i>Online Classroom management</i>				
# of yrs. Teaching online					
Had on line training		.090	.816	.416	.005
Number of PD Sessions					
Taken online AQ					
Used Expert Help					
Used board LMS		.181	2.041	.043*	.030
Used Virtual Tech Support		.167	1.909	.059	.026

	<i>Use of computers and technology</i>			
# of yrs. Teaching online				
Had online training	.082	.772	.442	.004
Number of PD sessions	.091	.887	.214	.005
Taken online AQ				
Used Expert Help				
Used board LMS	.246	2.859	.005*	.056
Used Virtual Tech Support	.183	2.155	.033*	.032

Note: *a* Standardized coefficient *b* squared semipartial correlation

In Phase 2, the regression analysis showed there is a non-zero relationship between the overall TSEOT scores and each of the independent variables, which indicates that the overall model is significant (see Table 4). A linear regression test was then performed to test the significance of the correlations of the independent variables on each of the subscales as dependent variables. Analysis of the subscale *student engagement* showed significant relationships with number of years teaching online $p=.010$, taken online AQ $p=.029$, had online training $p=.022$, and willingness to continue teaching online ($p=.007$). However, no significant independent relationship with *collaborating with colleagues*, and self-efficacy scores were found. No independent relationship with self-efficacy scores and *placed or chose virtual*, was found for the larger population. The dependent variable subscale *instructional strategies* was significantly predicted by all the independent variables that showed correlation from the sample. Regression analysis for the dependent variable subscale *use of computers* showed significant relationship with using the board LMS $t=3.381$, $p=.001$. The dependent variable *online classroom management* showed significant relationship with the variable placed or chose virtual $t=-2.303$, $p=.025$ but none of the other variables showed significant relationship in the sample (see Table

5). Implications of the regression analysis tests will be discussed below for each of the variables in both phases.

Table 5

Regression analysis Phase 2

Independent Variable	Dependent Variable	β	t-Value	p-Value	Sr₂
	<i>TSEOT Score</i>				
Placed or chose Virtual		-.220	-2.040	.047*	.044
# of yrs. Teaching online		.252	2.330	.024*	.057
Had on line training		.398	-3.520	.005*	.093
Taken online AQ		-.466	2.967	.001*	-.130
Collaborated with Colleagues		.238	2.092	.042*	.046
Willingness to teach online		.210	2.791	.008*	.082
	<i>Student Engagement</i>				
Teaching Assignment		.047	.424	.673	.009
Placed or chose Virtual		-.208	-1.854	.070	-.039
# of yrs. Teaching online		.302	2.685	.010*	.082
Had on line training		.330	2.364	.022*	.064

Taken online AQ		-.310	-2.248	.029*	-.057
Collaborated with Colleagues		.198	1.670	.101	.032
Willingness to teach online		.340	2.807	.007*	.09
	<i>Instructional Strategies</i>				
Placed or chose Virtual		-.217	-2.036	.047*	-.042
# of yrs. Teaching online		.247	2.318	.025*	.055
Had on line training		.378	2.862	.006*	.084
Taken online AQ		-.427	-3.269	.002*	-.110
Collaborated with Colleagues		.280	2.493	.016*	.064
Willingness to teach online		.335	2.913	.005*	.087
	<i>Online Classroom management</i>				
Placed or chose Virtual		-.287	-2.303	.025*	-.080
# of yrs. Teaching online		.067	.537	.593	.004
Had on line training		.100	.803	.426	.009
Taken online AQ					
Collaborated with Colleagues					
Willingness to teach online		.251	1.965	.055	.058

	<i>Use of computers and technology</i>			
Placed or chose Virtual	-.112	-1.076	.287	-.011
# of yrs. teaching online	.209	1.991	.052	.039
Had on line training	.323	2.491	.016*	.062
Taken online AQ	-.534	-4.162	.001*	-.171
Used LMS	.365	3.381	.001*	.113
Collaborated with Colleagues	.202	1.833	.073	.033
Willing to continue to teach online	.308	2.727	.009*	.073

Note: a Standardized coefficient b squared semipartial correlation

Experience Teaching Online

In contrast to previous research that identified experience as a predictor of higher efficacy for teaching (Tschannen-Moran & Woolfolk-Hoy, 2001) and online teaching (Horvtiz et al., 2015; Northcote et al., 2015; Robinia & Anderson, 2010), Phase 1 of this study showed no significant relationship between experience teaching online and teachers' overall sense of efficacy for teaching online in the context of the initial transition of the pandemic (Dolighan & Owen, 2021). A significant correlation was found between number of years teaching online, $r=.183, p=.036$ and the subscale *instructional strategies*. The independent relationship was confirmed in the regression analysis test $t=2.318, p=.025$. Teachers with online teaching experience may have believed in their ability to provide instruction online even though the

circumstances of the pandemic may have made the other teaching tasks difficult and impacted overall sense of efficacy for teaching online in the context of the pandemic. Analyzing the teaching tasks in context of the pandemic, Tschannen-Moran et al. (1998) referred to the relative importance of factors that make the teaching difficult as being weighed against an assessment of the resources available that facilitate learning. The pandemic may have influenced teachers' assessment and self-perceptions of teaching competence for teaching online even though they have experience teaching online. According to Tschannen-Moran et al., "the teacher judges personal capabilities such as skills, knowledge, strategies, or personality traits balanced against personal weaknesses or liabilities in this particular teaching context" (p. 228). It should be noted that of the 132 secondary teacher respondents, only 26 (19.7%) reported having three or more years' experience teaching online.

In the context of the initial stage of the pandemic, there was a distinction between the teaching tasks and responsibilities associated with ERT&L that teachers were asked to do and online teaching and learning or eLearning as it existed prior to the pandemic (Barbour, 2019). School districts across the province, in an effort to minimize the impact of the transition on students, imposed changes to grading procedures and limits to accountability for attending and participating in synchronous *Zoom* classes such as not requiring students to turn on cameras. Teachers felt these changes hindered their ability to hold students accountable, motivate them to do work and submit assignments, a finding that was reinforced by Marshall et al. (2020). Despite the differences between ERT&L and regular online teaching regarding teaching tasks and responsibilities, teachers who reported having experience teaching online had a higher sense of confidence with online instructional strategies that emphasized delivery of content. Prior to the pandemic, eLearning (online teaching and learning) in Ontario was entirely asynchronous and

the primary function of the teacher was content delivery (Barbour & LaBonte, 2018). Within the ERT&L context, teachers who had no training or experience with online teaching relied on traditional face-to-face content-centred teaching methods to manage a context that was unfamiliar (DeCoito & Estaiteyeh, 2022). In a survey of teachers in the United States, Marshall et al. (2020) found that some of the teachers reported feeling somewhat prepared to deliver content in the online context, but were unaware of the distinction between effective online pedagogy and ERT&L. It is not surprising that teachers would feel that they were capable of delivering content with which they were familiar, especially if they had extensive experience teaching and delivering content online. This finding did not hold true for experience teaching face-to-face as my study found no relationship between years of face-to-face teaching experience and efficacy for online teaching.

The ERT&L emphasis on content-centred instructional strategies that was used in the initial transition by both experienced online teachers and novice online teachers was seen as reflective of teaching online and reinforced the negative assumption that OT&L is inferior to in person teaching and learning (Hodges et al., 2020). The most consistent problem experienced by teachers, according to Marshall et al. (2020), was the inability to engage students in any meaningful learning. The lowest subscale mean found in Phase 1 of this study was *Student engagement* which is consistent with results reported by Marshall and colleagues. These authors found that teachers' most common response was that they were unable to hold students accountable or motivate students to do their work given that school districts had changed grading procedures so that students would not get a mark lower than they had before the pandemic transition to online. Engaging students may have been affected by teachers' perceived lack of ability to hold students accountable or motivate them to participate. Even seasoned online

teachers would have felt a similar lack of control and ability to motivate students with grades. It is confounding that no significant relationship between online teaching experience and use of technology and computers was found however, the mean score for *use of computers and technology* was the highest for all participants, $M = 6.58$, $SD = 1.35$, indicating that teachers surveyed, on average, felt they were capable between *some* and *quite a bit* on the survey scale. Teachers' use of computers to complete administrative tasks, research, and report grades may account for the higher mean perceived sense of efficacy with computers (Liu et al., 2017) and reinforces the need to distinguish between teacher use of technology and computers for administrative and professional use and the use of technology for effective learning. While the questions for *use of computers and technology* subscale were modified to reflect secondary teachers' experience from questions that were designed originally to measure nursing teaching staff (Robinia & Anderson, 2010), future use of this survey will need to consider self-efficacy for the use of technology in terms of pedagogical knowledge to measure specific uses of technology as it relates to online pedagogy, instruction, and student learning to provide a better picture of how to support teachers in training and PD (Mishra & Koehler, 2006).

Using a Learning Management System

The significant relationship between the teachers' use of the LMS across all subscales and overall efficacy score in Phase 1 of this study indicates teachers' sense of efficacy for the use of technology for teaching online was higher if they were already using the LMS provided by the school board in their everyday teaching prior to the transition to online. The LMS is a valuable tool for delivering and engaging with students regarding content and daily activities that are based online. As the transition to online teaching occurred in the spring of 2020, the LMS provided a teaching and learning bridge that was familiar to both students and teachers in the

midst of a difficult transition. One year later, survey findings revealed no significant correlations with using an LMS or using virtual tech support and overall higher levels of efficacy. However, significant correlations were found with use of an LMS and the subscale *use of technology and computers*. Elementary teachers were not included in the first survey during the initial transition.

Bandura (1986) discusses how efficacy in one area doesn't translate to all areas. The Teachers' sense of efficacy scale (TSES), developed by Tschannen-Moran and Woolfolk-Hoy (2001), reveal teaching tasks and responsibilities that are reflective of what teachers do day to day. The survey used in my study (TSEOT) is based on the TSES and is reflective of the tasks and responsibilities teachers face, although with the added subscale of *use of technology and computers* to reflect the online experience teachers encountered during the pandemic. In the context of the school district from which respondents were drawn, in the Phase 2 survey, teachers would have had the added task of transitioning to a new LMS platform to report grades and keep track of attendance if they had not previously made the transition voluntarily. Those teachers who had used the *Edsby* LMS platform for organizing course content and delivering course content prior to the board-mandated migration would have felt more confident with the use of computers and technology in the classroom and as they transitioned once again to ERT&L in January of 2022 in response to the second wave of the coronavirus. Those teachers who were assigned to the virtual schools would have been using the LMS platform for day-to-day instruction and collecting student work as well as administrative tasks from the start of the school year. Thus, experience using board provided technologies such as the LMS for teaching and administrative tasks may have had a positive impact on teacher self-efficacy.

However, the survey results in Phase 2 revealed no difference in teaching assignment between elementary and secondary teachers regarding familiarity and prior use of the *Edsby*

LMS platform. Given the difference in the populations of the two phases, it is difficult to draw comparisons. There are some important distinctions to be made. In Phase 1 of this study secondary teachers had access to an LMS provided by the board. Fifty-six percent of respondents indicated they were using the LMS in their face-to-face classrooms prior to the pandemic. Teachers who reported using an LMS had higher self-efficacy across all subscales and the overall score. The relationship between prior use of the board supplied LMS and higher teacher efficacy may stem from teachers' experience teaching eLearning courses using the *Brightspace* platform. The initial move to ERT&L drastically changed how students were to be assessed and even seasoned online teachers may have had confidence in delivering content and using the LMS but felt a loss of control and ability to impact student learning and hold students accountable (Marshall et al., 2020).

By the fall of 2020, the school board had invested in more professional training and resources to increase teacher use of the *Edsby* LMS for recording marks, attendance, and reporting grades. Significant support and resources were allocated to transition teaching staff to the *Edsby* LMS platform for administrative tasks as well as student assessment, collection of student work, and communicating with parents (a feature of the platform allowed parents to track their child's progress). Seeing the advantages of the *Edsby* platform for teaching online may have been clouded due to the context of the pandemic and the perception that additional tasks were being introduced to teachers' daily routines without appropriate communication, consultation, and training. The stress of the ongoing pandemic health and safety measures, an additional transition to ERT&L at the beginning of 2021, and the challenges of learning new technology may have compounded feeling a loss of control and anxiety from job related stress that impacts teachers' sense of efficacy for teaching (Pressley & Ha, 2022).

Support and Training for Teachers Teaching Online

What was evident and consistent with the research on teacher efficacy for online teaching in both phases of this study was the connection between higher perceived efficacy for teaching online and access to real-time tech support and having had online teaching training. In Phase 1, access to virtual tech support showed a significant independent relationship with the overall TSEOT score and all the subscales except the subscale *online classroom management* $t=1.909$, $p=.059$ (see Table 3). Higher teacher efficacy for teaching online is related to training and accessing ongoing support (Northcote et al., 2015). In my study, no significant relationship was found in the linear regression test for each of the independent variables, *had online PD training* and, *taken online AQ* with the overall TSEOT scores. However, 88% of participants transitioning to online teaching in the initial stages of the pandemic reported having no online training. This could explain why higher efficacy was found for those who accessed real time virtual technology support to solve problems as a main source of support during the initial transition. Chan et al. (2021) point to the sudden transition to online teaching and lack of training for teaching online as a source of stress and burnout. Stress and burnout negatively affected teacher retention rates, diminished teachers' perceived performance, and, ultimately, negatively affected student learning. Having had online training PD was an indicator for higher efficacy scores in the second phase of this study for overall TSEOT scores and all subscale scores except *online classroom management* (see Table 5). Phase 2 of this study examined teachers' experience and efficacy levels in the context of already working through the initial transition. The context of the pandemic and challenges faced by teachers transitioning to online with little or no training highlights the need for specific online training and support in terms of ERT&L preparedness.

Ongoing professional learning (PL) for use of technology and online teaching supports the challenge of coping with constant and even sudden change (Marshall et al., 2020). The authors suggest that incorporating digital learning days as a regular part of the school year so that teachers and students can become familiar with the online learning setting could affect teacher and student self-efficacy in a positive manner. Teachers who incorporated digital learning either with the *Edsby* platform or the *Brightspace* (D2L) platform were more confident teaching online in the initial stages of the pandemic and were better equipped to manage the change compared to teachers who were not using either LMS platform (Dolighan & Owen, 2021).

Additional Qualification Courses Online

The initial Pearson Correlation test showed a relationship correlated with overall efficacy scores in both phases of this study and the survey subscale *student engagement*. There was no linear relationship established with taking an online AQ and any of the overall TSEOT scores or subscale scores in Phase 1, suggesting the transition to ERT&L may have been more about surviving than thriving (Moorhouse & Kohnke, 2021). Eighteen percent of secondary teachers surveyed indicated they had taken an online AQ course. When asked if AOs adequately prepare for online teaching, on a Likert scale of 1 to 5, teachers responded slightly disagree to neutral $M = 2.78$. In Phase 2, significant relationships with overall TSEOT scores and all subscales except *online classroom management* were found to apply to the larger population (see Table 6). AQ courses delivered in an online context provided examples of effective online pedagogy and opportunities for teachers to engage subject content in a digital context and can be an effective starting point for ongoing collaborative professional learning. Recent updates in 2019 to online AQ courses developed by the Ontario College of Teachers included the expectation for embedding strategies for the use of technology and communication tools that support

pedagogical practices and programs that reflect the ethical use of technology in support of learners' safety, privacy, and well-being (Ontario College of Teachers, 2019). Since AQ courses are integral components of PD for teachers in Ontario, further research could examine the effectiveness of online AQ courses as an element of teachers online training and PL. The opportunity for teachers to learn while doing in an online context can support learning about content knowledge and digital pedagogies. Mishra and Koehler (2006) developed the TPACK framework that encompasses understanding and communicating representations of concepts based on using technologies and pedagogical techniques that apply technologies appropriately to teach content in differentiated ways that reflect students' learning needs. The framework would be useful in future studies that explore the effectiveness of online AQ courses on teacher efficacy for online teaching.

Teaching at the Virtual School

Teachers who taught in virtual school placement scored significantly higher across all subscales and the overall score for self-efficacy. Efficacy scores across all subscales are associated with significantly higher scores if those virtual school teachers chose the virtual placement. Chan et al. (2021) suggest teacher autonomy is an important factor for teacher well-being. If teaching online is a choice and is selected by teachers, it is likely there is a level of perceived competence and positive attitude toward online teaching amongst those teachers who opted into teaching. Teachers who were placed in the virtual schools were online with students from the start of the school year in 2021. They did receive specific online training and had access to technical support from onsite and virtual support staff and the support of colleagues who were located in the same building every day. Administrators in the virtual schools provided ongoing

support that was designed for virtual learning. Do you need a sentence to link those who were “placed” in virtual schools to perceived self-efficacy?

Collaborating With Colleagues

As the pandemic persisted into the second school year (2020-2021), teachers collaborated to solve problems, learned how to use online technology, and created learning experiences for students. Significant correlations were found with teachers who regularly collaborated with colleagues; teachers who would continue to teach online and the dependent variable measure of the overall TSEOT scores, $t=2.092$, $p=.042$ (See table 5). The only subscale that showed a significant relationship with *collaborating with colleagues* was *instructional strategies*, $t=2.493$, $p=.016$ (see Table 5). Teachers felt more efficacious sharing instructional strategies and solving technology problems associated with instruction for the online setting. This study’s finding that higher efficacy for online teaching was associated with teachers who collaborated regularly with colleagues aligns with the positive influence of supportive culture on teachers’ use of technology reported by Jung et al. (2019). Based on Schein’s (1985) organizational community and culture model, the professional learning community (PLC) framework increases participants’ feeling of self-efficacy for making change. While the PLC is an intentional use of professional collaboration, my study reported that teachers shared resources and collaborated based on the immediate need to try to improve student learning in the online context. PLCs offer a framework for ongoing professional learning for online teaching and learning as teachers, students, and parents transitioned from the pandemic to the emerging new normal (Hill, 2020). DuFour et al. (2016) describe PLCs as:

an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve.

PLCs operate under the assumption that the key to improved learning for students is continuous job-embedded learning for educators. (p. 10)

PLCs are people oriented not system oriented and are driven by teachers' inquiry and a framework that focuses the collaborative work on improving learning (Tschannen-Moran et al., 2000).

Willingness to Teach Online

This study's findings revealed teachers who are willing to continue teaching virtually, if given the choice, have significantly higher levels of online teaching efficacy. Teachers' willingness to teach online showed a significant correlation with all subscales and overall TSEOT score. The results of the regression test showed that all but the relationship with online classroom management subscale scores transfer to the larger population.

Teachers who reported experiences of collaborating with colleagues and accessing technical and pedagogical design support contacts have significantly higher levels of online teaching efficacy. Chan et al. (2021) found teachers who felt a sense of belonging and connectedness and were able to collaborate with colleagues to learn and solve problems were associated with teacher well-being. A major issue that resulted from the challenges and struggles of suddenly transitioning to online teaching due to the pandemic was the reinforcement of the view that online teaching and learning is inherently inferior to face-to-face instruction. There are some who might assume that the remote instruction offered in spring 2020 was typical of OT&L, validating their perception that online teaching is not as effective as teaching face-to-face (Hodges et al., 2021). Understanding the difference between ERT&L and OT&L is an important step toward countering the stigma that online learning is inferior to face-to-face.

Teaching Assignment

Elementary teachers who teach in primary and junior division had an initial correlation with the subscale *student engagement*. However, the regression analysis showed this did not translate to the larger population which included secondary teachers. This finding may suggest that teachers' experience of the pandemic and transition to ERT was similar and not related to teaching assignment. Jung et al. (2019) suggest there are differences between elementary and secondary teachers' use and integration of technology due to the differences in curriculums and teaching practices. While online teaching was not exclusive to secondary teachers, eLearning in Ontario prior to the pandemic was exclusively for secondary students. Elementary teachers' initial pre-service training and professional development focused on teaching strategies that support in-class learning. This approach to initial teacher education and PD amongst elementary teachers and sudden changes caused by the pandemic, compounded by insufficient training in online teaching methodologies (Archambault et al., 2016), led to teachers experiencing increased stress and workload (Allen et al., 2020; Carver-Thomas et al., 2021). The difference between elementary and secondary teachers' efficacy for online instruction in terms of student engagement online could be explained by the different emphasis on task-oriented teaching amongst elementary teachers versus a more performance-oriented teaching in secondary schools (Midgley et al., 1995). Performance driven learning, such as quizzes and tests, also aligns with perceived traditional modes of instruction and assessment associated with online instruction (Hodges et al., 2021).

An examination of the variables that influenced teachers' sense of efficacy for teaching online during the pandemic is helpful when identifying what to focus on to build supports for teachers to better implement ERT&L and integrate online technology into daily learning post-

pandemic. Positive teacher efficacy creates positive outcomes for students and an enriched learning environment (Tschannen-Moran and Woolfolk Hoy, 2001), and, although more research needs to be done to investigate if the same holds true for online learning environments, recent research is pointing to a similar relationship between student learning and positive teacher efficacy for OT&L (Dolighan & Owen, 2021; Northcote et al., 2015; Pressley & Ha, 2022).

Phase 1 of this study revealed a need for immediate and timely support for teachers who were dealing with the initial sudden change to online teaching and learning in the difficult context of a global pandemic. The study in Phase 1 in the initial stages of the pandemic highlighted how challenging the unprecedented shift to ERT&L was and how different ERT&L is from effective online teaching and learning in normal times. As the pandemic persisted and the context changed with multiple teaching modalities being employed, further investigation was needed to better understand how to support teachers and develop strategies for moving forward post-pandemic in an increasingly digital world.

Phase 2 of this investigation sought to understand teachers' experience in greater detail in context of a changing teaching environment that posed challenges for teaching and well-being. The relationship of each of the variables examined (i.e., choosing virtual placement; experience teaching online; having online training; taking an online AQ; collaborating regularly with colleagues and having a willingness to teach online) were positively correlated with teachers' sense of efficacy for teaching in online contexts during the pandemic. One year into the pandemic, teachers now had some online teaching experience from the initial transition as well as a second transition to fully online as COVID-19 and new variants of the disease surged in Ontario and across the globe.

CHAPTER FIVE: QUALITATIVE RESULTS AND DISCUSSION

The need to further explore the experiences of teachers teaching online emerged due to the changes imposed by the Ontario Ministries of Health and Education and school boards in response to the continuation of the COVID-19 pandemic into the 2020-2021 school year. According to Hill (2020), there were four phases of “education’s” response to the pandemic. Phase 1, the initial transition to emergency remote learning; Phase 2, (re)adding in basics of teaching and learning; Phase 3, extended transition during continued turmoil; and Phase 4, the emerging new normal. Labonte et al. (2021) identified the 2020-21 school year as being in Phase 2 and, for the most part, in an emergency remote teaching and learning (ERT&L) mode. The second phase of my study included the TSEOT survey used in the first phase of my study but changed some of the variables to reflect the situation. The survey was administered in the spring of 2021, one year after the initial survey. Participants in the quantitative TSEOT survey were asked to describe what they feel is the most pressing issue regarding PL and support for teachers designing and implementing online learning environments. Overwhelmingly, the responses reflected a need for time and resources. Responses to the question ($n = 233$) were coded and organized by themes that emerged from the responses. The data were then merged and compared with the subsequent semi-structured questionnaire.

The first part of this chapter begins with a description of the analysis and code development. This section describes the process of code development, the content of those codes, and decisions that aided in combining or blending codes to identify relevant emerging themes.

Next, analysis was conducted at the question level to identify common experiences of teachers teaching online such as barriers, successes, and concerns. Responses to the questionnaire were reviewed and organized by question to identify common themes. From the

first review of experiences in Phase 2 of the study, the literature was reviewed again to help identify issues and problems faced by novice online teachers that were used in the development of the initial codes (Dichev et al., 2013; DiPietro et al., 2008; Northcote et al., 2011). For example, difficulty engaging students online was a common theme reported in the literature (Northcote et al., 2011; Taimur et al., 2021) As the data from the participants were reviewed, experiences were identified and labeled. During this process, the code list was reviewed for redundancy. For example, initially the code list included concepts for “not enough training” and “lack of technical training” which seemed to describe the same experience of lack of training and support. The process of constant comparison of responses for each question was done using NVivo software, version 12, to code responses (organize into nodes in *Nvivo*). Eventually nine themes of teachers’ experience emerged (see Table 6). The *Nvivo* software tracked the frequency of responses per code and the participants or files associated with each node. Responses were also reviewed for tone or sentiment to gauge teachers’ experience as either negative, positive, or neutral. Sentiment nodes were included with responses and organized by theme in *Nvivo*. Sentiment attribution was used to further define themes. An example is the theme of *difficulty engaging students* was refined to *student engagement* since some of the experiences teachers reported were positive and successful accounts and some were negative accounts expressing difficulty or frustration.

In this chapter, teachers’ voices, in the form of quotations from responses, are used. Using teachers’ voices is important as the quotations illustrate the themes that emerged in the analysis and give an authenticity to the findings beyond frequency of responses in a particular theme.

The participants are teachers in the teachers' self-efficacy for online teaching (TSEOT) survey. These teachers ($n=30$) were identified as continuing to teach online in the new school year (2020-2021) and were invited to provide greater detail of their experience of teaching online. Nineteen responded and agreed to participate (66%). Eight were secondary in person teaching, three were secondary virtual, two were elementary in school, and six were elementary virtual. Seventeen of 19 respondents had two or less years of online teaching experience. In the semi-structured questionnaire, participants were asked to describe strategies that worked to promote student engagement and learning online. Participants were then asked what they felt they still needed to learn with regard to effective online pedagogy and how they felt the pandemic affected teaching and learning online. Data from the questionnaire were collated and analyzed and then compared with each other to determine focus categories. Using thematic analysis responses were coded and organized into themes that emerged from the responses (de Lucas Ancillo et al., 2021; Lapadat, 2010). Table 6 contains the nine themes that emerged from analyzing the data. Responses were then assessed as positive or negative sentiment based on how the statement reflected aspects of their experience.

Table 6

Qualitative Response Themes

Themes	Frequency	Positive sentiment	Negative sentiment
Assessment for online learning	22	8	14
Home support for families	9		9
Online instruction	12	3	9
Personal growth and learning	3	3	
Stress, anxiety, and exhaustion	26		26
Student engagement	71	25	46

Time to learn and prepare for teaching	56		56
Training resources and support	96	1	95
Use of technology	49	11	38
Total	344	50	293

Analysis

This study aimed to identify how best to support teachers in online teaching at the K-12 level. Overwhelmingly, the teachers who were asked to elaborate on their experience teaching online reported a lack of training for online teaching, lack of resources, and support as the greatest barriers to effective and engaging online teaching. These themes are consistent with recent research literature (citation).

A related theme was *time to learn and time to prepare for teaching*. Teachers indicated even with resources provided by the board, there was little or no time to learn how to use the resources, assess their appropriateness to the learning needs of students, and implement and integrate the resources into their daily teaching routine and curricula. Respondent 13 noted,

Some resources were sent out by the board, but you literally had no time to go through everything. It all seemed so overwhelming. I tried to be the best online teacher, burnt myself out at the beginning and then learned that I don't need to recreate everything myself and learned to use resources that were created by others online.

Stress and exhaustion also emerged as a related theme to the theme *time to learn and prepare for teaching*. One teacher reflected the strain of the lack of time saying, “not enough time is given to learn. I've also noticed that the “help” is offered over lunch, when I really need a break from screen time” (Respondent # 71). Another teacher indicated that lack of time to adequately support students was a problem,

Lack of time. The amount of work needed to support students in this learning environment was astronomical. This meant that most preparation had to be done in the evening. Weekly workloads (when teaching two courses in the quadmester model) were in the 60-80 hours per week range. (Respondent # 47)

Time, or lack thereof, for PL, for supporting students, and for personal and family needs was a constant theme emerging through the teacher responses. Time, or lack thereof, also affected how teachers collaborated one with another.

Collaborating with colleagues improves self-efficacy. In this study, teachers who reported collaborating with colleagues often-to-regularly had a higher sense of overall efficacy. Those who reported collaborating with colleagues had higher efficacy for the subscales *student engagement, online instruction, and use of computers and technology*. The reality of the transition to emergency remote online teaching requires a different approach to how support and access to resources for online teaching is done. This elementary teacher describes how valuable collaborating with colleagues was,

I pushed through to the end of the year with the support of 2 fabulous teaching partners, and there's another key element ... I collaborated with OUTSTANDING [*sic*] grade partners. We split the planning on heavy subjects (Lang, Math & Sci/SS) so we could share polished lessons and activities. That was also a major support to my teaching.
(Respondent # 11)

This teacher reinforced the sentiment that collaboration and professional support networks positively affected teacher self-efficacy and making the workload more manageable.

In contrast to findings of the study by Dolighan and Owen (2021) at the initial stage of the transition to OT&L, this phase found online teaching experience was revealed to have a

correlation with higher overall efficacy. Yet, 85% of respondents reported having two or less years of experience teaching online, indicating that their only experience teaching online was during the pandemic. The lack of online teaching experience (i.e., less than two years' experience) appears not to be a barrier to teaching online effectively. Teaching in the virtual setting had some positive influence on the teachers who responded to the qualitative semi-structured questionnaire. This outcome is supported by the results of the Phase 2 survey which demonstrated that a positive attitude and willingness to continue teaching online is associated with increased efficacy and capacity to learn to teach online more effectively. One secondary virtual school teacher with three years' face-to-face experience and one and a half years' online teaching experience described success adapting to the synchronous *Zoom* sessions in the virtual school:

Group work in breakout rooms with the use of whiteboard.fi so I can see what they're working on. "Hands-on" activities, with the use of online simulators (i.e., PHeT) - small group conversations. The use of the *Zoom* chat [meant] students could [send a] private message to me, alleviating the anxiety of answering questions in front of a class. Creating a safe space; inclusion of "Fun Fridays" so students could get to know one another.

(Respondent # 3)

Teachers who were new to teaching online but had extensive experience teaching face-to-face also adapted to the online teaching environment and expressed personal professional growth around assessment practice. One elementary virtual school teacher, who had 24 years' face-to-face teaching experience and 1.5 years online teaching experience, expressed their adaptation to online teaching as:

Games, humour, and community building activities. Teacher flexibility, especially regarding assessment. Tests, quizzes, and anything to be evaluated always created tension, so I've never "triangulated" my assessment more in my career than this year. Observation of student understanding by listening to them talk, interact with each other, and find success in game-based activities or group work was very important. (Respondent # 11)

Thus, online teaching, even during a pandemic, had a positive impact on some teachers' capacity to improve their professional practice and to see how online teaching could improve their teaching and student experience once they returned to face-to-face environments.

This study's findings identified several concerns or troublesome issues (Perkins, 2006) that teachers experienced transitioning to and adapting to ERT&L. The study's findings also identified teachers who have overcome barriers, adapted, and demonstrated that sound pedagogy is a critical component of online learning. The higher self-efficacy TSEOT scores of both secondary and elementary virtual teachers suggest that the daily experience of virtual teaching was closer to actual non-emergency online teaching than the transition to emergency remote that reoccurred in the second year of school in the pandemic. The Phase 2 TESOT survey data showed a positive correlation with online teaching experience and teacher efficacy. All but two of the qualitative questionnaire respondents who were teaching in virtual schools reported having two or less years of online teaching experience. Seventy-four percent of respondents referred to using technology and sound pedagogy to foster student learning. Given the higher sense of efficacy for online teaching in the teachers who indicated they would continue to teach online and those who chose the virtual school, having a positive attitude and willingness to learn offers a potential for peer leadership for online teaching and learning. The TESOT survey data show

positive correlation with online teaching experience and teacher efficacy $r=.206, p=.001$. In addition, 53% of qualitative questionnaire respondents who reported having two or less years of online teaching experience referenced using technology in effective ways to foster student learning. One participant noted, “the use of breakout rooms was effective for group work (when synchronous learning was possible) ... I had to use breakout rooms, use video, audio, and computer technologies/formats for teaching and for student presentations, discussions” (Respondent #15). This also showed how success with student learning can be integrative and transformative in an online setting for novice online teachers (Meyer, 2010; Northcote et al., 2011; Perkins, 2006). Two elementary virtual school teachers described their transformation as positive and illustrated the similarities between face-to-face teaching and online teaching, with one noting “I have learned a great deal over the last year and a half, and believe I need to continue learning in general regarding the similarities and differences of online versus traditional schooling” (Respondent #18). Respondent 17 shared the following:

I really enjoy teaching online. I feel with each new challenge that presents itself online there is an opportunity for professional development and growth in this area. The more exposure we as educators have to platforms that are effective, the more we are able to enhance the online experience for our students... I think it contributed to more professional growth in learning how to effectively teach online. It enabled teachers to see what platforms were successful in keeping students engaged and which ones were effective to use to assess their learning online. I think it also gave students a variety of ways to show their learning in a format which was suitable for them and enhanced their exposure to online programs which facilitated this. (Respondent #17)

The context of the pandemic and the necessity to adapt to new modes of teaching may have accelerated the willingness to use technology that had previously been lacking (Donnelly et al., 2011; Ertmer et al., 2015). Tondeur et al. (2012), in their systematic review of the literature, found that learning experiences with technology have the potential to change teachers' beliefs towards more student-centered, constructivist beliefs. My evidence suggests that the experience of teaching online may have changed some teachers' beliefs about OT&L as a viable learning environment and demonstrated how sound pedagogy is essential for teacher effectiveness in both environments.

Student Engagement

Teachers who participated in the qualitative portion of the study referred to student engagement as the second most frequency factor ($n = 71$) and an area of both concern due to lack of success and an area of success with engaging students online. One teacher expressed, "I felt it was very difficult to engage students. Many checked out early, some didn't want to be seen on camera, they were bored, or some were anxious. In the older classes there was little to no conversation with peers" (Respondent # 13). Although student engagement was identified more frequently as a challenge or barrier, 35% of the references to student engagement reflected positive experiences and successes. One example of this challenge was included in Respondent 2's observation, "It definitely took longer for students to feel more comfortable and [for me] to connect with them than it would have taken in face-to-face schools, but once the rapport was established, it actually went much smoother than I anticipated" (Respondent # 2).

The link between teacher efficacy and student engagement is well established for face-to-face classroom learning (Good & Brophy, 2003; Martin et al., 2012; Tschannen-Moran & Woolfolk Hoy, 2001). The connection between individual teacher efficacy and student

engagement in K-12 online contexts is not well studied and individual teacher efficacy and student engagement in K-12 online learning has not been well established (Chiu, 2021). The pandemic has sparked a surge in research into K-12 online learning and these connections are being established. As reported in the quantitative portion of this study, teacher efficacy was significantly correlated with student engagement in both phases of the TSEOT survey. Also, in both phases the mean score for student engagement was the lowest among subscales Phase 1 $M = 4.73$, $SD = 1.13$; Phase 2 $M = 5.23$, $SD = 1.44$. While no statistical comparisons can be made between the phases due to population differences and anonymity of respondents, it is notable that teachers' reported sense of efficacy for student engagement was the lowest in both phases. Taimur et al. (2021) found that teachers moving to virtual teaching during the pandemic reported a decrease in student engagement in the virtual setting compared to the face-to-face setting. Teachers who responded to the qualitative portion of this study attributed lack of student engagement to student lack of access to required technology, unfamiliarity with the use of technology by teachers and students, and students feeling uncomfortable using the cameras in synchronous sessions. One teacher noted, "I think some students weren't as engaged and weren't able to stay focused online. I think having their cameras on [is an] issue to ensure their engagement and understanding" (Respondent # 16). The challenges of using cameras in synchronous sessions also provided opportunity to innovate and meet student needs. Respondent 2 reported, "giving opportunities for student to share their answers in the chat rather than speaking their answers - so many were uncomfortable turning their cameras on during class, but this was a way for them to engage they felt comfortable with" (Respondent # 2). Students may have been reluctant to use cameras for many reasons, including the intrusion into personal and private spaces that such cameras permitted.

The Use of Technology

Similar to the theme of student engagement, the theme of technology emerged initially as a barrier only, but was refined to include successes as effective uses of technology to teach were identified in teachers' responses. While difficulties and challenges learning new technology dominated the frequency of responses ($n = 38$), there were a substantial number ($n = 11$) of responses that described using technology to engage students and create collaborative learning experiences. The pandemic may have created opportunities for teachers' use of technology in teaching that would not have occurred otherwise. The effective integration of educational technology may have depended on the attitude and willingness of teachers to learn and implement the technology for student learning (Ertmer & Ottenbrite-Leftwich, 2010; Tondeur et al., 2012). The results from the TSEOT survey in Phase 2 revealed teachers who were willing to continue to teach online $N = 264$; $r = .484$, $p = .001$ and those who chose virtual school placements $N = 61$; $r = .337$, $p = .008$ had higher overall efficacy for teaching online. The qualitative responses reflected similar attitudes amongst teachers who described being willing to learn and implement new technology to enhance student engagement and learning. This teacher reflected, "I still need to learn to master all aspects of every technology I use in online teaching. I learn more each time I teach an online course but wish to continue to make courses more engaging and interactive within the limitations of largely asynchronous environments" (Respondent # 15). If, on reflection, teachers see the value in students learning with technology, they are more likely to use those technologies in their teaching practices (Ertmer et al., 2015). To see value, teachers need to be able to see and understand the positive effects that an innovative technology has on student learning and be open to trying that and related technology as they can see the potential value for the student, even if they have not mastered the technology and its

applications. Respondent 15 said, “teaching during the pandemic forced me to teach in new ways, which was a silver lining of sorts: I had to use breakout rooms, use video, audio, and computer technologies/formats for teaching and for student presentations, discussions” (Respondent # 15). This teacher’s reflections show a positive sentiment toward PL to improve professional practice.

Only two specific references were made to hybrid learning and the concerns and challenges teachers experienced. It is possible that secondary teachers in the school district who returned to in class teaching at the beginning of the 2020-2021 school year did not associate hybrid or blended learning with online learning. The challenges may have stemmed from trying to fit an online context (hybrid) into an in-person modality that was a modification of the normal semester system to a quadmester system (four terms versus the more common two terms per year) that divided classes into cohorts that attended the class on an alternate day schedule to allow for social distancing. A study by Carl (2021) that examined teachers’ efficacy and technology acceptance found teachers’ perceived ease of use towards instructional technology was higher in a remote setting than a hybrid setting. The author suggested the difference is the dual modality and difficulties trying to fit remote strategies into a face-to-face setting. The difficulties identified by teachers in my study were associated with managing students online while trying to manage a classroom of students:

In the quadmester system, if we have 2 classes to teach then there's no time to prep (the partnered-up teacher is not usually of the same discipline so it is of no help - in fact it would take more prep time to utilize them). Also, for the hybrid [concurrent] model, it is unsustainable to provide the required support to both students in front of you and those joining from home. Education of all suffers (Respondent # 39).

This teacher's experience illustrates some of the limitations to effective planning and design such as collaboration between students in a concurrent teaching model. This teacher's experience also shows the need for time – time for professional learning and time for preparation to adapt to new teaching environments.

Blended or hybrid learning can be effective if it is designed and implemented in a way that leverages the advantages of asynchronous learning and synchronous learning (Beatty, 2019). The need for training and support for the effective use of online technology extends to the hybrid model which can be a viable way to accommodate students who cannot attend classes in person due to illness, quarantine as illustrated by the pandemic or other health issues.

Online Instruction and Assessment

This study identified troublesome knowledge (Perkins, 2006) or barriers to online teaching. Two themes emerged from teachers' experience of online instruction and assessment of student learning in the context of OT&L (i) *assessments for online learning* and (ii) *online instruction strategies*. I will first address assessment of learning in the ERT&L context.

Assessments for online learning: Many of the teachers' reflections cited difficulty transferring what was done in assessment practices in a face-to-face classroom to the online context. Not being near to or in proximity with students to deter potential cheating was uncomfortable for many teachers. One teacher described the challenge of online assessments as not being able to prevent cheating and effectively assess student learning, "given the technology available, the reality of tests and quizzes is they were all open book and students could freely cheat. Whether that was the case or not, I know teachers gave multiple versions of tests to try to alleviate it, but I don't think it could be fully avoided" (Respondent # 3). Another teacher described developing assessments that prevented cheating as challenging in the online context

and questioned the validity of assessments. The challenge was described as, “developing assessments that are as valid as those used in a classroom setting (with respect to assessing what a student knows and preventing academic dishonesty)” (Respondent # 44).

According to Galenti et al. (2021), effective online assessment reflects student-centred assessment design that integrates formative and summative assessment to provide evidence of learning that includes the process of learning. This can be achieved by designing assessments that support student learning through student interaction, peer-assessment, and self-assessment. Student engagement and deeper learning are related to the clear communication of learning expectations, use of multiple sources of evidence, support for learners as members of a community, and timely and ongoing feedback (Gikandi et al., 2011). The use of technology and digital tools in the virtual classroom can “provide a unique opportunity to reimagine the siloed roles of formative and summative assessment” (Galanti et al., 2021). The data presented in this study revealed that of the 22 teacher references to online assessment, academic dishonesty or cheating were mentioned explicitly in four of the 22 references. Tests were mentioned seven times. DeCoito and Estaiteyh (2022) found teachers used what was familiar to them due to the initial sudden transition to online teaching and little or no training to effectively engage in online teaching. The experience of OT&L during the pandemic moved some teachers to re-evaluate their own assessment practice:

The pandemic created an almost instant acceptance of the viability of online teaching and learning. The pandemic caused many teachers (myself included) to “dive in” and learn to use technologies and platforms like *Zoom*, *D2L*[LMS] and *Edsby* [LMS]. Teachers had to learn to assess and evaluate students in ways other than pen and paper tests (Respondent # 15).

Thus, a positive outcome occurred despite the absence of formal training or PD for online assessment: several teachers described using technology to expand how students could demonstrate learning. One teacher noted, “the use of video and audio submissions for student work was an effective addition to typed assignments, and could be done through *Edsby*, email or *D2L*” (Respondent # 15).

The theme *online instructional strategies* was deemed a separate theme from *assessments for online learning* even though many of the descriptions of teachers’ experiences referred to related challenges such as difficulty engaging students in the synchronous teaching sessions and not being able to see and monitor students during summative assessments. As the pandemic persisted through the 2020-2021 school year, teachers had experience teaching online and experience using the board provided LMS. The return to the face-to-face classroom in September 2020 required that some teachers teach in blended learning environments. Pulham and Graham (2018) indicated that learning to use a LMS was the top technology skill for teaching in blended learning environments. Dolighan and Owen (2021) found that teacher efficacy was higher during the initial transition if the teacher was using the LMS prior to switching to online modes of delivery in the initial stages of the pandemic. Similarly, Phase 2 data analysis revealed correlations with the using the LMS and higher perceived efficacy for the subscale *use of computers and technology*. Most references to using the LMS platform (either *Edsby*, *Brightspace/D2L*, or *Microsoft Teams*) related to instructional and administrative problems which may explain the increased use of an LMS in Phase 2 by all teachers but no indication of increased efficacy except in the subscale *use of computers and technology*.

Some teachers described using the LMS in creative and innovative ways to integrate assessment of student learning. This teacher described their experience this way, “the use of

video and audio submissions for student work was an effective addition to typed assignments, and could be done through *Edsby*, email or *D2L*” (Respondent # 15). Many LMSs have data tracking systems that help teachers adjust individual student instruction and use formative assessment and feedback in a timely manner to improve individual student learning (Pulham & Graham, 2018). As teachers gained more experience with online teaching contexts, their confidence and efficacy for providing effective learning experiences increased. Even though the experience of many participants was two years or less with online teaching and only in the context of the pandemic, this observation is consistent with some teachers’ description of their experience using the LMS as well as instructing and assessing online.

Mental and Physical Well-Being

Stress, anxiety, and exhaustion were dominant themes that emerged from teachers’ descriptions of their experience teaching online in the pandemic even though no specific survey question addressed teacher sense of well-being. Pressley and Ha (2022) link teacher efficacy to stress and anxiety levels. Under normal (i.e., non-pandemic) circumstances, teaching online can be stressful and exhausting when teachers first transition to online instruction (Horvitz et al., 2015; Northcote et al., 2011, 2015). The added stress of pandemic restrictions and personal and family health concerns compounded the stress teachers experienced when transitioning to online teaching (Pressley & Ha, 2022). Acknowledging that they were unprepared to teach in an online setting due to a lack of training, resources, and support was the most common experience teachers referred to in this study. A lack of awareness of available resources or feeling there was insufficient time to prep lessons and learn online teaching/pedagogical best practices contributed to stress, anxiety and exhaustion that negatively affected teachers’ sense of efficacy. Respondent #144 shared, “not enough time to learn the variety of apps, techniques, tools, and skills as well as

plan and prepare for content delivery, assessment & evaluation, IEP [individual education plan] planning etc... OVERWHELMING!*[sic]*” (Respondent # 144). Moreover, the stress and anxiety of trying to manage teaching online from home extended to teachers’ families and students’ families and compounded the job-related stress teachers reported. One participant highlighted these tensions,

teaching during the pandemic was extremely difficult on our family unit. We had three boys ages 5, 7 and 9 and ... my husband worked full time. We were fortunate to have jobs during the pandemic, but mentally, we struggled to keep our family happy and engaged in school. As a teacher, I had parents email me that this was all just too much for them. I had many parents log on and their kids (kindergarten) would just be playing in the background and no one would be interacting with the class. They just didn't want to be marked as absent. (Respondent # 13)

This respondent’s remarks revealed an ongoing theme in much of the pandemic related literature – the negative impact that the pandemic had on students’ and teachers’ mental health and well-being (MHWB) (pandemic (Kraft et al., 2021; Pressley, 2021; Sokal et al., 2020a).

The mental well-being of teachers is integral for establishing a healthy and positive learning environment. Adding to the stress of learning to teach in a new (online) environment, teachers experienced challenges working from home and providing for children who were learning virtually at home as well (Marshall et al., 2020; Sokal et al., 2020a). Schaufeli (2017) found the absence of job resources and the presence of excessive job demands drained employees’ energy, which led to adverse outcomes such as burnout and anxiety. In the COVID-19 context, teachers’ experience of lack of resources and sufficient job resources contributed to lower efficacy and increased stress and anxiety (Sokal et al., 2020a). My study revealed the lack

of job resources, namely training for online teaching, online resources, and support, along with the lack of time to learn and prepare to teach as the foremost concerns of teachers who taught online during the pandemic. It is understandable that the lack of job resources perceived by teachers contributed to feelings of exhaustion, stress, and burnout as reflected in their responses to the questionnaire.

Home Support for Families

There was no specific question in the quantitative? portion that asked teachers about student access to technology and teachers. However, in the qualitative component of this study, teachers' responses highlighted support for students and families at home as a concern $N = 9$. Several responses referred to the need to support teachers who also had children at home learning. The connection to the theme of *stress, anxiety and exhaustion* is well established in the literature that has emerged on teachers' experience during the pandemic (Kraft et al., 2021; Pressley, 2021; Sokal et al., 2020a). The central concern that emerged from these nine references was student accountability. That is, teachers were concerned that they were not able to hold students accountable for their own work. Respondent 44 stated, "checking if students are completing work without parents doing it for them" as a concern. Marshall et al. (2020) found primary teachers expressed having difficulty with younger students who required parents to help them online. One primary teacher in this study articulated a unique challenge working with parents and students online, "online does not work when parents give the answers and do the work for their child. Nothing can prepare you for that! [There] are no resources to help kindergarten students manage online learning and you cannot differentiate instruction" (Respondent # 55). This expression of concern reflected teachers' lack of control over the learning environment, which they would exercise in a face-to-face classroom.

Teachers' concerns about learning environments also extended to issues of equity of access by students to educational technologies (computers, broadband capacity) from marginalized and/or rural regions of the school district. Some teachers indicated that students who did not have reliable access to the internet or a reliable device were at a disadvantage, but the number of concerns expressed were limited $N = 2$. In this case (as well as others), the school board made laptops available for students who did not otherwise have access to a viable learning device.

Conclusion

The findings of this study highlight areas of teacher concern with online teaching. The findings of this study demonstrate instances in which training, support, and personal experience can improve the capacity and confidence of teachers teaching online. The experience of teaching online in an emergency remote context as well as a remote context that includes several modalities such as blended learning and virtual learning provides an opportunity to reassess current practices that might involve more integrated technology that can enhance instruction, collaboration, and assessment, and ultimately, student learning. The findings in this study support and extend prior and current published research on K-12 online teaching and ERT&L.

CHAPTER SIX: RECOMMENDATIONS AND FUTURE RESEARCH

This study reinforces the need to develop a sound, evidence-based, collaborative professional development strategy for building capacity for online and remote learning. The recommendations emerge from the analysis of data gathered from the two phases of quantitative inquiry and the qualitative inquiry of teachers' experience of teaching in the context of the pandemic from Phase 2 as well as comparisons with the current literature on developing online teaching skills for K-12 teachers. The recommendations identified herein are aimed at teachers and for school and school board administrators. For teachers, the primary recommendations are to consider how they can develop skills, efficacy, and pedagogy for online teaching contexts. For administrators at the board level, recommendations are made to consider how to develop professional learning and training for teachers new to online teaching and how and resources that support online teaching and learning are allocated. Recommendations are made for operational or school level administrators who allocate resources at the school level and implement the professional development for online teaching and learning (OT&L) for staff. Finally, the recommendations are designed to help inform Ontario Ministry of Education officials involved in creating policy that provides consistency provincially.

Emerging from this study are nine recommendations for teachers, administrators and policy makers.

1. Recognize emergency remote teaching and learning (ERT&L) is distinct from online learning.
2. Leverage collaborative inquiry for ongoing professional learning (PL).
3. Foster and support teacher collaboration in the online context.
4. View assessment as an integral part of the learning process.

5. Value pedagogy and technology as interconnected.
6. Administrative support for collaborative teacher online professional learning.
7. Recognize the impact on mental health and well-being.
8. Cultivate positive attitude and willingness to teach online
9. Make connections with novice teachers and teacher preparation programs.

From each of these recommendations are actions that would have significant impacts on the quality of teaching and learning in Ontario schools in pandemic as well as post-pandemic teaching environments. These recommendations are evidence based and useful for both face-to-face classroom environments as well as blended and online teaching environments. These recommendations are discussed sequentially below. It is important to note that while these are individual recommendations, one may have an impact or consequence for others.

Recognize Emergency Remote Teaching and Learning is Distinct from Online Learning

Amongst the events that affected the educational experience of students and the work of teachers from the start of the pandemic in March 2020 was an emergency measure requiring a transition to online learning that was quite different from non-emergency online learning. This emergency measure, researchers have argued, prevented teachers and students from transitioning to effective online learning (Marshall et al., 2020). Attitudes that see online learning as inferior to face-to-face were reinforced by restrictive academic and administrative measures that hindered teachers from doing their jobs, thereby influencing teachers' perceptions of lower efficacy for teaching and students' ability to learn and be held accountable (Dolighan & Owen, 2021; Marshall et al., 2020). Compounding the frustration of increased job demands were the added stress and exhaustion produced by living with the pandemic (Merrill, 2020). A confounding result from Phase 1 of this study revealed no correlation between overall efficacy

scores and experience teaching online. The assessment of the teaching task by experienced teachers may have seen ERT&L as substantially different than the eLearning they had experience doing. This study captured teachers' frustrations as they attempted to adapt to teaching online, reinforcing the need to more effectively train teaching staff for emergency transitions to remote learning. Building capacity for using technology as a regular part of teaching in face-to-face classrooms could make future transitions to online teaching in an emergency smoother without the loss of integrity and effectiveness in the teaching and learning processes. Regular integration of online components in the school year would be an effective strategy for teachers to learn and integrate online technologies and pedagogies into their practice. This study revealed shortcomings with online instructional strategy and online assessment strategy that did not consider the context of the online learning environment and student needs. Marshall et al. (2020) recommended that digital learning days should be incorporated into the school year so that the transition to emergency remote learning is not as prone to teacher and student misunderstanding, resistance, and frustration. Using synchronous learning platforms such as *Zoom* and *Microsoft Teams* helped teachers and students connect in real time during ERT&L. Asynchronous delivery also offers benefits and advantages that need to be explored further (Barbour et al., 2020). Face-to-face learning can be enhanced by integrating technology and the flexibility that is an affordance of educational technologies. Familiarity with digital learning would support emergency remote transition preparedness (Marshall et al., 2020). Digital learning can be fostered by:

- Using existing technology such as a Learning Management System (LMS) as a platform for digital learning experiences as well as remote learning experiences that can be used in an ERT&L situation (Dolighan & Owen, 2021)

- Learning how asynchronous tools embedded in the LMS can be used for alternative ways for students to engage learning and present learning such as video responses and discussion forums.
- Using LMS platforms that offer ways to organize daily learning goals, tasks, and assignments that students can access anywhere, anytime (remote flexible) that would be the same face-to-face or remote.
- Incorporating aspects of blended and flipped classroom learning to develop self-regulatory learning skills for students and help teachers become more familiar with how online technology can help students develop self-regulatory skills (Barbour et al., 2013; Lock et al., 2017; Stevens, 2020).

Leverage Collaborative Inquiry for Ongoing Professional Learning

Seeing online learning as both public and collaborative is an important shift in thinking about online learning. Garrison (2017) describes the process of learning as, “cultivated in the complex dynamics of collaborative inquiry that support thinking and learning in critical and creative ways. Thinking and learning collaboratively is a necessity in the increasingly connected and complex knowledge society in which educators are tasked to develop the thinking and learning of students (p. 170).” Teacher professional learning, as part of the collaborative processes important for education, needs to support learning in critical and creative ways rather than be focuses on content transmission.

In response to the pandemic, educators utilized online tools to avoid a complete shutdown of the education system in Ontario, Canada and elsewhere. The results of this study support international research findings that have emerged from the pandemic experience that show teachers felt they lacked the training and support needed to effectively teach online and to mirror

best instructional practices in online environments (DeCoito & Estaiteyeh, 2022; Dolighan & Owen, 2021; Marshall et al., 2020; Pressley, 2021). For example, DeCoito and Estaiteyeh (2022) found that STEM teachers reported they prioritized content delivery over student-centred creative teaching strategies in the ERT&L context. The authors also found that teachers opted for more traditional forms of assessment online with quizzes and tests being the most used. DeCoito and Estaiteyeh (2022) concluded that in the stress and context of the pandemic, teachers “lacked the time and skills necessary to implement more authentic and student-centred assessments (p. 10).” The results of my study are consistent with DeCoito and Estaiteyeh (2022) and reveal the challenges faced by teachers due to lack of time, training, and resources to teach effectively online.

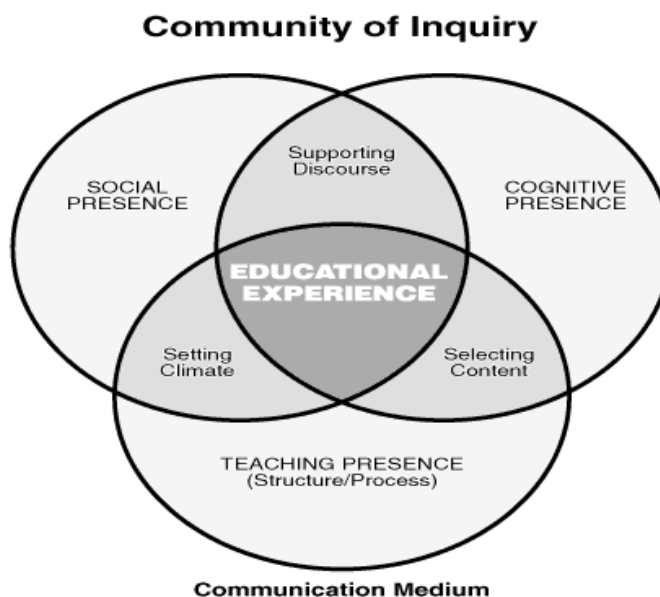
Overwhelmingly, the highest theme response by frequency was the need for *training, resources, and support* followed by *time to learn and prepare*. This study brought into focus the beliefs some teachers have about teaching and learning. Some teachers focused on specific issues of online assessment that reflected a competitive and siloed approach, which was reinforced by Respondent #3’s statement that “tests and quizzes were all open-book and students could freely cheat”. Garrison (2017) argues for the need to replace competition in education with collaboration, and that knowledge is created collaboratively and should be treated as a publicly shared good accessible to all. The pandemic exposed inequities and shortcomings of educational practice in Ontario and around the world. Online education can leverage connective opportunities to think and learn collaboratively (Garrison, 2017). The community of inquiry (CoI) framework developed by Garrison and colleagues (2000) provides a platform that is disruptive to the entrenched vertical educational structures and is open to learners regardless of time and distance. Not only is it useful for teacher PL the impact on student learning and

experience could be invaluable. Using the CoI framework as a foundation for designing and engaging in online teaching and learning would provide a basis for a process that has the potential to shift teachers' thinking and beliefs about teaching and learning (Garrison, 2017).

Garrison (2017) described the three constructs (teaching presence, cognitive presence, and social presence) (see Figure 1) as overlapping as they are applied to the learning experience. The learning experience happens at the intersection of these three constructs and in integrated digital space (Blayone et al., 2017). Garrison (2017) described the ability of eLearning to eliminate boundaries of time and distance and bring learners together as a CoI in a transformational way that reflects a connected and evolving knowledge society. The K-12 application of the CoI framework has shown students exposed to this approach “are more reasonable and more thoughtful, and that their teachers are not merely better at teaching specific subjects, but also are more effective in developing general thinking skills” (Lipman, 2003, p. 106). As education moves beyond the emergency measures imposed by the Ontario Ministry of Education and school boards in 2020 to deal with the pandemic, training for teachers needs to reflect additional job requirements and expectations of designing and implementing online learning for K-12 students.

My study examined the impact of transitioning to online teaching on teacher efficacy for teaching online and revealed a positive correlation with teachers’ sense of efficacy and collaborating with colleagues, having online training, and a positive attitude toward OT&L to meet that challenge. Teacher efficacy is linked to positive student outcomes and teachers who collaborate with each other build a sense of personal efficacy (Bandura, 1986; Goddard et al., 2004) as well as collective efficacy that sustains and reinforces the learning community (Donohoo & Katz, 2017). The collaborative teacher inquiry model for teacher PL proposed by

Donohoo and Katz (2017) complimented and supported the online CoI framework described by Garrison (2017), with the focus on teacher directed learning. Collaborative teacher inquiry begins with an inquiry question developed by the team of teachers that reflects their learning needs (Donohoo & Katz, 2017). Engaging in cycles of collaborative teacher inquiry and seeing an impact on student learning, the sense of collective efficacy increases. Measuring teacher efficacy and school collective efficacy for OT&L could provide an initial assessment for designing teacher support and learning as well as measuring progress for system-wide learning and capacity. Garrison (2017) pointed to evidence that the CoI framework supports the position that collaborative inquiry can be supported in eLearning and blended learning contexts (Garrison, 2017; Garrison & Arbaugh, 2007). Arbaugh et al. (2008) developed a CoI survey instrument that has a practical application for guiding the development of program design as well as assessing the effectiveness of a community of inquiry (Richardson et al., 2012) that would be useful for assessing teacher PL and building OT&L capacity for the school community.

Figure 1*Community of Inquiry Framework*

Note. (Garrison et al., 2000) © 2000 Elsevier Science Inc.

Foster and Support Teacher Collaboration in the Online Context

This study found that teachers collaborated with colleagues and directed their own learning on how to teach online one year into the pandemic experience. Teachers' sense of their own efficacy for teaching online was higher with those teachers who reported regular collaborations with colleagues to solve problems and to learn how to use technology for teaching $r = .166, p = .007$ versus those who did not collaborate. My study also included teachers who described collaborating with colleagues as helpful for tackling a heavy work load. Taimur et al. (2021) found teachers identified collaborating with colleagues as helpful for learning and sharing the load of creating online content. Teacher collaborations can build personal efficacy for teaching online and a school's collective efficacy to implement effective online teaching and learning (Goddard et al., 2004). Using the CoI framework for online teacher PL would give

teachers the framework to engage in collaborative ongoing professional learning with learning outcomes they establish based on their experience of online teaching and their specific learning needs. Donohoo and Katz (2017) describe how building teacher efficacy and collective efficacy affect student achievement. Belief in the collective capacity to make a difference impacts the diligence and resolve that teams will try to achieve their goals (Goddard et al., 2004).

Collaborative Inquiry offers a structure for meaningful collaboration that can increase teachers' knowledge about their collective work, and it reinforces team cohesion that ultimately builds collective teacher efficacy (Donohoo, 2017).

An important contribution to building a culture of collaboration is leveraging expertise and experience. Staff with more experience and advanced online teaching skills should be encouraged to engage collaboratively and share ideas, problem solve, and explore the use of technology and education technology software in the context of sound pedagogy (Northcote et al., 2011). It is important to accommodate diverse levels of skills and development. The findings from my study revealed a wide variation in the confidence levels of individual teachers to use technology for teaching. Developing a PL program that provides opportunity for teachers to collaborate with colleagues on shared concerns and interests to develop their technical skills and, subsequently, their technical confidence. Experienced staff sharing their expertise reflects the teaching presence described by Garrison (2011, 2017). PL should take place in the context of a strong pedagogical framework and allow for teachers to learn at their level and direct their own learning (Tondeur et al., 2017). Effective online learning involves social and cognitive presence (Garrison, 2017) in a negotiated digital space (Blayone et al., 2017). Online PL for teachers can happen using the digital space and tools teachers are learning to use in the context of effective online pedagogy. An example of this is the use of breakout rooms for small group discussion and

collaborative inquiry in live video conferencing. Managing the tools and setting guidelines for engaging the learning task and sharing with others can be modeled and discussed in terms of how it might look with K-12 students. Teachers as learners also bring a third element of teaching presence to the collaborative setting that comes from the experience or expertise they have. The CoI model offers a structure of learning through collaboration that is conducive to ongoing construction of knowledge and skills that would model effective pedagogy in the eLearning and virtual classroom. The framework, inclusive of integrated digital space, offers a model for teachers to use as they design online learning opportunities for their students.

Drawing from both the CoI model and the fully online learning community (FOLC) model needs to be investigated further. Garrison (2011) contended that including technology and the competencies required to use that technology in the model would make it too complex. The digital space is an important part of the learning process that involves learning how to use the digital technologies for learning process as well as learning how pedagogy integrates with that technology to enhance student learning. The digital space is then a negotiated space where educators would choose the platforms and technologies that would support their learning. Based on the General Technology Competency and Use framework (Desjardins, 2005), the FOLC model uses the four dimensions of human-computer-human interaction (technical, informational, social, and epistemological/ computational) and the associated competencies that support SP, CP, and the collaborative learning process (Blayone et al., 2017) (see Figure 2). Blayone and colleagues explain that supporting the acquisition of competencies is done through open access online tutorial videos so that the subsequent collaborative online learning experience “is affected and modified by the tools used for learning, and at the same time, learning tools are modified by the ways in which they are used for learning” (Blayone et al., 2017, p. 6). The inclusion of the

digital space and the competencies required to use the technologies in the collaborative learning framework for teachers learning online pedagogy and design makes sense and should be studied further.

The role of the teacher supporting and facilitating collaborative learning with adolescents is important (Borup, 2016; Borup et al., 2020). It also makes sense that a framework that models a K-12 online learning experience should include the TP element that leverages the expertise of experienced online educators in professional learning experiences. Modeling effective online facilitation of learning in the context of TP would also support collaborative learning in the classroom and online settings. My study found teachers reported a lack of time to learn about new technologies and plan to implement them online. Compounding the lack of time to learn and plan, school boards across the province of Ontario experienced supply exhaustion or a shortage of supply teachers that have traditionally been used to cover teachers who are doing PL while classes are running.

Teachers also reported the demands of teaching and planning in new online modalities also caused stress, anxiety, and exhaustion. Engaging in PD sessions after school and having to travel to another location to do so only would add to the fatigue teachers were feeling. Part of the health and safety response to the pandemic was for school boards to create online PL sessions to support teachers (Burton, 2023). Online PL offers affordances that can help address challenges to time that meeting face to face pose. Leveraging the experience of PL sessions online and using video conferencing could offer a way to facilitate frequent teacher collaboration and learning through communities of inquiry (Campbell et al., 2016; Kennedy, 2014). Campbell et al. (2016) and Stewart (2014) argued that collaborative and ongoing learning are elements of high-quality PL that supports high quality teaching. The maker approach to learning is a student-centred,

inquiry-based approach that integrates skills and competencies from science, technology, engineering, and the arts (STEAM). According to Hughes et al. (2021), teacher PL of new initiatives needs to be ongoing, embedded in context and collaborative. Hughes et al. (2021) argued that in the case of maker education, it is necessary for the PL to mirror the type of teaching and learning that students will experience in the classroom. Morrison and Hughes (2022) found teachers collaborating on the same coding challenge in the online maker learning process was effective for learning the Scratch coding program as more knowledgeable colleagues were able “to share innovative ideas others may not have thought of or been able to execute on their own” (p. 112). Further research needs to investigate how mirroring the online pedagogies in online PL sessions can help teachers better understand how the technologies and accompanying new pedagogies that are inherent to online learning contexts are part of the learning process across various divisions and subject areas.

View Assessment as an Integral Component of the Learning Process

Assessment practice can be a good place to start teacher inquiry and professional learning within online contexts. The experience by some teachers in this study indicates that challenges to engaging students and assessing students arise from trying to impose traditional assessment parameters of time and proximity for quizzes and tests that do not translate to the online environment. Concerns about cheating or the validity of open book assessments reflect a need to reassess assessment practice in a way that is more student-centred and oriented to supporting the learning process. Integrating formative and summative assessment provides evidence of learning through the process of learning. Designing assessments that support student learning through student interaction, peer-assessment, and self-assessment involves students in their own learning

and leverages collaboration (Galanti et al., 2021). Student engagement and deeper learning are related to the clear communication of learning expectations, use of multiple sources of evidence, support for learners as members of a community, and timely and ongoing feedback (Gikandi et al., 2011). The use of technology and digital tools in the virtual classroom provides an opportunity to reimagine the role of assessment as formative and part of the learning process (Galanti et al., 2021). The LMS provided by most district school boards have data tracking abilities that are under used or ignored based on how assessment is viewed. Tracking data provided by formative assessments can assist teachers with earlier interventions of student struggles and provide feedback in a timelier manner to improve student learning (Pulham & Graham, 2018).

Value Pedagogy and Technology as Interconnected

Participants in this study reported and described success teaching online when they integrated sound pedagogy with technology. Conversely, many of the concerns and frustrations with the use of technology focused on teachers not being able to engage students. Northcote et al. (2011) suggest prioritizing pedagogy over technology to help skeptical teachers learn that sound pedagogy is possible in online environments. Blayone et al. (2017) argue for the need to see the online learning environment and technology or digital space as part of the learning process and not as external factors (see Figure 2). While collaborative inquiry is an effective pedagogy in online settings, successful interaction and social connections are dependent on being able to access and use technology as much as it is dependent on interaction and collaboration. In the context of this study, the unprecedented mass transition to online learning made technology imperative. The task of learning how to use technology and build online teaching skills was most effective when integrated with effective pedagogy and design strategies that can make use of the

multitude of technology tools. Teachers who described success engaging students and fostering learning discussed using technology as a tool for students to work in groups, collaborate, and develop self-regulatory learning skills (Lock et al., 2017). The digital tools that enable pedagogically-sound online learning can be learned in the context of that pedagogy and interaction (Blayone et al., 2017). The FLOC offers an integrated model that includes the digital space as part of the learning experience. Blayone et al. (2017) include as a sub-model the dimensions of human computer interaction and their competencies required to use digital technologies (see Figure 2). Acquisition of these competencies is provided by virtual tutorials that participants can access to support the use of shared digital technologies in the learning experience (Blayone et al., 2017). Practical strategies for professional learning should incorporate pedagogical references and digital resources together. Reasons for using specific technologies need to be an integral component of workshops, professional learning, and teacher dialogue. The need for real-time virtual support to develop digital competencies is supported by the observations of higher self-efficacy amongst teachers who accessed real-time virtual tech support. Integrating technology meaningfully involves understanding how it works (see informational competency in the FLOC, Figure 2), and it requires continuous learning to update and deepen one's knowledge and a significant investment of time to experiment in a learning context. New technology, by its very nature, is untested and unknown. Mishra & Koehler (2006) offer a useful framework to understand knowledge required by teachers for effective technology integration for teacher PL for OT&L. The online context poses different pedagogical challenges than the in-person classroom. The technological pedagogical content knowledge (TPACK) framework emphasizes the "connections between technologies, curriculum content, and specific pedagogical approaches, demonstrating how teachers' understandings of technology, pedagogy,

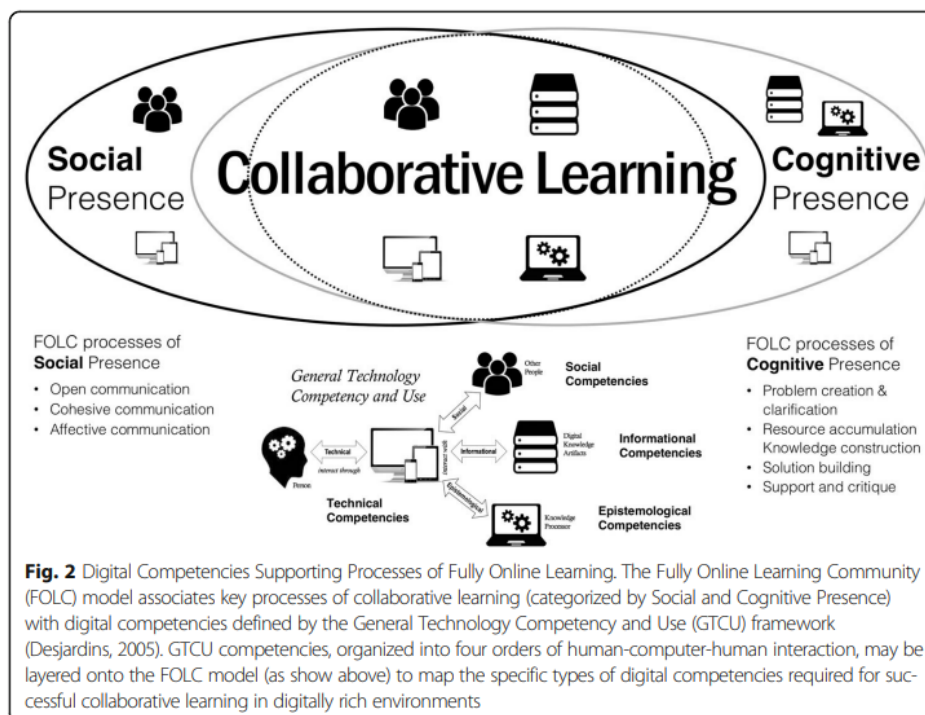
and content can interact with one another to produce effective discipline-based teaching with educational technologies.” (Mishra & Koehler, 2006 p. 397). The TPACK framework could help understand how teachers’ integration of technology in online contexts enhances student learning and considers the digital context and needs of the student. TPACK encompasses understanding and communicating representations of concepts based on using technologies; pedagogical techniques that apply technologies appropriately to teach content in differentiated ways that reflect students’ learning needs. The online context has different pedagogical challenges but shares the same goal of improved student learning. Harrington (2008) proposed the use of TPACK in teacher PL. Considering the combination of the social perspective with the cognitive perspective, TPACK can be an effective tool for framing and characterizing the teacher’s developing knowledge for integrating technology in the context of the classroom. Beyond considering perspectives, considering CoI presences, social presence (SP) and cognitive presence (CP) within the context of the online digital space is important for building capacity around effective online TPK as schools emerge out of the pandemic. Focusing on TK and TPK could benefit in-service teachers by building self-efficacy for using technology that supports online learning by personalizing learning whether it is in a blended learning context or a fully online context (Neiss & Gillow Wiles, 2021). Furthermore, the adolescent community of engagement (ACE) framework provides a means for exploring teacher presence (TP) in facilitating collaborative learning and learner-to-learner interactions online (Borup et al., 2020).

Teachers need to acquire knowledge about and implementing online pedagogical strategies. According to Archambault et al. (2022), the strategies and activities relevant for teaching online “coalesce around student-centered activities, the format of how content is delivered, communication strategies among students and teachers, and the inclusivity and

sociality of the learning environment” (p.184). The authors also argue that mastery learning and ongoing feedback can enhance student-centred activities and are conducive to online environments that are more flexible in time, pace and path. Moving from traditional face-to-face settings to online environments can benefit from what teachers know about effective face-to-face pedagogy. Rice (2012) advocates re-examining familiar pedagogical concepts such as community building and a learner-centred approach as a starting point for designing effective online delivery.

Figure 2

Digital Competencies Supporting FOLC.



Administrative Support for Collaborative Teacher Online Professional Learning

Training, resources, and support was the most frequently referenced theme among participants in this study. Of the 96 references to *training, resources and support*, only one was considered positive or not a barrier while all other occurrences referred to the lack of and need for access to online training, resources, and support. The lack of time to learn and prepare was a common concern frequently referenced by respondents. This study focused on how best to support teachers for online teaching and learning as they emerge from the emergency measures imposed by the pandemic. Providing meaningful and engaging training and timely support involves knowing what teachers need and building a professional learning community that supports continued building of individual and collective efficacy. For teachers to find time to build professional learning communities is challenging. Prior to the pandemic, traditional PD was set aside for professional activity days or required release time for teachers to attend while classes are running. Any meaningful change to how PD is delivered depends on effective leadership that can implement strategy and “provides teachers with adequate time to learn, practice, implement, and reflect upon new strategies that facilitate changes in their practice” (Darling-Hammond et al., 2017, p. vi). School level leaders need to support teacher engagement in the collaborative inquiry process and accommodate diverse levels of experience and TPACK. Facilitating a collaborative inquiry process with teachers who have identified a similar inquiry could provide needed leadership for building online teaching capacity. Support for administrators who may not have had any experience with online teaching but who were also thrust into the ERT&L due to the pandemic will be a critical piece for successful implementation of professional learning support (Donohoo & Katz, 2017). Goddard et al. (2004) showed that instructional leadership from a principal is a positive predictor of collective efficacy and enables

collaboration between the principal and teachers. Building on what is already being done in schools is a good place to start. Increasing awareness and access to resources and support that already exist for teachers such as using current learning management systems as a learning platform for both face-to-face and online learning contexts (Dolighan & Owen, 2021). School level administrators can promote a positive attitude toward OT&L by positioning teachers at the centre of their own PL based on teachers' concerns and observations (King, 2016). Creating teacher agency can foster sustained and effective PL that enables teachers to collaborate and overcome challenges with OT&L contexts (Hughes et al., 2021)

Ensuring access to reliable technology and free virtual tools is a key consideration for successful equitable professional learning (Morrison & Hughes, 2022). Board level administrators can procure and direct resources in a way that leverages the advantages of online PL. Educators' lack of experience, comfort, and skill can be a barrier to online teacher professional learning (Community for Advancing Discovery Research in Education, 2017). Flexibility and adaptability are important for administrators developing online PL for diverse teacher learners from varied subjects and divisions (Morrison & Hughes, 2022).

Recognize the Impact on Mental Health and Well-being

The findings from this study revealed the impact of stress, anxiety, and exhaustion demonstrated the need for adequate time to learn and prepare to teach online. Specific references to stress, anxiety, or exhaustion $n=26$ were reported by respondents in my study. Northcote et al. (2011) noted that there is an emotional element of the paradigm shift experienced by teachers moving from face-to-face to online teaching. The emotional element evident in teachers' descriptions of their experiences in this study reveals a sense of being overwhelmed and overworked due to the health restrictions and changing teaching environment due to the

pandemic. Although the references to *stress, anxiety, and exhaustion* with specific mention to changing modes of teaching were sparse, using semantic network connections in *Nvivo* with the related themes of *time to learn and prep; lack of training, resources, and support* identified stress, anxiety and exhaustion as an area for further research, as online teaching and learning is integrated into the secondary graduation requirements in Ontario (Ontario Ministry of Education, 2019). Anecdotal descriptions of exhaustion and stress amongst teachers as negatively affecting their ability to work effectively, as reported in this study, are supported by Pressley and Ha (2022). Pressley and Ha (2022) found teacher exhaustion and stress levels directly affected teachers' sense of efficacy. There is an opportunity to learn from the experience of the pandemic. Research on teacher mental health and well-being (MHWB) identified that feeling anxious, stressed, and overwhelmed were common emotions experienced by teachers during the pandemic (Pressley, 2021; Pressley & Ha, 2022; Sokal et al., 2020a). These emotions have negative impacts on teachers' health and their relationships on a personal level. This sense of poor MHWB negatively impact teachers' attention levels, performance, and decision-making on a professional level (Barbour et al., 2021). Beyond training and resource needs, supporting teachers as learners and valued members of a community is vital. Poor MHWB amongst teachers can negatively affect student outcomes (Madigan & Kim, 2021). Kim et al. (2022) used Bakker and Demerouti's (2007) job demands and resources model (JD-R model) to examine the range of job demands and job resources that teachers faced during the pandemic. The authors discuss how job demands such as workload and time spent preparing to teach and teaching increased during the pandemic putting added pressure on teachers' MHWB. Job resources, according to the JD-R model, including social support and work autonomy, can serve to buffer the effects of job demands. Kim et al. (2022) suggest there needs to be ongoing efforts to balance job demands and

resources that affect teachers' MHWB. My study illustrated how teachers reported that increased workload and pressures to learn new technology for teaching online contributed to exhaustion and stress. It is also important to note that teachers reported working and collaborating with colleagues was a source of support and contributed to a higher sense of efficacy for OT&L. Any model for effective professional development should consider the balance of job demands and resources and how it impacts MHWB. Future research could examine the impact of collaborative teacher learning communities on perceived job demands and stress.

Cultivate a Positive Attitude and Willingness to Teach in an Online Context.

Developing a positive attitude towards online learning happens when teachers see students learning and being successful in an online learning environment (Ertmer & Ottenbreit-Leftwich, 2010). Research supports the connection between teacher agency and the motivation and confidence teachers feel when they take ownership of their own professional learning (Calvert, 2016; Liao et al., 2017). The findings from my study show that teachers who were successful at teaching online and engaging students had a positive attitude towards online learning. It is also important to note that emergency remote learning is different from learning that is planned and designed to be online from the outset. By differentiating emergency remote from online learning, attention can be focused on developing teachers' online teaching capacity both technologically and pedagogically as a viable learning mode as well as an emergency teaching and learning mode (Barbour et al., 2020). A better understanding of how efficacy for online learning can impact student success can also impact attitudes and beliefs about effectively integrating technology into face-to-face learning environments (Ertmer & Ottenbreit-Leftwich, 2010). My study found that positive attitudes toward online learning and willingness to teach in online contexts correlates with higher efficacy for teaching in online contexts. Teachers who

described successfully engaging students and facilitating learning online reflected positive sentiment toward the experience teaching online. Thirty-five percent of the references to student engagement reflected positive sentiment and perceived success engaging students online. Teacher efficacy is cyclical and as teachers experience success, they become more efficacious about the particular task (Tschannen-Moran et al., 1998). My study details teachers' experiences of implementing strategies that were workable and needed for engaging students in online contexts. Hughes et al. (2021) described the importance of voluntary engagement for teacher agency building. PL that includes opportunity for teachers to direct their own learning based on their students' needs, values teachers as active agents, and facilitates positive attitudes toward learning about and implementing change in their learning environments (Blackley et al., 2017; Buxton et al., 2015; Insulander et al., 2019).

Make Connections with Novice Teachers and Teacher Preparation Programs

The focus of this study was on in-service teachers' experience of teaching online during the pandemic with the intention of better understanding how to support teacher learning for online teaching. While initial teacher education is beyond the scope of this study, it is important to recognize the foundation that teacher education programs provide for ongoing professional learning for teachers. In this study, 12% of the in-service teachers reported having five or less years of teaching experience with the school board. However, no significant difference was found in an independent t-test for overall efficacy scores between teachers with 5 or less years of teaching in this study. According to Tondeur et al. (2017), new teachers require ongoing support and mentoring as they build teaching experience and expertise whether it is face-to-face or online contexts. Novice teachers are often overwhelmed with the job demands in their first years of teaching (Whitcomb et al., 2009). Mecham et al. (2021) reported new teachers felt even more

overwhelmed when the pandemic hit from the drastic changes in teaching mode, just as they were starting to feel comfortable in the classroom. Supporting new teachers for online teaching contexts should begin before they start their new career and continue through the New Teacher Induction Program. The New Teacher Induction Program (NTIP) in Ontario is offered through all school boards to new teachers and provides orientation to the job, mentoring, and training in specific areas (Ontario Ministry of Education, 2022). NTIP already provides the framework for both mentoring online teaching and professional learning about designing and implementing effective OT&L. Danyluk et al. (2022) examined teacher preparation programs' response to the pandemic. The authors found that teacher candidates felt they lost in-person connections with both instructors and peers. Carpendale et al. (2020) described the shift to OT&L as an opportunity to model effective online teaching practices at the “intersection of technology, content, and pedagogy” (as cited in Danyluk et al., 2022, p. 2534) as a benefit to preservice teachers who will be required to teach in online and blended learning contexts. Bourgoin and Mitchell (2022) explored the impact of their experience building a sense of community in synchronous sessions with teacher candidates. The findings from the study reveal the emergence of key socio-emotional aspects of designing live online learning experiences for future teachers: a) fostering appositve learning atmosphere in the online environment b) establishing a safe and welcoming community c) building professional learning communities d) appreciating synchronous virtual interaction e) appreciating learning from each other (Bourgoin & Mitchell, 2022). Bourgoin and Mitchell concluded that building professional learning communities was highly appreciated by teacher candidates and that teacher candidates valued the social and communal learning aspects of their courses. The authors felt they were able to effectively build a

community of professional learners in the online context that would serve the teacher candidates as future educators.

Teacher education programs in Canada have begun to examine their experience of the transition to OT&L and how that might impact Bachelor of Education (B.Ed.) programs in terms of integrating technology and online learning contexts for teacher candidates who, as future educators, will be increasingly called on to teach in fully online or blended learning contexts. Teacher education programs should offer a solid foundation of online learning theory and practicum experience that reflects the online teaching demands in schools.

Practicum, or a professional clinical placement, is a vital component of teacher education programs that sets the foundation for future professional learning. Archambault et al. (2016) identify a need for practical experience in online settings in initial teacher education programs to address the growing requirements for K-12 online learning. Teacher education programs also had to transition from face-to-face learning environments to online contexts in response to the pandemic, including adapting practicum experiences to online settings in the host schools. Carillo and Flores (2020), in their systematic review of the literature on initial teacher education programs, examined studies of online teaching and learning practices of teacher education programs and found the ability of learners and teachers to interact, collaborate, and build relationships with others in the program positively influenced the cohesion of learning communities, knowledge construction, and the development online teaching and learning practices. Using the CoI framework to systematically analyze the literature (Garrison et al., 2000), Carillo & Flores (2020) found collaboration was a key feature of online learning and contributed to developing social presence. The authors identified consistent participation, prompt communication, regular group discussion, timely and relevant contributions, and commitment to

the task as an effective approach to developing collaborative competences for social presence in online teacher learning settings. Modeling and mentoring aspects of effective online learning based on the CoI framework for teacher candidates would provide a foundation for ongoing professional learning (Woo et al., 2023). As teacher candidates start their careers as new teachers, experience learning in the CoI framework would provide them the necessary skills and dispositions for effective OT&L. Setting a foundation that is evidence-based and recognizes the value of ongoing collaborative professional learning may help bridge the gap between teacher education and in-service teaching. Further research examining new teachers' experience of learning online pedagogy and design and how they are supported in their new teaching positions may be useful for school and board administrators in developing support for novice online teachers.

Limitations

This case study investigates teachers' experience of emergency remote teaching during the COVID-19 pandemic. The findings presented here suggest that teachers experienced the challenges of ERT&L in diverse ways. Moorhouse and Kohnke (2021) refer to some teachers thriving from the challenge, some teachers surviving, and some teachers struggling with teaching online. These differences, reflected in my study, illustrated how some teachers thrived and reported successes in engaging students while most reported concerns with lack of time, resources and training that were consistent with just trying to survive as discussed by Moorhouse and Kohnke (2021). While the response rate in the initial phase of my study was 31% ($N = 132$), the second phase had a much smaller overall response rate of 16%, even though the population was expanded to include elementary and secondary panels. The response rate of secondary teachers in the second phase was similar to Phase 1 ($N = 130$). An explanation for the lower

return rate among elementary teachers is the difference in online challenges with younger students. Teachers in this study expressed difficulty engaging and keep the attention of younger students who may not have been as familiar with employing the home computer as a learning device. Younger pupils may have been more familiar with active and participatory learning practices that were more difficult for teachers to replicate in an online environment, especially given elementary teachers' unfamiliarity with online teaching. In addition, as Jung et al. (2019) suggest, differences in elementary teachers' and secondary teachers' use of technology may have been due to differences in curriculum. Moreover, given these and other factors, elementary teachers may have experienced more job-related stress and may have been less likely to respond to a survey.

The need for ERT&L preparedness is clear. As district school boards and leaders reflected on the experience of teaching during the pandemic, an important distinction was made between ERT&L and online or virtual learning, as well as eLearning. The Ministry of Education in Ontario, had mandated that all students must earn at least two online learning credits as part of the requirements for an Ontario Secondary School Diploma. School boards will be required to build capacity for eLearning and online teaching which the Ministry distinguishes from remote learning. This study has important implications for how to support teachers and build capacity for online teaching and learning. The focus of this thesis investigates how to support teachers designing and implementing online learning experiences, both fully online and blended, but the research on online teaching and learning for K-12 is nowhere near the research on effective pedagogy and training for in person classroom contexts. Further research on effective online teaching and learning for K-12 contexts needs to continue and grow with the pace of technological advancements.

The transition to teaching fully online was an initial response of the Ontario government and school boards to ensure the continuation of schools during the pandemic. Some teachers remained fully online at a virtual school in the fall of 2020. However, many teachers returned to the classroom in a modified cohort system that included hybrid and online teaching and presented yet another new teaching experience. The case study approach used in this study is limited in that it may or may not reflect similar experiences in other school districts across Ontario that had different demographic and geographical challenges. While the case study approach used in this study offered a bounded and contextual perspective, the response to the pandemic continued to change and the context and teaching environment was different from the experience of the initial transition to online teaching to the following school year.

Comparing the self-efficacy scores from the first phase of the study (2020) to the second phase (2020-2021 and 2021-22), it is important to recognize that the experience of teaching online was different and new challenges continued to affect teachers' sense of efficacy for teaching in each phase. A further limitation exists with comparing the quantitative data from one phase to the next and the different groups of participants in the two samples. Growth and change cannot be measured between the groups, even though some of the participants participated in both phases. Even though efficacy scores are higher in Phase 2 than in Phase 1, the growth or learning of the participants cannot be measured. A longitudinal study would have been preferable to be able to measure change. However, with the restrictions of the pandemic and mounting stress on teachers, it was decided to make the survey anonymous with the hope of a higher response rate and not adding any undue stress on teachers. While a statistical comparison of efficacy scores is not possible, it is important to note that teachers did have some experience teaching in online settings in Phase 2 and learning how to use technology by the second year of

the pandemic may have reflected slightly higher mean efficacy scores from the initial transition. It is also worth noting that a willingness to continue to teach online and the positive sentiment that was referred to by teachers who reported success engaging students online correlated with higher senses of efficacy across all subscales.

The teacher self-efficacy for online teaching (TSEOT) instrument was useful in the quick turnaround needed to capture teachers' sense of efficacy as they transitioned online in response to the pandemic, but there needs to be further research that tests the usefulness of the scale in online settings (Corry & Stella, 2018). The decision to close schools and provide online classes that included synchronous *Zoom* classes impacted the research decision to proceed with an instrument that considered online teaching efficacy as different from face-to-face teaching (Corry & Stella, 2018). As such, a slightly altered version of the Michigan nurse educators' sense of efficacy for online teaching (MNESEOT) survey was used that had previously been validated and tested, albeit with an entirely different population of Nursing faculty. The MNESEOT is based on the teacher's sense of efficacy scale (TSES) (Tschannen-Moran et al., 2000) that was developed and validated for K-12 teachers and includes important teaching tasks that teachers must master such as instructional strategies, classroom management, and student engagement. The MNESEOT adapted the survey to reflect nursing faculty members' experiences teaching online and included a subsequent subscale that addressed self-efficacy for using computers in an online teaching context (Robinia & Anderson, 2010). There were also no questions in the version adapted by Robinia and Anderson that reflected teachers' sense of efficacy for selecting or implementing relevant software or technology that enhanced student learning. Teacher efficacy is a useful construct for understanding where teachers are in their beliefs about their own ability to effectively teach online but an updated scale that reflects online teaching pedagogy and design

may benefit future research. The use of video platforms such as *Zoom* and *Microsoft Teams* for synchronous learning have changed how online interaction happens in a digital space and should be reflected in the efficacy scale as an integral component of learning as opposed to being a distinct and separate component of the learning process (Blayone et al., 2017). It would be worth investigating the need for an updated version of the TSEOT scale that could support further exploration of the need to expand the online CoI teaching and learning model (Garrison et al., 1999) to include digital space as an element of teachers' learning that is reflected in teachers' sense of efficacy for online teaching based in the principles of socio-constructivism. The collaborative online learning environments described by Garrison (2017) and vanOostveen and colleagues (2019) have the potential to disrupt conventional conceptions of online learning as content delivery, and leverage the potential of learning in a shared digital space. As teacher preparation programs consider the implications of the transition to online teaching and learning through a lens of innovation among teacher educators (Ellis et al., 2020, as cited in Danyluk et al., 2022). Research on how K-12 OT&L should parallel efforts to better understand how to support new teachers and teachers new to OT&L contexts.

The recommendations in this study are based on teachers' experiences during the pandemic and can help pivot from ERT&L and build capacity for effective online teaching and learning. While the recommendations are based on teachers' experience and sense of efficacy for online teaching, the voices and experience of administrators and support staff could also help better understand how to support teachers. Future research needs to include the perspectives and input of administrators and support staff in determining an effective strategy for ERT&L preparedness at the school level. While gender and age showed no significant relationship to efficacy scores in this study, it would be worth looking at more diverse voices from diverse

cultural backgrounds and the impact the transition to online had on teachers from diverse cultures. This study also focuses solely on teachers' experience and any effective ERT&L strategy should also include student perspectives.

Future Research

The need to develop training for emergency remote online learning has emerged as an important lesson from the pandemic. Distinguishing between ERT&L and OT&L is important for building capacity for and leveraging the benefits of actual online learning based in sound pedagogy and practice. The eventual return to the classroom and “normalcy” should not be a move backward but rather a leveraging of opportunity to integrate technology and online learning for the benefit of students. Online skills for instruction and design of online learning environments should become an important aspect of teacher training and ongoing teacher professional learning that can enhance the face-to-face learning experience and better prepare for emergency remote transition, if needed. Understanding that teachers need the resources and training to make the transition to online teaching can start with developing existing access to tech and pedagogical support as well as ongoing support for using technology such as the LMS as part of their daily teaching.

PD also needs to look long term, providing teachers with the means to design and provide meaningful engaging learning experiences for students in online learning environments. In this study, teachers who engaged in online training, online PD, and who collaborated with colleagues reported higher self-efficacy and described success engaging students in online settings. Those teachers who reported successful experiences teaching online also used technology and online tools to engage students. Future research could investigate what successful teachers found useful

in the online context and how time and learning could be better managed for teachers to allow for meaningful learning in collaborative settings. Research could also focus on the experience of new teachers and the support their schools and boards are providing for teaching in online contexts.

Using new technologies such as online and blended learning contexts for teacher PD has inherent challenges. Morrison and Hughes (2022) pointed out considerations associated with online and blended maker PL that include a lack of infrastructure available in schools. Another consideration is being able to troubleshoot technical issues. Finally, some teachers may lack the skills to participate in the online learning process. Consideration for diversity of competencies teachers have and collaborative planning can help create relevant learning experiences in the online context (Li et al., 2019). Future research could explore collaborative online PL for teachers in various divisions and subject areas.

One of the key differences between ERT&L and online teaching and learning is the careful design process needed for effective online teaching and learning. Numerous research studies, theories, models, standards, and evaluation criteria focus on quality online learning, online teaching, and online course design. Research shows that effective online learning results from careful instructional design and planning, and using a systematic model for design and development (Branch & Dousay, 2015). The design process and the careful consideration of distinctive design decisions impact the quality of online teaching and learning (Hodges et al., 2021). Future research should focus on other stakeholders such as administrators and support staff that also had to deal with the challenges of supporting teaching and learning imposed by the unprecedented transition to ERT&L during the pandemic. Much of the research that has emerged on education during the pandemic has focused on teachers' experiences and how best to support

teachers. Little research has focused on the challenges and experience of administrators.

Donohoo and Katz (2017) argue that building collective efficacy and providing effective teacher PD requires training administrators to lead the way. The data gathered on teachers' experience teaching online during the pandemic can help inform professional development and training that will build capacity for online teaching and learning as a viable mode of education. Although there are studies that show teachers' sense of efficacy correlates with elevated levels of student engagement (Good & Brophy, 2003; Martin et al, 2012) there is little research that links that same sense of efficacy for online teaching with higher student engagement online.

These research deficits provide significant opportunities for future researchers to extend our understanding of how teachers' sense of self-efficacy in on-line and related teaching modalities can be measured and improved. As I have suggested, the nine action-oriented recommendations for teachers, school and school district administrators, and provincial educational authorities provide future researchers opportunities to test and assess whether such actions improve teacher self-efficacy for designing and implementing blended and online learning experiences for K-12 students. These action-oriented recommendations also could provide fruitful ways to examine how teachers' self-efficacy and collaborative PL, affect student learning in online modalities.

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31. How well can you use computers for word processing, internet searching, and e-mail communication?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

32. To what extent does your comfort level with computers facilitate participation in online teaching?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

33. How well can you navigate the internet to provide links and resources to students in an online course?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

Background

The next section will ask for background information from participants. All information collected is confidential. You will be given an opportunity to provide a contact email if you wish for a copy of the summarized results from this survey.

34. Please indicate your gender

- female
- male
- prefer not to answer

35. What is your birth year?

36. Please indicate present assignment.

full-time

part-time

37. Please indicate the highest degree you hold.

Bachelor's

Master's

Doctorate

38. About how many years do you have teaching online?

5 or less

6-10

11-15

16-20

more than 20

39. Please indicate the actual number of years you have teaching online.

40. About how many years do you have teaching traditional face to face in public education?

- 5 or less
- 6-10
- 11-15
- 16-20
- more than 20

41. Have you ever taken an additional qualification (AQ) professional development course or seminar that focused on skills, techniques, problems, and/or preparation for online teaching?

- Yes
- No

46. Have you ever met formally on a regular basis with an instructional support expert during an online teaching experience to discuss the skills, techniques, problems, and/or preparation for online teaching?

- Yes
- No

47. To what extent do you agree that formal meetings with an instructional support expert adequately prepare you in the skills needed for online teaching?

1. Strongly Disagree 2. Slightly Disagree 3. Neutral 4. Agree 5. Strongly Agree

1 2 3 4 5

48. Which of the following academic areas do you teach?

- Math and Business
- English and Languages
- Fine Arts, Music, Drama
- Humanities and Social Sciences
- Science
- Computers and Technology
- Religious Education
- Health and Physical Education
- Program Support
- Guidance and Student Success

49. Were you using a board provided learning management system (LMS) with your face-to-face classes?

- Yes
- No

50. Have you used virtual technical support (ie. Videos, digital resources) to learn the skills, techniques, digital tools, and/or preparation for online teaching?

Yes

No

51. To what extent do you agree that virtual technical support (ie. Videos, digital resources) adequately prepare you in the skills needed for online teaching?

1. Strongly Disagree 2. Slightly Disagree 3. Neutral 4. Agree 5. Strongly Agree

1 2 3 4 5

Background

The next section will ask for background information from participants. All information collected is confidential. You will be given an opportunity to provide a contact email if you wish for a copy of the summarized results from this survey.

34. Please indicate your gender

- female
- male
- prefer not to answer

35. What is your birth year?

36. Did you participate in the initial survey during the initial transition to remote online learning in 2020?

- Yes
- No

37. Please indicate present assignment.

- full-time
- part-time
- LTO

38. What is your present teaching assignment?

- Secondary face-to-face
- Secondary Virtual School
- Elementary

39. About how many years do you have teaching online?

- 5 or less
- 6-10
- 11-15
- 16-20
- more than 20

40. Please indicate the actual number of years experience you have teaching online. (You may indicate partial years with decimals. ie. 0.5 or 1.5)

41. About how many years do you have teaching traditional face to face in public education?

- 5 or less
- 6-10
- 11-15
- 16-20
- more than 20

42. Have you ever taken an additional qualification (AQ) professional development course or seminar that focused on skills, techniques, problems, and/or preparation for online teaching?

Yes

No

43. Have you ever taken an online course or seminar that focused on skills, techniques, problems, and/or preparation for online teaching?

Yes

No

44. To what extent do you agree that AQ professional development courses adequately prepare you for the skills needed for online teaching?

1. Strongly Disagree 2. Slightly Disagree 3. Neutral 4. Agree 5. Strongly Agree

1 2 3 4 5

45. Which of the following academic areas do you teach?

Primary /Junior

Junior/Intermediate

Intermediate/Senior

46. Were you using a board provided learning management system (LMS) with your face-to- face classes?

Yes

No

47. Have you used virtual technical support (ie. Videos, digital resources) to learn the skills, techniques, digital tools, and/or preparation for online teaching?

Yes No

48. To what extent do you agree that virtual technical support (ie. Videos, digital resources) adequately prepare you in the skills needed for online teaching?

1. Strongly Disagree 2. Slightly Disagree 3. Neutral 4. Agree 5. Strongly Agree

1 2 3 4 5

49. To what extent do you collaborate with colleagues to solve problems, try new techniques and learn skills needed for online teaching?

1. Never 2. Rarely 3. Sometimes 4. Often 5. Regularly

1 2 3 4 5

50. What do you feel is the most pressing issue regarding professional learning and support for teachers designing and implementing online learning environments?

51. To what extent do you agree the quality of support systems around remote learning have improved since the start of the pandemic?

1. Strongly disagree 2. Slightly disagree 3. Neutral 4. Agree 5. Strongly agree

1 2 3 4 5

52. Would you consider continuing to teach online if it were an option rather than a requirement?

Yes No

Appendix C

Qualitative Questionnaire

Teachers Experience of Online Teaching During the COVID-19 Pandemic

1. Discuss what strategies for online teaching you feel worked well and promote student engagement and student learning.

2. Discuss what barriers you encountered to teaching online.

3. How do you feel the pandemic impacted online teaching and learning?

4. Is there anything you would like to add regarding your experience teaching during the COVID-19 pandemic?

Appendix D

Ethical Approval Phase 1



Brock University
Office of Research Ethics
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Social Science Research Ethics Board

Certificate of Ethics Clearance for Human Participant Research

DATE: 4/20/2020

PRINCIPAL INVESTIGATOR: OWEN, Michael - Educational Studies

FILE: 19-305 - OWEN

TYPE: Ph. D. STUDENT: Tim Dolighan
SUPERVISOR: Michael Owen

TITLE: Self-perceptions secondary teachers's ability to successfully teach online during the COVID-19 pandemic

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW

Expiry Date: 4/1/2021

The Brock University Social Science Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 4/20/2020 to 4/1/2021.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 4/1/2021. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Office of Research Ethics web page at <http://www.brocku.ca/research/policies-and-forms/research-forms>.

In addition, throughout your research, you must report promptly to the REB:

- Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
- New information that may adversely affect the safety of the participants or the conduct of the study;
- Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved:

Lynn Dempsey, Chair
Social Science Research Ethics Board

Robert Steinbauer, Chair
Social Science Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.

Appendix E

Ethical Approval Phase 2



Brock University
Office of Research Ethics
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Social Science Research Ethics Board

Certificate of Ethics Clearance for Human Participant Research

DATE: 6/2/2021

PRINCIPAL INVESTIGATOR: OWEN, Michael - Educational Studies

FILE: 20-328 - OWEN

TYPE: Ph. D. STUDENT: Tim Dolighan
SUPERVISOR: Michael Owen

TITLE: Teachers Experience of Online Teaching During the COVID-19 Pandemic

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW Expiry Date: 6/1/2022

The Brock University Social Science Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 6/2/2021 to 6/1/2022.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 6/1/2022. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Office of Research Ethics web page at: <https://brocku.ca/research-at-brock/office-of-research-services/research-ethics-office/#application-forms>.

In addition, throughout your research, you must report promptly to the REB:

- Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
- New information that may adversely affect the safety of the participants or the conduct of the study;
- Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved:

Angela Book, Chair
Social Science Research Ethics Board

Dipanjan Chatterjee, Chair
Social Science Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.

Appendix F

Informed Consent Phase 1

1. Informed Consent:

The purpose of this study is to learn more about teachers preparing to teach online by using a reliable survey instrument that has been given to other teachers and teaching professionals in different settings. If you would like to see the results of the survey you can email me at td17fe@brocku.ca (<mailto:td17fe@brocku.ca>) and I will forward the results. Since this study involves the context of the COVID-19 pandemic, the purpose, in part, is to report back as soon as reasonable to help the Board and teachers to understand the impact of the transition on teachers.

Description of the Research Activity

As a participant in the study, you will be asked questions about the amount and type of your past teaching experience. You will be asked questions about how satisfied you are with your preparation for teaching online. The survey also includes a few demographic items. The survey will take approximately 10-15 minutes and will be completed using the Microsoft forms digital survey tool.

Risks

There are no known risks involved in this survey research study, but as in any research, there is some chance of risks that have not yet been identified. To decrease the impact of risk, you can skip any item in the survey. You can stop at any time if you feel uncomfortable or uncertain about your continued participation.

Benefits

Although there are no direct benefits to you, there may be indirect benefits. Your participation in this research may help us gain a better understanding of which factors may be related to teacher self-efficacy beliefs when teaching online. Further benefits may arise from studying teachers' perceptions and attitudes during the unprecedented transition to online teaching during the COVID-19 pandemic.

Anonymity

Data obtained from your response to this survey will remain anonymous. The results of this research study may be used in reports, presentations, and publications, but the researcher will not identify you. Your answers to the questions in this survey will not be connected to you. To maintain the anonymity of your records a digital survey form will be used with anonymous settings so that your email is not accessed and keeps your response separate from your personal identity. The people who will have access to your response are myself, my supervisor and my committee members. I will secure your response with these steps: All responses submitted through the digital survey app will be kept in secure web storage. I will delete survey data files from my computer after I defend my research findings. I will delete survey data files from secure web storage 3-years after I defend my dissertation.

Withdrawal Privilege

You can decline to participate in this research study at any time. Even if you say yes now, you are free to say no later and stop participating at any time. There is no penalty. Simply do not complete the survey. If you begin the survey and decide you would prefer not to finish, please discontinue the survey without completing it. Information gathered will be discarded. Your decision will not affect your relationship with the DCDSB.

Costs and Payments

²¹ There is no cost to you as a participant in this study. There is no payment for your participation. If you agree to participate in the study your consent does not waive any of your legal rights.

Voluntary Consent

Any questions you have concerning the research study or your participation in the study, before or after your consent, will be answered by Tim Dolighan td17fe@brocku.ca (<mailto:td17fe@brocku.ca>), or Dr. Michael Owen mowen@brocku.ca (<mailto:mowen@brocku.ca>). If you have questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact Brock University Research Ethics Board at reb@brocku.ca (<mailto:reb@brocku.ca>). This form explains the nature, demands, benefits and any risk of the research study.

By clicking "I Agree" you confirm that you are 18 years or older, understand the content of this form and agree to participate in this study. *

I Agree

Appendix G

Informed Survey Consent Phase 2

1. Informed Consent:

The purpose of this study is to learn more about teachers adjusting to teach online by using a reliable survey instrument that has been given to other teachers and teaching professionals in different settings. If you would like to see the results of the survey you can email me at tim.dolighan@brocku.ca (<mailto:tim.dolighan@brocku.ca>) and I will forward the results. Since this study involves the context of the COVID-19 pandemic, the purpose, in part, is to help the Board and teachers to better understand the impact of the transition and adjustments on teachers.

Description of the Research Activity

As a participant in the study, you will be asked questions about the amount and type of your past teaching experience. You will be asked questions about how satisfied you are with your preparation for teaching online. The survey also includes a few demographic items. The survey will take approximately 8 minutes and will be completed using the Microsoft forms digital survey tool.

Risks

There are no known risks involved in this survey research study, but as in any research, there is some chance of risks that have not yet been identified. To decrease the impact of risk, you can skip any item in the survey. You can stop at any time if you feel uncomfortable or uncertain about your continued participation.

Benefits

Although there are no direct benefits to you, there may be indirect benefits. Your participation in this research may help us gain a better understanding of which factors may be related to teacher self-efficacy beliefs when teaching online. Further benefits may arise from studying teachers' perceptions and attitudes during the unprecedented transition to online teaching during the COVID-19 pandemic.

Anonymity

Data obtained from your response to this survey will remain anonymous. The results of this research study may be used in reports, presentations, and publications, but the researcher will not identify you. Your answers to the questions in this survey will not be connected to you. To maintain the anonymity of your records a digital survey form will be used with anonymous settings so that your email is not accessed and keeps your response separate from your personal identity. The people who will have access to your response are myself, my supervisor and my committee members. I will secure your response with these steps: All responses submitted through the digital survey app will be kept in secure web storage. I will delete survey data files from my computer after I defend my research findings. I will delete survey data files from secure web storage 3-years after I defend my dissertation.

Withdrawal Privilege

You can decline to participate in this research study at any time. Even if you say yes now, you are free to say no later and stop participating at any time. There is no penalty. Simply do not complete the survey. If you begin the survey and decide you would prefer not to finish, please discontinue the survey without completing it. Information gathered will be discarded. Your decision will not affect your relationship with the DCDSB.

Costs and Payments

021 There is no cost to you as a participant in this study. There is no payment for your participation. If you agree to participate in the study your consent does not waive any of your legal rights.

Voluntary Consent

Any questions you have concerning the research study or your participation in the study, before or after your consent, will be answered by Tim Dolighan tim.dolighan@brocku.ca (<mailto:tim.dolighan@brocku.ca>), or Dr. Michael Owen mowen@brocku.ca (<mailto:mowen@brocku.ca>). If you have questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact Brock University Research Ethics Board at reb@brocku.ca (<mailto:reb@brocku.ca>). This form explains the nature, demands, benefits and any risk of the research study.

By clicking "I Agree" you confirm that you are 18 years or older, understand the content of this form and agree to participate in this study. *

I Agree

Appendix H

Informed Consent Questionnaire

Informed Consent

The purpose of this study is to learn more about teachers adjusting to teach online by having teachers detail their experience of teaching online during the pandemic. Since this study involves the context of the COVID-19 pandemic, the purpose, in part, is to help the Board and teachers to better understand the impact of the transition and adjustments on teachers.

Description of the Research Activity

As a participant in the study, you will be asked questions about your teaching online experience during the pandemic.

Risks

There are no known risks involved in this survey research study, but as in any research, there is some chance of risks that have not yet been identified. To decrease the impact of risk, you can skip any item in the survey. You can stop at any time if you feel uncomfortable or uncertain about your continued participation.

Benefits

Although there are no direct benefits to you, there may be indirect benefits. Your participation in this research may help us gain a better understanding of which factors may be related to teacher self-efficacy beliefs when teaching online and how to better support teachers teaching online. Further benefits may arise from studying teachers' perceptions and attitudes during the unprecedented transition to online teaching during the COVID-19 pandemic.

Anonymity

Data obtained from your response to this questionnaire will remain anonymous. The results of this research study may be used in reports, presentations, and publications, but the researcher will not identify you. Your answers to the questions in this survey will not be connected to you or use your name. To maintain the anonymity of your records a digital Microsoft form will be used with anonymous settings so that your email is not accessed and keeps your response separate from your personal identity. The people who will have access to your responses are myself, my supervisor and my committee members. I will secure your response with these steps: All responses submitted through the digital survey app will be kept in secure web storage. I will delete survey data files from my computer after I defend my research findings. I will delete survey data files from secure web storage 3-years after I defend my dissertation.

Withdrawal Privilege

You can decline to participate in this research study at any time. Even if you say yes now, you are free to say no later and stop participating at any time. There is no penalty. Simply do not complete the questionnaire. If you begin and decide you would prefer not to finish, please discontinue the questionnaire without completing it. Information gathered will be discarded. Your decision will not affect your relationship with the DCDSB.

Costs and Payments

There is no cost to you as a participant in this study. There is no payment for your participation. If you agree to participate in the study your consent does not waive any of your legal rights.

Voluntary Consent

Any questions you have concerning the research study or your participation in the study, before or after your consent, will be answered by Tim Dolighan tim.dolighan@brocku.ca (<mailto:tim.dolighan@brocku.ca>), or Dr. Michael Owen mowen@brocku.ca (<mailto:mowen@brocku.ca>). If you have questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact Brock University Research Ethics Board at reb@brocku.ca (<mailto:reb@brocku.ca>). This form explains the nature, demands, benefits and any risk of the research study.

By proceeding to answer the questions below you confirm that you are 18 years or older, understand the content of this form and agree to participate in this study.

Appendix I

Recruitment E-mail Scripts

Participants will be recruited through board email to voluntarily access the survey and the questionnaire.

Script:

You are invited to participate in a quantitative research survey through Brock university of Self-perceptions and teachers' ability to successfully teach online during the COVID-19 pandemic. As a participant in the study, you will be asked questions about the amount and type of your past teaching experience. You will be asked questions about how satisfied you are with your preparation for teaching online. The survey also includes a few demographic items. The survey is **voluntary and anonymous**. It will take approximately 8-10 minutes and will be completed using Microsoft forms digital survey tool.

You can access the survey here (insert link)

Thank you. Your participation is greatly appreciated.

Script for questionnaire:

You are invited to participate in a qualitative research study through Brock university to examine in greater detail teachers' experience teaching online during the COVID-19 pandemic. As a participant in the study, you will be asked questions about the amount and type of your past teaching experience. You will be asked questions about best practices, barriers to teaching online and the impact of the pandemic on teaching online. The survey also includes a few demographic items. The questionnaire is **voluntary and your identity will be kept confidential**. and will be completed using Microsoft forms digital survey tool.

You can access the survey here (insert link)

Thank you. Your participation is greatly appreciated.