The use of Information and Communication Technology (ICT) by preschool and kindergarten educators.
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Abstract

This study has examined Preschool and Kindergarten educators' perspectives on the use of Information and Communication Technology (ICT) to support learning in the classroom. The purpose was to determine the factors that influenced educators' use of ICTs in their practice, their views on whether ICTs enhances children's learning, and their value of ICT training. The data revealed three themes herewith detailed in hierarchical order, that educators' perceptions were dependent on the tools' effectiveness and applicability in their program; that there were varied perspectives on what constituted a technological barrier and a technological impact; and that participants' concerns were based on their overall perception of ICTs. However, although there were factors which affected educators' decisions on whether or not to use ICTs in their programs, the data also suggested that educators' level of interest in the use of ICTs in the classroom was thought to be the most influential factor in educators' overall decision to use ICTs in their program.

Introduction

Information and Communication Technology (ICT) are forms of technology that "are widely seen as enhancing learning" (Livingstone, 2012, p. 9) experiences of young children. When educators successfully integrate ICTs such as computers, the internet, smartphones, videos, smartboards, projectors, digital games, and applications (Apps) as purposeful tools in the classrooms, they "can improve the quality of teaching, learning and management in schools and so help raise standards", establish a more "exciting, rewarding and successful experience" for "learners", while empowering them to reach their potentials (p. 9). Although there is a vast majority of positive perspectives about the use of "ICTs with children" (Mertala, 2017, p. 197), there were many educators who did not share this view. Hence, this study investigated the factors that caused the disparity of ICT integration among educators in the Preschool and Kindergarten classrooms. The objective, was to answer the overarching question, "What are educators' perspectives on the use of ICTs to support children's learning in the classroom with 3-5-year-olds?" Also, to develop an understanding of, 'What factors influenced educators' use of ICTs in their practice?', 'What their views were on enhancing children's learning with the use of ICTs?' and 'What value educators placed on ICT training?' Through the analysis of the data, three themes were established, with the most prominent being, educators' views of ICTs as purposeful tools; the barriers that impacted the ICT integration; and educators' concerns about the use of ICTs in children's learning.

Literature Review

Educators' purpose for using technology in their program.

Though Information and Communication Technology (ICT) are rapidly becoming more accessible to young children (Magen-Nagar & Firstater, 2019, p. 165), for educators, several factors continued to influence their decision to integrate ICTs in children's learning. Preradovic et al. (2017) pointed out that educators' beliefs about ICTs were dependent on their perceived relevance in their practice (as sited in Magen-Nagar & Firstater, 2019, p. 167). This also suggested that educators' beliefs have a strong influence on their positive perceptions of ICT's, and confidence in integrating ICTs in their programs. This corresponded with Mertala (2017) claims that a majority of Early Childhood Educators had positive feelings towards ICTs (p. 197). However, there was a contradiction to Mertala's (2017) study, which explained that there were educators who preferred "traditional" teaching to "technical activities…" (Magen-Nagar & Firstater, 2019, p. 172), and this could be an added factor that gave relevance to the negative perceptions and lack of interest in ICT integration and training for some educators.

The barriers that impact educators' ICT use.

The integration of ICTs into teaching and learning is typically affected by educators' perceptions of technological barriers to ICTs. Based on the literature, educators' negative perceptions of barriers caused them to "struggle to integrate" technology in their programs, and further reduced their efforts to integrate technology in children's learning (Nikolopoulou & Gialamas, 2015b, p. 286). However, it was suggested by Nikolopoulou & Gialamas (2015b), that many educators have positive views of ICTs as "accepted tools" in their classrooms (p. 286), this is supported by Mohammed & Mohammed (2012) and Vitoulisi (2017) which pointed out that educators' "positive mindsets and attitudes" towards the ICT integration, influenced their increased use of technology in children's learning, "while overcoming obstacles" they were facing (as sited by Magen-Nagar & Firstater, 2019, p. 165).

Concerns educators' have about the use of technology in children's learning.

In pinpointing the concerns educators had about the use of ICTs in children's learning, it was realized that educators' concerns reflected their overall perception of ICTs in their practice. Although educators understood ICTs' value to this "age of technology", ICTs were not given a "key role" in their programs, as technology was seen as unimportant and "marginal" in educators' daily lives (Magen-Nagar & Firstater, 2019, p. 171). Educators also viewed ICTs to have tremendous power to "delay the Physical, emotional, and intellectual development of young children over a long term" (Magen-Nagar & Firstater, 2019, p. 165), and this belief of the negative implications of children's easy access to ICTs, caused educators to have "reservations about the roles of ICTs" in the classrooms. The literature also pointed out that educators' were concerned that "computer activities" were too much of an attraction for children, and that they took up a lot of children's time, "diverting them from other important activities". This resulted in some educators adjusting their methods of integrating ICTs to support a more appropriate use by children, for example, setting "time limits", while other educators restricted technology use (p. 171).

Methodology

Research Design

A qualitative research design method was chosen for this study, as it is less reliant on the direction of the information identified in the literature and is focused on the perspectives of the participants in the study (Creswell & Guetterman, 2019, p. 17). For this reason, the "grounded theory design" was used to "generate a general explanation" of the participants' views about ICT integration in children's learning, to explain their "process, action, or interaction" with the children during learning activities (p. 21), which helped to answer the research question. This systematic design emphasized the use of "data analysis steps of open, axial, and selective coding", and this was presented in a "visual picture of the theory generated" from the data (Creswell & Guetterman, 2019, p. 436) called the Grounded Theory Data Analysis Chart.

Instrument

In this qualitative study, the data collection process involved the use of one-on-one interviews with five participants, who responded to eight open-ended, semi-structured questions. An audio recorder was used to record each interview, which lasted between 10-20 minutes. Also, Interview Protocols were used by the researcher to write down the participants' responses to each question. The Interview Protocols served as a back up to the recorded interviews that were transcribed word for word in a word document following each interview. This allowed the information to be easily analyzed during the data analysis process.

Procedure

Step 1.
The researcher met with each participant on the agreed-upon secure locations, on specific days and times. The Letter of the Invitation and Consent Forms, and the Sound Recordings Consent Forms were reviewed with each participant. Copies of each form were signed, and each participant kept a signed copy of each for their own records as well as the researcher.

Step 2.
The Interview protocol was read to each participant, then the audio recorder was turned on to capture their responses to the interview questions which followed. Interviews lasted 10-20 minutes. The interview protocols served as a guide to each question, and short notes of the participants' responses were written during each interview. Assigned pseudonyms for each participant were written on each Protocol, and each question numbered to correspond with each recorded interview. The short notes on the Interview Protocol served as a back-up to the recorded responses when they were transcribed.

Step 3.
At the end of each interview, the participants were thanked for their participation, and the audio recorder stopped. Each participant was asked to complete a Variables Chart which highlighted additional information about their age, level of education, length of service, and level of training in ICTs.
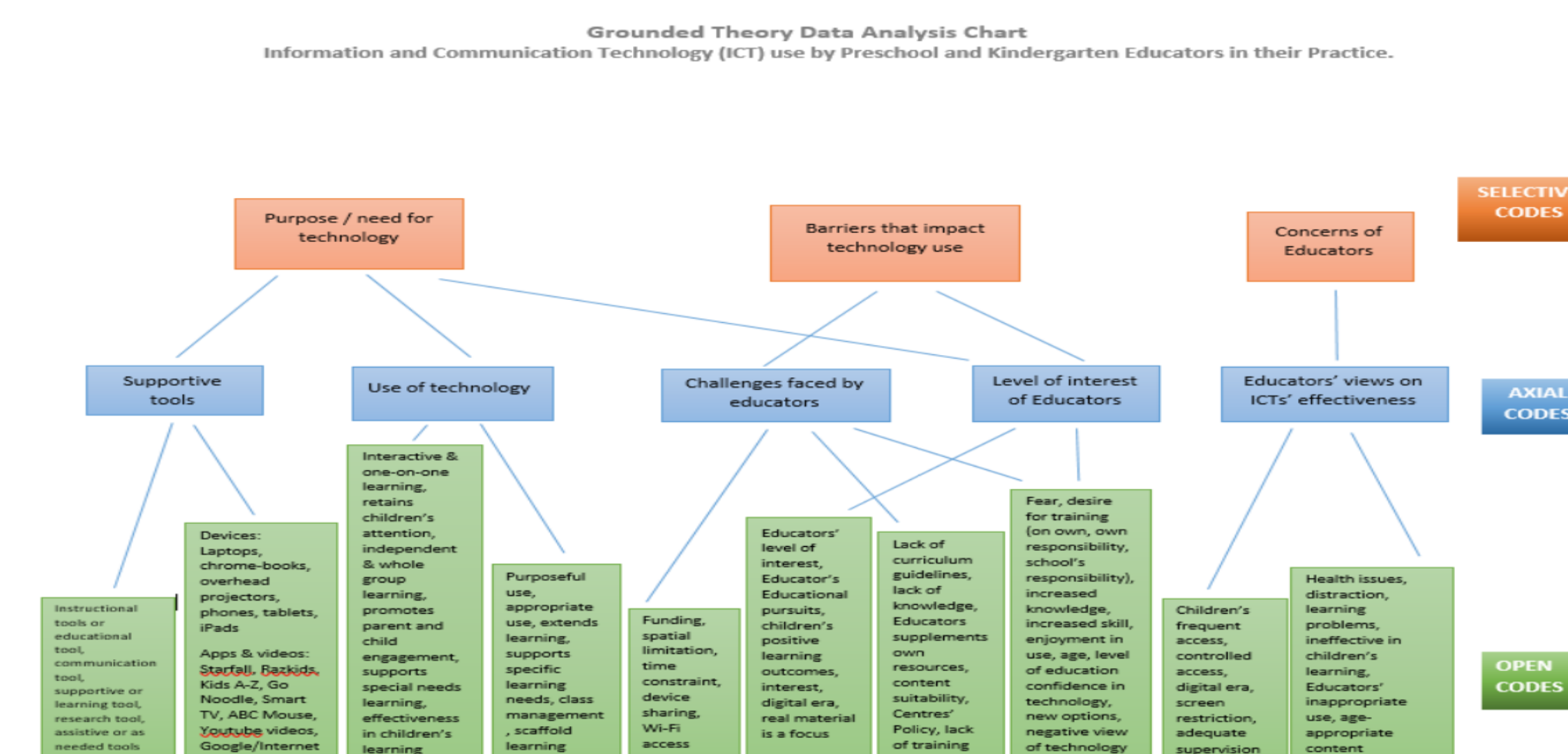
Step 4.
The voice recorded responses and short notes were transcribed word for word upon completion of the interviews, in a typed double spaced Word Document, and stored as Word documents on a secure password-protected folder on the researcher's computer. These were analyzed following the completion of each interview transcription. All copies of data, that is, transcribed interviews, Interview Protocol with short notes, Variables Charts were labeled with pseudonyms for each participant, of which only the researcher could identify the related participant to which they belong.

Participants

The number of participants selected for this study were five female educators. Three of which were Registered Early Childhood Educators (RECE) from Child Care Centers, and two Kindergarten teachers from a Private Elementary School located in Brampton, Ontario. Their age ranged between 26-58 years old, their years of service, 7-29 years, and their level of education varied from a Diploma to a Bachelor's Degree. This sample size allowed the researcher to conduct one-on-one open-ended interviews with each participant, and this provided "an in-depth picture" (Creswell & Guetterman, 2019, p. 209) of the educators' perspectives on the integration of ICTs in children's learning, which helped to explain the disparity of ICT use among them. Concerning the analysis of the data/participants' responses, the Grounded Theory Approach was used. To begin the analysis of the data in this qualitative study, the researcher carried out a preliminary exploratory analysis of the information. The transcripts of the interviews were read several times to get a general sense of the information. The ideas that came to mind from the data, were written alongside potential themes that were identified while thinking of how to organize the data, or whether more data was needed. When the researcher arrived at an understanding of the responses as a whole, after analyzing all the copies of the data, transcripts, short handwritten notes, and Variables charts – by re-reading the data again, marking by hand and dividing it into parts, by using codes – written on the left margins, circled keywords that identified the codes, bracketed text segments (of which the codes originated), and color-coded specific words or statements in the responses that suggest ideas for themes. To arrive at the themes, the researcher analyzed the data by identifying the "multiple perspectives", views of the participants as the "evidence" for each theme. Also, "possible alternative codes", were listed as well (Creswell & Guetterman, 2019, p. 243-245, 251). This was a "systematic" process of analysis, which allowed the researcher to develop an understanding of the data with the use of codes, which helped to developed categories (open codes) in the first phase, where the initial categories of themes were identified from the color-coded sections in the sentences. These themes were grouped based on their relatedness to each other and written at the base of the Grounded Theory Data Analysis chart. In the second phase, where related categories for axial codes were developed, five open codes were selected from the open codes that represented groups of open code themes that related to each other. Lines were drawn to connect the five axial codes to the interrelated groups of open codes. Finally, to develop a theory the selective codes, the axial codes were reviewed which allowed the researcher to arrive at a theory based on the "interrelationship of the categories". By integrating and refining the categories (p. 436-439), three overarching themes emerged from the data. Therefore, the data analysis was led by the data generated from the responses of the participants, rather than by literature. Hence, the Grounded Theory approach allowed the researcher to build categories from the bottom up, using broad themes, to finally arrive at the top three themes. This process helped the researcher make connections within the data in an organized way.

Results and Discussion

Grounded Theory Data Analysis Chart. Information and Communication Technology (ICT) use by Preschool and Kindergarten Educators in their Practice.

Educators' purpose for using technology in their program.

The data indicated that all the educators believed that Information and Communication Technology (ICT) have a purpose in their practice, and, pointed out that their decision to use ICTs was dependent on their perceptions of the ICTs' applicability and effectiveness in their programs, which was also proposed by Preradovic et al. (2017), that educators' beliefs about ICTs were dependent on their relevance in their practice (as sited in Magen-Nagar & Firstater, 2019, p. 167). It was realized, that when educators' characterized ICTs as tools, they identified them according to how they used the devices or Apps. These included instructional, educational tools, communication, documentation, research, assistive or as needed tools. The data showed that three of the educators' purpose for using ICTs was to enhance children's learning, in whole group settings, to support independent work, and in one-on-one engagement with children, with the use of various interactive activities. This indicated their high level of interest in using ICTs, as their focus was on the perceived benefits to children's learning, support gained to their class management, and their increased confidence in integrating ICTs regularly in their programs. However, it was discovered that the remaining two RECEs' had an opposite view, as their purpose for using ICTs were for mainly as assistive and instructional skills. The data showed that these educators had little to no interest in using ICTs, as they further imposed restrictions on children's use of ICTs because of their negative perceptions that ICTs are ineffective in children's learning. This finding, however, contradicts Mertala (2017) claims that a majority of Early Childhood Educators have positive feelings towards ICTs (p. 197). These educators' negative views and methods of using ICTs, however, concurs with literature which stated educators prefer "traditional to technical activities…" (Magen-Nagar & Firstater, 2019, p. 172), and this could be an added factor that gave relevance to their negative perceptions and lack of interest in ICT training for some educators.

The barriers that impact educators' ICT use.

The data pointed out many barriers that posed as obstacles to educators' integration of ICTs in their programs. It was found that the lack of curriculum guidelines and ICT training were the two common barriers experienced by the educators, but, it was noted that all the barriers were perceived differently by each educator. Additionally, the notion that barriers to ICTs hindered or caused educators to "struggle to integrate" ICTs in their practice, was realized to further reduced educators' efforts to integrate technology in children's learning (Nikolopoulou & Gialamas, 2015b, p. 286). It was discovered from the data that though some participants faced the two most significant barriers identified, which were the lack of curriculum guidelines, and limited to no formal training, they still actively integrated ICTs on their own. The data, therefore, suggested, that due to the educators high level of interest and confidence in the use of ICTs, this helped to influence their decision to continue ICT integration in children's learning, and in so doing they developed additional technological skills, "while overcoming obstacles", as suggested by Mohammed & Mohammed (2012) and Vitoulisi (2017) (as sited by Magen-Nagar & Firstater, 2019, p. 165). Other findings, revealed barriers such as funding, spatial limitation, time constraint, device sharing, which made it difficult for educators to use ICTs, but did not hinder their integration process. Even so, there was one educator identified in the data, who did not consider lack of a curriculum guideline as a significant barrier, but pointed out that the "content or language" in certain digital activities were not age-appropriate for the children. Based on her response, she thought is it was the responsibility of the educator to ensure that the information relayed to children was appropriate, thus promoting continuous ICT integration in children's learning. However, it was realized that though educators in the Child Care Centers did not have access to curriculum guidelines, they considered their Centers' rules and regulations as appropriate guides to the integration of ICTs in their practice. This indicated the possibility that the access to a curriculum guideline was not seen as important because the need for it was not realized. The data also revealed one educator who did not believe she faced any barriers to ICTs in her practice, she revealed that she restricted children's use of ICTs, but, was guided in the use of ICTs by the children's interest in a specific topics when she needed added information from online. What then does it mean when educators failed to recognize the barriers they faced? Could their only obstacles to ICT integration be themselves?

Concerns educators' have about the use of technology in children's learning.

Based on the findings, it was noted, that educators' concerns were based on their experiences with the use of ICTs in children's learning, their perceptions of the technology, or their observation of children's access in the wider society. The main concern that was commonly shared among four of the educators was the appropriate use of ICTs. There were other concerns mentioned that related to children's health in terms of their vision, and learning problems related to too much screen time, which caused one educator to practice a balanced used of ICTs with her regular teaching practices, for example, setting "time limits" (Magen-Nagar & Firstater, 2019, p. 171) to help remedy the issue. Another concern about ICTs use was that they could be distractions to children's learning, they were used as fillers by educators, and that children accessed devices for playing without a purpose for learning, which further highlighted the importance of supervision and age-appropriate access by the educators. This ties in with Magen-Nagar & Firstater (2019), who pointed out that educators' belief that children's use of computers encouraged "individual activity at the expense of social interaction…", "disrupts free play" and their "normative development" (p. 172). However, other findings showed that although the educators understood ICTs' value to this "age of technology", some educators did not give ICTs a "key role" in their programs, as they viewed technology as unimportant and "marginal" in their daily lives (Magen-Nagar & Firstater, 2019, p. 171). The data also revealed educators' lack of interest in ICT use in their program, especially due to a belief that ICTs had a tremendous power to "delay the physical, emotional, and intellectual development of young children over a long term" as suggested by Magen-Nagar & Firstater (2019) (p. 165). The literature showed that educators' concern that "computer activities" were too much of an attraction for children, they took up a lot of children's time by "diverting them from other important activities". This negative view of children's easy access to ICTs, caused some educators to have "reservations about the roles of ICTs" in the classrooms (p. 171), which proposed that their convictions of ICTs outweighed any benefits to children's learning. Therefore, it would be easy to conclude, that the disparity in ICT use by Preschool and Kindergarten teachers was due only to the three main themes, their purpose for using ICTs, the barriers to ICTs, and educators' concerns about ICTs use in children's learning. With further analysis of the data, one specific sub-theme was evident throughout, which encapsulated all three themes, this was 'educators' level of interest in using ICTs'. Hence, educators' level of interest could very well be the most influential factor in educators' decisions to integrate ICTs after all. It cannot be assumed then, that there is a 'one size fits all' solution to alter the disparity in the integration process among these educators, as this may rely greatly on their level of interest in ICTs which only they have control of.