Investigating the Influence of Technology as a Communication Tool for Parents and Early Childhood Educators

by
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ABSTRACT

INVESTIGATING THE INFLUENCE OF TECHNOLOGY AS A COMMUNICATION TOOL FOR FAMILIES AND EARLY CHILDHOOD EDUCATORS

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This study examined the impact of technology in supporting parent-educator communication within the early childhood education and care sector. Participants were recruited from the pool of parents accessing child care services using HiMama communication software within the province of Ontario. One hundred and forty parents completed an online survey assessing their perspectives of changes in parent-educator communication with the introduction of HiMama. The influence of the software was explored using a retrospective mixed method survey design. Data were analyzed using paired sample t-tests and thematic analysis. The results indicated that computer-mediated communication has promising potential for strengthening parent-educator communication practices, particularly when paired with face-to-face communication. Participants reported increased communication content on children’s daily experiences and its influence in both parent-educator and parent-child relationships. This thesis concludes with recommendations to ensure on-going training and articulated expectations for use are developed to support effective application of technology to parent-educator communication practices.
DEDICATION

For Charlotte, Thomas and Paul, your patience and unwavering faith in my ability to persevere has been deeply appreciated.
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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

CMC – Computer-mediated communication

ELECT – Early Learning for Every Child Today: A Framework for Ontario Early Childhood Settings (Ontario, Ministry of Education, 2007) – ELECT articulates six principles to guide early learning practices in Ontario, as well as provides a continuum of development for young children. As part of the features embedded in HiMama, educators are able to tag ELECT development domains to learning activities.

FtF – communication that occurs face-to-face


MRT – Media Richness Theory

Pre-HiMama – before HiMama was introduced as a tool for communication

Post-HiMama – after HiMama was implemented as a tool for communication

RECE – Registered Early Childhood Educator

SIPT – Social information processing theory
Terminology

**Educator** – For the purpose of this study the term “educator” represents those possessing the skills, knowledge and accountability for providing care and learning for young children (0 to 6 years of age) and their families.

**Bidirectional communication** – Opportunity for both parties to engage in ongoing dialogue both within the communication technology platform, and outside of the technology tool. Bidirectional communication recognizes the right and opportunity for either party to initiate and maintain the communication.

**Process** – The current research was designed to study design ‘*technology as a process*’ – the action and activities related to using technology as a social process that consequently engages families and educators, potentially leading to changes in both interpersonal and intrapersonal development. It is important to note, given the emphasis on *process*, that it is intended that this research differs significantly from process evaluation. In a process evaluation, evaluators assess the degree of success by which a new tool or program is able to meet its objectives. Evaluators observe, measure, and document the fit between the new program’s implementation and application, and manner by which the various components support or deter from the overall success of reaching objectives in partnership with stakeholders / organizations (McGuire, 2002). As there has been limited empirically-based evidence on computer-mediated communication practices, in the current research there is a strong emphasis on inquiry into how and what is being achieved by using the new communication technology due to its potential for supporting bidirectional communication within parent-educator partnerships. This positioning of inquiry
related to process versus the evaluation of process in the attainment of goals/objectives is the fundamental difference between process evaluation and the current research design.
1 Introduction

The establishment of Ontario’s first ever provincial-wide pedagogy for early learning, *How Does Learning Happen* (Ontario Ministry of Education, 2014) provides an articulated vision for learning that honors the powerful connections between children, educators and families within the context of their communities and larger society. It recognizes the powerful influence of families in children’s learning; deserving of the right to be engaged in meaningful ways within early learning programs. Educators are required to “cultivate authentic, caring relationships and connections to create a sense of belonging among and between children, adults, and the world around them” (Ontario Ministry of Education, 2014, p.13). In addition, establishing and sustaining communication and engagement with families is now considered a core responsibility in the professional role of Early Childhood Educator in Ontario, as articulated in the Code of Ethics and Standards of Practice put forth by the College of Early Childhood Educators in 2011 (see Code of Ethics and Standards of Practice Code B: Responsibility to Families; College of Early Childhood Educators, 2011). As such, bidirectional communication between families and educators is now considered a core component for the achievement of both pedagogical goals and professional practice. Finding the most effective methods to meet these goals requires educators to consider the methods and resources needed to support meaningful communication.

Over the past three decades there has been an explosion in the development and use of handheld technology. The late 1990s saw the emergence of the first handheld mobile phones and advancements in the capabilities, functions, and designs have been
exponential since that time, advancing the rate, speed, and application to daily life (Berman & Dorrier, 2016). The market for personal handheld devices including smartphones, and tablets, on a global level demonstrates a new era of communication and technological infiltration on human interaction (Phillips, 2014). Apple, a leader in the market for personal technology, launched its first iPhone in June 2007 which has arguably become one of the largest cultural artifacts of this century with over 1.16 billion million sold world-wide since its launch (Costello, 2018). In addition, Apple released its first tablet device, the iPad, in 2010 with 360 million sold since its debut (Nations, 2017). The use of personal communication devices has permeated almost every function of daily life and work environments, including that of early childhood education.

In an investigation of current trends in technology among early childhood educators between the years 2012 to 2014, it was found that tablets had the highest increase in use (from 29% of educators to 55%). Further results highlighted that educators increasingly see technology as a useful tool for family communication, with 90 percent of the educators in 2014 identifying this as a perceived benefit of technology (Blackwell, Lauricella, Robb, & Wartella, 2015). Technology is in our playrooms and programs, and, similar to their approach to learning with young children, educators are in a period of “playing” with technology and its application to determine its fit and function to daily early learning practices.

Discussions related to perceived benefits, effective application, and usefulness of technology have been widely publicized (Dillon, 2014; Herbert, 2016; Kashin, 2016; PRWeb, 2014; PRWeb, 2015); however, the need for research-based evidence is
profound. In 2012, a joint position statement released by the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Centre for Early Learning and Children’s Media provided an articulated stance on the importance and need for informed decision making, evidence-based practice, and thorough investigation of technology in early education (National Association for the Education of Young Children and the Fred Rogers Centre for Early Learning and Children’s Media and Saint Vincent College, 2012). Included in this statement was a specific recommendation to investigate those advancements that support parent-educator communication. Since then, systematic analysis of technological advancements with the field has considered multiple variables (including motivation for use, and mode selection) from multiple perspectives (including educators, families, and children); however, there are still very few studies that consider technology designed for communication within parent-educator relationships in early education, and even fewer within the Canadian context.

As previously identified, the recent articulation of pedagogical and professional standards regarding communication highlights this as an important area for research. The aim of the current research was to gain parents’ perceptions of the impact of technology on communication including changes in modes of communication, quality measures, and overall content. This research is the first in its kind to gain insight on the influence of technology on parent-educator communication within the context of early learning in Ontario.
2 Literature Review

2.1 Current Studies on Technology and Early Education

Research focused on using technology in early education is multifaceted, expansive, and considers technology from a variety of perspectives including that of children, educators, and families. Within each of these perspectives considerations include:

1) For the child: Research on the appropriateness of use with young children including: developmentally appropriate technology use (Rosen, & Jaruszewicz, 2009); technology integration (Keengwe, & Onchwari, 2009); and the incorporation of technology in the play/learning and lives of young children (Aubrey, & Dahl, 2013; Turja, Endepohlis-Ulpe, & Chatoney, 2009); including technology education as a component of the learning curriculum for young children (Chikasanda, Ortel-Cass, Williams, & Jones, 2012; Siu, & Lam, 2005).

2) For the educator: Research on educators’ acceptance of technology and the variety of factors that increase technological use (Blackwell, Lauricella, & Wartella, 2014; Ho, Hung, & Chen, 2013; Teo, 2011); and the impact of professional development opportunities for support of technological practice (Chikasanda, Ortel-Cass, Williams, & Jones, 2012; Keengwe & Onchwari, 2009).

3) For the families: Research on parent involvement and student success in elementary and secondary school systems, including components of technology communication and parental engagement (Lewin, & Luckin, 2010); and its usefulness as a tool for parent-educator communication (Bosch, Bosch, Takekawa,
Walther, Rieland, Hochhalter & Cline, 2017; Thompson, 2008; Thompson, Mazzer, & Flood Grady, 2015).

Each category describes and examines various facets of a broad range of variables that influence technology application, processes, users, and outcomes, offering valuable insight on developing technological practices within the current education context. That being said, two perceived limitations can be identified within this pool of research.

The first limitation is the inability of the timeliness of the research to progress along with the speed of technological advancement. The prowess of human ingenuity has allowed technology to progress at a much faster rate than is possible to meet within a research-based forum. Researchers are working diligently to capture and understand this interplay between technology and society; however, at the point of publication, many of the studies that are contributing to the proposed research are ‘dated’ as they investigate platforms such as email (e.g., Thompson, 2008) that are beginning to fade out due to powerful newer methods of communication, such as texting. Furthermore, technological advancements in relation to programming and tablet “applications” have now resulted in a huge market of potential platforms focused directly on education and communication needs. As such, educators are inundated with a wide range of choices in selecting a mode of technology to implement within their practice.

As a point of illustration, Gilgore (2015), in a review of recent case examples of parent-educator communication in the American elementary and secondary school systems, illuminates a current trend in early adoption of technology-based communication and use: a patchwork of many systems and programs, including social
media, as educators and educational systems “play” with technology and communication. It can be argued that, given the inconsistent application of technology practices across schools and school districts, and such a diverse range of tools, each technological system will present its own strengths and challenges with process and outcomes, leaving researchers with limited scope on what communication processes are most effective and, in turn limited understanding on the impact of these processes on user outcomes.

The second limitation is the population of study within the research. The majority of studies on technology and education occur within the primary and secondary school system. In considering research related to parent-educator communication using technology, there is a small body of research to draw from and no studies have been found pertaining specifically to the early learning sector. Borrowing from findings related to parent-educator communication within elementary and secondary school settings offers some critical considerations in the understanding of practices (Bosch et al., 2017; Ho et al., 2013; Thompson, 2008; Thompson et al., 2015); however, relying on research conducted within the elementary and secondary school population is problematic for several reasons. First, communication needs are quite different in these education settings. The type of communication is much more driven by school achievement, as well as issues in success, including homework responsibilities, grades, classroom management issues, and attendance. This content is more directly related to students’ participation and accountability for reaching learning objectives and the educator’s and parent’s support or expectations of the students (Juniu, 2009). This is extremely
different from the collaborative partnership developed to support early learning and care, where each child’s learning is seen as unique and within the context of relationships and partnerships between home and school. Second, in the professionalization of early childhood education, the need for advocacy on the differences between what constitutes early education specialization and that of what is teacher development relies on clear boundaries of articulated differences. Borrowing from the pool of research currently available related to parent-teacher communication may deemphasize the important and unique differences between these professions. Scholarship in early educational communication practices using technology is crucial for supporting further development within this specialized learning environment and for professional growth.

To summarize, the body of current research on technology, education, and, as a subcomponent, communication, is seemingly lacking in providing specific research on communication practices using technology to support parent-educator communication in the early learning setting. Due to the limited research available on technological communication practices within early learning settings, a review of research examining parent-educator communication in the early years, as well as computer-mediated communication between parents and educators within the school system was conducted and is presented in the next section.

2.2 Parent-Educator Communication in Early Education

Understanding the opportunity for technology as a viable platform for parent-educator communication requires insight on the communication needs and processes that are
typical in early childhood education. It's common in the early learning community for parents and educators to have face-to-face contact at both morning drop-off and afternoon pick-up times. Drugli and Undheim (2012) investigated these communication periods and their impact for building partnerships between parents and educators. Using interview data from a non-representative sample of 41 parents and 35 educators, and applying a grounded theory approach, they found that, although all parties were primarily satisfied within the relationship, neither party had clear knowledge of what occurs within either environment (daycare or home). While these findings cannot be generalized, they do offer some insight into the type of communication practices that face-to-face interactions may offer. Based on these findings, it could be hypothesized that, when no alternative forms of daily communication are offered, these typical periods relate more to the exchange of information related to the health and well-being of the children during their time in either environment (e.g., sleeping and eating patterns, overall disposition).

In their mixed-method, two-tiered study on parent-teacher communication, Reedy and McGrath (2010) attested that “if the early childhood community is serious about fostering parent–teacher partnerships, then unhurried communication between parents and teachers must be encouraged and supported” (p. 354). Based on a compilation of two individual research projects (McGrath, 2003; Reedy, 2007), the scholars identified that communication is critical for parent-educator relationships; however, current communication practices (such as face-to-face communication during transition periods, written notes, and information boards) have limitations in meeting the communication
needs of families and educators. The communication tools were considered from both the director’s perspective (Reedy, 2007), and that of parents (McGrath, 2003). In combination with their previous findings, Reedy and McGrath were able to articulate issues within various communication efforts (e.g., misinterpretation of written notes, hurried transition times at the end of the day, lost or unread memos), and to make recommendations to improve communication between educators and parents. They maintained that effective communication practices should incorporate three primary components: (1) the communication process is ongoing and continuous; (2) there is open, bidirectional communication; and (3) support of parents is provided through education (Reedy & McGrath, 2010). They also conceded that further research on parent-educator communication is required, and that the focus needs to be placed on the process of how information is provided, received, and interpreted by parents.

Looking a little deeper into the experiences of families using care arrangements, the limited research available finds that, although parents are pleased with the care arrangements they are receiving, they tend to be uninformed of the particular details of care that may be most relevant to their child’s well-being and therefore miss opportunities for collaboration and engagement. As discussed in the previous section on communication practices, Drugli and Undheim (2012) found that neither parents nor educators had clear knowledge of what occurs within either environment (daycare or home). Shpancer, Bowden, Ferrell, Pavlik, Robinson, Schwind, Volpe, Williams, and Young (2002) investigated parental knowledge of daycare practices related to the provision of care within the daycare facilities their child(ren) were attending at the time.
Based on phone interviews with daycare parents \((N=37)\) and information on structural and licensing requirements obtained from centre directors, they found that parents only answered 49% of questions correctly. On issues related to their own child’s activities during the day, approximately 22% of parents were unable to identify key items such as typical food served, amount of outdoor play, or the parameters of naptime. Only 38% of parents were able to correctly identify their primary caregiver’s education and experience, with 46% of parents indicating they didn’t know, and 14% answering incorrectly. Regardless of the gap in knowledge, the researchers found that parents still rated their daycares as high quality \((M = 4.3\) on a 5-point scale). Similarly, in research exploring Canadian parents’ knowledge on their child’s daycare experience, Howe, Jacobs, Vukelich, and Recchia (2013) found that only 40% of parents were able to correctly report the teacher’s education. In their study, participants \((n = 94)\) tended to underestimate the proportion of educators with a basic level of education, and overestimate the proportion at the advanced level. They also considered parental knowledge of philosophy statements finding that, while some families had knowledge of the philosophy for the early learning community, others did not (Howe et al., 2013, p.145). Communication between parents and educators was considered a key platform to strengthen this knowledge (Howe et al., 2013).

Therefore, the current knowledge of communication practices may suggest that, while parents and educators feel somewhat satisfied with overall communication processes, there is a limited amount of shared understanding of the child’s experiences within these separate environments. In improving communication processes that are
typical in early learning and care settings, there may be an increased capacity for both shared understandings and parent-educator partnerships. Research on technology and parent-educator communication within the elementary and secondary school system provides further insight on the potential for computer-mediated communication to improve collaboration and partnerships between parents and educators.

2.3 Parent-Educator Communication and Technology

Computer-mediated communication (CMC) refers to a merger of offline activities and knowledge, applied innovatively in an online form to promote shared understanding and engagement between users. Drawing from the body of research on parent-educator communication and technology currently available using samples drawn from elementary and secondary schools, primarily located in the United States, there have been credible findings on the potential for CMC to be an effective strategy for moving parent-educator communication towards collaborative partnerships in the early years. This includes validation of the type of technology that may be the most viable mode of communication for educators and families, and consideration of the potential for CMC to support interpersonal relationships. The following section will begin with a discussion on mode selection prior to moving on to examine the influences of CMC on interpersonal relationships.

2.3.1 Mode Selection

Research related to mode selection for communication between parents and educators considers what type of communication is more useful and effective. Thompson, Mazer, and Flood Grady (2015) looked specifically at mode selection for
parent-teacher communication, using the media richness theory. Media Richness Theory (MRT) is a framework for understanding communication and technological medium selection based on individual needs and the complexity of the task. It rank-orders media based on the richness of engagement they provide from face-to-face communication through to text messaging. Using a large sample survey of parents of elementary and secondary school students, it was found that leaner modes of communication (such as emails and text messages) were the preferred method of communication due to their asynchronous nature and convenience. Parents preferred the convenience of leaner forms of communication for the ability to read and reply to messages on their own time (Thompson, Mazer & Flood Grady, 2015). Supporting the notion that users are selecting leaner modes of communication that fit their lifestyle and needs, Ho, Hung, and Chen (2013) conducted a path analysis to examine influences affecting the intention to use technology for supporting parent and educator communication, and found that perceived usefulness and ease of use were critical. These two qualities therefore should be considered when adopting new technology strategies for communication between families and educators. Ho et al. further suggested that continued research on e-communication was necessary moving forward.

In recognizing the importance of parent-educator partnerships to support student success studies are now demonstrating that the use of technology for communication between the home and school environments may be a positive influence in school success (e.g. Kraft & Dougherty, 2012; Thompson 2008). In research at the elementary and secondary school levels, parent-teacher communication using phone calls and text
messaging was found to have positive effects on student classroom management and course work (Kraft & Dougherty, 2012). Thompson (2008) found that email communication increased student success; however, he recognized that this was due to an increase in homework completion. Thompson cautioned that, in using communication technology, attention needs to be placed on both the instrumental and relational dimensions of partnership to support parent engagement and student success. Recommendations for on-going research on the effectiveness of communication technology for pedagogical consequences including enhancing parent-educator relationships were highlighted.

In sum, leaner methods of communication, allowing for asynchronous, convenient, and time sensitive responses that are considerate of the communication needs of both families and educators as well as provide ease of use are important features for technology that supports parent-educator communication. Attention to the use of technology for both instrumental and relational processes is important when investigating successful application of modes of technology to support parent-educator communication.

### 2.3.2 Social Information Processing Theory

Within the body of research on computer-mediated communication, specific focus has been applied to the investigation of the establishment of interpersonal relationships through on-line communication formats. Social information processing theory (SIPT) considers the process that occurs during computer-mediated communication that leads to the related outcomes (e.g., online friendships) and identifies the components of user
interactions that may account for these outcomes (i.e., personal disclosures, interpersonal knowledge acquisition; Tidwell & Walther, 2002). A major tenet of this theory is the consideration of how communication that is devoid of the nonverbal cues critical in face-to-face (FtF) communication is able to establish and sustain interpersonal connection between users, including temporal characteristics (Tidwell & Walther, 2002), and the presence or absence of photographs (Walther, Slovacek & Tidwell, 2002). SIPT typically considers CMC as a unified single platform of communication and positions it in comparison to FtF communication (Tidwell & Walther, 2002). It has been applied to various aspects of on-line communication including group work, chat rooms, and social media.

Thompson (2008) investigated the characteristics of parent-educator email communication using the framework of SIPT. It is the only study of its kind found to apply the theory of SIPT to a group of individuals that share a common real-time connection (i.e., a child who engages in both environments), and, as such, pushes the boundaries between the comparative nature of the theory (CMC versus FtF) as it is assumed that parents may access the teacher physically, and that the child may also transfer communication between home and school in other formats (verbally reporting, notes, etc.). The study involved both interviews and content analysis interpretation from 30 educators and 30 parents from various levels and types of elementary and secondary schools. Thompson found that the context of the emails remained relatively instrumental over time; however, SIPT maintains that the relation aspect of communication should evolve over an extended period of use. Thompson suggested
that, without the goal of communication to build relationships, this premise will not be fully reached.

One finding from research applying SIPT is that users of CMC tend to use more direct affection or intimacy on the CMC format than with FtF communication (Tidwell & Walter, 2002). In applying these considerations to the early learning sector, one may consider that the primary focus on relationships will demonstrate an increase in the relational component of SIPT. As both parents and educators use CMC in conjunction with FtF communication, it may offer an increased capacity for relationship building between parties and strengthen connections between home-school environments.

2.4 Summary

While there is a growing body of research on the use of technology in education and communication, specific research on technology as a communication platform for parents and educators within the early childhood sector is lacking. Existing literature suggests that traditional communication practices supporting parent-educator communication, while satisfactory, are ineffective in fully communicating children’s experiences within home and school environments, and have identified limitations in the establishment of collaborative, bidirectional communication. In drawing from research conducted within elementary and secondary school systems, it was found that parents prefer leaner methods of communication that are asynchronous, convenient, and user-friendly (e.g. Ho, Hung & Chen, 2013; Thompson, Mazer & Flood Grady, 2015). Promising findings related to student improvement and school engagement have been found when computer-mediated communication practices have been implemented (e.g.
Kraft & Dougherty, 2012; Thompson, 2008); however, moving beyond the use of technology for instrumental purposes (e.g. reminding of assignments) to include relational qualities necessary for parent-educator partnerships was highlighted as an area for further development. SIPT maintains that computer-mediated communication is effective in supporting the establishment and maintenance of interpersonal relationships. Although these relationships may take a little more time to develop than those accessed through F2F communication, there may be a higher degree of openness and intimacy within this format. At this time no published studies have been located that used computer-mediated technology coupled with daily opportunities for F2F communication between parents and educators, which is more typical of the early learning setting. This further reinforces the limitations of drawing from research findings on technology communication that have focused on the elementary and secondary school systems.

2.5 Contributions

Through thorough review it is clear that research examining the practices of communication technology specifically designed for early childhood education and used within the Canadian context has not been conducted. The current research sought to generate evidence-based findings on the functions and experiences of early childhood educators and families as they encounter communication technology. With shifts in both pedagogy and professional accountability toward the ideology of all parties being actively engaged within the early learning setting, the current research focused on
understanding the impact of technology on parent-educator communication within the early learning sector of Ontario.

3 Frameworks

3.1 Conceptual Framework

3.1.1 Mitcham’s Conceptual Framework for Technology

Technology, “the making and using of artifacts” (Ethix, 2001), has been established as its own field of research. Carl Mitcham, a noted philosopher devoted to the study of technology within the context of human culture, has been paramount in shaping the understanding of technological research as a distinct discipline. His conceptual framework for defining and studying technology consists of four distinct dimensions (Custer, 1995). The dimensions are as follows:

1) Technology as an artifact: the physical tools designed through human ingenuity typically to support problem solving, including improving effectiveness and efficiency;

2) Technology as knowledge: the skills and information needed to both make the artifact, as well as use it effectively:

3) Technology as a process: the application of knowledge and artifact to the actions or activities of daily life and the influence of this activity within the social context:

and
4) *Technology as volition*: the power of technology to influence culture and shape our participation and use of it within our daily lives (Custer, 1995).

In the current research this conceptual framework provided clear dimensions by which to understand the multiple components of technology, including mode selection (artifact) and knowledge. Of particular consideration within the research was how *process* may influence both the “meanings” and “practices” associated within early childhood education for both educators and parents. The framework also recognizes the potential for intended and unintended outcomes (including volitions) that the application of technology may have on parent-educator communication. Furthermore, when applied to the context of parent-educator communication, Mitcham’s framework allowed for the recognition of technology in having an active role in creating and sustaining bidirectional communication between users and how this process of exchange affects users. For these reasons this framework provided a critical foundation for the current research as it offered a definition of technology that promoted a range of considerations in constructing the research questions as well as supporting both the survey design and resulting analysis.

### 3.2 Theoretical Framework

In the application of technology to support bidirectional communication and engagement it is important to consider the research within the context of the individual “user” experience and the process of exchange of information between users. Vygotsky’s socio-cultural theory supports understanding the relational influence of information exchange critical to learning and thought formation.
3.2.1 Vygotsky’s Sociocultural Theory

Lev Vygotsky (1896 – 1934), a developmental psychologist, theorized the process of human development through engagement in social relationships and the interplay between interpersonal and intrapersonal interactions on the formation of higher mental functions. His primary focus of study was the development of thought and language, and its impact on higher mental functioning across the lifespan of the individual. He diverged from regimented ontological beliefs regarding the unfolding of the human mind, and instead saw intrapersonal development as fluid, constantly evolving, and forever being shaped by the individual's experiences and interactions within the social world. He theorized that social interaction consisted of layers of inner thought, inner speech, and the formation of language as the processes of exchange between the inner mind and external world (Vygotsky, 2012).

According to Vygotsky, “direct communication between minds is impossible, not only physically but psychologically. Communication can be achieved only in a roundabout way. Thought must first pass through meanings and only then through words” (Vygotsky, 2012, p.267). Vygotsky’s “roundabout” process incorporated ideas being shaped into meanings and words in order to be shared; then reflected on and further shaped to present new perspectives and ideas. The merger of interpsychological relations with others in the social world becomes the intrapsychological mental functions that quantify human development (Vygotsky, 2012).

Vygotsky identified cultural tools or artifacts as playing a viable role in the interaction between both interpersonal and intrapersonal engagements within social settings. He
recognized that these artifacts were outlets that allowed for the formation of thoughts into symbols and words to share with others. Cultural tools come in various forms, such as writing materials, various artistic forms, and, more recently, technological platforms.

3.3 Summary

Vygotsky’s cultural artifacts align directly with Mitcham’s dimension of technology as an artifact. Both theorists recognized the influence of the artifact in resulting processes; Mitcham’s dimension of *process*, and Vygotsky’s formation of thought and language. Both maintain that through action and engagement between users and artifacts, changes occur both within the individual and on a societal level. Therefore, using both Mitcham’s conceptual framework and Vygotsky’s theoretical lens provided foundational understanding regarding the potential influence technology may have on communication and the relationship between parents and early childhood educators.

4 Meet The Artifact: *HiMama*

*HiMama* is a web-based interface created for early learning environments to support recording and documentation in an electronic format (*HiMama*, 2016). The application provides opportunities for educators to record children’s learning and care routines throughout the day. It supports the inclusion of videos, photographs, and note taking. A daily report is compiled for each child, providing parents a lasting record of their child’s daily experiences and special learning moments. To date, *HiMama* has been used to document approximately 288,343,464 moments worldwide (as of September 29, 2018;
HiMama, 2018). The web-based application, which first launched in 2013, is accessible through tablets, smart-phones, and computers.

HiMama was selected as the communication technology mode to be studied within this research design due to the capabilities it offers that align well with the findings from the literature review. It is asynchronous, time responsive (in that families have opportunity to use it when it best fits their needs), and convenient (due to its availability across multiple devices and access through any internet connection). The program promotes bidirectional communication by offering families opportunities to communicate with educators through messaging, as well as “comment” capabilities attached to all educator documentation. Furthermore, as a Canadian-based company now established with a world-wide market as an award-winning product for early childhood educators, HiMama’s company vision and values related to high quality education, professional identity, and family engagement were highly regarded.
5 Research Objective and Questions

The current research was designed to examine the influence of technology on parent-educator communication within early learning programs in Ontario. Using Mitcham’s conceptual definition of technology as a guide, this research aimed to gain insight on parents’ perspectives on a number of components including modes of communication, changes in communication processes and content, and perspectives on collaboration and experience with technology.

5.1 Overall Research Question

How has the use of communication technology, in the form of HiMama software, impacted parent-educator communication practices within early childhood education settings in Ontario?

5.2 Question Subsets

Four specific areas of focus include:

1) Technology as an artifact – 1a) What are parents’ experience in using HiMama as a mode of communication? 1b) What changes were perceived in other modes of communication with the implementation of HiMama?

2) Technology as knowledge – 2a) What training did parents receive to support implementation and use of HiMama? 2b) What additional knowledge may be helpful to support using HiMama?
3) Technology as a process –

Part 1.  3a) How are parents and educators using HiMama?

Part 2.  3b) What changes were perceived in communication qualities and
3c) in the content of communication with the implementation of HiMama?

Part 3.  3d) What are parents’ perceptions of collaboration? How do they
feel HiMama contributes to collaboration? 3e) What knowledge do parents
have about the profession of early childhood education and care?

4) Technology as a volition - 4a) What perceived barriers do parents identify in
using communication technology?

Using a mixed-method approach within the survey design and resulting analysis
allowed for the ability to both quantitatively assess the impact of the technology on
users’ perceptions of change and, through qualitative measures, to assess the deeper
meanings and experiences of users in relation to those changes. The approaches
included the use of quantitative measuring in the form of rating scales to assess
participants’ perceptions of communication both pre and post HiMama, as well as open-
end questions to gain insight into the personal experiences of parents on
communication processes in early learning. The related analysis involved descriptive
statistics and paired-sample sign test of significance through SPSS software, and
thematic analysis whereby codes were induced from the data set.
6 Methods

6.1 Participants

Participants were recruited from the population of parents whose children were enrolled in early learning programs within the province of Ontario in 2018 and who are currently using HiMama technology. All parents of young children currently using HiMama technology within Ontario were invited to participate. Two surveys were originally constructed for parents which allowed all interested parents to participate: those who had accessed child care services prior to HiMama technology being implemented (Post/Pre design), and those who did not have the prior experience necessary to complete the comparative aspects of the retrospective survey design (Post-only design). The decision to include both variations of the survey for the parent population was in recognition of the duration of time most families may access services (< 6 years for a single child family). For purposes of the current research project only the data collected through the post-pre survey design was used. No other exclusion or inclusion criteria were utilized for participation.

6.2 Recruitment Materials

Participants were recruited via electronic correspondence distributed through the HiMama database. HiMama was contacted during the initial planning stages of the research design (see Appendix A for letter of support). They were asked to support recruitment by distributing electronic invitations via email to potential participants through their database. To support parent recruitment HiMama was able to use direct communication by accessing a distribution list they hold for parent users within Ontario.
This allowed email correspondence containing the invitation to be sent directly to parents (recruitment materials can be found in Appendix B).

Within the invitation to participate participants were provided electronic links to the project website, online survey, and consent PDF. The project website was created as an additional method to support recruitment. Given the technological focus of the research, creating an online presence to support participants in accessing further information on the research project and connection to the team felt appropriate. The website can be found at www.parent-educationcommunication@weebly.com (screenshots of the website design can be found in Appendix C).

The online survey link was embedded within the electronic invitation email. When accessed, participants were immediately presented with the informed consent information. Participants were informed of the potential risks of participation as well as the potential for the data to be shared publicly. As it was an anonymous survey, participants were advised that, once their survey was submitted, it would be pooled electronically restricting the ability for it to be withdrawn at a later date. The research team’s contacts accompanied the consent should participants have any further questions. Consent for participating in the survey was acquired by participants selecting “yes” to access the survey. An incentive of five $25 cash prizes wA offered to all potential participants regardless of participation in the survey. They could access the incentive draw directly from the consent document or through the electronic survey. (see Appendix D for consent documents).
6.3 Ethical Considerations

Participants were informed of the goal of the research project and their rights as participants through the embedded consent document that accompanied recruitment materials. Directly within the recruitment documents attention was drawn to the relationship between the participant and HiMama. It was identified that there would be no potential for HiMama to know who participated in the study or not, as survey data would be collected anonymously. Participation in the incentive survey was gathered separately from the main data, protecting the identity of participants.

Attention was given to the risk of using electronic communication for correspondence and data collection. Participants were encouraged to use a non-networked computer for the completion of the survey, as well as taking the steps to delete browsing history to prevent others from accessing the information.

Data were gathered using Qualtrics, an electronic web-based interface. Participants were given the opportunity to skip any questions they did not feel comfortable answering while still remaining in the study. Demographic information was general enough that identifying the participant once pooled with other respondents would not be possible. Once the surveys were closed, data were downloaded onto a password-protected, encrypted laptop that was only accessible to the research team. Once the research project is completed, the data will be stored within the University of Guelph repository for the duration of 10 years.
6.4 Procedures

Ethics approval for completing research involving human subjects was received through the University of Guelph (see Appendix E for certificate of ethics approval). Once ethics approval was received, HiMama was informed of the opportunity to begin the recruitment process.

Recruitment started July 4th, 2018 with email distribution to 9627 parents across Ontario (enrolled across approximately 700 sites using HiMama technology; 95% licensed child care centres, 5% home-based care). Based on delivery rate statistics generated from HiMama, there was a 76% open-rate for the email distribution. A follow-up email correspondence was sent on July 30th, 2018 reminding parents of the research and alerting them that the survey will be closing shortly. This wave had 53% open rate for the email correspondence.

The survey, as well as the incentive draw, closed on August 27, 2018. Data were downloaded onto an encrypted laptop for cleaning and analysis using SPSS. An online, computer-generated, randomizing software (random.org) was used to draw the five names of recipients for the $25 incentive prizes. Recipients were contacted via email to receive the money transfer.

6.5 Measures

The survey was created by the researcher, and consisted of both quantitative data collection (in the form of rating scales and attitude statements), as well as qualitative data collection (in the form of open-ended questions to gather perspectives and user experiences).
The decision to use post-pre design methodology for this study came from initial experiences by the research team to capture pre-implementation data from childcare sites on the cusp of using HiMama technology. In this previous research design, the researcher team and recruiters faced challenges in acquiring early learning sites willing to participate in the research. The main reason for this seemed to be that most sites considering implementing HiMama began with a free trial prior to purchasing, and therefore limited their opportunity to participate in the study which required a longer time commitment. Therefore, following consultation with the advisory committee, the decision was made to change the project to the post-pre design utilized in the current research as it allowed us to access participants’ pre-implementation perspectives once implementation had occurred. One of the strengths of post-pre survey designs is in its convenience as participants can answer both pre and post measures simultaneously, making it less burdensome for participants (Klatt & Taylor-Powell, 2005). It also reduces the potential of response shift bias – shifts in participants’ frame of understanding – that come from traditional pre – then – post measures over an extended time period (Klatt & Taylor-Powell, 2005). The challenge with post-pre design, however, is that we are no longer measuring actual change, but instead people’s perceptions of the changes that have taken place. In the current research measuring perceptions of change is useful as it allows insight into the unique user experiences that have occurred, and how the participant feels technology has influenced the communication process.

In order to develop the survey, a review of the research literature was completed to support the construction and development of the measurement tool. As illustrated in the
literature review, in spite of rapid changes in modes of communication and an increased focus on parent engagement in early learning settings, no current research that used established measurement tools for data collection could be found at this time. Many of the variables examined in the previous studies were considered within the creation of the survey (such as Drugli & Undheim, 2012; Thompson & Mazer, 2012). In addition, the student researcher’s extensive experience working within an early learning setting in Ontario was a beneficial source of knowledge in designing the survey. As identified by Larossi in his work on survey construction, both relevance and accuracy are important components of survey question design: “Relevance is achieved when the questionnaire designer is intimately familiar with the questions, knows exactly the questions’ objectives, and the type of information needed” (Larossi, 2006, p.27) In the current study having 20 years of experience in both the early learning and care setting, as well as five years’ experience with HiMama communication software offered insight into the context of use that was imperative for survey construction. According to Larossi, accuracy is achieved if information is sought in a manner that is reliable, valid, and participants are able to answer accurately. The combination of quantitative and qualitative methods of response were efforts to support the overall accuracy of the survey design and resulting data.

In formatting the survey, consideration was given to how post-pre measures were constructed. Clear instructions, reflective order, and presentation style have been cited as key features in this type of measure (Klatt & Taylor-Power, 2005b). Post / pre comparatives were listed together within each variable to support participants in making
a clear distinction between pre and post implementation of HiMama, which has been identified as a key feature for retrospective design (Klatt & Taylor-Power, 2005b). Items within the survey were presented in an order that allowed for a logical flow of information gathering for participants and were then later regrouped for analysis by the research team. (See Appendix F for the survey guide).

In developing the survey, Mitcham’s conceptual definition of technology was considered as guiding the foundation for both the research questions and survey components. Within the four categories (artifact, knowledge, process and volition) literature pertaining to both technology and parent-educator communication was consulted for further consideration within the four areas of potential impact. These factors, as well as the guiding research question and analytic strategy, can be found outlined below.

6.5.1 Survey Questions and Analytic Strategy

The retrospective survey consisted of eight parts with a total of 47 items: 15 closed-ended, 16 open-ended, 6 blended questions (closed and open combined) and 10 demographic questions.

a) Content on Artifact

The first cluster of questions pertaining to the artifact was focused on considering HiMama as a physical tool for communication and its impact on other tools (or modes) for communication common within the early learning setting. Participants were asked to share their experience in using HiMama as a communication tool. Two closed-
ended questions in the form of rating scales were used to assess overall satisfaction and ease of use ratings for HiMama as a communication tool. Following this, participants had an opportunity to share their experience of using HiMama as a communication tool through open-ended text response.¹

The next section of questions asked, what changes were perceived in other modes of communication with the implementation of HiMama? Participants’ perceptions of changes in modes of communication were measured quantitatively by having participants report on the use of seven different modes of communication tools used in early learning settings (such as written notes, phone calls, text messaging), the frequency of use, and their overall satisfaction of each type. This allowed for descriptive analysis of the trends and ratings across modes of communication, as well as t-test analysis for significance in overall changes in perception of satisfaction as well as frequency of use pre and post HiMama implementation. Following the quantitative measures participants were provided with an open-ended text box asking them to “Please explain any changes you have noticed in (insert mode type) since the implementation of HiMama”, which allowed for thematic analysis of these perceived changes.

¹ Exploration and analysis on how HiMama is being used for communication will be presented in the section on ‘process’.
b) Content on Knowledge

The second cluster of questions focused on, *What training did parents receive to support the implementation and use of HiMama?* and *What additional knowledge may be helpful to support using HiMama?* Closed-ended questions accessed data on the opportunity for training and its usefulness across the participant group. An open-ended question generated data for thematic analysis regarding the type of supports and resources participants may recommend moving forward. Finally, participants were asked if early learning sites had any expectation on how HiMama was to be used in communication, and, if so, open-ended text responses were gathered for thematic analysis on these expectations.

c) Content on Process

The third cluster of questions focused how the technology was being used and its impact on both daily activity and the social context. To assess this, three components of process were considered: 1) how HiMama is being used by participants; 2) its impact on quality measures of communication and communication content and 3) through process of use, participants’ experiences of collaboration, as well as participants’ understanding of the context of early childhood education.

The first area section of questions, *How are parents and educators using HiMama?* focused on the use of daily reports as well as messaging capabilities in HiMama. Closed-ended questions were used to generate data regarding the types of information recorded in HiMama daily reports (such as activities, food intake, mood, toileting) and participants’ ratings of usefulness of the information on a 7-point rating scale. Thematic
analysis was then used to analyze participants’ experiences of interacting with the information generated within HiMama reports, via questions such as “What information are you most interested in?”, “How has the information available through HiMama affected you as a parent?”, and “Please describe in a typical day how you interact with the information provided on your child’s HiMama report”. Information was collected from parent participants on the practice of receiving “real time” updates containing new report information as well as their frequency for checking into their child’s HiMama content throughout the day when the child is in care. A final, closed-ended question assessed whether parents had invited other family members into the child’s account and if so, whom.

The use of HiMama messaging capabilities was also assessed. Participants were asked to indicate what type of information was typically shared through messaging based on six categories (such as illness, developmental milestones, concerns) as well as the option of “other” accompanying a textbox by which participants could describe additional categories. Frequency of communication through messaging was also measured using a five-point scale ranging from “rarely” to “daily”. Participants were also given the opportunity to indicate if they did not use messaging capabilities and, through open-ended text responses, what reasons they had for not using it, allowing for thematic analysis of this content.

The HiMama website allows parents to access additional content including their child’s portfolio, developmental assessment, as well as various online resources. Parents were asked if they accessed these components and, if so, how frequently.
The second section of content addressed, *What changes were perceived in quality of communication from parents and educators with the implementation of HiMama?* as well as, *What changes were perceived in the content of communication with the implementation of HiMama?* Participants were asked to rate their experience of communication across four components (openness, effectiveness, responsiveness, overall satisfaction). A 7-point rating scale was used with responses that could range from 1 - “not at all” to 7 - “extremely”. Participants were asked to rate their experiences both prior to the implementation of HiMama as well as currently.

To assess changes in content of communication participants were asked to rate the inclusion of information pre and post implementation of HiMama across eight categories (including health, social interaction, behaviour management, playroom activities, learning across developmental domains and well-being (Thompson & Mazer, 2012), two of which pertained specifically to guiding documents used in early learning programs in Ontario (ELECT and HDLH). Response options utilized a 5-point rating scale from “never” to “always” included. Statistical analysis used paired sample sign test to determine the significance in changes across content areas. Three open-ended questions were used to gain further insight into the process of communication on daily experiences of parents. Parents were asked to share 1) how they felt HiMama had affected communication between educators and themselves; 2) what they found effective about current communication processes; and 3) how this information has impacted them as a parent.
The final section of process looked at parents’ perspectives of collaboration and the knowledge they have about early learning and care. To understand the impact of process technology on perceptions of collaboration, ten researcher-generated statements pertaining to collaboration in the early learning environment were generated. These were informed through review of the pedagogy for Ontario and its focus on parent-educator relationships. Attitude statements such as “I am encouraged to share moments of celebration and developmental milestones regarding my child”, “I seek out educators’ support on issues occurring within the home”, “I have opportunities to contribute to my child’s program (sharing ideas, offering support or resources, participating in special activities, joining in on daily programming)” were generated and participants were asked to rate them on level of agreement from “strongly disagree” to “strongly agree”. Three open-end text response questions were included to allow for thematic analysis to further understand perceptions of collaboration as it relates to Ontario’s pedagogy. Two questions acknowledged HDLH’s focus on the importance of parent-educator collaboration and asked participants to identify aspects of communication that are supportive of this, as well as aspects that minimize it. Finally, participants were asked to share their perception on how they felt HiMama contributes to collaboration.

For the last component of process, we looked to understand the potential impact of technology on parents’ knowledge of early learning (Durgli & Undheim, 2012; Howe et al., 2013). We were interested in exploring parents’ understanding of the context of their child’s day in relation to early learning pedagogy, as well as their knowledge on the
professional role of ECEs. Data were obtained through six researcher-generated attitude statements pertaining to early learning in Ontario such as "I am familiar with the daily routines and experiences that are part of the early education program", “I am familiar with the pedagogical approach used in the early education setting my child(ren) attend”, “I have a good understanding of play-based learning”. Participants were asked to rate these statements on a 5-point scale ranging from “strongly disagree” to “strongly agree”. In addition, participants were asked if their knowledge of educators’ roles and responsibilities had changed since the introduction of HiMama, and if so in what way. Thematic analysis was used to identify shifts in parents’ understanding of the profession.

d) Content on Volition

The last component from Mitcham’s conceptual definition considers technology as volition – unanticipated influences that technology may impose on the context it is applied to. Thematic analysis of the two open-ended questions, “What do you find challenging about current communication processes?” as well as “What feedback do you have for HiMama?” was used to deduce potential areas of volition of technology. In addition, through the analysis of the other three categories (artifact, knowledge and process) attention was given to results that may indicate the presence of volition (such as trends that might indicate technology as disrupting parents’ focus at work). Potential findings that may be indicative of volition were further explored within the discussion section of this thesis.
6.5.2 Data Analysis

Data analysis was completed within each of the four subsets of questions prior to integrating findings to determine “How has the use of communication technology, in the form of HiMama software, impacted parent-educator communication practices within early childhood education settings in Ontario?”. Within each of the four subsets (artifact, knowledge, process, volition) the quantitative analysis components were completed within SPSS to illustrate trends and changes in participants’ perceptions pre- to post-HiMama implementation. This analysis tested the following hypothesis:

\[ H_0: \text{There will be no significant differences between participants’ perceptions of communication measures post-HiMama implementation.} \]

\[ H_a: \text{There will be significant differences between participants’ perceptions post-HiMama implementation.} \]

Descriptive statistics in the form of frequencies and distributions, as well as tests of significance were completed. The study used a related-sample sign test as its statistically method of analysis. This nonparametric test allowed for the analysis of pre-post data by first matching pairs and then testing for median differences between the data sets (\( H_0: \text{There will be no significant differences between median scores of pre and post-HiMama} \)). The test does not assume data comes from a normal distribution which was a better fit to the current data set than that of the paired t test that requires the assumption of normality (Field, 2013).
Qualitative analysis provided further insight into parents’ experiences of HiMama technology and communication processes. Data were analyzed using the 6-step approach outlined by Berg & Lune (2012) whereby codes are inductively identified from within the data. Once codes have been determined, data is sorted and examined for meaningful patterns. Patterns are then considered in context to overall research findings including past research and theories.

Within the body of the thesis, at the completion of each subset, a related discussion pertaining to its results is presented. After the four subsets have been presented, the thesis moves into a larger discussion whereby findings from across the four components (artifact, knowledge, process and volition) are considered together. It is within this discussion section that the larger research question, How has the use of communication technology, in the form of HiMama software, impacted parent-educator communication practices within early childhood education settings in Ontario? will be presented.

6.6 Methodological Issues

In the current study, methodological issues were experienced during recruitment including aspects of the recruitment processes as well as encountering a broken survey link. In order to access the parent database recruitment strategies occurred in partnership with HiMama. As such, we were one-step removed from the process and needed to rely on HiMama for both the timeliness and responsiveness for the recruitment process to be completed. Given the bulk size of emails for distribution (almost 10,000) HiMama company processes required involvement of multiple teams to
support distribution. This gave us less control over the timeliness of the email as well as direct contact with parent participants.

During the initial recruitment phase an issue with a broken link to access the Qualtrics survey occurred. As we were a step removed from the recruitment process some participants communicated directly to HiMama, as opposed to alerting the research team on the issue. While the issue was identified and corrected quickly, this event was not foreseen as having been something HiMama would have needed to spend time responding too. It had required HiMama to engage in correspondence with the research team throughout the day to identify and ensure the issue was resolved. Having direct access to the distribution would have reduced stress and time constraints experienced across HiMama and the research team in response to this event.

Finally, our methodology for contacting parent participants was through email correspondence. As such, we were unable to recruit participants who are experiencing HiMama as a communication tool at their child’s early learning site but do not have access to electronic methods of communication (or may be have access but still opt not to). Having insight into the experiences of parents who are unable to access electronic correspondence would have been beneficial to the study in understanding the impact of technology on parent-educator communication.

6.7 Data Cleaning Process

Prior to beginning data analysis, a data cleaning process was completed. The following steps were taken:
Step 1: After downloading the data from Qualtrics into the encrypted laptop, 674 entries were logged. Logged entries for individual who initially entered the survey but moved directly to the incentive draw through the embedded link were removed ($n_{incentive}=335$). Following the ethics protocol, incomplete surveys (less than 98% completed; incomplete responses removed had 80% or less of the survey completed) were removed from the data set ($n_{incomplete}=191$) resulting in 148 parent Post/Pre responses that comprised the initial data set.

Step 2: As a screening question, parents were asked to enter the length of time they had been using HiMama. Two parents responded they had always used HiMama for communication. These two participants (Participant ID#10, ID#119) were removed from the Post/Pre data set.

Step 3: Five other respondents were removed from the data set as their answers to qualitative questions indicated they did not have the necessary pre-implementation experience to support Post/Pre comparatives (ID#11 “None, as the programme was already in place from before starting daycare”; ID#46 “Always had HiMama since I’ve signed up for daycare”; ID#14 “I have only ever been at the daycare when HiMama was being used so I cannot say”; ID#33 “HiMama has been used since my son started at daycare so there’s no basis for comparison for me.”, ID#66 My child started daycare with HiMama already being use so I’m not sure”). In addition, one participant was removed due to a qualitative response that indicated they resided outside of the population being studied (ID#135 “I live in Alberta.”)

The final parent post-pre data set consisted of $N=140$ participants.
7 Results

7.1 Demographics

The target population was parents in Ontario who were accessing early education and care prior to the implementation of HiMama at their child’s early learning site. A total of 140 surveys were completed and Table 1 provides details of the parents’ characteristics. The majority of the population identified as mothers ($n=126$, 90%), and as the primary contact with their child’s education team ($n=129$, 92.8%). In relation to family composition the majority of families had between one ($n=53$, 38.1%) to two children ($n=71$, 51.1%) under the age of 18 years. The length of time spent accessing childcare services ranged from under 6 months to 23 years with the median length of time being 3 years ($n=138$). The majority of the population identified English as their first language (85.7%), with French ($n=13$), Arabic ($n=1$), Albanian ($n=1$), Japanese ($n=1$), Michif French dialect ($n=1$), Portuguese ($n=1$), Spanish ($n=1$), and Tagalog ($n=1$) identified as additional first languages.

<table>
<thead>
<tr>
<th>Variable</th>
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<th>%</th>
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<tbody>
<tr>
<td>Relationship to Child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>126</td>
<td>90.0</td>
</tr>
<tr>
<td>Father</td>
<td>12</td>
<td>8.6</td>
</tr>
<tr>
<td>Legal Guardian</td>
<td>1</td>
<td>0.7</td>
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<tr>
<td>Other</td>
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Parents were asked to provide information on their experiences and access to technology (See Table 2). In relation to technology, 100% of the population had access to Internet services at home and owned a cellphone (n=138). The majority had access to computers (95.0%) and tablets (89.2%). The majority of parents reported feeling extremely comfortable using technology (64.3%) with 30.7% indicating they were moderately comfortable. A small percentage reported feeling somewhat comfortable with technology (4.3%), and only one participant reported feeling only slightly comfortable (0.7%). No parents identified as being “not at all comfortable” with technology.
Parents reported having one (76.3%), two (23.0%) or three (0.7%) children receiving HiMama reports. For the component of the survey looking specifically at the content of HiMama reports they were asked to select one child as a focus for answering the questions. From this selection, 6.1% percent of parents reported that the focus child for this component of the survey had been diagnosed (2.3%) or suspected of being
diagnosed (3.8%) with a special need. The distribution of the programs the child attended ranged from infants through to before-and-after school care, with the majority attending toddler and preschool programs. Figure 1 illustrates this distribution.

Figure 1. The Distribution of Program Types Represented within the Data Set

The majority of parents reported having had between six months and five years’ experience communicating with educators prior to the implementation of HiMama. Figure 2 illustrates the length of time parents had been accessing child care prior to the introduction of HiMama.
In relation to survey completion, participants spent an average of 35 minutes completing the survey (n=134). In six cases, participants extended the survey completion over several days and therefore were not averaged into this time estimate. The number of participants who choose to respond to open-ended questions varied across the data and, as such, the total number of respondents for each question will be identified within the thematic analysis reporting. In addition, word counts for the length of qualitative responses were typically short (<20 words). A few of the more complex questions, such as “How do feel HiMama has affected communication between your child(ren)’s educators and yourself?”, “What do you find challenging about current communication practices between child(ren)’s educators and yourself?” and “What do you find effective about your current communication practices between your child(ren)’s educators and yourself?”, resulted in longer and more detailed answers (<100 words).
The following four sections review the results related to the four research questions developed across Mitcham’s conceptual definition of technology (artifact, knowledge, process and volition).

7.2 Artifact

Technology as an artifact, refers to the physical tool. To understand the impact of HiMama as an artifact this section first focusses on parents’ rating of it as a mode of communication prior to considering its impact on other modes of communication used within early learning settings.

1a) What are parents’ experiences with HiMama as a mode of communication?

Participants were asked to rate their level of satisfaction with HiMama as a communication tool on a scale of one to five, one being “not at all satisfied” and five being “extremely satisfied”. The majority of parents were moderately to extremely satisfied with HiMama as a communication tool ($M=4.18$, $SD=.87$).

Figure 3. Parents’ Satisfaction Ratings for HiMama
Participants were also asked to rank HiMama for ease of use on a scale of one to seven, one being “extremely difficult” and seven being “extremely easy”. The majority of the sample found that as a mode of communication HiMama was easy to use ($M=5.83$, $SD=1.098$).

**Figure 4. Parents’ Ease of Use Ratings for HiMama (n=138)**

When asked, 56 participants offered additional comments related to their experience using HiMama software. The majority of participants who commented had a positive user experience to share ($n=28$), including 16 comments identifying it as “easy”. Other positive comments included user friendly, intuitive, enjoyable, and simple.

Some examples of participants’ comments related to positive experience in using HiMama include “I like having a centralized repository for all info relating to my son at school. I love receiving photos throughout the day. The user interface is fairly easy to navigate” (ID#52). In addition, participant #78 shared,
Although I wish the app had the same functions as the web site, I find HiMama easy to use and intuitive. It is fast and easy to get to reports and use the message center, and it’s a good experience mostly because the ECEs are good at updating HiMama. (#78)

Some of the comments were identified as being indicative of a negative experience \((n=16)\) and were summarized across three general categories: issues with HiMama software/product \((n=8)\), issues with the early learning site’s implementation of the product \((n=6)\), and issues with lack of knowledge or training \((n=4)\).

For issues related to HiMama, participants shared some examples of software issues \((n=1)\), problems with photos / videos including downloading \((n=3)\) as well as navigation differences between app and website \((n=3)\). One parent felt strongly that the name of the product “HiMama” was a barrier to user-experience as a single father and that it should be reconsidered. In general, the negative comments identified an isolated component of the software’s extensive capabilities and use.

In relation to implementation, parents’ expressed concern that the early learning sites are not using it to its full capabilities \((n=3)\) such as, “I think our centre doesn’t use it to its full capability” (#112) and “I wish it was used to more of its ability” (#68). One parent expressed frustration in the early learning site’s ineffectiveness of getting the family signed up in a timely manner.

Lastly, in terms of training or knowledge of the software, multiple comments indicated a gap in knowledge on capabilities and features of HiMama. One participant explained: “It was just introduced one day. No tutorial. No email with slides indicating go to areas
and what’s what” (#72). Three comments from participants indicated that through participating in the research project they were learning more about the application. “I find it easy to use but now that I am doing this survey I think there is more to the app then I am using it for” (#104) including one participant who shared “I downloaded the app today” (#140).

Overall the majority of participants were satisfied with HiMama as a mode of communication and felt it was easy to use. Challenges identified with HiMama pertained to specific elements of use, as well as overall implementation processes (such as training). Thorough exploration of the training opportunities associated with its use (knowledge) as well as how it is being used (process) will be explored in-depth in the subsequent sections of results.

1b) What changes were perceived in modes of communication with the implementation of HiMama?

1) Modes of Communication

Seven modes of communication were studied to examine the impact of HiMama technology on overall trends of use, frequency and satisfaction. Participants were asked to indicate if the mode of communication was used at their early learning program, its frequency of use, and their overall satisfaction with it as a tool for communication both pre and post HiMama. Following these quantitative measures, participants were given the option to share any changes they had noticed in the mode of communication since the implementation of HiMama. These responses were then thematically analyzed. After the exploration of the seven modes of communication participants were asked to share
any other modes of communication used at the early learning site. The results for each mode of communication are listed below.

a) **Face-to-Face Communication**

Of 139 participants, 132 reported using FTF communication at their early learning site prior to *HiMama*, and 128 participants reported it was still being used after *HiMama* was introduced. Using a related-samples sign test a statistically significant median difference in frequency of FTF communication was found across participants that used it both pre and post *HiMama* (*z*=-3.064, *p*=.001) (*n*<sub>pre&post</sub>=128). Figure 5 displays the shifts in frequencies of use.

*Figure 5. Shifts in Frequency of FTF Communication with the Introduction of *HiMama***
Of the 128 participants who rated overall levels of satisfaction with FtF communication pre and post implementation, 40 participants (31.3%) experienced a positive difference in perceived satisfaction, 77 experienced no difference (60.2%), and 11 saw a negative difference in satisfaction (8.6%). The related-pair sign test confirmed that there was a statistically significant median difference in perceptions of satisfaction of FtF communication \( (z=3.921, p<.001) \). Figure 6 illustrates the satisfaction ratings for FtF communication pre and post implementation.

Figure 6 illustrates the satisfaction ratings for FtF communication pre and post implementation.

**Figure 6. Changes in FtF Satisfaction Ratings with the introduction of HiMama**

![Satisfaction Ratings Chart](image)

Participants were asked to “Please share with us any changes you have noticed in FtF communication since the introduction of HiMama”. The thematic analysis of the
qualitative data identified changes to both FtF communication content and processes post-implementation including the experience of increased convenience as well as relationship benefits.

From this sample of respondents \((n=81)\), 43 comments identified changes to communication content and were coded to indicate the direction of change (enhanced communication, hindered communication, or ambiguous in nature). In 28 comments it was identified that communication was enhanced, and 15 comments were coded as ambiguous (such as, “All of the essential information continues to be passed along through face to face, but the daily/routine details are often left to the HiMama communication” (#106)). No comments were found that indicated HiMama hindered FtF communication.

One of the main themes related to enhanced communication \((n=28)\) was the impact of HiMama on the content of the FtF communication. Participants identified that by having routine information logged in to HiMama it promoted FtF conversation that is richer and more intentional. By having information in advance parents felt better prepared to engage in more meaningful conversation: “I’m not asking about what she ate or if she slept. I know that already from the app, so the convo is much more about the quality of her day (the how) versus the logistics (or the what)” (#47). Another participant shared “Face-to-face communication is at a different level, since the basics are already covered in HiMama (I feel we already have basic information so I can just 'get right to the point' with things that are really important” (#78). It was identified communication is now more “personal” (#35) and that “it is nice to not have to discuss
more mundane details" (#60). Finally, participant #51 summarized this aspect by sharing “All the small stuff is already in HiMama, so that opens the opportunity / time to discuss bigger issues.”

Another category theme was the increased convenience of communication (n=11). Participants described communication as easier and more efficient (n=9).

Using HiMama allows the educators to make notes in real time, so when I check the app, I get continuous feedback. Without the app, often times the educators can forget what happened throughout the day. This app allows an additional, easy way to communicate. Also, if my child is absent or late, or if I have any questions, I can post it through HiMama and receive a timely response. (#105)

Parents identified the value of HiMama in reducing the demands and stress at pick-up time stress (n=3), and being able to communicate messages missed during FtF communication (n=3). An example of this theme was apparent in the following participants’ comments:

Often at pick up times my child doesn't want to hang around and wait for me to talk to his "teachers" about his day. With HiMama I can quickly pick up my child and less time talking about things that they can easily communicate to me in HiMama. I love if I'm running slightly late and unable to make a phone call I can message the staff and can leave more detailed notes than leaving a message on a voice mail or talking in person. I love the pictures being sent
about what my child and his other classmates are doing in class and that I can comment if I like. (#104)

As one parent shared, there is “no longer need to communicate about sleep, potty and eating so we can focus on the unique aspects of their day - stories, behavior, etc. It is also much faster and if the educator is busy we don’t have to wait around for a report” (#34).

Within these comments there are also some suggestions of some of the barriers that do occur during FtF communication during pick-up times; including the multiple demands on the educators as they work to supervise the children and communicate effectively with parents, parents’ own busy schedules, and tired children ready to head home for the day.

Within the context of changes to FTF communication seven participants identified that they had experienced positive impacts in their relationships with others. This included the relationship between parent/educator \((n=3)\), parent/child \((n=2)\), parent/parent and parent/early learning community. Participant #140 shared:

*It makes it easier to have targeted conversations about the day. I can see what she’s eaten, her playtime, etc. and have a richer understanding of her day through the app. Then when we talk to teacher, it's about her social and emotional development overall. It has greatly improved our conversations with teacher and made us feel more connected to the centre as well.*
One parent shared the impact their communication with their child, “I appreciate the photos a lot on HiMama. Face to face is great but the opportunity to sit with our son at the end of the night and read as well as look at the picture together is extremely rewarding and appreciated” (#44). One parent identified HiMama’s usefulness in co-parenting as through the app they no longer have to depend on the parent who did pick-up to relay important information back on the child’s day (#115). Parents also identified that it allowed them to connect with their child’s primary educators even if they are not the ones who are there during pick up and drop off times.

An additional question asked participants to share any changes they noted in verbal communication with the introduction of HiMama related specifically to changes in verbal content. Of the 101 responses, 30 participants identified an improvement in the verbal content, 53 saw no changes, and 10 reported a decline in verbal content. This provides further support for the changes noted in previous quantitative findings.

b) Personal written notes

Of the 140 participants, 92 reported personal written notes being used as a mode of communication at their early learning site prior to HiMama, and 43 reported that they were still being used after HiMama was introduced, indicating a decrease in use of over 50.0%. In comparing frequency of use trends there was a decrease of use in daily communication and an increase in the frequency of monthly use (See Figure 7). Using a related-pair sign test results indicated that there was a non-significant median difference
in frequency of personal note communication pre and post HiMama ($z=0.707$, $p=0.481$) ($n_{pre\&post}=43$). \(^2\)

**Figure 7. Changes in the Frequency of Use for Personal Notes**

Using a related pair sign test, median difference in satisfaction ratings pre and post-HiMama were non-significant ($z=1.809$, $p=0.065$, $Mdn=4$). The sign test demonstrated that nine participants (20.9%) experienced a positive difference, two (4.7%) experienced a negative difference, and 32 (74.4%) experienced no difference in overall satisfaction with personal notes pre and post implementation of HiMama.

\(^2\) When interpreting this result, it is important to be mindful that the results only apply to the frequency of use of personal notes for those participants that received them pre and post-HiMama. This means that the test does not take into account the shifts from use to non-use pre and post-implementation.

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When asked to share any changes to personal notes with the introduction of HiMama
16 participants offered responses. In a few instances participants indicated there had been no change in the use of personal written notes ($n=3$). A number of parents indicated personal notes were used for a specific purpose ($n=3$) such as a reminder for more diapers, or an accident report. Parents indicated that the paper and electronic communication complemented each other, which was helpful if you missed one ($n=2$). Parents shared the value of personal notes as a keepsake for their own records (#76) or child’s memory box (#47). Finally, three parents indicated they valued having notes in an electronic format within HiMama as it helps ensure communication does not go missing (#12, #140), and in situations of dual-parent families both parents are able to access it electronically (#37).

c) Group notes (written)

Of the 140 participants, 95 reported group notes (such as hard copies of newsletters) as having been used in communication prior to the implementation of HiMama, and 71 reported that they were still being used after HiMama. A statistically significant median difference in frequency of group note communication was found across participants that used it both pre and post HiMama ($z=2.582$, $p=.007$) ($n_{pre\&post}=71$) (see Figure 8).
Figure 8. Changes in the Frequency of Use for Group Notes

![Bar chart showing changes in frequency of group note use before and after implementation of HiMama]

Results from related samples sign test determined that there was statistically significant median difference in perception of satisfaction with the implementation of HiMama ($z = 3.354$, $p < 0.000$, $Mdn = 4$).

Results of the sign test demonstrated that 18 participants experienced a positive difference, two experienced a negative difference, and 51 participants experienced no difference in overall satisfaction with group notes pre and post implementation of HiMama. Figure 9 displays satisfaction ratings pre and post-HiMama.
When asked to elaborate, 26 parents offered insight into the changes in use of group notes with the implementation of HiMama. From this response set nine participants identified no changes, and three noted a decrease in the use of group notes; one parent wishing that they would be used more frequently. There were four comments that indicated that communication was enhanced and six were coded ambiguous. Within enhanced communication one parent shared that “group notes now supplement information from HiMama; communication about what’s going on at the Centre is more consistently communicated with the introduction of HiMama” (#115). In addition, ten parents indicated the value of this mode of communication for monthly calendars, newsletters and special events at the centre; however, seven indicated that this type of communication was now being conducted through HiMama. One parent stated the
benefit of this as “previously, the notes were printed and taped to the wall for families to access. With HiMama, the notes are available online – so I actually read them” (#120). That being said another parent identified the value of having a hard copy which can then be posted on the fridge (#86).

d) Bulletin Boards

Out of 140 participants, 93 reported bulletin boards as having been used in communication prior to the implementation of HiMama, and 90 reported that they were still being used after HiMama. A related-samples sign test demonstrated a statistically significant median difference in frequency of bulletin board communication pre and post HiMama ($z=2.294$, $p=.019$) ($n_{pre\&post}=88$).

Figure 10. Frequency of Bulletin Board Communication Pre and Post-Implementation
Results from related samples sign test determined that there was not a statistically significance median difference in satisfaction ratings with the introduction of HiMama ($z=0.000$, $p=1.0$, $Mdn=4$). Of those participants who rated level of satisfaction pre and post implementation of HiMama, seven participants experienced a positive difference, six a negative difference, and 77 participants saw no difference in satisfaction levels.

When asked to provide further insight 26 participants offered written responses to changes in bulletin board communication with the implementation of HiMama, however six identified no changes in this mode of communication. Participants identified that they refer to the bulletin boards less frequently now that HiMama had been implemented ($n=8$). Comments included “There is a learning map of activities in the classroom but don’t have much time at the end of the day with the kids hanging off me to look it over or discuss. I actually don’t know if they still use bulletin boards since HiMama, but I haven’t looks in a long time” (#55), as well as “not sure I notice the bulletin boards anymore” (#47).

Within the response set five comments indicated that communication through bulletin boards was enhanced with the use of HiMama, and four were ambiguous. A few participants identified the value of bulletin boards in communication including for parents who aren’t using the app (#1) or to read information on what’s happening without disturbing the program (#91) if the board is in a central hallway. One identified that information from public health (#62) is also posted here.
e) Individual Email

Out of 140 participants, 52 reported individual email as having been used in communication prior to the implementation of HiMama, and 37 reported that email was still being used after HiMama. Results from a related-samples sign test determined that the median difference for frequency of individual email communication pre and post HiMama was not found to be statistically significant ($z=1.109$, $p=.267$, $Mdn=5$) ($n_{pre\&post}=37$).

Results from related samples sign test determined that there was not a statistically significance median difference in perception of satisfaction with the implementation of HiMama ($z=.354$, $p=.727$, $Mdn=4$). Of those participants who rated level of satisfaction pre and post implementation of HiMama five participants (13.5%) experienced a positive difference, three a negative difference (8.1%), and 29 participants (78.4%) saw no difference in satisfaction levels.

When provided the opportunity 11 participants provided further insight into the changes to personal email with the implementation of HiMama. A number of participants identified that personal email was used less ($n=5$); however, it was noted that personal email was used to communicate with administration ($n=1$) and on content related to finances ($n=2$).

f) Group Email

Of the 140 participants, 57 reported group email as having been used in communication prior to the implementation of HiMama, and 40 reported that they were still being used after HiMama. Using a sign test changes in the median difference in
frequency of group email communication was not found to be statistically significant across participants that used it both pre and post HiMama ($z=1.512$, $p=.125$, $Mdn=5$) ($n_{pre\&post}=40$).

Trends in frequency of use remained relatively stable pre and post implementation with monthly being the most common frequency of use both pre and post implementation (pre 46.6%; post 52.5%).

Results from related samples sign test determined that there was not a statistically significance median difference in perception of satisfaction with the implementation of HiMama ($z=0.000$, $p=1.000$, $Mdn=4$) Of those participants who rated level of satisfaction pre and post implementation of HiMama one participant experienced a positive difference (2.5%), one a negative difference (2.5%), and 38 participants (95%) saw no difference in satisfaction levels. The majority of the sample remained “moderately satisfied” with group email communication (39.7% pre implementation; 52.5% post implementation).

When asked, ten participants provided comments on the changes to group email with the introduction of HiMama, however three of these participants indicated no change. Participants identified that this format of communication was typically used in sending group newsletter, calendars, reminders and reports to all families ($n=6$). One participant expressed dissatisfaction in that “email communication should be done through HiMama. Doesn’t make sense to have multiple modes of communication” (#99).
g) Text messaging

Out of 140 participants, nine indicated that text messaging was used in communication prior to the implementation of HiMama, and five reported that it is still being used. Using a sign test changes median in differences related to the frequency of text message communication was not found to be statistically significant across participants that used it both pre and post HiMama \((z=0.000, p=1.00)\) \((n_{pre\&post}=5)\).

Trends in frequency of use remained stable pre and post implementation with “every few months” as being the most common frequency of use both pre and post implementation \((pre\ 37.5\%:\ post\ 40\%)\).

Results from related samples sign test determined that there was not a statistically significance median difference in perception of satisfaction with the implementation of HiMama \((z=0.000, p=1.000)\) Of the five participants who rated level of satisfaction pre and post implementation of HiMama four participants indicated no difference in satisfaction levels \((80\%)\) and one a negative difference \((20\%)\).

In the qualitative analysis \((n=2)\) no differences were reported in the use of text messaging pre and post HiMama.

h) Phone calls

Of the 142 participants, 78 indicated that phone calls were used in communication prior to the implementation of HiMama, and 65 reported that they were still being used after HiMama. Using a sign test changes median differences in the frequency of phone call communication was not found to be statistically significant across participants that used it both pre and post HiMama \((z=1.664, p=0.092)\) \((n_{pre\&post}=65)\).
Trends in frequency of use remained relatively stable pre and post implementation with “every few months” as being the most common frequency of use both pre (59%) and post implementation (55.4%).

Results from related samples sign test determined that there was not a statistically significance median difference in perception of satisfaction with the implementation of HiMama ($z=0.894$, $p=0.371$, $Mdn=5$). Of the 66 participants who rated level of satisfaction pre and post implementation of HiMama four participants (61.5%) experienced a positive difference, one participant experienced a negative difference (1.5%), and 59 participants (89.4%) saw no difference in satisfaction levels. The majority of the population remained “extremely satisfied” with phone call communication (47.4% pre implementation and 51.6% post implementation).

When asked, 31 participants offered written comments in regard to changes in phone call communication with the implementation of HiMama. From this sample, 21 comments identified that the primary purpose of phone calls was to communication responsively in the event of emergencies such as injuries or illness. In addition, eight participants indicated no change in the use post implementation. Finally, one participant felt that they were used less frequently, and an other suggested only when necessary.

i) Other

When asked if other modes of communication were used within their early learning environment, three additional modes were identified (n=5). These included posters/flyers (n=1), formal scheduled face-to-face meetings (n=1) and Facebook (n=1).
One participant did not identify and another participant named *HiMama* \( (n=1) \) as a response.

**Discussion on Changes in Modes of Communication**

In considering the impact of *HiMama* on various modes of communication, noteworthy results were found in relation to overall satisfaction ratings across FTF communication and group notes as well as frequency patterns for use of personal notes. Results generated through thematic analysis of parents’ perceptions illuminated their experiences with the application and the use of multi-mode communication strategies within the early learning setting.

Statistically significant median differences in parents’ perceptions of satisfaction were found for both FTF communication as well as group notes post-implementation of *HiMama*. The increase in the satisfaction for FTF communication is particularly relevant to the current study. As explored in the literature review, social information processing theory considers the way interpersonal relationships develop through computer-mediated communication (CMC). The study by Thompson (2008) on parent-educator email communication using the framework of SIPT pushed the boundary between the comparative nature of the theory (CMC versus FTF) as participants had an opportunity for communication both electronically and physically through the child’s actions as mediator of communication between home and school (within the elementary education setting). In the current study there is a merger of both CMC and FTF communication process whereby parents and educators could use both methods of communication directly and simultaneously day after day.
Parents found FtF communication more intentional, effective, and convenient after *HiMama* was introduced. They acknowledged that by having more of the health/wellness details logged into *HiMama* they were able to engage in deeper conversations with educators when together; moving from the “how” to the “why” (as describe by participant #47). Parents felt they were better equipped for FtF communication at pick-up time. They also noted that there was a reduction in the expectations and time-demands at this point of the day based on information being logged. Having a complementary method to reduce some of the stress at this time of the day was perceived as asset to the communication needs by parents. Relating back to the SIPT, in this study the changes in the content quality of FTF communication may be indicative of changes in communication due to the presence of CMC; increasing the overall satisfaction ratings of FtF communication. The current study focused on parents’ perceptions of change. It would be worthwhile in investigate this further using direct observational data gathered during parent pick-up times that may be obtainable through a field study.

The use of group notes was also identified as having a statistically significant median difference in satisfaction ratings post-implementation. The frequency of the use remained stable across implementation, with “monthly” use being indicated as the most common frequency. These ratings may be reflective of the common practice of “monthly newsletters” within the educational setting. Having monthly group correspondence across the early learning community is a standard way to support parent-educator communication and links parents to information from across the wider school
community (*HiMama* tends to focus on the individual child’s program). In recognizing that it is a mode of correspondence that serves a particular communication purpose, (community updates) it may complement the daily communication that is accessible through *HiMama*.

Results from the thematic analysis also identified the unique value of various modes in meeting communication needs. Parent comments on the subject of emails, personal notes, and phone calls identified the general purpose each mode served and the gaps in communication each particular mode filled. Participants identified that group notes and group emails were useful in communicating centre-wide information and overall monthly events. Phone calls were identified as being used to communicate important time-sensitive information, such as illness, injury, or needing to be picked-up. Personal email was also identified as an important way to communicate on content around financials or other administrative components. As identified by participant #132, “I only communicate with management by email. Educators always through *HiMama*”. This signifies that, when considering communication within early learning environment there are different contexts of communication that happen. Furthermore, the nature of communication may shift from parent-educator, to parent-administrator, and parent-community. Overall it was noted that while much of the qualitative data indicated either no change or a reduction of use across the various modes of communication, participants were able to identify particular purposes for certain modes of communication and the role they played in meeting communication needs across the early learning community.
Personal notes saw the largest decline in use with the implementation of HiMama. Descriptive statistics indicated that there was over a 50% reduction in the use of personal notes. In addition, there was a marked change in the trends in use of personal notes pre and post implementation. Prior to HiMama the majority of participants reported that personal notes were used “daily”. This shifted to a “monthly” basis post implementation. Overall satisfaction measures stayed at a median score of “moderately satisfied”.

It is interesting to note that across the participant group, less than half of the participants reported having had technology as a part of their communication processes (such as group emails, individual emails or text messaging) prior to HiMama. Any improvements in communication ratings after the introduction of HiMama (which will be explored in the following section on process) may be due to the introduction of CMC and/or the actual artifact. From the literature review it was demonstrated that the opportunity for asynchronous, time-sensitive, and bidirectional communication was considered of value to parents, such as email (see Thompson, Mazer, & Grady, 2015). That being said, across the sample, HiMama is rated as a “moderately satisfying” to “extremely satisfying” communication tool (82.2%).

In comparison to all other modes of communication HiMama ranked the third highest in overall satisfaction ratings with 41.4% of participants indicating they were extremely satisfied with it as a communication tool (n=139). Highest was phone call communication with “extreme satisfaction” ratings (47.4% pre implementation and 51.6% post implementation) (n=64). Second highest was FtF communication with
43.8% of participants rating FtF communication “extremely satisfying” post implementation, however it was only after the introduction of HiMama that there was a shift in the overall satisfaction rating for this mode (a 15.8% increase) \((n=128)\). When considering only those participants who provided satisfaction ratings both pre and post implementation across the three modes, the hierarchy of ranking remained. From the data collected across the 59 participants who provided satisfaction ratings mean scores across all three modes retained the ranking order: phone calls \((M=4.37, SD=0.74)\), FtF communication \((M=4.25, SD=0.709)\) and HiMama \((M=4.15, SD=0.89)\). It’s worth noting that within the current study, phone call communication was the only mode of communication to receive a median score of 5, “extremely satisfied”.

In considering previous research on mode selection *convenience* was identified as a key factor in selecting communication modes by parents (Thompson, Mazer & Flood Grady, 2015). It was found that parents selected the mode of email communication more frequently (even though identified as leaner) due to convenience when compared to richer modes of communication (such as FtF and phone calls). Thompson, Mazer & Flood Grady (2015) have previously proposed “an extension of MRT to account for the role convenience plays in media selection because the richness of media now plays a lesser role in the modes communicators select” (p.203). At the time of their research they identified a number of emerging trends in CMC including parents’ use of text messaging, and parents’ appreciation of accessing photographs through social media; however, this was prior to the development of HiMama. The four criteria the theory
currently uses to determine the richness of a medium make it challenging to consider where \textit{HiMama} may rank within the theory due to its unique features.

\textit{Richness of a medium is determined by four components: (1) capability for immediate feedback, (2) capacity for multiple cues, including auditory and visual cues and physical presence, (3) level of natural language to assist in explaining an idea, and (4) ability to personalize a message} (Daft & Lengel, 1986). Media ranking high across these components are considered rich (e.g., FTF), while media ranking lower are deemed lean (e.g., e-mail). MRT suggests that e-mail, a leaner medium, would be less effective for communication about complex or sensitive matters due to delayed feedback, limited nonverbal cues, and decreased personal focus. (Thompson et al., 2015, p.189)

In considering features of \textit{HiMama} within the classification defined by the theory it is challenging to recognize where it may fit on the continuum from email to FtF communication. It does allow for immediate feedback, and holds the capacity for multiple cues (written descriptions and visual evidence in the form of videos and photographs). Natural language can be added through both video and written accounts – with embedded links to developmental frameworks, and it is personalized for each child. However, it does not have synchronous qualities similar to FtF or phone call connection across its platform. It differs in quality from lean email, but does not fit within the positioning of ‘richness’ related to phone call communication or FtF, making it challenging to position within this theory. Extending MRT in relation to new directions of
CMC technology, including the previously proposed focus of convenience by Thompson et al. (2015) would be an additional area for further development of this theory.

The majority of participants were moderately to extremely satisfied with HiMama and found it easy to use. Negative feedback that was received on the artifact was primarily focused on a particular aspect of the software (such as downloading images) as well as introduction and training on using it for communication. Training and knowledge on using the tool with be further explored within the results related to knowledge.

The results from changes to modes of communication offer some valuable insight for the use of communication technology moving forward. The results suggest that offering a range of communication modes that are supportive in meeting particular communication needs and complement one another may be important in developing successful parent-educator communication practices. Further, it was found that with the implementation of HiMama communication, FtF communication and monthly group notes had increased satisfaction ratings from parents. These modes of communication, along with phone calls were highly favored within this sample. These results suggest that multiple modes of communication may still be necessary in parent-educator communication with the introduction of CMC; however, these additional modes may be used with more intentionality (such as FtF communication) and decreased frequency as they target specific content and application.
7.3 Knowledge

2a) What training did parents receive to support the implementation and use of 

*HiMama*?

Of 139 participants, only 7.1% reported receiving training for using *HiMama*. Of this sample (*n*=10), participants were asked to rate the training on a scale of one to five with one being “not at all helpful” and 5 being “very helpful”. The majority of the sample (60%) rated the training a four (*helpful*).

Parents were asked to share their experiences on the type of training they received (*n*=6). Two parents indicated that they received training via email when they first set-up their *HiMama* accounts. In addition, two other parents reported receiving training through the early learning site. In one instance, it was an “*explanation given by daycare*” (#24) and, in the other, they indicated, “*we were taught how to use it upon registration*” (#44). One participant indicated that they received a brief introduction to the tool but did not specify by whom. Finally, one participant in our study is also an educator and indicated that they had completed the educator training for the tool.

In relation to expectations for use, 33 participants indicated that the early learning site they attended had expectations in place for using *HiMama* (23.6%). 88 participants indicated that their site did not have expectations (19 individuals did not respond to this question). From the sample of participants who indicated there were expectations (*n*=33), 17 participants offered further insight into these expectations. Based on the findings from the thematic analysis the majority of expectations programs have are directly related to minimum standards for the information that parents can expect to
receive from HiMama (n=10); such as quantity of photos ("one pic per day" (#13), report details ("at least nap and a meal" (#63), and intention for use ("suppose to replace written diaries" (#49). Of the 17 respondents, only two participants expressed comments that are suggestive of the bidirectional process of communication that may occur between parents and educators when using the application. One participant shared “Parents are encouraged to add “crew”, contribute to HiMama, and use the message center to communicate anytime” (#78) suggesting specific details on how parents might engage with the tool. Another parent expressed “we are free to communicate through the platform as we would like. They are generally very open to communication and feedback” (#54) which appears to be devoid of explicit expectations.

From the response set, two participants shared that they had assumed the expectations through the routine use of the tool by the educators. In addition, two other participants expressed frustration when educators do not meet expectations for using the tool.

2b) What additional knowledge may be helpful in using HiMama?

Participants were asked if they felt training would be helpful for using HiMama. Of 138 participants 37.9% indicated they felt some training would be helpful (n=53).

Participants shared their perspective of what type of training may be helpful (n=36). Three main categories emerged from the response set: 1) training content, 2) formats, and 3) target audience for training. In relation to training content 13 participants indicated wanting more knowledge on the various features of HiMama, seven indicated wanting knowledge on how to use it, and two others asked directly for support on
navigating the software. One participant indicated that it would be helpful to know if there was an app for using the software (indicating that they are unaware of both the website and application interfaces for use of HiMama).

Three formats for training were suggested: a help guide that can be accessed, a brief introduction via email, and a walkthrough for the initial use. Within this data set there were two comments in which participants expressed their concern about the manner in which the new communication tool was introduced. “I was never told how to use it or what it was being used for. I was just told to download the app. I would get notices that photos were posted but otherwise it wasn’t used for anything else” (#126), and “It’s a new program we have never seen or heard of before and just told to use it…with no context or instructions” (#91). Furthermore, through the process of participating in the research one participant shared, “I feel like I’m learning through this survey of things I didn’t know existed?” (#96).

In relation to the target audience, four comments were directed at the need for additional training for educators / early learning site to support using the tool, and one comment specified additional training for parents. One participant identified the importance of generating a collaborative understanding in using HiMama across parents and educators

*I think it would be helpful for parents to know how the daycare expects us to interact with the program, as well as how the educators are interacting with it, so that expectations are clear around what information is to be housed and how it is to be accessed.* (#96)
Similar considerations were found in the content on additional tools and resources which are summarized below.

Participants were asked to identify specific tools or resources that would increase the success of *HiMama* as a communication tool. Of the 69 responses, 22 comments were directly related to the implementation of the tool by the educators and the early learning site.

Parents identified that it would be helpful if educators had increased consistency of use ($n=13$), motivation for use ($n=3$), and implemented specific features ($n=6$). Examples of this included: “better training for the educators. I don’t feel they know how to use it” (#49),

*Educators in my child’s daycare seem to see *HiMama* use as perfunctory requirement. It isn’t used for any substantial communication. I guess for it to be useful, educators would have to have both the time and the inclination to use it* (#122),

and “educators should improve their use of it by entering and using all of the features” (#81). In relation to educators, two parents identified the needs of the educator in meeting communication expectations and suggested that educators need more time / support to complete data entry (#87), and that every educator should have access to a tablet (#3). Participants also recognized that there is a need for clear communication from the early learning site on how they are going to use it and expectations for families ($n=3$).
Within this response set parents provided a range of suggested formats for training and support in using *HiMama* that would be useful for developers to consider \((n=13)\). These included a range of automated training formats that could be accessed electronically (such as video tutorials, online help guide, email communication with quick reference guides), as well as requests for handouts, cheat sheets, or instruction manuals.

*A few quick video demos online about how to use milestones and what things go into the journal would be helpful, as well as direct suggestions on the site/app about ways parents AND educators can use HiMama. I think people might not have thought of all of the possibilities. Even doing this survey some new ideas came up for me because of things asked about in the survey; for example, using it to see video and using it to document milestones and development. (#78)*

Providing ongoing support online for parents and educators was identified as an ongoing method for successful use of the tool for both parties.

Finally, two participants offered suggestions for collaborative training that would engage parents and educators together, allowing them to explore the use of the software as well as making decisions on how they will be using it in practice. “*A parent and educator info session would give parents and teachers a chance to network and understand how each other is using the app and what each other's user experience looks like* (#115). As another participant shared “*I'm now thinking it would have been nice to have had an in person introduction between myself, my ECEs and HiMama. I*
feel like perhaps the program has more potential for two-sided communication then I was lead to believe with it’s implementation” (#96).

Parents also provided feedback for additional features that they feel would be useful in HiMama (n=13). These included monthly calendars, auto-reminders on the mornings of special events, and a platform that allowed for parent connection (parent group chats). One parent suggested adding in a “like button so that the educators can see the parent’s involvement with what activities we see and like on HiMama that they have posted” (#28).

Lastly, five participants requested further knowledge related directly on the content regarding early learning and child development. This included offering parents’ links to the resources early learning and pedagogy, further insight into child development and milestones, and offering insight into the value of play-based learning as it relates to the individual child.

**Discussion on Knowledge**

It is clear from the results that there has been limited opportunity for training and support in using HiMama as a communication tool. Training is rarely utilized, only offered during the initial stages of use, and ongoing support for the use of the tool is not accessed and/or available to parents. Parents were able to identify gaps in their own knowledge base as well as potential areas for learning and development directed at the educators. From the results related to expectations for the early learning site, three areas were identified: the need for ongoing training support for both educators and
parents, opportunity for parents and educators to determine communication goals and approaches, and the clear articulation of guidelines for use.

One key element to highlight is the shared accountability for site administrators and the software developer in offering training and support of use for educators and parents. Within the current study parents identify both stakeholders as having a role in the successful implementation and use of HiMama.

In adapting new technology early learning sites might identify the importance of supporting training for parents and educators during the implementation stage; however, the need for ongoing training and development may not be recognized. It is important for early learning sites to consider their role in offering on-going training and support. Training should include supporting consistency of use across all programs within the site, articulating the level of detail included in reports, as well as consideration on how to support staff’s motivation for effective use. Given the high turn-over rate of families and staff within early learning sites it is important that appropriate training and resources for use are available to educators and parents on an ongoing basis.

Providing the opportunity for parents and educators to collaborate on how to use the tool, and to understand each other’s experiences for use was identified. Many of the parents highlighted the lack of training they felt that educators have received. While this may be one of the factors, additional variables including educators’ daily responsibilities (such as positive, responsive child engagement) may take precedence over data entry. Having the opportunity to collaborate on use and recognize one another’s communication needs and multiple role demands may help to ensure communication
practices and expectations fit both the educators and parents needs. Furthermore, as illustrated by Gilgore (2015), the education community is in a period of playing with technology. Understanding the goodness of fit between the application’s capabilities and the needs of educators and parents including time for data entry within the learning setting may be difficult to establish initially.

The current study identified the need for early learning sites to offer clearly communicated guidelines on the intended use of HiMama. The wide range of features available in HiMama allows for extensive possibilities creating wide variation on how sites might use the tool for communication, as well as in-house variation across educators and teams. (This will be explored in the following section on process). The intended application therefore would be best met if there are clearly defined expectations for both parents and educators in meeting the functions and goals of CMC. These findings mirror recommendations proposed by Lewin and Luckin (2010) who suggested that, “acknowledging that the use of technology to develop working relationships between schools and families is an on-going enterprise that needs to be nurtured in order to develop sustainable solutions” (p.757) was an important step in the integration of technology. Furthermore, Bosch, Bosch, Teakekawa, Walther & Rieland (2017) proposed that “digital tools can strengthen the teacher-parent relationships, facilitating individual and group communication between school and home – as long as its users are knowledgeable of how to maximize the tool’s benefits” (Bosch et. al., 2017, p.53). In the current study, an annual review of the strategies for use was recommended by participants. Engaging in this collaboratively across the early learning setting would
serve multiple purposes: it would help ensured shared goals for communication occur annually, it would support ensuring new parents and educators have the opportunity to explore the software together, and support articulating expectations for use moving forward.

As these considerations were generated through parent perceptions, gathering insight from directors and educators on usage behaviour, motivation, and training would be a potential area for further research in CMC.

Parents provided a range of suggested formats for training that would be useful for software developers to consider. Extending resources to include hard-copy paper formats may help support parents or educators who feel uneasy with new technology allowing them first to receive support manually prior to accessing resources online.

It would be helpful if software developers offer ongoing e-communication regarding HiMama including its use and features. Many parents were unaware of the range of tools (including the existence of both a website and an app).

Providing ongoing support online for parents and educators in using the tool effectively and sharing new strategies and features as they change and evolve would be a useful consideration for developers of the software. This would support ensuring that ongoing knowledge of the technology is made accessible to all users.
7.4 Process

Based on Mitcham’s conceptual definition the process of using technology encompasses two components: 1) the application of knowledge and artifact to the actions or activities of daily life, and 2) the influence of this activity within the social context. The following results and discussion offer insight into parents’ perceptions of each of these components. Part A will illustrate how parents and educators are using HiMama in communication by investigating three components of the software. Part B will describe parents’ perceptions on the influence of the technology within the social context including overall ratings of communication and perceived changes in communication content. Part C will focus on parents’ perceptions of communication related to opportunities for collaboration as well as shifts in knowledge of early learning practices after the implementation of HiMama.

Part A: Using HiMama

3a) How are parents and educators using HiMama?

Three components of HiMama were investigated to understand how parents and educators were using the software including: 1) daily reports, 2) e-messaging, and 3) interacting with the information and the unique features of the technology. The following results and discussion describe parents’ perspectives across these components.

1) Information shared through daily reports

HiMama has the ability to generate a daily report for each child that outlines specific information related to health and wellness, as well as descriptions of daily events and activities. Parents were asked to indicate the presence or absence of this information in
their child’s daily reports and the overall usefulness of each type of information. Table 3 illustrates the inclusion rates for each type of information as well as the mean score for overall usefulness.

<table>
<thead>
<tr>
<th>Content Category</th>
<th>n</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on Eating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>123</td>
<td>87.9</td>
<td>5.77</td>
<td>1.45</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>12.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on Sleeping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>110</td>
<td>79.1</td>
<td>6.25</td>
<td>1.12</td>
</tr>
<tr>
<td>No</td>
<td>29</td>
<td>20.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on Toileting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>88</td>
<td>62.9</td>
<td>6.08</td>
<td>1.27</td>
</tr>
<tr>
<td>No</td>
<td>52</td>
<td>37.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on Mood</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>64</td>
<td>46.0</td>
<td>5.75</td>
<td>1.35</td>
</tr>
<tr>
<td>No</td>
<td>75</td>
<td>54.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>122</td>
<td>87.1</td>
<td>5.94</td>
<td>1.34</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>12.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*scale rating 1 – 7 one being “not at all” and 7 being “extremely useful”*
As illustrated, the majority of participants received information on their children’s food intake, activities and sleeping. In over 60% of the cases information recording on toileting was documented. Mood was the least likely information to be recorded with less than half of the sample reporting it recorded on daily reports. Mean scores for overall usefulness ratings demonstrated that parents found information in all five areas highly useful (average ratings were between 5.75 to 6.25 out of a possible 7).

When reporting on daily activities educators are able to include photographs, videos and written descriptions. Table 4 outlines some of the specific content for daily activities that parents identified having been included in reporting.

Table 4. Specific Content included in Activity Reporting

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Inclusion Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Summary of Individual Activities</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>101</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
</tr>
<tr>
<td>Summary of Group Activities</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>92</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
</tr>
<tr>
<td>Activities are linked to ELECT</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>58</td>
</tr>
<tr>
<td>No</td>
<td>54</td>
</tr>
</tbody>
</table>
Lesson plans are included

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>13</td>
<td>101</td>
</tr>
<tr>
<td>%</td>
<td>11.4</td>
<td>88.6</td>
</tr>
</tbody>
</table>

Group photographs are included

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>91</td>
<td>28</td>
</tr>
<tr>
<td>%</td>
<td>76.5</td>
<td>23.5</td>
</tr>
</tbody>
</table>

Individual photographs are included

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>115</td>
<td>3</td>
</tr>
<tr>
<td>%</td>
<td>97.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Videos are included

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>52</td>
<td>63</td>
</tr>
<tr>
<td>%</td>
<td>45.2</td>
<td>54.8</td>
</tr>
</tbody>
</table>

Out of 123 participants 42.1% report that photographs are included “daily”, and an additional 19.3% reported that photographs were included “a few times a week”. 54.1% of the sample reported that videos are never included, and the most frequent inclusion rate for videos was only “a few times a year” (15.3%).

Parents were asked to share what they enjoy most about the information shared on daily activities. Three main areas were identified: 1) having access to the details of their child’s day, 2) having content to support parent-child communication, and 3) gaining knowledge on learning and development (n=93).

Parents acknowledged that they enjoyed gaining knowledge of their child’s day (n=23). Many spoke of “seeing” the day including descriptors such as a “window into a
child’s day” (#77), a “sneak peak” (#28), “a snapshot” (#106), and “inside information” (#49).

Parents identified photographs and videos as being highly valued (n=28). Two cited that it lifted their spirits during their workdays. Parents acknowledged that they loved seeing that their children were happy, and felt a connection to them even though they were physically separated during the day (n=4). “I love seeing my child everyday!!! It is a treat at work knowing he is happy and they are always doing something different.” (#32) and “I love seeing her happy. Hate the fact that I have to go to work but at least I get to see her happy and playing with other kids, learning etc.” (#114).

Parents indicated that the information they received through HiMama supported parent-child interactions by providing content for on-going dialogue (n=17). It was identified that when interacting with younger children having specific details to draw on enhances the quality of the dialogue.

I like knowing the specific activities my child participates in to inform the questions I ask my child at the end of the day. If I generally ask “how was your day?” or “what did you do?”, I don’t get much of an answer, but if I’m able to say “I saw you guys danced in class today. What songs did you dance to? Or what moves did you learn?”, then I’m more likely to spur a conversation with my child. (#56)

Parents identified gaining knowledge on their child’s learning and development through the information that is shared (n=24). Parents acknowledged that they were able to use the information shared to extend learning activities into the home (n=9), and
three parents appreciated having knowledge of educator’s intention for activities and program goals.

*I want to know what she is doing; I want to better understand the reasons why educators design the activities the way they do. I want to understand her development. HiMama’s descriptions of the children’s daily activities help me with this.* (#54)

One parent acknowledged having information on activities gives them insight into their child, “*I love seeing my child do things I didn’t know he could do*” (#74) and another identified how it helps to bring the connection to their child when separated. “*It makes me feel like I was there with them, when sadly I wasn’t able to be. It helps me to know what they are enjoying and ideas for play at home as well*” (86). Gaining information on their child’s social connections and peer group interactions was identified as a benefit (n=5). As summarized by one parent, the information gained through daily reports is “*absolutely the best part about this app. Gives parents reassurance about programming goals and how your child is going at a given time. Thank you!*” (#140)

Two parents specified that in their experience they do not receive daily reports but only a picture infrequently over the week.

In a related question parents were asked to share what information they were most interested in on their child’s reports (n=112). Health and wellness was a priority with 45 parents identifying information on sleep patterns, 59 parents mentioning food intake, 17 acknowledging toileting patterns and 11 focused on mood/behavior. An additional 23 comments were focused on social interactions. 48 parents identified daily activities with
29 comments related to specific learning and development. In 29 comments photographs were mentioned. Most comments provided by the parents included a range of these components, and three additional parents simply stated that they like it all! In two comments, parents identified the role of the ECE in the communication process.

*I am interested in the activities she takes part in and how the report links these activities to important developmental milestones. The descriptions are educational and interesting. Also makes me feel as if the educators care on a personal level about my child’s education and development. (#16)*

Four comments identified aspects parents wish they had further insight on including adding details to accompany photos, and information on circumstances around negative interactions within the peer group.

2) Bidirectional communication

*HiMama* has two procedures within the application to support bidirectional communication. Parents are able to comment directly on activities posted, as well as use the embedded messaging system to communicate with the educating team.

a) Commenting Feature

Parents were asked "*how frequently do you respond by commenting in HiMama on activities shared by educators (including videos and photos)*". Of the 123 participants who answered this question, the most frequent response rate was “never” (36.6%). The frequency of commenting ranged from a few times a year (12.1%) to always (6.4%). Figure 11 shows the distribution of commenting rates of parents to educators’ postings.
Participants were asked to share “what influences their decision on whether or not to comment on content shared in HiMama?”, and 81 participants offered insight into this practice. A number of responses indicated personal factors such as time / busyness ($n=7$), location (where at work or home) ($n=1$), and mood ($n=2$) influenced their decision to comment.

A number of responses indicated positive factors that influenced commenting ($n=22$) including: their interest level in the content, if something cute or funny was shared, or if the parent felt that they had something constructive to offer. In addition, 12 parents recognized the value of commenting in promoting relationships with the educators. Participants also acknowledge that by commenting they were letting the educators / operators know that they appreciate the communication efforts ($n=9$).
I decide whether to comment based on whether I think the ECEs would find it useful or not, and I always comment in responses to something they have taken the time to post because I want to encourage them to post us. (#78)

Commenting was also identified as a way to connect with educators (n=2), and a few participants acknowledge that they would comment if there were aspects of the information that they wanted to follow-up on (n=3). In one comment the relational aspect communication between educators and parents was identified:

I almost always comment if comments are solicited (asking about how we celebrate a particular holiday, etc.), and then I comment occasionally when a picture of my child is particularly cute or where the narrative that accompanies the picture gives me a particular insight into a moment in my child’s day. (#54)

One participant shared her reflections on commenting and why she will continue to comment more frequently moving forward:

I commented about a month ago on a picture of my son doing an activity outside. I thought what he was doing was such a great idea and I could tell that he was enjoying it so I commented that it was a wonderful idea and I was so happy to see that he was having fun and enjoying it. The teacher verbally told me the next day that she was so touched by my comment that she went home and told her dad that one of the parents was very impressed with what she had planned. I think I will comment more often to acknowledge the creative ideas of the staff. (#104)
Key barriers from commenting on activities included the desire for privacy and the uncertainty of who would be viewing the comments \((n=6)\). Parents acknowledged lack of content in which to comment on \((n=4)\), unresponsiveness of the educators in acknowledging comments \((n=2)\) and inconvenience experienced in trying to comment \((n=1)\) as additional barriers. Some of the responses made comparisons between HiMama and social media \((n=3)\); two suggested that HiMama should not be considered a social media tool, and a third felt commenting practices were the same as what occurs on media. “I comment but it never engages a conversation. It’s like ‘liking’ a photo on FB essentially” \((#96)\). Three parents directly identified feeling that HiMama is for one-way communication “I tend to see it as a one-way street – information primarily for me to received, not necessarily for me to communicate back with. If there’s something I want to interact with, I’ll do it in person with the educators” \((#102)\).

In some of the cases parents shared reflections on their perspective of the educators. Some parents didn’t think that educators wanted them to comment \((n=4)\), worried they would be bothering them \((n=2)\) and felt that the educators should be focused on working with the children.

Finally, 12 participants indicated they didn’t know they could comment, and seven didn’t feel it was necessary to comment.

b) Messaging Capabilities

Of the sample, 66 participants \((47.1\% \text{ of the sample}; n=140)\) indicated that they use the messaging capabilities to communicate with educators. Information was gathered
on the type of content shared over messaging. Table 5 indicates frequencies of inclusion of various topics for messaging.

Table 5. Type of Content Parents Included in E-Messaging

<table>
<thead>
<tr>
<th>Message Topic</th>
<th>Inclusion Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Illness or Absence</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
</tr>
<tr>
<td>Late Arrival</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>27</td>
</tr>
<tr>
<td>Developmental Milestones</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>46</td>
</tr>
<tr>
<td>Concerns</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
</tr>
<tr>
<td>Comments on Program Activities</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
</tr>
<tr>
<td>Celebrations or Special Moments</td>
<td></td>
</tr>
<tr>
<td>at Home</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
</tr>
</tbody>
</table>
In addition to the content identified in Table 5, eight participants identified further reasons for using *HiMama* messaging including: general questions (*n*=1), changes to pick-up times / routines (*n*=3), forgot information missed at drop-off (*n*=1), problem solving and updates on sleep (*n*=1), and follow up questions to educator correspondence (*n*=1).

3) **How are parents using the information available?**

Parents were asked to describe how they interact with the information available on *HiMama* on a daily basis. Parents provided general descriptions of this interaction including: time spent reviewing it, time of day they review it, specific content they review and ways that it impacts daily life (*n*=94).

In terms of time spent reviewing, 18 parents indicated that it takes five minutes or less to review information on a daily basis; whereas two indicated that they spend longer than five minutes reviewing information. Parent specified that they review information before pick-up time (*n*=4), before dinner (*n*=6), and before the end of the day (*n*=11).

When asked when during the day they check *HiMama*, 22 parents identified that they check the information any time a notification or email is received indicating an update has been added. An additional 16 parents indicated that they go into the app to check in periodically throughout the day without prompting / notifications. Comments included “*During my lunch at work I’ll check in to see if there are any photos available. At night I’ll review the daily report*” (#96); as well as “*I check it as often as I can. I spend about 10 minutes each time I check going through what is being sent to me*” (#24).
In terms of the type of content they review, 31 parents mentioned looking at photographs, seven mentioned reviewing activities, and 16 referenced specific details related to health and wellness (such as nap times, toileting and eating). A few parents specified how the information available influences parenting practices (n=5) such as:

*I spend 5 full minutes reading through in an effort to gather information required to make decisions about what to give her for dinner (how hungry she might be), her mood, her bathroom habits and sleeping (for bedtime adjustments). I also review it to know what she’s done so we can talk about her day over dinner or at bath time. (#15)*

In eight comments parents mentioned sharing the information they receive during the day with others including colleagues or family members.

Additional information was gathered to gain insight into a) how parents access information / receive real-time updates, b) explore the information available on HiMama for personal use, and c) share access to the information with others. Results from these specifics aspects are outlined below.

a) Access to information during the day and through “real time” updates

More than half of participants reported checking for updates in HiMama during the workday (84, n=140); and of this 41.7% acknowledged checking in “2 or 3 times a day”. Figure 12 illustrates the frequency in which parents report checking in to HiMama throughout the day (n=85).
Participants were asked if they receive real time updates from educators. From the sample 84 participants acknowledged receiving these (68.9%; $n=122$) and 95.3% indicated that they enjoyed being able to receive them. Of the sample who did not currently receive real time updates ($n=38$), 25 indicated that they would like to be able to receive them. From the set of parents currently not receiving real time updates, 13 parents indicated that they were not interested in receiving updates during the day, and of those parents currently receiving them, four indicated that they do not enjoy getting them.

When asked to elaborate on their preference in receiving real-time updates 23 parents offered additional insight. Parents responded that they would like to receive them primarily to gain knowledge on what is happening in their children’s day ($n=10$), for
a boost in their day ($n=1$) or to be informed of important information ($n=2$). Some parents responded that ‘real time’ updates weren’t necessary ($n=9$). A few parents identified that it is hard to access and receive updates when working ($n=2$). Three parents in this sample acknowledge that while they enjoyed receiving information on their children they worry about the balance between the educators’ time spent on the technology as opposed to with the children. One parent shared their experience of receiving correspondence from the educators acknowledging this balance:

> I don’t need a play-by-play of my child’s activities and I think this would distract from her interactions with the educators. The educators sent us a very thoughtful email about 3 months after HiMama explaining that they wanted to strike a balance between informing us and also allowing the day to unfold without too much technological intervention. That made a lot of sense to me. (#54).

Parents also shared what they enjoy about receiving “real time” updates ($n=53$). From the responses it was clear that real time updates had a positive emotional effect on parents’ well-being, including: experiences of happiness and positive impact to their day ($n=13$), connection ($n=8$), and feeling reassured and promoting trust in the care ($n=7$).

In three comments parents offered cautions with updates. One parent felt that sending updates of random activities without children in it were a waste of time (#8). Another recognized that there is a lack of consistency between different educators.
Finally, one parent shared that she had come to anticipate their arrival and therefore gets worried when one is late (#38).

b) Accessing information for personal use

*HiMama* generates an electronic portfolio for individual children, as well as a developmental assessment based on the educators input of ELECT domains into activity reporting. In the current study 64% of parents reported reviewing their child’s electronic portfolio, and 35.7% reported reviewing the developmental assessment. Figure 12 illustrates the frequency rates for reviewing both the portfolio and developmental assessment.

**Figure 13. Frequency of Checking Developmental Assessments and Portfolios**
A small percentage of the sample identified accessing additional information through the *HiMama* website (*n*=24, 17.1%; *N*=140) and commented on this (*n*=17). Parents shared that through the website they accessed photos (*n*=10), messages (*n*=2), journals (*n*=3), the calendar (*n*=3) and making edits to their child’s profile (*n*=2). In two cases, the parent identified that they also upload and add photos and milestones to their children’s journal. Parents shared that it was easier to read longer content, see photographs and download pictures through the website. None of the comments related to the information available through the website identified using the portal for gaining resources on child development or parenting.

c) Sharing information with others

In the current study 76 parents (54.3%; *n*=140) identified that they had shared access to their child’s *HiMama* account with other individuals. Individuals who were invited to access the account included: co-parent/child’s other parent (*n*=25), grandparents (*n*=46), aunt or uncles (*n*=7), family (*n*=11), child’s sibling (*n*=1), child’s nanny (*n*=1) and friends (*n*=1).

**Discussion on how parents and educators are using HiMama**

It is clear that parents love hearing about their children; any and all additional information regarding their health, well-being and daily activities was regarded as highly useful in the current study. Results on the type of content being included in *HiMama* reports indicated that information on eating and activities was the most common content to be included. Differences in the inclusion rates of particular information (such as toileting or sleeping) may be a reflection of the range of age groups represented in the
study. As children age there is a decreased need to communicate with parents on toileting or sleep patterns. Differences in program types, such as the dynamics of a before and after school care program compared to a full-day toddler class may contribute to differences in content reporting.

Mood was identified as the least likely information to be included in the report. This may be due in part to educator preferences and practices. Within the HiMama application mood is recorded through feature buttons that give predetermined “mood” descriptions (such as somewhat excited). They are subjective to the educator’s perspective and capture the child’s mood at a single point in time; it’s questionable if they can accurately describe the child’s mood and whether educators feel confident in making that assessment. Mood is also more sensitive and contentious than some of the other content areas. If the child was experiencing a negative mood educators may feel it is more appropriate to share this information across other modes of communication that would allow for richer description of the child’s well-being (such as a phone call to the parent).

In regard to daily reporting 87.1% of parents indicated that information on their child’s activities was included in their reports. The use of individual photographs and individual activity summaries were the most frequent content to be included, followed by group photographs and descriptions of group activities. Over half of the participants reported the inclusion of ELECT on daily reports. Within HiMama educators have the ability to access developmental constructs from ELECT to tag alongside of their activity reporting. Over 50% of participants indicated that this information was included in their
child’s daily report. Lesson plans were identified as the least likely content to be included in the HiMama report (12.1% reporting their inclusion). An omission of this type of information may be reflective of new pedagogical practices of emergent learning. As articulated by the Council of Ministers of Education Canada (CMEC) in their statement on play-based learning, “Viewing children as active participants in their own development and learning allows educators to move beyond preconceived expectations about what children should be learning, and focus on what they are learning” (CMEC, 2012, p.1). As educators are shifting into a role of co-constructors of learning alongside young children there is a reduction in the practice of developing and implementing pre-conceived lesson planning in early education within Ontario.

The use of the CMC to support bidirectional communication was limited across this sample. Less than 25% of the sample (n=126) reported commenting on activities posted by educators at least once a week (22.1%) and 36.6% reported ‘never’ commenting. Less than half of the parents actively use messaging to communication with educators (47.1%, n=140). For those who do use it, the content of messages is most likely related to sharing information on daily tasks (such as absences; 73.8%, n=61) or late arrivals (53.4%, n=58). It is worth noting that parents were more likely to communicate a concern through messaging (65.5%, n=55) than to comment on an activity (31.4%, n=51). Parents were least likely to use messaging to share knowledge on their child’s developmental milestones (23.5%, n=51) or celebrations / special events occurring in the home (31.4%, n=51). Many parents shared their lack of knowledge or awareness of HiMama’s features in promoting bidirectional communication. In a number of cases
HiMama was described as a one-way communication tool by parents. These results, paired with the earlier findings on both training and program expectations for using HiMama suggest that more purposeful implementation may be necessary to ensure the overall goal of bidirectional communication is achieved. Shifting reporting past sharing of daily task responsibilities (such as food intake, late drop-offs) toward providing insight into the experiences and development of the child as it relates to pedagogical processes may require more direct goal setting and intentional communication for both educators and parents.

The ability to access and receive information on their child’s day, especially when physically separated from their children was identified as having a positive influence on parents’ well-being. Parents reported that by being able to access information during the day they feel more connect to their children, and some experience feelings of reassurance, trust and joy. These findings suggest that the platform is supportive of the parent-child relationship as well as the relationships to extended family, with over 50% of the sample having offered access to this information to extended family (54.3%).

In the current sample 64% of participants reported reviewing their child’s portfolio, and 35.7% reviewed the developmental assessments. Parents expressed interest in engaging with information on their child’s experiences and learning when accessing the website (17.1%). HiMama has numerous online resources and podcasts across a wide range of topics related to parenting, child development and early learning. No parents within the data set acknowledged accessing information available on HiMama to support their own learning or parenting practices.
Findings on how parents are using the information available through HiMama are reflective of previous work on the potential for CMC to support parent-educator partnerships as a bidirectional communication tool. Previous work by Thompson (2008) in the investigation email to support parent-teacher communication found that “while some parents and teachers who communicated via e-mail developed relationships with each other, in most instances, parent-teacher e-mail exchanges were instrumental rather than relational in nature” (Thompson, 2008, p.219). Furthermore, he suggests, through application of SIPT that the fact that, “so few parents and teachers achieve relational communication stems from the fact that relationships development was not the goal of their communication” (Thompson, 2008, p.219). In the current study, educators are providing a great range of detail into the child’s day (including sleeping, eating, play experiences, and photographs), however less than half of the parents are using the technology to engage in bidirectional communication. This suggests CMC is being used successfully for instrumental rather than relational correspondence. As suggested, this may be reflective of distinct differences in parents’ and educators’ goals for communication. Parents may be satisfied gaining information and knowledge of their children’s days, whereas under the pedagogical aspirations educators may be desiring a shift toward relational correspondence. Similarly, in Lewin and Luckin’s investigation of technology to support engagement they found that communication was “predominantly one-way despite the potential for technology to more easily support two-way communication” and that “there was a perceived need to develop protocols for email communication between school and home” (Lewin & Luckin, 2010, p. 756). As
discussed previously, there were minimal expectations for using HiMama to support communication across the current sample. Having articulated goals and clear protocols for use may be the key component for shifting correspondence from instrumental to relational and one-way to bidirectional. It is important to note that the previous studies took place within the elementary and secondary school environment where correspondence on grading and assignments is common, and distinctly different from an early learning context. That being said, there does seem to be commonality in the patterns for correspondence through CMC across learning settings (early learning, elementary and secondary). Therefore, the need for clearly articulated goals for communication identified as a key component for success within the previous research (e.g. Lewin & Luckin, 2010; Thompson, 2008) is maintained as a key for successful use of CMC within the early learning environment.

Part B: Changes in Communication

Based on Mitcham’s definition of process the following section explores the impact of the technology on the social context; namely parents’ perceptions of change in ratings of communication quality and communication content with the implementation of HiMama.

3b) What changes were perceived in communication qualities with the implementation of HiMama?

Participants were asked to rate four qualities of communication (satisfaction, effectiveness, openness, and responsiveness to written communication) using a 7-point rating scale (from ‘not at all’ to “extremely”). Participants completed this rating for both
pre and post HiMama implementation. Table 6 displays the results from the related-pairs sign test as well as median scores for all four qualities.

**Table 6. Changes in Ratings of Quality Measures**

<table>
<thead>
<tr>
<th>Communication Quality</th>
<th>Sign test</th>
<th>Median Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>Positive Difference</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>140</td>
<td>96</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>140</td>
<td>87</td>
</tr>
<tr>
<td>Openness</td>
<td>139</td>
<td>59</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>86</td>
<td>43</td>
</tr>
</tbody>
</table>

$p<.1;^{*}p<.05;^{**}p<.01;^{***}p<.001$

Rating scale: 1 ‘not at all’ to 7 ‘extremely’

Results indicated that there were statistically significant differences in the median scores pre and post HiMama implementation with all four qualities receiving a median score of 6 out of 7 post implementation.

**3c) What changes were perceived in the content of communication with the implementation of HiMama?**

Parents were asked to indicate the frequency of communication across nine areas of communication pre and post-HiMama using a 5-point rating scale (never to always).
Table 7 displays the results of the related pairs sign test for each area as well as the differences in median scores.  

### Table 7. Changes in Communication Content

<table>
<thead>
<tr>
<th>Communication Content</th>
<th>n</th>
<th>Positive Difference</th>
<th>Negative Difference</th>
<th>No Difference</th>
<th>t-statistic</th>
<th>z score</th>
<th>Median Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive Difference</td>
<td>Negative Difference</td>
<td>No Difference</td>
<td>z value</td>
<td></td>
<td>Median pre</td>
</tr>
<tr>
<td>Health</td>
<td>140</td>
<td>28</td>
<td>12</td>
<td>100</td>
<td>z=2.372*</td>
<td>.000</td>
<td>3.00</td>
</tr>
<tr>
<td>Well-being</td>
<td>138</td>
<td>37</td>
<td>10</td>
<td>91</td>
<td>z=3.792***</td>
<td>.000</td>
<td>4.00</td>
</tr>
<tr>
<td>Playroom activities</td>
<td>140</td>
<td>99</td>
<td>8</td>
<td>32</td>
<td>z=8.701***</td>
<td>1.000</td>
<td>3.00</td>
</tr>
<tr>
<td>Social Interactions</td>
<td>139</td>
<td>79</td>
<td>11</td>
<td>49</td>
<td>z=7.062***</td>
<td>1.000</td>
<td>3.00</td>
</tr>
<tr>
<td>Behavior Guidance</td>
<td>138</td>
<td>23</td>
<td>14</td>
<td>101</td>
<td>z=1.315</td>
<td>.000</td>
<td>3.00</td>
</tr>
</tbody>
</table>

In a number of cases the t-test statistic demonstrated that there were statistically significant median differences in the inclusion of content pre and post HiMama however a $Mdn_{\text{difference}}=.000$ is reported. This can be interpreted by understanding that, through the matched pair process, there are statistically significant differences in median scores (e.g., 28 positive differences for health); however, there is not enough difference to affect the overall position of the median (e.g., move it from a ranking of 3 ‘sometimes’ to a ranking of 4 ‘frequently’). Furthermore, the $Mdn_{\text{difference}}=.000$ is the median of the differences (pre-post) for each of the matched pairs, and refers to the distribution of this computed variable (e.g., $Mdn_{\text{healthdifference}}$).
Based on the related sample sign test, eight areas of communication content had a statistically significant median differences after HiMama was introduced. Communication content on behavior guidance was the only area of communication where changes in median scores were not found to be statistically significant. Figures 11 – 19 illustrate the changes in content frequencies pre and post-implementation for each type of communication content.

+p<.1;*p<.05;**p<.01; ***p<.001

Rating scale: 1 never, 2 rarely, 3 sometimes, 4 frequently, 5 always
Figure 14–17. Changes in Communication Content

Figure 14. Communication on Health

Figure 15. Communication on Well-being

Figure 16. Communication on Playroom Activities

Figure 17. Communication on Social Interactions
Figure 18 – 21. Changes in Communication Content cont.
Three open-ended questions were used to gain further insight into the process of communication on daily experiences of parents. Parents were asked to share 1) how they felt HiMama had affected communication between educators and themselves, 2) what they found effective about current communication processes; and 3) how this information has impacted them as a parent. The results from the thematic analysis are summarized below.

a) How has HiMama affected communication between educators and parents?

From the sample, 118 participants provided insight into how they felt HiMama has affected communication with educators. The majority of comments (n=85) indicated HiMama had improved communication in multiple ways including: increased convenience (n=30), increased amount of content shared (n=42), and parents feeling
more connected (n=14). Parents also identified the value of being able to build
connection to extended family members (n=3). It was interesting to note one parent’s
experience using HiMama as part of a bilingual community:

*My kid is in a French daycare so the app actually helps me feel more
certain in speaking with the daycare in my second language because I’m
reading the vocabulary and I’m able to think about what to ask them in
French prior to doing pick-up.* (#47)

In a few cases participants identified only a slight change in communication with
educators (n=2). As shared by one:

*HiMama makes me feel more involved in my child’s day and has improved
communication between myself and my children the most. It has slightly
increased communication between the educators and myself, mostly
because it is in a form that is individualized and I can review at my own
leisure – not just at the child care facility.* (#56)

In a few cases parents voiced frustration with the implementation of the tool and lack
of consistency of use over time (n=5). As one parent shared, “I love seeing pictures and
knowing she’s okay throughout the day...when they send something. Usually these
days, they send nothing at all” (#73).

Participants also distinguished that changes in communication were dependent on
the individual educator’s implementation of the tool (n=5). Parents recognized that
different educators used it differently:
I’m not sure if this is because my son had moved into preschool where the caregiver: child ratio is lower so caregivers have less time but the amount of information I get now has decreased vs. when we received daily written reports. For instance, we no longer receive information about daily program activities and how my child is engaged in them. (#52)

Furthermore, as shared by participant #23, it “all depends upon the details that are written. Some days, very little description of my kid’s activities is written.”

Within this sample, 14 parents offered general comments that could not be categorized as either positive or negative. An additional nine parents indicated that there was no change with HiMama.

b) What do parents find effective about current communication processes?

Participants provided insight into the question “What do you find effective about current communication processes?” (n=109). Their responses ranged from insights into which modes of communication they felt were effective, the type of content and aspects of the communication process they felt support effectiveness.

In terms of modes of communication 25 participants identified HiMama as being effective, and 14 referenced FtF communication. An additional 13 participants identified the effectiveness of the combination of FtF and HiMama. In their responses they acknowledged that by having specific information available through the app they were better able to have more intentional FtF communication. They highlighted the ability to ask specific questions, reduce demands at busy pick-up times, and supplement communication as necessary between the two modes.
Participants recognized that receiving the content on their child’s day was of value to them ($n=38$). Being able to access and receive information through HiMama including prior to pick-up, helped to support parents feeling connected to the child and the program and to strengthen communication:

*I like how I get to know what kind of mood my little one is in while I’m on my way to get her – it’s helps me be a better parent, more responsive to her needs. The teachers can tell me this on the app – it’s helpful and it means we’re a team being responsive to her needs.* (#47)

The use of photographs was recognized as an effective part of the communication process ($n=22$). Parents identified that being able to “see” a moment in their child’s day when captured and shared through HiMama was of value. Parents identified that by having photographs and detailed information on the day they are able to have more intentional conversations with their children ($n=5$). Holding memories and looking back on their child’s reports allows parents to revisit their child’s learning and growth ($n=2$). As one participant commented, “*HiMama makes me feel connected in ways that I wasn’t before and it wasn’t even bad before! It helps me feel like I’m in touch with what my child is learning and who she is interacting with*” (#102).

As demonstrated above, participants also identified that through the communication process they feel more connected to their child. “I feel more connected to her life at daycare” (#82). Participant #36 also shared, “*the photos of what he’s doing throughout the day are great because I feel more connected to him and can mention things I “saw” him doing on HiMama when I pick him up or at bedtime*.”
Parents identified that through the use of HiMama they felt they were better able to stay connected with their child’s primary educators. In two scenarios (either educators finishing shifts prior to pick-up times, or parent not being the one to pick up the child) it was recognized that HiMama was able to maintain connection in the event of physical distance. As one parent described:

*I can get information and follow up with educators myself instead of going through my partner who does pick up and drop off; I am able to communicate at my convenience rather than only during business hours; information comes in a fairly consistent format, and many centre-wide events and initiatives are communicated reliably through the app.* (#115)

Finally, a number of the process components of HiMama communication were identified as being key to effectiveness. Real time updates \((n=19)\) and the ability to access information \((n=9)\) were highlighted as a value to communication. As articulated by one parent,

*The most important feature of this communication is the comfort and the accessibility. It is user friendly and helps with keeping track and accessing information from the past. I happen to also like the log that it has on my two children, so many memories. Great way of sharing milestones and important changes. Keeping track of the kids without the invasion of privacy* (#118).
c) How has the information shared through this platform impacted you as a parent?

Of the 80 parents who responded, 74 comments were indicative of positive impacts to parenting including: increased connection to their child \((n=9)\), the educators \((n=2)\), and the overall day \((n=16)\). Parents also acknowledged qualities (e.g. happiness, reduced anxiety) that indicated an increase in parental well-being \((n=7)\), as well as improved responsiveness as a parent \((n=3)\). Parents recognized that they had gained new knowledge \((n=15)\) including more insight into the details of the day \((n=10)\), their children’s development \((n=6)\), the child’s well-being \((n=5)\), how to extend learning into the home \((n=3)\), as well as an understanding of ELECT \((n=1)\). Finally, parents acknowledged that it gave them reassurance in the care they selected for their child \((n=17)\).

As one parent summarized:

> Apart from its inherent value, it has been my security blanket during the day while our child is in daycare. It has enhanced my trust in the daycare provider (centre) and ECEs and removed the mystery around what is going on during the day. (#78)

In a few cases participants indicated that they did not experience any changes with the implementation of HiMama \((n=7)\).

**Discussion On Process: Changes in Communication**

Results from parent perceptions of communication quality pre and post implementation demonstrated a statistically significant median differences across all
four qualities of communication. All four measures (satisfaction, openness, responsiveness, and effectiveness) received a score of 6 (with 7 being “extremely satisfied”) after HiMama was introduced. This sample of parents perceived positive improvements across all qualities of communication with the introduction of HiMama.

The findings on communication content indicated statistically significant median differences in 8 of the 9 content areas with the implementation of HiMama. Median scores for health and wellness remained consistent across the two measures with “health” remaining as “sometimes” and “well-being” as “frequently”, however in looking at the before and after frequencies for each area there are visible shifts in the practice of this content being “frequently” and “always” included. The statistically significant findings for both of these content areas may be reflective of the shift in practice around how health and well-being reporting is being completed. As the qualitative data suggests, previous reporting on aspects of health and well-being was the primary focus for FtF communication and it is now more likely occurring within HiMama daily reporting. The daily reporting online allows for routine data entry on areas such as toileting, eating, sleeping and mood, and thereby encourages more systematic and routine reporting across these areas.

Exciting results were shown in areas of playroom activities, social interactions and communication on developmental domains. In all three areas, parents indicated an increase in the amount of communication in these areas after the implementation of HiMama. This resulted in a shift from ratings of “sometimes” to “frequently”. A few factors may be influencing these shifts including: parents’ perceptions on the increased
quality of FtF communication with health and wellness reporting being completed in HiMama, as well as the inclusion of photographs, activity reporting and links to developmental domains within the HiMama reports themselves. By no longer needing to include health and well-being information as part of FtF communication, parents and educators have more time and opportunity both in FtF communication and through HiMama to connect on aspects of the children’s daily activities, social interactions and learning across developmental domains. This pattern was mirrored in the qualitative portion of the data set when parents shared feeling that the content of verbal communication had become more intentional and meaningful, moving past the reporting of health and well-being details into consideration of their child’s engagement and development.

As this was the first study of its kind to investigate the use of CMC within early learning settings, these findings build on pre-existing knowledge of both application of CMC to support parent-educator communication, and typical parent-educator communication in early learning settings. In previous work by Thompson (2008) the distinction between the instrumental and relational aspects of communication through e-mail was made. Furthermore, past research on the content of FtF communication in early learning settings demonstrated that these times of day were typically used for an exchange of information (Drugli & Undheim, 2012). In the current study, findings demonstrated that content shared through HiMama is primarily instrumental, including limited use of it as a bidirectional tool for communication. However, there may be further development of relational aspects of communication happening during daily FtF
communication now that much of the instrumental content is being shared through *HiMama*. This potential shift in correspondence content of FtF communication may be part of the overall improvement in communication quality including overall satisfaction. Further research that studies the application of both CMC and FtF communication patterns within the early learning setting would be a recommended next step. Having the opportunity to study the application of CMC (such as what was conducted within the current study) paired with direct observation of FtF interactions between parents and educators during transition periods would provide further insight into the impact and application of this mode combination.

The only content area that did not have statistically significant median increases was that of behavior guidance. In looking at the frequency of reporting patterns both pre and post-implementation trends remained stable. The lack of change in behavior guidance communication may be reflective of the pattern of occurrences for these types of situations (i.e. some children rarely having behavior guidance issues, and some children always experiencing them). Furthermore, educators may be cautious to share content related to behavior guidance in an electronic format where miscommunication or heightened parental concern could be a potential outcome. As such educators may be typically saving this type of content for appropriate FtF communication opportunities.

Results on communication related to pedagogical practices including parent engagement and reference to guiding documents also saw statistically significant median differences. Trends in frequency saw noteworthy shifts in communication regarding ELECT (increases in *frequently* (9.4% pre; 20.3% post) and *always* (7.2%
pre, 23.9% post) \((n=138)\). This may be due in part to HiMama’s function that allows developmental domains from ELECT to be “tagged” activities shared by the educators.

Overall communication rates for both HDLH as well as opportunities to contribute to the program remained quite low with a median score of ‘rarely’ for both types of content post-implementation. This may highlight an opportunity for educators to take a more active stance in communicating pedagogical aspirations including the important role of parent engagement within their communication practices. Professional identity and use of guiding documents as a tool for increasing parent awareness of the roles and responsibilities of ECE may need further consideration. The findings on content related to pedagogy suggest statistically significant differences in communication on HDLH post-HiMama (from never to rarely), however the area of most improvement (ELECT from rarely to sometimes) was also prompted through the HiMama platform for data entry (i.e. tagging ELECT domains). Without the prompts within CMC educators may not be as explicit in dialogue on pedagogy and parent engagement. HDLH in particular, with its pedagogical aspirations to support parent-educator relationships, needs to be intentionally communicated and shared with parents to support meeting these goals. These considerations are in line with previous research on Canadian parents’ knowledge of day-care completed by Howe, Jacobs, Vukelich & Recchia (2013). When investigating parents’ knowledge of pedagogical practices including centre philosophy and daily curriculum they found that,
while many parents report having knowledge about the philosophy of their child’s day-care centre, other parents do not. These findings have direct relevance for early childhood educators and highlight the need for teachers to assume greater professional responsibility for helping parents to understand the important factors of the day-care environment (e.g. philosophy, curriculum). (Howe et al., 2013, p.145)

Furthermore, they suggest that “educators should become proficient at opening the lines of communication with parents so as to convey relevant and meaningful information about their child and the classroom philosophy and programme” (Howe et al., 2013 p.146). Extending communication to incorporate more direct communication on the pedagogical context of learning would be beneficial in supporting provincial goals for early learning. Further research exploring educator perspectives and parent engagement through the lens of pedagogical practices (particularly goals of HDLH) would be recommended.

Within the analysis of parents’ perspectives on the effect of HiMama communication in daily experiences an interesting trend emerged; the impact of HiMama in supporting the parent-child relationship. Through thematic analysis, presence of HiMama has been showcased to have positive impact on parent-child communication and connection. Parents shared the value of this tool in promoting increased knowledge on their child’s daily life (including photographs) as well as feeling more connected in spite of physical separation. Through content shared on HiMama, parents articulated feeling better equipped to communicate effectively in both dialogue with educators at pick-up time and
in communicating with their children throughout the evening. Some parents indicated that the ability to have real-time updates, and to check-in to their child’s accounts during the day increased their feelings of positive affect – which would result in improved parental well-being.

It was interesting to note that although parents praised the functionality and increased information available through *HiMama*, there were very few positive affirmations for educators’ involvement in producing the content found within the data set. Many of the comments related directly to the educators were in acknowledgement of errors in use; including inconsistency across educators and programs. There appears to be an underlying disconnect in parents’ perception of the role of the educator in supporting and producing the content that is shared through this platform. This too may be reflective of the instrumental use of CMC as opposed to relational aspects. As suggested, parents may be perceiving it as a tool for knowledge translation (and enjoying the content) but recognition between the information being offered and the relationship to the educators’ intention may be less recognized.

**Part C: Experiences of Collaboration and Knowledge of Early Learning**

The following sections consider the influence of the process of technology in support of parents’ experiences of collaboration, as well as knowledge of early childhood education. The extension of the application of technology to the social context and its potential influence on experiences of collaboration and knowledge acquisition relate back to the conceptual and theoretical frameworks used within the current study.
3d) What are parents’ perceptions of collaboration? How do they feel HiMama contributes to collaboration?

Participants were asked to rate their perspective on a number of statements generated to provide insight on parent-educator collaboration (such as “I have opportunity to share information about my home and family with educators”, or “Educators seek out support from me on issues that are occurring within the program (i.e. emotional regulation, behavior management”)”. Participants rated their experience on a five-point scale ranging from “strongly disagree” to “strongly agree”. Table 8 illustrates response frequencies for each of these statements.

Table 8. Percentage of Agreement on Statements Related to Collaboration

<table>
<thead>
<tr>
<th>Statement</th>
<th>n</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel comfortable initiating communication with educators (verbal).</td>
<td>140</td>
<td>0.0</td>
<td>0.7</td>
<td>10.7</td>
<td>38.6</td>
<td>50.0</td>
<td>4.38</td>
<td>0.70</td>
</tr>
<tr>
<td>I feel comfortable initiating communication with educators (written).</td>
<td>140</td>
<td>0.0</td>
<td>4.3</td>
<td>10.7</td>
<td>40.7</td>
<td>44.3</td>
<td>4.25</td>
<td>0.81</td>
</tr>
<tr>
<td>I have a good sense of my child(ren)’s day in program.</td>
<td>140</td>
<td>1.4</td>
<td>4.3</td>
<td>15.0</td>
<td>46.4</td>
<td>32.9</td>
<td>4.05</td>
<td>0.89</td>
</tr>
<tr>
<td>I share moments of celebration, and developmental milestones regarding my child(ren).</td>
<td>139</td>
<td>1.4</td>
<td>2.9</td>
<td>18.7</td>
<td>47.5</td>
<td>29.5</td>
<td>4.00</td>
<td>0.85</td>
</tr>
</tbody>
</table>
I have opportunities to share information about my home and family with educators. 140 0.7 5.7 22.9 44.3 26.4 3.90 0.88

I am encouraged to share moments of celebration, and developmental milestones regarding my child(ren) with educators. 139 3.6 4.3 25.9 38.8 27.3 3.82 1.00

Educators seek out support from me on issues that are occurring within the program (i.e. emotional regulation, behavior management). 140 4.3 14.3 23.6 41.4 16.4 3.50 1.06

I am encouraged to seek support from educators on issues that occur at home. 139 7.2 15.1 36.0 29.5 12.2 3.24 1.08

I have an active role within my child(ren)’s program (i.e. visits into the playroom, participate in special events, help out with certain activities etc.). 140 5.1 24.6 26.1 34.1 10.1 3.20 1.08

I seek out support from educators on issues that are occurring at home. 139 10.1 18.7 28.1 29.5 13.7 3.18 1.19

I have opportunities to contribute to the program (sharing ideas. Offering support or resources, participating in special activities, joining in on daily programming). 140 5.1 27.5 30.4 26.1 10.9 3.10 1.08
Parents were asked “In what ways does HiMama contribute to parent-educator collaboration?” (n=87). From the thematic analysis communication was highlighted as a key component of collaboration (n=30) including the opportunity for bidirectional communication (n=7), and the timeliness of the communication process (n=17). As reflected on by one parent, “It provides another method of communication and gives me as a parent an opportunity to be more immersed in what my child does each day and therefore have a better foundation for face to face communication with educators” (#31). In addition, another parent commented, “We value open lines of communication and the app allows opportunities to really share in that communication. It also allows for a complete picture of each day’s structure and activities” (#85) Parents also noted the ability to connect with educators regardless of the lack of physical connection to the school setting (n=2).

Another key element identified within the data was the increased amount of information that parents felt they were receiving (n=20). In 16 comments participants identified photographs as playing a role in supporting collaboration. An additional 10 parents identified that through HiMama they were able to access information on daily activities, learning and development that supported extending this into the home. As shared by one parent:
I’m definitely kept abreast as to the schedule of my daughter’s day – I am given an idea of what concepts are being developed that allow me to expand on these at home. I also appreciate knowing what she is eating, so that I can either continue to offer or introduce these foods to the home environment. (#96).

In six comments parents identified connection as being a part of supporting collaboration through HiMama. Parents identified connection to their child (n=3), connection to educators (n=2), and connection to the program (n=1). In one case a parent shared that having the ability to extend connection to the grandparents was a benefit.

A number of parents shared that they did not feel HiMama had a role in supporting collaboration (n=14). In an additional three comments parents identified that while there is potential for partnerships, it really depends on how the tool is being used by educators and parents: “I think the best way it helps parents is the convenience of it. But it will only work well if all parties are excited about it and using the tool effectively” (#8).

Parents were asked to further consider the goal of HDLH in the development of parent-educator collaboration as key to quality programs, and were asked what aspects of their current experiences supported meeting this goal. Out of 68 responses, parents highlighted knowledge of child developmental and learning (n=16), communication (n=14) and staff engagement (n=12) as key components. In addition, five parents identified opportunities to participate in the larger community including playing in
program spaces, celebrating special days, and being on the board for the early learning site.

In eight responses parents specifically identified a lack of collaboration. Some responses included:

*None-because it isn't necessary. Daycare is there to take care of the child during the day, when parents are working. Parents don't need to get involved and don't have the time, energy etc. to get involved – that is what they are paying daycare for.* (#24)

As well as,

*There isn't really any collaboration, but we also don't have any serious behavioral or learning issues. I don't really know what that kind of collaboration would look like. I work all days so I don't have the time to participate more fully in program.* (#92)

In nine responses parents indicated not having knowledge of HLDH, and in seven responses parents simply identified that they “did not know”.

Lastly, parents were asked to share their insight into what minimizes the potential for collaboration based on their experiences (n=64). Key elements included lack of time (n=22) from both the perspective of parents’ needs (n=8) and educators (n=8), lack of consistency across staffing (n=7), inconsistent communication practices (n=7), as well as barriers to parent-educator relationships (n=7). Some of the barriers identified included educator burn-out, parents feeling judged or worried about sharing their
perspective, the experience of being masculine / fatherhood, and that collaboration only occurs if it is parent initiated. Parents also recognized child-educator ratios \((n=2)\), as well as staff turn-over \((n=2)\) as factors impacting collaboration. As described by one parent “I have little sense of my child’s daily routine, and I do not know who her caregivers are most of the day. Caregivers are too busy at pickup/drop off times to have any substantial conversations about how things are going” (\#122).

Finally, two parents responded with “I don’t know” and another ten stated “n/a”. In two cases parents felt collaboration was great, and that there were no issues.

**Discussion on collaboration**

From the findings on parents’ perceptions of collaboration it is clear that the majority of the participants feel confident in initiating communication with educators. Over 70% reported sharing positive information such as moments of celebration and children’s development with educators and felt that they had opportunities to share information related to their home environment. Over 50% of the participants acknowledged that educators seek them out as a resource to issues occurring in program, however less than half of the participants reported utilizing educators as a resource for issues occurring at home or felt encouraged to do so. Less than 50% felt like they had an active role within the programs, or opportunities to contribute to the program. Furthermore, parents identified a number of barriers to collaboration which highlight to the importance of quality in early learning and care programs, such as high staff-turn over and educator burn-out.
In considering the findings from both the quantitative data as well as the perspectives of collaboration shared by parents through thematic analysis, further review of recent research on parent-educator collaboration was conducted. In a 2008 thesis completed by Ted Amendt, a model for school partnerships focused on collaboration was proposed that offers insight for the interpretation of the current results.

Figure 23. Amendt’s Model for Collaboration and Partnership

![Community Engagement Diagram]

Increasing degree of collaboration and partnership

(Amendt, 2008, p.3)

This model depicts degrees of collaboration through four stages and offers a useful lens by which to consider parents’ experiences of collaboration within the current study. Amendt’s descriptions of the stages are as follows. In stage one, informing is the primary process by which information is given to the school community on decisions or actions made by the school staff (in our case educators to parents). Stage two involves members of the community within the learning setting based on the needs or ideas determined by the educators (such as attending a field trip as a volunteer). Stage three engages parents with parents and educators as well as other community members have active participation in the life of the school and the community (such as the co-construction of learning goals). There is a reciprocity and trust in the bidirectional partnerships that is created. In stage four parents are included in leadership roles as
group norms are established and all stakeholders work together toward a shared vision. Parents and community members take on leadership roles and these are based on the relationships and engagement across the community (Ament, 2008).

In reflecting on the current data set using these stages of collaboration, it appears that current experiences of collaboration in parents’ perceptions are primarily at the **informing** stage, with some participants experiencing opportunities for **involving** and the potential for **engaging** in practices with the community. Parents recognized the convenience and value of receiving increased communication content in a timely manner through the *HiMama* application as an action of collaboration (**informing**). The findings on perspectives of collaboration show that parents feel informed and knowledgeable about their child’s day, and confident in initiating communication. That being said, less than half of the participants felt that they have an active role within the early learning setting including opportunities for contribution (**involving** / **engaging**). This may be due to a number of factors including educator initiatives (as shown by the low rating of frequency of communication on opportunities to contribute) and parent desire and opportunity (including lack of resources such as time as pointed out in qualitative analysis).

Parents responded that *HiMama* has an important role to play in collaboration primarily due to its functions as a communication tool, including a small sample who acknowledged the value of bidirectional communication (*n*=7). Results on the practice of using the tool for bidirectional communication indicated that fewer than half of the parents are engaging in bidirectional communication opportunities through the software.
The increased satisfaction of FtF communication may suggest that while the software is primarily being implemented as a “one-way tool”, parents are experiencing richer FtF opportunities with educators. This may support the development of the parent-educator relationships that meet the criteria of Ament’s stage of engaging. Further research on the qualities of FtF communication alongside of CMC in the early learning setting would useful in understanding the nature of communication / collaboration within the early learning setting.

As highlighted within the section on knowledge, parents identified that opportunity to meet together with educators to articulate communication goals, expectations for use of HiMama and understand one another user experiences was suggested. This type of co-construction of communication goals and processes would also support engaging within Amendt’s model. The pedagogical aspirations outlined in HDLH also fit within the model in the areas of engaging and leadership for all parties including children, families, educators and administrators.

In coming to understand and consider collaboration as supported through communication and parent-educator partnerships, the overall goal for collaboration should also be reflected on. The premise of the current research was to consider the potential for communication technology to support educators in meeting pedagogical and professional expectations in building partnerships with parents. In this instance the goal for collaboration is the development of relationships that create bidirectional partnerships that engage parents as co-learners and co-constructors of the early learning setting’s pedagogical practices. This goal is driven by the pedagogy and its
achievement rests in the actions of educators. Yet, in the current study, we are only considering collaboration through the perceptions of parents. Their goal for the early learning setting and decisions for entering care could be considered as having a very different goal for collaboration with educators; that being the healthy care and optimal development for their individual child. They have accessed early learning services to provide care and learning opportunities for their child in their absence, and opportunities to communicate and collaborate between the school and home environment in meeting this goal may be their primary priority, as opposed to collaborating on pedagogy.

The results demonstrated that parents experienced increased perceptions of collaboration related to their own child’s daily experience, learning and development, and the ability to extend experiences occurring at the school into the home environment. A proportion of the sample identified receiving photographs and information on child development as key actions for collaboration, which fits within the goal of the health and development of their own child. These actions support parents’ experiences of collaboration between parents and educators in meeting their ability to reach their underlying goal for accessing early learning services.

On the other hand, in considering the goal of parent-educator collaboration in meeting pedagogical and professional aspirations, the results indicate areas for further development (including research). Within the current study parents expressed having little or no knowledge of HDLH, as well as limited opportunity for contribution or active participation within the early learning setting. In earlier results on content, parents identified these aspects as being rarely included within communication content. These
findings suggest that educators may not be actively including parents in dialogue on pedagogy, and therefore limiting the ability for parents to understand and engage in meaningful ways that support reaching the pedagogical goals. In order for collaboration to occur, all parties need to have a clear understanding of the overall goal. As discussed within the early learning setting this goal may be comprised of two components: the optimal development and well-being of the individual child (parent goal), within the context of the co-construction of learning through relationships between children, families and educators (pedagogical goal).

3e) What knowledge do parents’ have about the profession of early childhood education and care?

Participants were asked to rate their perspective on a number of statements generated to provide insight into their knowledge of early learning and care practices within Ontario (such as “I have a good understanding of play-based learning”, or “I am familiar with How Does Learning Happen? Ontario’s pedagogy for the early years”). Participants rated their knowledge on a five-point rating scale ranging from “strongly disagree” to “strongly agree”. Table 9 illustrates response frequencies and means for each of these statements.
Table 9. Parents' Self-Assessed Knowledge of ECE Components

<table>
<thead>
<tr>
<th>Statement</th>
<th>Percentage of Agreement</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly DISAGREE</td>
<td>Somewhat DISAGREE</td>
<td>Neither Agree or DISAGREE</td>
<td>Somewhat AGREE</td>
<td>Strongly AGREE</td>
<td>M</td>
<td>SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have a good understanding of play-based learning.</td>
<td>2.9</td>
<td>4.3</td>
<td>7.2</td>
<td>49.6</td>
<td>36.0</td>
<td>4.12</td>
<td>0.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am familiar with the responsibilities of Early Childhood Educators.</td>
<td>3.6</td>
<td>7.9</td>
<td>12.2</td>
<td>47.5</td>
<td>28.8</td>
<td>4.0</td>
<td>1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am familiar with the daily routines and experiences that are part of the early education program.</td>
<td>3.6</td>
<td>10.1</td>
<td>11.4</td>
<td>51.8</td>
<td>23.0</td>
<td>3.81</td>
<td>1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am familiar with the pedagogical approach used in the early education setting my child(ren) attend.</td>
<td>20.1</td>
<td>20.1</td>
<td>18</td>
<td>31.7</td>
<td>10.1</td>
<td>2.91</td>
<td>1.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am familiar with the document Early Learning for Every Child Today (ELECT).</td>
<td>34.5</td>
<td>21.6</td>
<td>20.9</td>
<td>15.8</td>
<td>7.2</td>
<td>2.39</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am familiar with How Does Learning Happen? Ontario's pedagogy for the early years.</td>
<td>38.1</td>
<td>22.3</td>
<td>15.1</td>
<td>18.0</td>
<td>6.5</td>
<td>2.32</td>
<td>1.32</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

From the sample, 22 participants indicated that their knowledge about early childhood educators' roles and responsibilities had changed since the implementation of HiMama. When asked to elaborate on how it had changed, 14 participants provided
additional insight. They recognized that they had increased awareness of educators’ knowledge of child development \((n=8)\) including educators’ objectives for learning activities \((n=2)\), and the educators’ ability to recognize the relationship between an activity and a child’s development \((n=6)\). In four comments parents identified new knowledge of educators’ daily routine responsibilities and tasks, and in three cases they felt they had an increase in knowledge in the educators’ overall role, and finally one participant was uncertain as to how to put into words the changes experienced. A few overarching comments from parents included: “HiMama helps me to see how hard the educators work the time that is spent with my children as well as the effort they put in to make sure that as his parents we know exactly what’s going on” \((#44)\) and “I realize that they are super amazing folks that stimulate learning and developmental growth in so many ways each day with my child! They are experts with children and their playing to learn” \((#86)\).

**Discussion on Parents’ knowledge of ECE**

The majority of participants expressed feeling confident in their knowledge of a number of components related to early learning practices within Ontario including: knowledge of their child’s day in program, understanding of play-based learning, and the roles and responsibilities of educators. There was a bit of a discrepancy within the findings as 41% of parents felt that they had knowledge of pedagogical practices; however, only 25% indicated that they were familiar with HDLH. In addition, 23% identified having knowledge of ELECT; yet, in early results on communication content 52% acknowledged that activities were linked to ELECT on their children’s daily reports.
The differences between the two results may indicate that parents recognize seeing ELECT from having it referenced within reports, but otherwise have little understanding or knowledge of what ELECT is. Likewise, parents may experience aspects of the pedagogy for learning without recognizing its connection to the provincial document HDLH.

In comparing these findings to previous research on parent knowledge of early learning experiences (Drugli & Undheim, 2012; Shpancer et al., 2002), it appears that in the current study parents have more access to specific knowledge about their child’s experiences within the early learning setting. In Drugli and Undheim’s study on partnerships occurring within the early learning setting parents expressed satisfaction with communication, however, identified that they did not have specific knowledge of the children’s experiences. In the results from the current study parents indicated that they have access to a range of content related to specific knowledge on their child’s day. In the results on communication content there was a statistically significant median difference across almost all content, including playroom activities, social interactions and learning across developmental domains. Parents in the current study indicated the value of HiMama communication in allowing them to feel connected to their children’s experiences in care when the technology was used appropriately. This suggests a distinct difference in parents’ access to knowledge compared to the previous study where FtF communication was the only mode of communication.

Shpancer et al. (2002) researched parents’ knowledge of daycare experiences including daily experiences and components of quality care (e.g. staff qualifications,
ratios). In their study, parent responses were compared to correct information provided by child care centre directors. Their findings indicated gaps in parental knowledge in relation to characteristics of care (ratios, qualifications, licensing agency) as well as daily components (start and end times of daily routines, lunch menu items, and amount of outdoor play experiences). Shpancer et al.’s study was more directly related to quality measures as outlined in regulation (such as ratios and qualifications), whereas, the current study focused on understanding parents’ familiarity with pedagogical and professional accountabilities (such as familiarity with guiding documents such as HDLH and ELECT). In the current study it appears a majority of parents are confident in their knowledge of daily routines (75% “somewhat” to “strongly agree” that they are familiar with this) and aspects of pedagogy related to play-based learning (86% “somewhat” to “strongly agree”) and the role of the early learning professional (76% “somewhat” to “strongly agree”), and less on the pedagogical approach (42% “somewhat” to “strongly agree” to knowledge of this) and guiding documents that support these practices (knowledge of HDLH 25% “somewhat” to “strongly agree”). Further research comparing aspects of parents’ knowledge and actual practices (similar to the design used by Shpancer at et., 2002) would provide additional validation about parents’ knowledge and potential differences between parents’ perceptions and actual practices.

7.5 Volition

The final component is technology as volition – the way technology can impose its influence on the culture including daily participation by users. In the current study potential volitions were shaped by considering risks or concerns identified in using
communication technology within the early learning setting. Results from thematic analysis on perceived challenges, as well as concerns identified across the data set are presented below.

4a) **What perceived barriers do parents identify in using communication technology?**

From the sample, 106 parents responded to the question, “*What do you find challenging about current communication processes?*”. In 28 responses elements of the HiMama reporting were identified as a challenge. This included feeling that daily reports were incomplete (*n*=17), at times inaccurate (*n*=6), and that at times the reports were not being received in a timely manner (*n*=5). One parent recognized the power of “*form*” type communication as a barrier:

*When I used to get written notes there were usually stories and elaborations on what was done during the day. With the reports now, it’s very “form” complete. This is what was done, this was the duration it happened and very little personal reflection.* (#96)

In nine cases parents identified the lack of consistency across educators in using communication systems (*n*=8), as well as differing perspectives shared in communication (*n*=1). In four cases lack of response to messages sent through HiMama as well as knowledge of who might see it was cited as a challenge.
In 11 comments challenges experienced using FtF communication were identified. This included feeling rushed during communication (n=8), as well as being interrupted by others (n=3). As shared by one parent:

*If a conversation might be best without the presence of the child it can be difficult in a before/after care program due to the circumstances surrounding drop off and pick-up. Not enough staff for someone to step aside for a conversation.* (#126)

In 10 cases parents identified wanting more information, and in three cases wanting increased FtF communication was highlighted. A few of the other considerations for challenges included training / use of the app (n=3), staff balancing data entry and connection with children (n=1), as well as presence of tablets in program being highlighted as a concern (n=1).

In seven comments parents expressed satisfaction with current communication. In 19 counts nothing challenging was identified, and in nine cases the response was “n/a”.

Throughout the process of qualitative analysis within the survey data, attention was given to comments that may be indicative of a potential volition caused by the presence of technology. These comments were coded in order to analyze for main themes or trends in volition from using communication technology. Comments were also tracked to ensure that data counts were reflective from participants across the sample, and not just one participant reiterating the same concern. This was done by first coding the individual comments and then looking across each participants’ data set to see if there was a repetition of ideas contributed by a single participant or if they derived from
across multiple participants. Of the 1982 comments collected throughout the survey using qualitative methods, 170 of them were coded as indicative of potential volition. The 170 comments were generated from 77 participants within the sample.

Primary themes within the volitions included: 1) educator’s ability to balance data entry and child engagement, 2) lack of consistency in implementation and daily use of HiMama, 3) lack of knowledge on particular features of the tool, and 4) the use of the tool as a method for monitoring the day while at work / increased access to insight into the child’s life. A sample from each of these four themes is explored below.

In terms of the educators’ ability to balance data entry, one parent shared, “I enjoy looking at the pictures that are sent, but I worry that educators will end up spending more time looking at their phone rather than engaging with the children” (#19, “How do you feel HiMama has affected communication between educators and yourself?”). Similar comments were present at various points within the data set that recognized that with the presence of technology in the playroom, educators may have conflicting areas of focus between being present with the children, and the capturing and recording of the day’s events. Gathering insight on educators’ experiences of using technology within early learning settings would be beneficial in understanding both the application and volitions of CMC within professional practice.

Parents identified in some cases that there is a lack of consistency and expectation across programs on how the tool is being used or implemented. This created challenges for parents who experience differences in reporting across their children or became
dissatisfied when content changed based on different educators / programs. As shared by one parent:

The app, when used, provides a lot of information about the daily routines undergone by the children. The ability to see daily pictures / interactions of my children is a great tool for understanding what they are doing, how they are feeling and how the educators are interacting with the children. We have two children enrolled whose teachers use the app. One more frequently than the other. We greatly value the communication and information provided by the frequent use of the app. (#85 in response to “How do you feel HiMama has affected communication between children’s educators and yourself?”)

And again from another, yet perceived in a positive way,

My child recently changed classrooms, and as much as I loved receiving sometimes 3 pictures a day, I feel good assuming now the educator is spending time watching the kids instead of sending individual pictures to each parent. (#145 on “What do you enjoy most about the information shared on daily activities?”).

In addition, the software promotes a routine, structured platform for communication and by doing so variations in content are much more likely noticed (as oppose to the ability to notice differences in F2F communication content). As one parent reflected, “I know more about what they are doing day-to-day. It is nice to see photos of them, crafts that they did. I didn’t notice the absence of this communication prior to HiMama” (#92, on ‘How do you feel HiMama has affected communication between your child(ren)’s
educators and yourself?). Another parent shared, “Once my child moved to toddler room, we no longer use HiMama. We miss seeing photos of our child while in daycare” (#69).

Furthermore, poor communication strategies within the educational site or the team may become further amplified with lack of a consistent approach to the technology. As shared by one parent:

They barely use it. There is little communication. I like the app but they rarely use it for my toddler and it has gone down to nearly never for my preschooler. It has not affected the communication because there was barely any in it to begin with. (#139, on “How do you feel HiMama has affected communication between your child(ren)’s educators and yourself?”).

The allure of first using the technology and the excitement of the platform may wear off over time, leaving parents questioning its use and implementation by the team. As one participant commented, “It used to be a great tool, but one and a half years in and there is very little engagement on the centre’s part. There is also no encouragement for parents to use it as a tool for communication” (#116 on “How do you feel HiMama has affected communication between your children’s educators and yourself?”).

It is worth noting that in response to the question related to “What minimizes the potential for collaboration based on your experience?”, 12 comments (n=64) were related to issues with technological communication processes (including limited amount of electronic resources, time needed for data entry, and the lack of consistency in the use of the tool).
The technology indirectly sets a precedence on the level of detail that may accompany correspondence. Without clear guidelines and expectations for use parents may experience frustration with its implementation – which becomes directly associated with the educators and less reflective of training and administrative responsibilities. As shared by one parent, “The daily communication is less than the written journal they used to use. I like receiving pictures via HiMama, but otherwise it feels like HiMama allows them to be lazier” (#49 on “How do you feel HiMama has affect communication between your child(ren)’s educators and yourself?”). In addition, one parent explained, “I love seeing pictures and knowing she’s okay throughout the day…when they send something. Usually these days, they send nothing at all” (#73 on “How do you feel HiMama has affect communication between your child(ren)’s educators and yourself?”).

Parents were able to recognize the gap between the functions of the application and its implementation. In their comments it suggested that error was associated with the educators and early learning site. As shared, “HiMama is used in my child’s daycare only to send occasional (2 times per week) photographs of children’s activities, and to distribute important notices and the newsletter. It’s not a venue for meaningful or individual communication” (#122, on “How do you feel HiMama has affected communication between your child(ren)’s educators and yourself?”). In addition, “It is a great app. Unfortunately use has been limited by staff, so it has had minimal impact on communication. The images are wonderful for recapping day with my child. If used to fuller potential by care providers, could allow for greater focus and depth to brief
interactions with providers” (#148 on “How do you feel it has affected communication between your child(ren)’s educators and yourself?”).

The lack of training given to the parents on the use of the tool was also identified. As one parent commented, “I feel like I was not fully shown the app” (#41 on “What challenges do you find with current communication processes?”). This lack of support in understanding the tool may reflect more poorly on the educational site and less on the software developers.

In addition to these identified concerns over the communication processes, two alternative considerations may pose threats of volition with technology. First, in having access to real time notifications parents identified the pattern of accessing data as soon as a notification arrived. This has the potential to disrupt work tasks or focus on particular aspects of their day. Second, parents praised being able to “see” their child’s day and having sneak peek access. Within this context little consideration was given to the child’s right for privacy and the private world of childhood. In the current study, parents’ expressed concerns for their own privacy when using HiMama messaging; however, no concerns were identified within the data set that are reflective of the child’s rights for privacy. Only one comment within the data set spoke specifically about the storage and access to the information. As shared:

*I think it would be helpful for the parents to know how the daycare expects us to interact with the program, as well as how the educators themselves are interacting with it, so that expectations are clear around what information is to be housed where and how it is to be accessed.* (#115)
Discussion on Volitions

In circling back to Mitcham’s overall definition of volition – “the power of technology to influence culture and shape our participation and use of it within our daily lives” (Custer, 1995) - identifying volitions requires consideration of how the technology may be impacting the culture and participation of users in relation to the technology. From the results of the identified challenges of communication, as well as themes across the qualitative data set a few emerging possibilities of volitions may be present. Questions for further consideration include:

1) What expectations are created by technology around the amount of communication content parents are expecting to receive and the timeliness of this correspondence?

2) How do educators balance the responsibilities for data entry while working directly with the children?

3) Who’s accountable for training and developing expectations for use when introducing and maintaining technology within parent-educator partnerships?

4) How does the administration protect communication technology from being misused as a surveillance measure?

and

5) What are the rights of the child for privacy in relation to their experiences within the world?

Further research on these five areas that includes gaining insight into the experiences of educators and administrators would be an asset in generating a richer
understanding into how CMC technology may exhibit volitions within the early learning community of which it is applied.

8 Discussion

The current research focused on the impact of technology on parent-educator communication within the early learning sector of Ontario. In using Mitcham's conceptual definition of technology as a guide, data were collected and analyzed to gain access to parents’ perspectives on a number of components of communication including modes, knowledge, changes in processes (including content and collaboration) and potential volitions. Results and discussions across each area of focus were presented to support gaining a deeper understanding of the impact of CMC technology in parent-educator communication. The following discussion integrates the findings in relation to the overall research question: How has the use of communication technology, in the form of HiMama software, impacted parent-educator communication practices within early childhood education settings in Ontario?

Five overarching findings related to HiMama's impact can be deduced from the results of the current study. These five components are drawn from parents’ perceptions of change. As the data collected measured perceptions and not actual processes, it is important to present the findings as such. The five findings provide insight into directions for further research and best practice guidelines in using CMC in support of parent-educator communication within early years settings in Ontario.
1) Introduction of HiMama within the early learning setting highlights the value of a multi-mode approach to parent-educator communication.

With the introduction of HiMama participants identified changes in frequency and satisfaction with each of the seven modes of communication studied (FTF communication, personal / group notes, individual / group email, bulletin boards, phone calls and text messages). There was a reduction in the frequency of use across most modes of communication, including a decline in personal written notes of over 50%. In relation to satisfaction measures, sign tests determined statistically significant median differences were found for FtF communication and group notes after the introduction of HiMama. Phone calls, FTF communication and HiMama communication received high satisfaction ratings by parents within this sample.

From the data it was clear that certain modes of communication continue to serve a specific purpose even after CMC technology was introduced (such as phone calls for emergencies, monthly newsletters to communicate across the early learning community, and personal email to support administrative correspondence related to financials or annual reporting). These changes signify that with the introduction of CMC multi-mode communication strategies, these other modes of communication may still be necessary and of value within the early learning setting. This finding mirrors previous results found in the work by McGrath and Reedy (2010) who shared that within their research, “directors recognized the need for integration of multiple practices within their sites to support open and ongoing communication with parents” (McGrath & Reedy, 2010, p. 353).
Parents’ perceptions of communication quality post-implementation resulted in statistically significant median differences in all four qualities (satisfaction, effectiveness, openness, and responsiveness). The increases in quality measures across all four categories may be due to intentional use of multiple modes of communication in meeting both content and process needs (such as FtF–HiMama blend for daily communication tasks). Previous work by Thompson, Mazer and Flood Grady (2015) identified patterns of “mode combinations” as having promising application for supporting parent-educator communication processes. They maintained that pairing synchronous and asynchronous methods allow parents to vary their communication content across richer and leaner modes. At the time of their work, FtF/email communication was the most common mode combination preferred by parents. In the current study parents reported that the implementation of HiMama allowed for more intentional communication content when given the opportunity for FtF communication with the educating team. Therefore, the promising combination of HiMama (as an asynchronous method) used at high frequency (daily; within the day) paired with opportunities for FtF communication during pick-up/drop-off times may offer a mode combination that is powerful in meeting the daily communication needs of parents and educators. This cycle (daily asynchronous-synchronous strategies) embedded within daily routines and communication needs for parent and educators may be the key to overall effectiveness and success of this mode combination.

It was noted the majority of participants had very limited previous experience of CMC within parent-educator communication prior to HiMama. Introducing CMC into parent-
educator communication may have had a role in impacting perceptions of quality, regardless of whether it was in the form of HiMama or an array of other CMC modes. Further research comparing HiMama to other formats of CMC (such as email or social media platforms) may support understanding the particular features of CMC communication that improve parents’ perceptions of quality. (See Borsh et al. 2017 for an example of research comparing digital tools designed for parent-educator communication.)

While HiMama holds the promising potential to promote bidirectional communication practices, fewer than 50% of the parent sample reported using its various messaging features including the ability to comment on activities. Many parents spoke of it as a one-way communication tool, and shared their lack of knowledge or awareness of its ability for bidirectional communication. That being said, considerations on how CMC may enhance FtF communication suggests that its actions as a “knowledge translator” from educators to parents is supportive to overall parent-educator communication processes that occur beyond the application. In previous work Reedy and McGrath (2010) recognized the importance of coming to understand “the process of how information is provided and conveyed to, received by, and accepted from families” (p. 353). Further research into the process of using the synchronous-asynchronous pairing of FtF–HiMama communication may offer further insight into the strength of this mode combination.

Being able to implement various modes of communication with clear intention of their purpose in meeting communication needs is an important facet of considering the use of
CMC in the early learning community. In the current study it was found that the pairing of daily synchronous-asynchronous communication strategies, alongside less frequent, purposeful modes of communication (emergency phone calls, community newsletters) promoted intentional strategies for meeting parent-educator communication needs across a range of modes.

2) The HiMama platform, when used effectively, can offer communication content that increases parents knowledge of their child’s day in care, and further insight into the healthy development and well-being of their children.

The strength of HiMama is in its ability to provide specific details on the child’s day in care, and offer parents a convenient platform by which to access and review this information in a timely manner. The majority of parents (over 80%) in the current study were moderately to extremely satisfied with it as a communication tool. Results from changes in communication content illustrated that after HiMama was implemented statistically significant increases were found across eight out of nine content areas. Worth noting was that parents identified that content on playroom activities, social interactions, and learning across developmental domains occurred frequently in communication after the introduction of HiMama.

As described within the literature review, information on the child’s day was previously communicated during busy pick-up times at the end of the day or through written notes housed at the early learning site – both of which had limited opportunity to meet the daily communication needs of parents and educators. Work by both Drugli et al. (2012) and Shpancer et al. (2002) identified significant gaps in the information
parents had on the daily experiences and routines in the early learning and care setting when relying on FtF communication practices. In the current study parents were able to identify the value of receiving detailed content, especially photographs, as a means of understanding their children’s daily experiences including their development and overall well-being. In some case parents identified that by having access to their child’s experiences during the day they felt more equipped in making responsive parenting decisions after care hours. In addition, parents identified the value in gaining insight into knowledge of child development, and the types of activities their children were participating in at school to promote extending the learning and opportunities they were offering within the home.

It was noted within the research that participants experienced considerable variation with the type of content included in HiMama reporting, as well as the frequency of communications. In some cases, the reports only cover the specific health and wellness components of the child’s day (food intake, sleep times and toileting); others offer of a photograph, and in some cases it was used so infrequently that it resulted in the experience of frustration. As such it should be recognized that increases in communication content are not solely due to the platform, but rather in how the platform works within the mode combinations, and across individual users and early learning programs. Participants recognized that in many cases the more ‘mundane’ details of their children’s day were now logged in HiMama allowing for richer FtF communication with educators on the activities and experiences of their children’s day in care. This further supports the notion that multiple modes of communication used with purpose is
of value within the early learning community. Participants also noticed that the level of
detail and consistency across educators and programs varied depending on the
training, motivation and expectations of educators to use the tool for communication.
This will be explored further in the findings on best practices.

With acknowledgement of its role within a multi-mode strategy for communication, it
is clear that HiMama promotes routine daily data input and communication on various
components of health, wellness and daily activities. In the current study the majority of
participants reported receiving information of this nature including information on daily
activities, food intake, sleeping, and toileting. As outlined in the previous section on
collaboration, if the goal for parents in accessing child care services is to promote the
healthy development and well-being of their child in their absence, then when used
effectively HiMama offers a wonderful platform to communicate specific information
related to this goal.

3) HiMama has the potential to impact relationships within the early learning setting.

In the initial design of the current study focus was placed on exploring the impact of
technology on parent-educator communication, and as such it positioned parent-
educator partnerships as the primary relationship focus of this study. Both successes
and limitations of HiMama in support of parent-educator communication were found
within the results of the current study that speak to the potential impact of technology on
parent-educator relationships. Nonetheless, in addition to its impact on parent-educator
relationships, unanticipated outcomes from the results demonstrate that HiMama has a
positive influence on parent-child relationships.
From the data, the impact of HiMama in either enhancing / reducing parent-educator relationships can be identified. Parents acknowledged that through HiMama they felt more connected, more knowledgeable, and more informed about their child’s experiences in care, including the role of the educator in providing support for learning and development. In a number of cases parents acknowledged that changes in communication processes allowed them to experience more intentional and deeper connection when communicating with educators. Parents recognized the value of the tool in maintaining connection to the education team when FtF communication is not possible (such as the timing of educators’ shifts). Furthermore, a small sample of the parents within the study specifically praised the wonderful work and commitment of the early childhood educators in the learning and care they provide for young children.

The ability to access information on the content of the child’s day through HiMama was linked to feeling more connected. This feeling of connection and trust that parents identified was also recognized in previous work by McGrath (2003), who “found that communication about the children and their activities was essential in maintaining trust between parents and the child care centre” (as cited in, Reedy & McGrath, 2010, p.349). In the current study parents recognized feeling reassured and trusting of the care they had selected for their children based on the information available through HiMama, in particular the photographic evidence of children’s happiness and engagement in the early learning community.
In some instances, the presence of HiMama as a communication tool resulted in the experience of frustration by parents within the sample, and demonstrated the potential of CMC to impact the parent-educator relationship negatively. As explored within the section on volitions when the tool is used ineffectively or differences in application for use across educators occur parents are more likely to notice. As the tool is a ‘template’ form for recording information, errors in reporting or omissions are more readily noticeable especially when the implementation shifts toward less detailed and consistent use. This template approach reflected poorly on parents’ perceptions of the educators. Parents identified issues of inconsistency or lack of effective use as resulting from educators’ lack of knowledge, training, motivation - and in one case - general laziness. Further consideration of the role of the administrative team and the software developers in ensuring effective implementation of the tool to support communication is needed to ensure that the parent-educator relationship is not compromised when communication technology is applied to the community. This will be discussed further in the finding on best practices.

In relation to parent-child relationships, unanticipated findings suggested that using HiMama has a positive impact on communication, connection, responsiveness, and parents’ well-being. Parents identified that having specific information on their child’s day-to-day activities provided valuable context for communicating with their children. They felt they were better able to ask specific questions on their child’s day and engage
in more meaningful conversations. This was identified as being especially valuable when communicating with younger children who have limited expressive language skills.

Parents shared that detailed information including photographs available throughout the day and in real time allowed them to feel connected to their children even though they were physically separated. The opportunity to check in, or receive updates from educators through the *HiMama* platform impacted parents’ experiences of well-being including inducing joy, reassurance and trust. Parents enjoyed feeling part of their child’s day and having insight into their well-being throughout the work day. Having this information was identified as being helpful at pick-up times reducing the stress of communicating with educators as well as being responsive to the child’s needs as they returned back to the care of parents (including meal planning and adjustments to sleep times). All of these components were viewed as favorable in supporting the parent-child relationship.

Lastly *HiMama* offers the potential to strengthen the relationship between children and their extended families. Over half of the current sample indicated sharing access to their child’s *HiMama* accounts. In the majority of cases grandparents were identified as having access. The opportunity to support connection and engagement beyond the immediate family may play an important role in supporting both young children’s development and family support. Further research on how access to communication influences relationships beyond the child’s immediate family may be of value, especially
when considered within Bronfenbrenner’s ecological systems theory.

In thinking more broadly on the role of CMC in developing and supporting relationships, SIPT looks to understand the factors of CMC that are effective in supporting the establishment and maintenance of interpersonal relationships. There has been limited application of this theory to early learning settings, and particularly in situations where CMC and FtF communication are used in combination. In early work by Thompson (2008) investigating email as a tool for parent-educator communication it was found that the context of the emails remained relatively instrumental over time; defying SIPT anticipation that the relation aspect of communication should evolve over an extended period of use on the CMC platform. Thompson suggested that, without the goal of communication to build relationships, this premise will not be fully reached. In the current study, the majority of parents perceived CMC as a one-way tool for information sharing. However, offering it in combination with richer modes of communication may have led to the increased capacity for relationship building between parties. This was demonstrated in parents’ increased satisfaction of FtF communication and parents’ acknowledgement of extending experiences between school and home environments.

One additional consideration related to SIPT that is worth exploring is the overall focus on the content of communication shared through the CMC platform. In past research on SIPT inquiry is typically directed at how the two mode users develop a relationship through CMC. In the current study the goal of CMC may be less focused on the establishment of the relationship between the parents and educators, but more so
on collaboration over a common relationship – the individual child. Within the results it was demonstrated that HiMama has a positive impact on the parent-child relationships. By communicating through HiMama parents felt more connected to their children throughout the day and the information on this platform strengthened the parent-child communication practices. Perhaps then, in relation to SIPT, CMC can influence the development of the relationship – depending on which relationship is then positioned as the focus for communication. The richness and intimacy that is said to develop through SIPT may therefore be more related to the content and goal of communication (in this case the child) and less on establishing relationships with educators (thus the limited use of bidirectional practices by parents). These distinctions reflect similar patterns to the previous discussion on parents’ and educators’ goals for collaboration and the potential difference in focus (educators toward pedagogical practices, and parents on the healthy development for their individual child). Gaining additional insight on how HiMama can influence and support interpersonal relationships through the application of the SIPT may be a useful direction for further research.

4) Best practice guidelines for use of CMC should include plans for parent and educator training and intentional implementation and ongoing commitment by site administrators to support effective goals setting and long term use of communication systems.

Of primary concern within the current research and results was the lack of training and clarity of the expectations around using HiMama communication. In the current study only 7% of the parents reported receiving any training in using HiMama as a mode of communication. Furthermore, a number of parents shared their perspective that the
educators were needing further training in how to use the tool effectively. In addition, there were a number of comments through the data set that indicated that by participating in the current research participants were gaining further knowledge on the tool. As shared by participant #104, “I find it easy to use but now that I am doing this survey I think there is more to the app then I am using it for”.

Less than a quarter of participants (23.6%) felt that their early learning site had expectations on how HiMama was to be used to support communication; the qualitative analysis demonstrates that the presences of explicit expectations is generally lacking.

In the discussion on knowledge, consideration was given to the important role of both site administrators and the software developers in being responsive to the on-going needs for training and development for the early childhood educators. This particular population experiences high turn-over rates in both parent/child enrollment and staff. Having ongoing opportunities for training and monitoring systems to ensure consistency in the use of the communication tools is highly recommended.

As discussed previously, HiMama has the potential for impacting parent-educator relationships negatively if educators are not given the appropriate tools and resources to use the tool effectively, and if clear guidelines are not communicated and implemented within the early education site. Having a ‘template’ format for communication allows for heightened awareness of missing content by the receiver which was identified numerous times across this parent sample.

One of the challenges of implementing software that is designed to be easy to use, and user-friendly is that it may misguide users / administrators into thinking that the
“plug and play” features of application do not require ongoing monitoring and support. In looking to examine the multiple features of HiMama through the survey data it was clear that there were many potential features of the application that were unknown or unused by the parents, including opportunity for bidirectional communication. Based on this it may be hypothesized that many of the educators currently using this tool may not have full comprehension of the various tools or features that it can offer. In earlier research by Ho et al. (2013) using path analysis to determine educators’ acceptance of use behavior for mobile messaging, both ease of use and usefulness of the tool had direct positive relationships with educators’ attitudes towards use. Within their research they identified that providing educators with necessary communication and training was a key component for using the tool. Furthermore, they found that actual use behavior was more directly related to school policy and not teacher intention, supporting the importance of establishing clear expectations for use by the early learning community. Accordingly, specific consideration must be given to the implementation and use of CMC including providing training and clarifying expectations and articulating policies for use.

Clear articulation of the role of the administrative team in ensuring successful use of this technology in communication, as well as delegation of task management for consistent application and monitoring across the early learning site will support successful use. Having a clear plan to offer on-going professional development in using communication technology and a method for articulating of expectations of use may be something that is not overly identified when bringing in new technology. Having an
annual review of communication strategies and ensuring consistency in approach was identified within the current study as necessary considerations for on-going success. As shared by parents within this study, engaging parents in this process and providing opportunities for parents and educators to co-construct goals and use based on their unique user experiences would be an asset in establishing effective use for CMC. Further research assessing educators’ experiences in using HiMama and the involvement of site administrators would an asset to this investigation, as current understanding has only been formulated through parent perspectives.

5) HiMama has the potential to impact parents’ knowledge of both legislative and pedagogical expectations within the early learning community. To meet the goals for communication and collaboration educators and parents must be actively engaged in dialogue on understanding one another’s intentions for the early learning community.

As discussed previously, results on communication content related to pedagogical practices including reference to guiding documents saw statistically significant median differences after the introduction of HiMama. Median scores post implementation demonstrated that parents perceived communication on learning across development domains occurred “frequently”, information on ELECT “sometimes”, and HDLH “rarely”. Statistically significant median differences were found in all three content areas post-HiMama. In particular trends in frequency saw noteworthy shifts in communication regarding ELECT (increases in “frequently” (9.4% pre; 20.3% post) and “always” (7.2% pre, 23.9% post) (n=138). Additionally, over half of participants identified that activities posted through HiMama were linked to ELECT.
That being said, 34.5% of the parent population acknowledged that they strongly disagree with the statement “I am familiar with the document Early Learning for Every Child Today (ELECT)” (only 23% “agreed” or “strongly agreed”) and 38.1% of the participants stated that they strongly disagree with the statement “I am familiar with How Does Learning Happen? Ontario’s pedagogy for the early years” (only 24.5% “agreed” to “strongly agreed”). These findings suggest that while parents recognize communication on ELECT as taking place, they have limited understanding of the actual document. Within HiMama educators are able to tag activities with developmental constructs from ELECT. As stated, parents report having knowledge of their child’s learning across developmental domains (the exact information that is found within ELECT) although they may not recognize the relationship between this information and the document. This suggests that HiMama impacts parents’ access to information (more increased frequency in seeing ELECT) even if they do not understand what the content might entail. Currently aspects of HDLH (such as the four foundations) are not readily available in HiMama reporting, potentially contributing to the differences in parents’ knowledge of these two provincial documents. By having direct prompts to tag ELECT, educators may be more readily including it in communication, as opposed to HDLH which they would have to independently choose to include.

These findings highlight the potential for HiMama to increase parents’ knowledge of pedagogical practices and provincial expectations, but it will require educators to take a more active stance in communicating with parents on pedagogical aspirations including the important role of parent engagement within their communication practices (either
through *HiMama* or FtF communication). To meet pedagogical and professional goals, educators need to communicate with parents on the goals for partnerships. In the current study there was evidence that parents misunderstood or were unclear of the perspective of the educators, as demonstrated in the findings related to assumptions on use of messaging, perspectives of educators needing training, uncertainty of educators desires in wanting communication.

*HiMama* is currently being used by parents primarily as an information gathering tool, and less likely as a bidirectional communication process. To shift the use of *HiMama* past informing parents daily task responsibilities (such as food intake, late drop-offs) toward providing communication focused on the deeper co-construction of pedagogical aspirations will require direct goal setting and intentional communication practices by both the educators and parents. This relates back to Amendt’s theory on the progression of collaboration whereby one-way informing is the basic level (Amendt, 2008). Moving toward engagement or leadership in the establishment of trusting, responsive, bidirectional communication and relationships are the forefront of deeper partnerships within the learning environment.

Vygotsky’s sociocultural theory offers consideration into how artifacts such as *HiMama* may shape knowledge acquisition. He recognized that cultural artifacts can play a viable role in shaping thoughts through the messages and meaning communicated through the tool. In the current study evidence of ELECT identified within parents’ reports signifies the potential of the platform for increasing parents’ knowledge of pedagogical practices; however, only if used intentionally and with necessary
information included (such as an embedded link to the ELECT document so parents can explore the resource further). Encouraging educators to incorporate more detail and content on pedagogical aspirations through this method may support ongoing development of parents’ constructs of early learning and care. Professional identity and use of guiding documents as a tool for increasing parent awareness of the roles and responsibilities of ECE may need further consideration. Research on professional discourses, educator identity and parent-educator communication process using CMC may support gaining further insight into this potential.

As discussed, HiMama impacted parent-educator communication within the early learning setting in Ontario in numerous ways including: 1) highlighting the value of multi-mode communication strategies, 2) increasing communication content, 3) influencing relationships including parent-educator and parent-child relationships, 4) recognizing the importance for training and expectations for use, and finally 5) offering the potential for improved knowledge on pedagogical aspirations and parent-educator collaboration if used effectively.

**Strengths and Limitations**

The current study accessed parents’ perceptions of change using retrospective survey methodology. Within the context of the study’s design both strengths and limitations can be identified. One of the primary strengths of the current study was its focus on an under-examined population: parents currently accessing child care services within Ontario. There is limited evidence-based research on the experiences of parents related to both CMC processes and early learning services in Ontario. The findings from
this study support gaining insight into parents’ perceptions of communication technology as well as practices within early learning settings in Ontario.

A second strength of the current research is the application of Mitcham’s conceptual definition of technology in supporting the research design including survey construction, data collection and analysis. The four components of technology defined by Mitcham allowed for comprehension across various layers to understand the impact CMC may have within the early learning setting. By using this framework, the study was able to consider HiMama technology in a manner that allowed for detailed understanding of its potential impact across a range of characteristics of technology.

Finally, using an online retrospective survey allowed recruitment to happen simultaneously across a large geographical area. It offered the ability to access parents’ perspectives on the impact of communication technology conveniently and in a manner that was sensitive to their time-commitments and constraints. The design was a single-use measure, and participants had the ability to start/stop until completion and access it from any location with their choice of device using Qualtrics software.

While the study provided insight into the experiences of parents currently using communication technology within early learning settings, there were a number of limitations in this study. One of the major limitations of the current study was the process of relying on technological methods for both sampling and survey participation, thereby missing a proportion of families accessing early learning services that do not have access to technology, or may not be comfortable using technology. This is especially critical in relationship to the context of the research, as parents who do not
have access to technology may differ dramatically in their experience of communication technology in supporting parent-educator communication. In the current study it was recognized that 100% of this study’s sample had access to Internet technology and cellphones which is different from provincial averages. According to Statistics Canada, 92% of the population in Ontario had access to Internet service in 2016 and 76% of the Canadians owned a smart phone (Statistics Canada, 2017).

In addition, the timeliness of the research project may also be considered as a limitation. Screening measures required parent participants to have experience within the early learning setting prior to the implementation of HiMama in order to make post/pre comparatives. Recruiting parents currently accessing services at the same point in time as HiMama technology was being implemented meant that the current study may have missed the opportunity to gain insight into settings that would be classified as “early adopters” to the technology. There may be differences in experience with technology between “early adopters” of the software, and those sites represented in this study. Newer sites for use of HiMama may be less technologically inclined than those of early adopters. The results on low levels of training or lack of expectations for use may be reflective of sites inexperience with using technology rather than being reflective of the larger early learning and care community.

Finally using a retrospective survey to gain insight on the impact of technology in parent-educator communication means that results are reflective of participants’ perceptions of change and not actual causal relationships. Changes in the perception of change may be at risk of social desirability – the participants’ desire to show positive
change – and less on the actual impact of the technology. The inclusion of a qualitative
data collection measures in the form of open-ended questions was used to promote
deeper understanding into why participants felt they experienced the changes they
perceived (Kanevsky, 2016) and allowed for the exploration of potential impact.
Furthermore, the memory recall period for parents in comparing communication pre and
post-
HiMama implementation may influence findings. In the current study 28.6% of the
sample had between 6 to 12 months’ experience communicating with educators prior to
the introduction of HiMama. An additional 22.9% had 1 to 2 years’ experience. The
average length of time accessing childcare services within this sample was three years
resulting in the potential of recall periods of over 2 years’ time. Incorporating an
additional source of data collection within the research design (such as interviews or
focus groups) would have supported strengthening the overall findings (Klatt & Taylor-
Powell, 2005).

**Future Directions**

Numerous recommendations for future research directions have been made in
relation to the four dimensions of technology as well as the application of CMC in the
early learning and care setting. To recap, some of the key areas for future research
include:

1) Examining the effect of mode combinations to meet communication needs in the
context of early learning and care, including extending MRT to incorporate
advancements in CMC. Further research on the qualities of FTF-
HiMama mode
combination in the early learning setting would be useful in understanding the nature of communication / collaboration within the early learning setting.

2) Research into the perspectives of educators and site administrators on the use of CMC technology in supporting parent-educator communication.

3) Research on a number of areas of potential volitions of CMC in the early learning setting identified within the current study (see discussion on volitions).

4) Exploring parents’ and educators’ goals for communication and collaboration within early learning settings. Amendt’s model for progress of collaboration offers a potential foundational framework to support this research (Amendt, 2008).

5) Examining pedagogical aspirations identified within HDLH as a foundation for co-constructing parent-educator communication processes that support each party’s goals and expectations for partnership in early learning.

**Implications for Practice**

The current research contributes to a growing body of research on the application of technology to support communication within educational settings. It is the first study of its kind that gained insight into the experiences of parents accessing care within the province of Ontario and using *HiMama* communication software to support parent-educator communication. The findings from this study may be used by several key stakeholders including *HiMama* software developers, site administrators, early childhood educators and the Ministry of Education in Ontario.
The findings suggest that software developers should consider the inclusion of further resources for implementation and on-going training measures to support early learning sites, parents and educators in using HiMama effectively to meet their communication goals. Supporting site administrators in understanding the potential impact of technology in communication systems, including the need for support and training across both educator and parent community members, and the articulation of clear expectations should be part of the initial introduction and access to any form of CMC, including HiMama. Supporting sites in using the tool effectively supports ensuring the overall success of HiMama in meeting its objectives. Furthermore, parents’ feedback gained through the current study could lead to improvements in the user experience of this software. Parents identified the value of incorporating further information within the app including links to pedagogical documents, and chat rooms for parent connection. In addition, considering a name change to be more reflective of modern parenting processes where gendered pronouns are no longer associated within certain parenting practices may increase parent satisfaction with the tool. Using these suggestions for further development of the software may increase parents’ satisfaction and appreciation of the software.

Providing insight to the potential impact of communication technology to both site administrators and early childhood educators may increase the successful implementation and use of the CMC in meeting overall goals for use. It was clear within the current study that the development of clear guidelines on using the tool, as well as co-construction of goals for communication with parents, including an annual review of
processes was recommended. An important component for site administrators to understand is that based on the frequent population shifts within the early learning setting on-going training and effective monitoring systems to ensure consistency are critical for the successful application of CMC.

Finally results related to parents’ perspectives on communication and their knowledge of pedagogical aspiration may be of use to the Ministry of Education in understanding the application of HDLH within the early learning setting. Participants in the current study had limited knowledge of the pedagogy regardless of the fact that it was launched over five years ago (prior to the development of HiMama technology). If legislative requirements include the development of bidirectional parent-educator relationships within the early learning settings, increasing communication directed towards parents accessing services on these goals needs to occur. As identified, parents access early learning services with the primary goal of receiving quality care to support the healthy development of their child in their absence. Therefore, parents’ goals for collaboration may not be in direct alignment with the provincial pedagogy and educators’ goals for parent-educator partnerships to support the co-construction of learning.

9 Conclusion

The current study investigated the impact of communication technology in support of parent-educator communication. This research aligns with recommendations made by the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Centre for Early Learning and Children’s Media on the importance and need for
informed decision-making, evidence-based practice, and thorough investigation of technology in early education, especially in the area of parent-educator communication. The current study was able to access an under-examined population within the research on parent-educator communication; parents accessing early learning services within the province of Ontario. It was the first study of its kind to look specifically at the software application, HiMama. Through the application of Mitcham’s conceptual definition of technology, the impact of HiMama communication software was studied across four dimensions: modes of communication, knowledge on application, parent-educator processes of using the software, and potential volitions that communication software may cause.

Findings demonstrated that the technology has rich potential for increasing parents’ knowledge of their children’s daily experiences when in care. The unique features of including real time access to information throughout the day and a standardized processing of routine data entries for reporting was highlighted as increasing parents’ knowledge of daily experiences within early learning and care. The impact of HiMama, when used in conjunction with FtF communication, created a daily cycle of synchronous-asynchronous communication methods that demonstrated promising potential for the use of CMC-FtF pairing within the early learning setting, allowing for more meaningful FtF communication. Parents in the current study were found to have a richer understanding of their children’s early years’ experiences in contrast to previous literature on parents’ knowledge and experiences when accessing early learning services (e.g. Drugli & Undheim, 2012; Shpancer et al, 2002). Unanticipated findings
illustrated that *HiMama* communication has the potential positively influence within parent-child relationships. Finally, recommendations for the development of ongoing training, and clarity on the early learning sites’ expectations for use was deduced from the perspectives of parents in understanding both the educators’ and their own limitations in using the software.

Based on parents’ perceptions within the current study, the development of bidirectional parent-educator relationships that support early learning pedagogy through active engagement of parents does not yet appear to be established. The opportunity for active engagement within the early learning environment as well as knowledge of the provincial pedagogy, HDLH was low, within this sample. Consideration of differing goals for communication and collaboration held by parents and educators, and lack of explicit communication on professional practices and pedagogical aspiration were identified as potential barriers. That being said, investigation of the impact of communication technology within the early learning setting reveals that CMC may be a powerful platform for establishing collaborative parent-educator partnerships if used effectively. The establishment of expectations for use, as well as co-construction of goals for communication and collaboration developed in partnership with parents, educators, and site administrators may be the first step in meeting overarching pedagogical goals within early learning settings.
References


Costello, S. (2018, January 20). *How many iPhones have been sold worldwide?*. Retrieved from [https://www.lifewire.com/how-many-iphones-have-been-sold-1999500](https://www.lifewire.com/how-many-iphones-have-been-sold-1999500)


http://www.edu.on.ca/childcare/pedagogy.html

https://www.ontario.ca/laws/statute/14c11?_ga=1.57468334.580936904.1463513492


http://www.prweb.com/releases/2014/04/prweb11779760.htm


Appendices
Appendix A Letter of Support From *HiMama*

*Email correspondence from Savannah Copland February 13, 2018*

*HiMama* is pleased to be supporting a research project being undertaken by the University of Guelph, Department of Family Relations and Human Development on the influence of technology as a communication tool for families and early childhood educators. The company will be assisting Dr. Tricia van Rhijn and Ann Wilke, the principal and student investigators by distributing the invitation for participation through the *HiMama* database. *HiMama* will not be providing any funding to the research project, nor will the company be providing any financial incentive to centers who wish to be involved in the study.
Appendix B Recruitment Materials

*Parent email* (sent directly from *HiMama* through database)

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**Investigating the influence of technology in parent-educator communication**

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Hello Families,

Dr. Tricia van Rhijn and Ann Wilke, a research team from the University of Guelph department of Family Relations and Human Development excited to invite you to participate in a retrospective study investigating the impact of *HiMama* software in supporting parent-educator communication in early learning settings. The goal of this research project is aimed to capture the impact of the technology from the perception of both parents and educators.

Your participation in this study is key to strengthening sector wide understanding of the impact of technology in parent-educator communication and collaboration. There are no perceived risks in participating. Your rights as a participant including confidentiality can be found within the attached PDF document, or by accessing our website at [www.parent-educatorcommunication.weebly.com](http://www.parent-educatorcommunication.weebly.com). While *HiMama* is involved in the distribution of this invitation, information gathered on the decision to take part or decline participation, as well as any identifying information will not be shared with the company. We encourage you to visit our website to learn more about this research (University of Guelph REB#18-02-026).

The online survey can be accessed directly from the following link. It will take approximately 1 hour to complete. You are able to skip questions and still remain in the study. All surveys are anonymous and, once you have completed the survey, your responses will be pooled electronically with all other respondents (*insert link*). We encourage you to complete this survey on a non-networked computer. If you are completed it on a computer shared with others we recommend clearing the browsing history to prevent other users begin able to access it.
We appreciate your consideration and look forward to hearing the unique perspective of parents accessing early childhood education services in Ontario today.

Sincerely,

Dr. Tricia van Rhijn, RECE
Assistant Professor
Family Relations and Applied Nutrition
University of Guelph
519-824-4120 ext. 52412 or tricia.vanrhijn@uoguelph.ca

Ann Wilke, BASc, RECE
Master’s Candidate
Family Relations and Human Development
University of Guelph
519-546-7119 or amolnar@uoguelph.ca
Appendix C Screenshots from the Project Website

INVESTIGATING THE INFLUENCE OF TECHNOLOGY IN PARENT-EDUCATOR COMMUNICATION

Rationale

The establishment of Ontario’s first ever provincial-wide pedagogy for early learning, How Does Learning Happen?, provides an articulated vision for learning that honors the powerful connections between children, educators, and families within the context of their communities and larger society. It recognizes families as the most powerful influence in their child’s learning and deserving of the right to be engaged in meaningful ways within early learning programs. Educators are required to “cultivate authentic, caring relationships and connections to create a sense of belonging among and between children, adults, and the world around them” (Ontario, Ministry of Education, 2014, p.13). To effective building relationships (bi-directional communication) between families and educators is considered a core component for the achievement of these pedagogical goals.

Furthermore the development of the Code of Ethics and Standards of Practice in 2011, by the College of Early Childhood Educators establishing and sustaining communication and engagement with families is now considered a core responsibility in the professional role of early childhood educator in Ontario (see Code of Ethics and Standards of Practice Code E: Responsibility to Families, College of Early Childhood Educators, 2011). Finding the most effective method to meet this goal requires educators to consider the resources needed to support the ability for daily communication. New technological advancements offer potential support; however, limited research has been conducted on the quality and value of these tools in early learning environments. Very limited research exists on parent-educator communication practices within the context of early learning setting within the Canadian context.
Research Question
How has the use of communication technology, in the form of HiMama® software, influenced parent-educator communication practices within early childhood education settings?

Recruitment Process
Potential research participants across Ontario who have access to HiMama® software (both parents and educators) will receive an email introducing them to the project along with a link inviting them to participate in the survey. This link will be distributed directly through the HiMama® database to parent participants. Educators will receive correspondence via workplace directors/ administrators.

Surveys
Surveys will collect parent and educator perspectives on a number of components including modes of communication, changes in communication processes, and perspectives on collaboration, content and experience with technology.

Survey links will be distributed to RECEs through Centre Administrators at each site location. Survey links to families will be distributed through HiMama. If you are needing support in accessing a survey we invite you to contact the research team.

* indicates required field
Email

Survey Request
INVESTIGATING THE INFLUENCE OF TECHNOLOGY IN PARENT-EDUCATOR COMMUNICATION

Meet Our Research Team
University of Guelph, Department of Family Relations and Applied Nutrition

Tricia van Rhijn

Principal Investigator

Tricia van Rhijn (PhD, RECC) is an Assistant Professor of Family Relations and Human Development in the Department of Family Relations and Applied Nutrition. She is an interdisciplinary social scientist and Registered Early Childhood Educator whose research interests include parent-child relationships, child development, and effective communication strategies in early childhood settings.

Ann Wilke

Student Investigator

Ann Wilke (BEd(c), RECC) is a Registered Early Childhood Educator with over 10 years' experience in early learning and care. Ann's passion for the profession of ECE has been strengthened by her commitment to lifelong learning. She was a mentor in the College of Early Childhood Educator's Leadership Pilot Program and has experience in various roles at the preschool level.
Appendix D Consent Information

CONSENT INFORMATION

You are invited to participate in a research study titled, “Investigating the influence of technology as a communication tool for families and early childhood educators”. The results of this study will contribute to faculty research and a master thesis project. This research is being conducted by the researchers listed below and contact information is provided should you have any questions or concerns about the research.

Principal Investigator:
Dr. Tricia van Rhijn, Assistant Professor, Family Relations and Applied Nutrition (FRAN), University of Guelph, 519-824-4120 ext. 52412 or tricia.vanrhijn@uoguelph.ca

Student Investigator (University of Guelph):
Ann Wilke, Graduate Student (FRHD), University of Guelph, 519-546-7119 or amolnar@uoguelph.ca

PURPOSE OF THE STUDY
The purpose of this study is to understand the impact of HiMama© software in supporting parent-educator communication in early learning settings. The timeliness of this research project is aimed to capture the impact of the technology from the perception of both parents and educators.

This study is using a survey to gather participants’ perspectives on using communication technology in comparison to the earlier forms of communication used prior to accessing HiMama©. This consent accompanies an anonymous online survey for you to complete regarding your perceptions of parent-educator communication.
PROCEDURES
This consent accompanies an anonymous online survey for you to complete regarding your perceptions of parent-educator communication. The survey will take appropriately 1 hour to complete. You are able to skip questions and still remain in the study. You do not have to complete the survey at one single time period. You can close the survey at any time and return to it by accessing the link provided. Only completed surveys that are submitted by participants will be used in the study. Partially completed surveys will be deleted from the database when the survey closes.

Should you choose to participate simply follow the accompanied link embedded in the invitation email to access the survey, or hit “next” below. All surveys are anonymous, and once you have completed the survey to will be pooled electronically with all other respondents across Ontario.

RENUMERATION
There will be an incentive draw associated with this survey as a sign of gratitude for your time and support in considering participating in this research project. 5 cash prizes of $25 will be awarded at random to those participants wishing to enter into the draw. To enter the draw simply click on the following url (link inserted) or access it at the completion of your survey. We will be asking you to provide you name and email address to participate. This information will be collected separately from the survey data and there is no potential to link it to the initial survey in any capacity. The information will be stored separately and deleted once the draw has been completed. The full list will be destroyed once of all the prizes have been claimed. The only information that will be retained will be the record of e-transfers (including name and email addresses) that is required to be submitted by the researchers to University of Guelph, Financial Services Department to document the disbursement of funds. You are welcome to enter the draw even if you chose not to participate in the survey.
POTENTIAL RISKS AND BENEFITS

There are no identified risks as a result of participation in this study. A benefit of your participation may include strengthening sector wide understanding of the impact of technology in parent-educator communication and collaboration.

CONFIDENTIALITY

Every effort will be made to ensure confidentiality of any identifying information that is obtained in connection to this study. The survey data is anonymous. Please note that confidentiality cannot be guaranteed while data are in transit over the Internet. We encourage you to complete this survey on a non-networked computer. If you are completed it on a computer shared with others we recommend clearing the browsing history to prevent other users begin able to access it. Data collected will be stored on a locked computer within a locked office belonging to the principal investigator during analysis. After this point it will be stored in the University of Guelph Research Database where it will be kept for a period of ten years, and may be used in future studies to answer similar research questions. After which it will be deleted/destroyed. Results of this study which are presented or published will use only summarized findings to ensure confidentiality. The results of the study may also be used by HiMama© for commercial purposes.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. Your decision to participate or not is your right. This information is not being collected and therefore will not be shared with any other parties including the organization you belong to within the early learning and care sector. If you volunteer to be in this study, you may decide at any time to decide not to submit your survey without consequences of any kind. Only surveys that are completed and sent via “submit” will be collected. You may also refuse to answer any questions you don’t want to answer and still remain in the study. Once surveys have been submitted they are pooled with all other respondents making them unidentifiable.
Should you choose to withdraw you will still have the opportunity to enter your email in the prize draw by visiting the follow web page (link to the prize draw url).

**RIGHTS OF RESEARCH PARTICIPANTS**

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. You do not waive any legal rights by agreeing to take part in this study. This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. If you have questions regarding your rights and welfare as a research participant in this study (REB#18-02-026) please contact: The Director of Research Ethics at 519-824-4120, ext. 56606 or email: reb@uoguelph.ca

*You are invited to print a copy of the consent for your records.*
Appendix E Certificate of Ethics Approval

Stephen P. Lewis
Chair, Research Ethics Board-General

UNIVERSITY OF GUELPH
RESEARCH ETHICS BOARDS
Certification of Ethical Acceptability of Research Involving Human Participants

APPROVAL PERIOD: April 3, 2018
EXPIRY DATE: April 2, 2019
REB: G
REB NUMBER: 18-02-026
TYPE OF REVIEW: Delegated
PRINCIPAL INVESTIGATOR: van Rhijn, Tricia (tvanrhijn@uoguelph.ca)
DEPARTMENT: Family Relations & Applied Nutrition
SPONSOR(S): N/A
TITLE OF PROJECT: Investigating the influence of technology as a communication tool for families and Early Childhood Educators

The members of the University of Guelph Research Ethics Board have examined the protocol which describes the participation of the human participants in the above-named research project and considers the procedures, as described by the applicant, to conform to the University’s ethical standards and the Tri-Council Policy Statement, 2nd Edition.

The REB requires that researchers:
- Adhere to the protocol as last reviewed and approved by the REB.
- Receive approval from the REB for any modifications before they can be implemented.
- Report any change in the source of funding.
- Report unexpected events or incidental findings to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants, and the continuation of the protocol.
- Are responsible for ascertaining and complying with all applicable legal and regulatory requirements with respect to consent and the protection of privacy of participants in the jurisdiction of the research project.

The Principal Investigator must:
- Ensure that the ethical guidelines and approvals of facilities or institutions involved in the research are obtained and filed with the REB prior to the initiation of any research protocols.
- Submit an Annual Renewal to the REB upon completion of the project. If the research is a multi-year project, a status report must be submitted annually prior to the expiry date. Failure to submit an annual status report will lead to your study being suspended and potentially terminated.

The approval for this protocol terminates on the EXPIRY DATE, or the term of your appointment or employment at the University of Guelph whichever comes first.

Signature: Date: April 3, 2018

Stephen P. Lewis
Chair, Research Ethics Board-General
## Appendix F Survey Guide

PARENT SURVEY GUIDE: Investigating the influence of technology as a communication tool for parents and early childhood educators

<table>
<thead>
<tr>
<th>Question #</th>
<th>Source</th>
<th>Items</th>
<th>Response options</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to survey or incentive draw</td>
<td>You are invited to participate in an online survey on technology as a tool for parent educator communication. If you wish to participate in this survey, please select “yes”. By selecting “no” you are declining the survey but still invite to participate separate incentive draw for $25</td>
<td>1. Yes&lt;br&gt;2. No</td>
<td>Yes – continues to survey&lt;br&gt;No – links to incentive draw</td>
<td></td>
</tr>
</tbody>
</table>

### Part A: We are interested in gathering information from Registered Early Childhood Educators and families on the influence of HiMama© technology as a communication method

<table>
<thead>
<tr>
<th>Screening</th>
<th>Parent of young child(ren)/ Registered Early Childhood Educator</th>
<th>Parent survey accessed if selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please select the appropriate designation from the following options:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screening</th>
<th>Did you begin accessing childcare services before HiMama© was introduced in your child’s program?</th>
<th>1. Yes&lt;br&gt;2. No</th>
<th>No – separate parent survey – Post Only</th>
</tr>
</thead>
</table>

### Part B: We are interested in learning about how communication practices between educators and parents have changed since the implementation of HiMama©. For each of the following types of communication please indicate if they were used prior to the implementation of HiMama©:

(a) if they were used

(b) how often
(c) how satisfied you were with them as a communication tool between your child(ren)’s educators and yourself.

<table>
<thead>
<tr>
<th>Q1 (type)</th>
<th>1. Face-to-Face conversation</th>
<th>If they were used?</th>
<th>Remove for Post Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2 (frequency)</td>
<td>2. Personal notes (written specifically to individual families) (paper)</td>
<td>Yes / No</td>
<td></td>
</tr>
<tr>
<td>Q3 (satisfaction)</td>
<td>3. Group notes (written for all families) (paper)</td>
<td>At what frequency were they used?</td>
<td></td>
</tr>
<tr>
<td>For all: Q1Q2Q3</td>
<td>4. Bulletin board displays</td>
<td>1 - Daily</td>
<td></td>
</tr>
<tr>
<td>Q1 Q2 Q3</td>
<td>5. Email (from an account outside of HiMama)</td>
<td>2 - 2 or 3 times a week</td>
<td></td>
</tr>
<tr>
<td>to Q1 Q2</td>
<td>6. Text messages</td>
<td>3 — once a weekly</td>
<td></td>
</tr>
<tr>
<td>Q_8</td>
<td>7. Phone calls</td>
<td>4 — every two weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Other, please specify</td>
<td>5 — monthly</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 — every 2-3 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 - semi-annually</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8— Annually</td>
<td></td>
</tr>
</tbody>
</table>

Rating scale:
1 – Not at all satisfied
2 – Slightly satisfied
3 – Somewhat satisfied
4 – Moderately satisfied
5 – Extremely satisfied
For each of the following types of communication please indicate if they were used after the implementation of HiMama©:

(a) if they are used

(b) how often

(c) how satisfied you are with them as a communication tool between child(ren)’s educators and yourself.

Please share with us any changes you have noticed in this mode of communication with the implementation of HiMama©

<table>
<thead>
<tr>
<th>Q1 (type)</th>
<th>Q2 (frequency)</th>
<th>Q3 (satisfaction)</th>
<th>Q4 (open-ended response)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 to Q3</td>
<td>Q4_1</td>
<td>Q5</td>
<td>Q6</td>
</tr>
<tr>
<td>Q1Q2Q3</td>
<td>Q4_1</td>
<td>Q5</td>
<td>Q6</td>
</tr>
<tr>
<td>If they are used?</td>
<td>At what frequency?</td>
<td>How satisfied you are with them?</td>
<td>Open-ended response</td>
</tr>
<tr>
<td>Yes / No</td>
<td>1 - Daily</td>
<td>1 - Daily</td>
<td>1 - Daily</td>
</tr>
<tr>
<td>2 - 2 or 3 times a week</td>
<td>2 - 2 or 3 times a week</td>
<td>2 - 2 or 3 times a week</td>
<td>2 - 2 or 3 times a week</td>
</tr>
<tr>
<td>3 - once a week</td>
<td>3 - once a week</td>
<td>3 - once a week</td>
<td>3 - once a week</td>
</tr>
<tr>
<td>4 - every two weeks</td>
<td>4 - every two weeks</td>
<td>4 - every two weeks</td>
<td>4 - every two weeks</td>
</tr>
<tr>
<td>5 - monthly</td>
<td>5 - monthly</td>
<td>5 - monthly</td>
<td>5 - monthly</td>
</tr>
<tr>
<td>6 - every 2-3 months</td>
<td>6 - every 2-3 months</td>
<td>6 - every 2-3 months</td>
<td>6 - every 2-3 months</td>
</tr>
<tr>
<td>7 - semi-annually</td>
<td>7 - semi-annually</td>
<td>7 - semi-annually</td>
<td>7 - semi-annually</td>
</tr>
<tr>
<td>8 - Annually</td>
<td>8 - Annually</td>
<td>8 - Annually</td>
<td>8 - Annually</td>
</tr>
</tbody>
</table>
### Part C: We are interested in understanding changes in the quality of communication between families and educators in building a collaborative partnership. For the following questions please rate the qualities of communication process prior to and following the use of HiMama©.

<p>| Q5 | How would you rate your level of satisfaction with communication between your child(ren)’s educators and yourself <strong>prior to the use of HiMama©?</strong> | Rating scale: 1-7 rating scale | RETRO FOR POST ONLY ELIMINATE THE POST/PRE COMPARISON S |
| Q6 | How would you rate the effectiveness of communication between your child(ren)’s educators and yourself <strong>prior to the use of HiMama©?</strong> | Rating scale: 1-7 rating scale | RETRO |</p>
<table>
<thead>
<tr>
<th>Q7</th>
<th>Thomas and Mazer, 2012</th>
<th>How would you rate the effectiveness of communication between your child(ren)’s educators and yourself after using HiMama©?</th>
<th>Rating Scale: 1-7 rating scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>How would you rate how open communication between your child(ren)’s educators and yourself prior to the use of HiMama©?</td>
<td>RETRO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How would you rate the perceived openness of communication between your child(ren)’s educators and yourself after the use of HiMama©?</td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>Thomas and Mazer, 2012</td>
<td>How would you rate the responsiveness written communication between your child(ren)’s educators and yourself prior to the use of HiMama©?</td>
<td>1-7 rating scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How would you rate the responsiveness written communication between your child(ren)’s educators and yourself after using HiMama©?</td>
<td>RETRO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A available for option to indicate not using written communication</td>
</tr>
<tr>
<td>Q9</td>
<td></td>
<td>What did you find effective about your current communication practices between your child(ren)’s educators and yourself?</td>
<td>Open-ended text</td>
</tr>
<tr>
<td>Q10</td>
<td></td>
<td>What do you find challenging about current communication practices between your child(ren)’s educators and yourself?</td>
<td>Open-ended text</td>
</tr>
<tr>
<td>Q11</td>
<td></td>
<td>How do you feel HiMama has affected your communication?</td>
<td>Open-ended text</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>REMOVE FOR POST</td>
</tr>
</tbody>
</table>
**Part D**: We are interested in understanding the type of content that is typically communicated to families and how this content may have changed since implementing HiMama®. Please tell us how often the following topics were addressed in communication between educators and yourself before HiMama and then after HiMama was introduced in your child’s program.

<table>
<thead>
<tr>
<th>Q12 Q12.1- Q12.8 (post/pre frequency)</th>
<th>Well-being from Thomas and Mazer, 2012</th>
<th>1. Your child(ren)’s health</th>
<th>Rating Scale: Before HiMama® implementation</th>
<th>Post / Pre</th>
<th>REMOVE COMPARISON S FOR POST ONLY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Your child(ren)’s well-being</td>
<td>1. Never included</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Playroom activities</td>
<td>2. Rarely included</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Your child(ren)’s social interaction with others</td>
<td>3. Sometimes included</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Any behavior management issues</td>
<td>4. Frequently included</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Learning across developmental domains</td>
<td>5. Always included</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Reference to <em>Early Learning for Every Child Today</em> (ELECT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Reference to <em>How Does Learning Happen? Ontario’s Pedagogy for the Early Years</em></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part D: We are interested in learning what type of information is being shared about your child’s day with you in HiMama\textsuperscript{©} reports. (if you have more than one child using HiMama\textsuperscript{©} please select one child’s report to describe in in this section.

<table>
<thead>
<tr>
<th>Q13a</th>
<th>How many children do you have for whom you receive HiMama reports?</th>
<th>Numerical response (0-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q13b</td>
<td>a) What is the age of your child you are focusing on for this section of the survey?</td>
<td>Numerical response (0-6)</td>
</tr>
</tbody>
</table>
|      | b) Has your child been diagnosed or are they suspected of having a disability or special need? | 1) No 
2) Yes, diagnosed. Please specify: 
3) Yes, suspected. Please specify: |
<p>| Q14  | What information are you most interested in on your child’s report? | Open-ended text response |</p>
<table>
<thead>
<tr>
<th>Q15_1 to Q15_6</th>
<th>Please rate the usefulness of the following information you receive on your child’s HiMama© report:</th>
<th>Included</th>
<th>Change this to a matrix with all “wellness” subjects and then complete the specific photos videos etc. individually</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Information on eating</td>
<td>1. Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Information on sleeping</td>
<td>2. No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Information on toileting</td>
<td>If yes usefulness on a scale of 1 to 7 for each item</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Information on mood</td>
<td>Rating Scale:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Other</td>
<td>1-7 slider:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1- not at all useful</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 – moderately useful</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 –extremely useful</td>
<td></td>
</tr>
<tr>
<td>Q15_7, Q15_8</td>
<td>7. Information on activities – Individual (only your child)</td>
<td>1. Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Information on activities – Group (more than one child)</td>
<td>2. No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>How frequently is it included:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rating Scale:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. A few times a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Once a week</td>
<td></td>
</tr>
<tr>
<td>Q15_9</td>
<td>9. Lesson Plans</td>
<td>1. Yes</td>
<td>2. No</td>
</tr>
<tr>
<td>-------</td>
<td>----------------</td>
<td>-------</td>
<td>-------</td>
</tr>
</tbody>
</table>

How frequently is it included:

4. A few times a month
5. Rarely

If yes, are developmental skills attached to the activity?

If yes usefulness on a scale of 1 to 7 for each item

Do you comment on activities that are posted in HiMama©?

1. Yes
2. No
| Q15_10, Q15_11 | 10. Photographs – Individual  
11. Photographs - Group | 1. Yes  
2. No | POST |
|---|---|---|---|
| | | Rating Scale:  
1. Daily  
2. A few times a week  
3. Once a week  
4. A few times a month  
5. Rarely | If yes usefulness on a scale of 1 to 7 |
5. Rarely  
If yes usefulness on a scale of 1 to 7  
Do you comment on photographs that are posted in HiMama®?  
1. Yes  
2. No  
How frequently is it included:  
Rating Scale:  
1. Daily  
2. A few times a week  
3. Once a week | POST |
**Part E** We are interested in understanding how families and educators are using HiMama© to communicate with each other?

<table>
<thead>
<tr>
<th>Q16</th>
<th>10. How frequently do you respond by commenting in HiMama© on activities shared by educators (including videos / photographs)?</th>
<th>Rating Scale:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. Daily</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. A few times a week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Once a week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. A few times a month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Rarely</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Never</td>
</tr>
<tr>
<td>Q17</td>
<td>11. What influences your decision on whether or not to comment on content shared in HiMama©?</td>
<td>Open-ended text</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>
| Q18 | Do educators send “real time” updates from HiMama© during the school day? (i.e. emailed activities, notes) | 1. Yes  
2. No  
If yes, do you enjoy receiving these?  
1. Yes  
2. No  
Please explain your answer open-ended (text) response  
If no, would you like to receive alerts during the day?  
1. Yes  
2. No  
Please explain your answer |
<p>| Q19 | Please describe how you typically interact with the information available on a daily basis from HiMama (e.g., time spent) | Open-ended (text) response |</p>
<table>
<thead>
<tr>
<th>Q20</th>
<th>How has the information shared through this platform affected you as a parent?</th>
<th>Open-ended (text) response</th>
</tr>
</thead>
</table>

| Q21 | Do you check into your child’s HiMama© account during the day to see what’s been happening? | 1. Yes  
| | | 2. No  
| | How frequently do you find yourself checking? | Rating Scale:  
| | | 1. A few times an hour  
| | | 2. Hourly  
| | | 3. Three or four times a day  
| | | 4. Once or Twice a day  
| | | 5. Less than once a day  
| Q22 | Does your program have expectations on how HiMama© is to be used in communicating with educators? | 1. Yes  
| | | 2. No  

207
<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Response Options</th>
<th>Next Question or Action</th>
</tr>
</thead>
</table>
| **Q23_1 to Q23_2** | 1. Do you use the messaging capabilities in HiMama© to communicate with the education team? | 1. Yes 2. No | If Yes – survey moves to Q18_2, skip Q19  
If No – survey moves to Q19 |
| | 2. Which of the following type of information do you typically share through messages (check all that apply)? | 1. Yes 2. No | Other – open-ended (text) response |
| | 1) Illness / absence  
2) Late arrivals  
3) Developmental milestones  
4) Concerns  
5) Comments on activities  
6) Celebrations or special moments that happen at home | | |
### Part F: We are interested in understanding how families are using HiMama© software for personal interest?

<table>
<thead>
<tr>
<th>Q24</th>
<th>What reasons do you have for not using the messaging features available through HiMama©?</th>
<th>Open-ended (text) response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q25</td>
<td>Have you found any changes in the content of verbal communication between educators and yourself since implementing HiMama©?</td>
<td>Open-ended (text) response</td>
</tr>
</tbody>
</table>

**Q26** Have you shared access to your child’s HiMama account with other individuals?

1. Yes
2. No

If yes, with whom? (open-ended (text) response)

**Q27** Do you review your child’s portfolio?

1. Yes
2. No

If yes, how frequently?

1. A few times a week
2. Once a week
3. A few times a month
<table>
<thead>
<tr>
<th>Q28</th>
<th>Do you review your child’s developmental assessment?</th>
<th>1. Yes</th>
<th>2. No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>If yes, how frequently</td>
<td>1. A few times a week</td>
<td>2. Once a week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. A few times a month</td>
<td>4. Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Once every few months</td>
<td>6. Once a year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Less than once a year</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q29</th>
<th>Do you access any other components of the HiMama® site?</th>
<th>1. Yes</th>
<th>2. No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. If yes, please explain:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Part G:** We are interested in understanding your experience in using the HiMama© software. For the following questions please select the ONE response that best describes your opinion.

<table>
<thead>
<tr>
<th>Q30</th>
<th>How easy do you find the HiMama© software to use?</th>
<th>Rating scale:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. Extremely difficult</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Difficult</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Somewhat difficult</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Relatively easy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Easy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Extremely easy</td>
</tr>
</tbody>
</table>

Please explain your answer: open-ended (text) response

<table>
<thead>
<tr>
<th>Q31</th>
<th>How satisfied are you with HiMama©?</th>
<th>1 – Not at all satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2 – Slightly satisfied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – Somewhat satisfied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 – Moderately satisfied</td>
</tr>
<tr>
<td>Q32_1_</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q32_3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Did you receive any training on how to use the HiMama© software?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) If yes, What type of training did you receive?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-ended (text) response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) How helpful did you find the training?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating scale:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Not very helpful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Somewhat helpful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Neutral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Helpful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Very helpful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. If no, Do you think training would be helpful for using HiMama©?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. What resources / support do you feel would increase the success of HiMama© as a communication tool?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-ended (text) response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If you have any additional comments or feedback you would like to provide regarding the HiMama© software including ease of use, or type of information shared please type them below.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-ended (text) response</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Part H:** We are interested in understanding your perceptions of collaboration between child care programs and parents. For the following questions please select the ONE response that best describes your opinion.

| Q35_1to Q35_11 | 1. I have a good sense of my child’s day in the program. | 1. Strongly disagree  
| | 2. I have opportunity to share information about our home and family with educators. | 2. Disagree  
| | 3. I feel comfortable initiating communication with my child’s educators (verbal). | 3. Not sure / neutral  
| | 4. I feel comfortable initiating communication with my child’s educators (written). | 4. Agree  
| | 5. I am encouraged to seek support from educators on issues that occur at home. | 5. Strongly agree  
| | 6. I seek out support from educators on issues that are occurring at home. |  
| | 7. Educators seek out support from me on issues that are occurring within the program (i.e. emotional regulation, behavior management). |  
| | 8. I am encouraged to share moments of celebration and developmental milestones with the educators. |  

9. I share moments of celebration, and developmental milestones regarding children with their families.

10. I have an active role within my children’s program (i.e. frequent visits into the playroom, participate in special events, help out with certain activities etc.).

11. I have opportunities to contribute to the program (sharing ideas, offering support or resources, participating in special activities, joining in on daily programming).

| Q36 | The new pedagogy for Ontario *How Does Learning Happen?* emphasizes the importance of family-educator collaboration in the development of quality early learning programs for children. What aspects of your current experiences and communication processes do you find supports the development of this collaboration? | Open-ended (text) response |
| Q37 | What minimizes the potential for collaboration from happening based on your experiences? | Open-ended (text) response |
| Q38 | In what ways does using HiMama contribute to your perceptions of collaboration? | Open-ended (text) response |

*Part I:* We are interested in learning more about your knowledge of early childhood education. For the following questions please select the ONE response that best describes your opinion.
| Q39_1 to Q39_6 | 1. I am familiar with the daily routines and experiences that are part of the early education program. | 1. Strongly disagree  
2. Disagree  
3. Not sure / neutral  
4. Agree  
5. Strongly agree |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. I have a good understanding of play-based learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. I am familiar with the document <em>Early Learning For Every Child Today (E.L.E.C.T.)</em>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. I am familiar with the pedagogy <em>How Does Learning Happen?</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. I am familiar with the pedagogical approach used in the early education setting my child(ren) attend.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. I am familiar with the responsibilities of Early Childhood Educators.</td>
<td></td>
</tr>
</tbody>
</table>

| Q40 | Has your knowledge about early childhood educators’ roles and responsibilities changed since the introduction of HiMama©? If so, in what way? | 1. Yes  
2. No  
If yes Open-ended (text) response | Remove for post only |

*Part J: Although this is an anonymous survey, it is important that we know some of the characteristics of the individual who complete this questionnaire. Please provide the following information about yourself by selecting the appropriate answers*
| Q41 | What is your relationship to the child for whom you have answered this survey? | 1. Father  
2. Mother  
3. Legal Guardian  
4. Other, please specify: |
|-----|--------------------------------------------------------------------------------|--------------------------------------------------|
| Q42 | Do you identify yourself as the primary contact between educators and your family in that you have the most frequent contact with the education team? | 1. Yes  
2. No |
| Q43 | How many children do you have under the age of 18? | Numerical response 1-15 |
| Q44 | How many years have you been accessing child care services? | Numerical response >6 months to 30 years |
| Q45 | In general, how comfortable are you in using new technology? | Rating scale:  
1 – Not at all  
2 – Slightly  
3 – Somewhat  
4 – Moderately  
5 – Extremely |
<table>
<thead>
<tr>
<th>Q46_1 to Q46_7</th>
<th>Of the following, please indicate which of the following communication devices you currently own or have access to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Telephone (land line)</td>
</tr>
<tr>
<td></td>
<td>2. Cell Phone</td>
</tr>
<tr>
<td></td>
<td>3. Tablet device (such as iPad, Chrome book, Samsung Galaxy, etc.).</td>
</tr>
<tr>
<td></td>
<td>4. Laptop computer</td>
</tr>
<tr>
<td></td>
<td>5. Desktop computer</td>
</tr>
<tr>
<td></td>
<td>6. Internet services at home</td>
</tr>
<tr>
<td></td>
<td>7. Other? Please specify: (text entry)</td>
</tr>
</tbody>
</table>

| Q47            | 1. Is English your first language?                                                                             |
|                | Response options                                                                                               |
|                | Yes / No                                                                                                      |

| Q47            | 1 (a) If no, please indicate your first language? (text entry)                                                 |
Thank you for your time in helping to shape our understanding of technology as a communication tool between parents and educators. This is the end of the survey. By hitting the submit button you are agreeing to have your information pooled with other respondents across Ontario.

Respondents hit submit and then are sent to the incentive survey.

Thank you! If you are interested in participating in our incentive prize draw please click on the “yes” button to enter a separate survey for this draw. Otherwise hitting “no” will close the survey.

1. Yes
2. No

Yes, takes them to the survey. No will take the participant to our website.

Incentive Draw (separate URL from the original survey)

You are entering an incentive draw for the potential of 1 of 5 $25 cash prizes to be sent by Banking e-transfer to be drawn at random. Your contact information is collected in a separate data file from the larger survey and will only be used for the purpose of the draw and to contact winners. Once all prizes have been claimed this information will be destroyed.
<table>
<thead>
<tr>
<th>Please enter your full name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Your email address:</td>
<td></td>
</tr>
<tr>
<td>Included Captcha Question from Qualtrics</td>
<td></td>
</tr>
<tr>
<td>Thank you! You have been entered into the incentive draw for the potential to win one of 5 cash prizes of $25. Winners will be selected at random and contacted via email to receive their prize by banking e-transfer. Good luck!</td>
<td></td>
</tr>
</tbody>
</table>