Re-imagining Pedagogy for Early Childhood Education Pre-service Curriculum in the Face of the COVID 19 Pandemic

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ABSTRACT

COVID-19 has caused a change in the demography of the Early Childhood Education (ECE) teaching fraternity. This paper problematizes the ECE curriculum delivery gap created by the influence of COVID-19. Central to this paper is the assumption that online learning might limit the stimulation of children's holistic development. Reflecting on their experiences, the authors examine the influence of COVID-19 on pedagogy for ECE pre-service and kindergarten curriculum through the lens of design thinking theory. The reflections are based on one open and distance learning institution in South Africa and one kindergarten program in Canada. The findings reveal challenges, such as digital inequality brought on by socio-economic imbalances and opportunities. The authors suggest the digital literacy skills needed to mitigate the influence of COVID-19 in the ECE pre-service and kindergarten curriculum delivery

Keywords: Curriculum, COVID-19, early childhood, design thinking theory, kindergarten, pre-service teachers

INTRODUCTION

The coronavirus (COVID-19) pandemic hit the hardest in many institutions of learning around the globe. The global response to the pandemic by institutions of learning has changed the normal methods of service delivery and activities of different sectors, including ECE. The focus of ECE, according to Cohrssen, et al (2013,) is quality pedagogy and evidence of learning outcomes for children. Exploring this focus from the perspective of the Institute of Medicine and the National Research Council, (2015), the learning outcomes for children can be achieved through the children's emerging development, by providing experiences related to their physical, social, emotional, behavioral, language, and cognitive processes and skills.

Although ECE is a highly diverse field that continuously acquire new facets of meaning, this paper aligns with the definition by Akbari and McCuaig (2014), which referred to ECE as programmes for young children based on an explicit curriculum, delivered by qualified staff and designed to support children's development and learning. This paper focuses on pedagogy for the ECE pre-service and kindergarten curriculum. It should be noted that ECE pre-service teaching has a strong link with kindergarten teaching because kindergarten teachers go through ECE pre-service teacher training to qualify. In light of this, the ECE teachers referred to in this paper are kindergarten teachers.

In the history of ECE pre-service teachers' training, the emphasis has always been to help pre-service teachers to analyze and transform their beliefs about teaching, in order to develop a deeper understanding of young children with diverse backgrounds and needs (Jale & Ozcan, 2009). These needs include positive sustained relationships that foster attachment and emotional connections; physical, emotional, and identity safety; and a sense of belonging and purpose. However, it should be noted that before COVID-19 ECE pre-service teachers globally were taken through programmes tailored to meet the demands of the various components of the ECE curriculum, to provide them with relevant competencies and expertise prescribed for their institutions and communities. This paper problematizes the ECE curriculum delivery gap created by the influence of COVID-19, such as social distancing and working from home.

Central to this paper is the assumption that for kindergarten teachers to abide by the COVID-19 regulations, they need to be equipped with digital literacy skills and approaches for curriculum delivery during their preparation to become kindergarten teachers. In line with this assumption, we drive the argument of this paper with the following research question:

What are the approaches needed to mitigate the influence of COVID-19 in the ECE pre-service and kindergarten curriculum delivery? Drawing from the implications of digital literacy on educational equity, as presented by Kerkhoff, et al (2018a), we argue that there is still some evidence of digital naivety among ECE pre-service teachers in most institutions of higher learning.

THEORETICAL FOUNDATIONS

The theoretical base underpinning this study is Rowe's (1987) design thinking theory. As conceived by Rowe (1987), the design thinking theory is viewed as the give-and-take of problem-solving situations in the real world. When design thinking theory began receiving attention in the business sector, Razzouk and Shute (2012) defined it as an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback, and redesign the product. Noting that design thinking theory originated with academics who researched within design disciplines, Kimbell (2011) asserted that there is a shift in terms of using it for the challenges facing organizations. In this paper, design thinking theory is employed to re-imagine pedagogy for ECE pre-service and kindergarten curriculum in the face of the COVID-19 pandemic. Kimbell (2011) described design thinking theory in three different ways: as a cognitive style, a general theory of design, and an organizational resource. For this paper, we selected the general theory of design because we viewed design thinking as an agent of change for ECE pre-service and kindergarten curriculum amid COVID-19.

There is some evidence to suggest that the ECE pre-service curriculum should equip kindergarten teachers with the instructional strategies suggested by Kankam and Abroampa (2015), which include but is not limited to role play, dramatization, and simulation. Kankam and Abroampa (2015) further posited that these instructional strategies naturally foster a network of relationships between and among agents at work: teacher-learner, learner-learner, and learner-learning resources. This paper interrogates the use of these instructional strategies during the COVID-19 pandemic. Most pre-service teachers should conduct their practice teaching through Work Integrated Learning, while kindergarten teachers should continue to offer teaching and learning services to children. This paper argues that the ECE pre-service and kindergarten curriculum should be re-imagined with the implementation of virtual instructional strategies. It should be noted, however, that for the virtual implementation of these

strategies, pre-service and kindergarten teachers should have some knowledge and skills of digital literacy.

LITERATURE REVIEW

The literature review was propelled by our research question: "*What are the approaches needed to mitigate the influence of COVID-19 in the ECE pre-service and kindergarten curriculum delivery?*" To help answer this question, we examined the literature on the following headings: ECE pre-service curriculum; teaching strategies and student learning; the effect of COVID-19 on ECE pre-service curriculum delivery and skills needed for ECE pre-service curriculum delivery during and post COVID-19. Consideration was also given to a critical look at the influence of this curricular approach and pedagogy on children's learning in play-based early learning settings.

The ECE pre-service and kindergarten curriculum

The ECE pre-service curriculum aimed at equipping kindergarten teachers is designed to cultivate a thorough understanding of the developing child by infusing theories of childhood development into coursework and practicum (Ragpot, 2017). Training outlines skill sets necessary to support children in all developmental domains, including physical, cognitive, language or communication, social and emotional. These are broad developmental areas, each playing a critical role in children's learning and overall well-being. As a requirement, ECE pre-service teachers also participate in field placement opportunities (Allen & Wright, 2014; Atiles, Jones, & Kim, 2012; Gong & Wang, 2017,) to gather experience in teaching culturally, socially, and economically diverse children in different settings (Lee & Hemer-Patnode, 2010). During these placements, pre-service teachers apply hands-on training to real-world experiences in infant-toddler, preschool, and kindergarten programs in schools and early learning centers (Garvis, Lemon, Pendergast, & Yim, 2013). Observation, an essential component of field placements, gives pre-service teachers opportunities to observe children's learning in daily experiences through play, and to use it as experienced teachers to inform their practice. Observationally driven data, when well documented, are also useful in assessing children's learning outcomes and in promoting reflective teaching practices (McKie, Manswell Butty & Green, 2012). This important aspect of observation and

documentation in ECE pre-service teachers' pedagogy and training is critical to the enrichment of children's learning and development.

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ECE teaching strategies and student learning

ECE pre-service and kindergarten teachers employ teaching practices that promote and support broad categories of children's physical, cognitive, language or communication, social and emotional development, as well as "mathematical and scientific reasoning" (Meloy, Schachner & Learning Policy Institute, 2019, p. 4). Meloy, et al. (2019, p. 4) note that "developmental trajectory in one area may be fundamentally linked to the child's progress in another". Taking note of these progressions or changes, kindergarten teachers can not only assess learning, but also provide ways to improve children's learning. The curriculum that kindergarten teachers plan for young children has specific goals to develop children's physical skills,

which in turn promotes the construction of knowledge as children engage in and interact with others in physical activities. Through positive classroom interactions and play with teachers and peers, kindergarten children show development in cognitive and executive functioning skills (Hamre, 2014; Meloy, et al. 2019). This form of learning and skill development is congruent with the kindergarten children's language and literacy abilities and their social and emotional skills, which also are supported and sustained through positive and meaningful interactions especially with teachers. Kindergarten teachers use their training and expertise in child development to enrich the learning experience, build positive relationships by asking questions, and sustaining play activities. In their research on the conceptualization of play-based curriculum by ECE pre-service teachers, Ridgway and Quinones (2012: 48) described "shared sustained thinking" as "the construction and sharing of knowledge." Sharing similar sentiments, McLachlan, Fleer, and Edwards (2018: 66) viewed it as an optimal prerequisite for play-based teaching and learning. This idea of co-constructing knowledge and building positive relationships among educators and students is important for the pedagogic ECE environment.

Notably, a review of the empirical and theoretical literature foregrounded teaching practices and training from responsive ECE pre-service teachers, who require in-depth specialized knowledge in child development and social and emotional learning or SEL (Blewitt et al., 2020). Kindergarten teachers are required to observe and document the learning of children's exuberance during play, then plan and implement lessons to support these early learning experiences. Researchers support the importance of play in the ECE curriculum (Hewes, 2006) and when it is intentional (Barblett, Knaus, & Barratt-Pugh, 2016), the play serves as a significant channel for learning. Additionally, kindergarten children build on fundamental early childhood concepts and ideas by practicing these skills through meaningful engagement in play. Although the play is a student-oriented activity, through careful and effective curriculum planning and implementation responsive kindergarten teachers capitalize on children's play in a rich social environment, by embedding moments for enrichment in play to support learning and children's creativity.

The effect of COVID-19 pandemic on ECE pre-service curriculum

The literature on COVID-19 was epidemiological in nature with a focus on the care of a given population and the containment of the pandemic. Hence, themajority of studies that focused on education concentrated on how COVID-19 affects medical students (Ahmed, Allaf, &

Elghazaly, 2020; Ferrel & Ryan, 2020; Goh & Sandars, 2020; Rose, 2020; Theoret & Ming, 2020). Nevertheless, there were broad interpretations in the literature that highlighted factors that interfere with the teaching of kindergarten students and training of students in higher education because of COVID-19 (Crawford, Butler-Henderson, Rudolp & Glowatz, 2020; Moorhouse, 2020; Toquero, 2020). One study focused on logistics in preparing to shift university teaching and learning online in twenty countries (Crawford et al., 2020). While the authors found a collective response from universities around the world to attend to students' learning needs, some poorly resourced universities could not meet this global change, and most universities that did switch engaged in a mere shift online and not particularly to strategic online teaching (Crawford et al., 2020).

Implications of the unavailability of, and inexperience, in virtual teaching and learning negatively impact lesson delivery and how students learn. This offers some insight into how the quality of teaching is contingent on the quality of the technology used to drive virtual learning. A reoccurring factor in the work of Crawford et al. (2020) was that the shift to online teaching and learning was driven by country-wide physical distancing mandates. Further expansion to the literature on university online learning resulting from physical distancing measures and its effects on students' learning was provided by Toquero (2020) and Rose (2020). Against this backdrop, it can be concluded that ECE pre-service and kindergarten teachers were also affected by the shift to online teaching and learning.

Focusing on medical education, Rose (2020) highlighted the disruption that COVID-19caused to clinical clerkship and how the clerkship curriculum of training and mentorship on patient care were moved to online teaching and learning. Although they did not note detrimental effect of this change in the clerkship curriculum, Rose (2020) warned of the necessity to critically evaluate the outcome of this new mode of learning in the medical field. Alternatively, Moorhouse (2020) looked specifically at virtual learning for pre-service teachers was a work, but they only focused on a teaching course that showed no significant outcome on how virtual learning affects the education curriculum in general.

Despite the lack of applicable literature on ECE pre-service and kindergarten curriculum, the works reviewed suggest what effect COVID-19 could have on the ECE curriculum delivery. Some of the effects will be on the learning environment, the teaching methods, policies, and national standards. Kindergarten teachers are trained to work with children in settings that capitalize on learning interactions and play activities in the physical environment. The ECE spaces are designed to facilitate positive interactions between kindergarten teachers and children and among children.

The aim is to allow for full participation in play to develop children's social skills, emotional and intellectual skills. Play-based environments promote fundamental learning skills like self-regulation, social and emotional development (Barnett, Yarosz, Thomas, & Hornbeck, 2006). Researchers firmly believe that children need to play (Hewes, 2006). A shift in focus from the importance of the physical environment, hands-on practice and inquiry activities in ECE settings, to rudimentary practices and activities will not only affect kindergarten children's learning, but also the delivery of ECE pre-service teachers' curriculum and education in institutions of higher learning.

There is some evidence to suggest that part of the delivery of the ECE pre-service curriculum at institutions of higher learning is practicum (White, Peter, Sims, Rockel, & Kumeroa, 2016). Practicum, as viewed by (White et al., 2016), provides opportunities for pre-service teachers to apply their recently acquired pedagogical knowledge to the field, and offers significant insight into the teaching and learning fraternity into which they will eventually become a member. Considering the COVID-19 pandemic, practicum may be challenging as the pandemic has forced closure of institutions of learning, including kindergarten schools. With the absence of children in kindergarten classrooms, it will become difficult to complete proper documentation of children's development and learning during play and interactions. The preventative practice of physical distancing might interfere with how children naturally play and respond to others in constructing knowledge with peers and with kindergarten teachers in the learning environment. This might, in turn, affect the curricular approach on how to elicit a response from kindergarten children, to promote language and communication development.

COVID-19 may affect the work environment of ECE pre-service and kindergarten teachers, as these settings influence kindergarten teachers' responsiveness to children's needs (Devercelli, 2020). Hence, co-construction of knowledge would be challenging, and assessment of kindergarten children's learning and growth may also be a challenge. It is important to recognise that part of the requirement of pre-service teachers' obligation and professional practice is to undertake an ongoing assessment in quality early childhood settings, to collect not only important information on kindergarten children's learning and development, but also to assess the effectiveness and quality of the spaces in which the children occupy and learn. The assessment of kindergarten children's learning is communicated to parents, and this is important to program delivery and the promotion of child development (Kolucki & Lemish, 2011). Assessment, with documentation and other forms of professional practices, captures holistic

views of kindergarten children's learning. With COVID-19, this important aspect of training could be stymied to a great extent. Nevertheless, with the move to new ways of teaching and learning comes a renewed commitment to innovative delivery of educational opportunities to counteract the effects of COVID-19.

Skills needed for ECE pre-service and kindergarten curriculum delivery during and post covid-19

Despite the lack of literature, we have gathered some ECE pre-service and kindergarten curricula adjustment and skills set needed to mitigate the influence of COVID-19. To help with logistical challenges, some studies have called for national, and even international, universities to work in tandem in providing effective digital spaces to support academic activities in unprecedented times (Crawford et al., 2020, Rose, 2020). According to Learning Policy Institute (2020: 2):

> The United Nations Educational, Scientific, and Cultural Organization has created a comprehensive list of educational applications and platforms to help parents, teachers, schools and school systems to facilitate student learning and provide social caring and interaction during periods of school closure.

Most of the skills they recommended are distance learning and digital skills. (Kerkhoff, Paul, & Spires, 2018b) described digital literacy skills as (a) locating and consuming digital content, (b) creating digital content, and (c) communicating digital content. Finding innovative ways to use technology to promote learning is also of great importance especially as the times change (Fullan, 2013). Fullan (2013) advocated for a "new pedagogy" where critical thinking skills through innovative digital tools can contribute to "deep learning" that is student-centered and based on students' own passions to solve real issues in the world. Hence, for kindergarten students, teachers can capitalise on students' interests and the use of technology to shape positive learning outcomes during COVID-19 and, at the same time, shifting pedagogy from a traditional approach to a student-centered, technology-driven approach.

RESEARCH METHOD

The research applies a qualitative narrative design based on the authors' reflective journals. We chose the narrative design because this paper is based on the study of the researcher's educational practice and experience. As Connelly and Clandinin (1990) noted, teachers, like other human beings,

are storytellers. Bashan and Holsblat (2017) affirmed that reflective journals written by researchers in practical settings constitute a source of narrative research. This paper is authored by two individuals (one from South Africa and the other one from Canada), both implementing the ECE curriculum in their institutions. The authors each documented a reflective journal on the influence of COVID-19 on pedagogy for ECE pre-service curriculum from the start of COVID 19 lockdowns in South Africa and Canada, respectively. The first author's reflections are based on experiences of implementing ECE pre-service curriculum, while the second author reflected on experiences on a play-based kindergarten curriculum. The first author is a lecturer in the Department of ECE at the Open and Distance Learning (ODL) institution in South Africa. The second author is a doctoral candidate, working on a Doctor of Philosophy (Ph.D.) in education with a focus on ECE and a kindergarten teacher in Canada.

The paper is intended, therefore, to add to conversations about observed experiences of pre-service and kindergarten teachers, to describe the thematic deconstruction of the influence of COVID-19, and to explore the potential of a qualitative reflection. The contents of this paper are not intended to be generalized as a rule-of-thumb. However, the possibilities of naturalistic generalization (Stake, 1995; Melrose, 2010) lead us to believe, at least in qualitative terms, that our observations about aspects of ECE pre-service kindergarten curriculum during COVID-19 may be of benefit to others. We employed reflective journal writing as our data collection tool. Due to lockdowns that were happening in our countries, we viewed reflective journal writing as a suitable data collection tool to expand the scope of our reflection beyond problematic situations caused by the COVID-19 pandemic. Drawing from (Annink, 2017), reflective journal writing, as a tool for reflection, has the potential to unfold the researchers' knowledge, skills, expertise, values, assumptions, and emotions evoked by the research.

To maintain the trustworthiness and the reliability of the data generated from our reflections, as recommended by Moen (2006), we made sure that we captured each research subject's voice, by relying on their written queries, and we documented the journals as early as the COVID 19 lockdowns started. Credibility, according to Elo, et al (2014) essentially asks the researcher to link the research study's findings with reality. To demonstrate the truth of the research study's findings we identified design thinking theory to present the findings with its components.

Firstly, the authors give their backgrounds to demonstrate their experiences in the ECE pre-service and kindergarten curriculum. Secondly, results from the two reflective journals are reported using design thinking as

a general theory to underpin this study. Thirdly, drawing from the implications of digital literacy, we present the discussion of findings. Lastly, conclusions were made from the findings and the limitations were highlighted.

Author's backgrounds

The first author qualified as a primary school teacher twenty-five years ago. During her experience of teaching in ECE, she learned to respect children's right to play. As a result, she began to view play as the main teaching method in ECE that stimulates the capacity and creativity of the children. Currently, she is a lecturer at the ODL institution, teaching ECE pre-service teachers. Being in an ODL institution that admits ECE pre-service teachers from different parts of the world, the author strives to contextualize the ECE teaching role to accommodate diverse curriculum goals, content, teaching techniques, and educational resources that pre-service teachers might be exposed to. Before the COVID-19 pandemic, the author used the blended model of teaching and learning. The students accessed learning materials online and by print. During the COVID-19 lockdown, the institution switched to fully online teaching and learning mode.

The second author has both ECE and primary teaching experiences. She has had the opportunity to study in a face-to-face in-class setting and online through distant education. Obtaining one of her earliest degrees 10 years ago in ECE, she recalls her entire initial ECE training where she was required to be physically present in a classroom, with the obligation to participate in the discussion, hands-on activities in ECE, and field experience through the practicum. With her current educational experience, her presence on campus, in class with a professor, and with a group of cohort doctoral students, make up for a meager component of her program. These educational experiences during the new global COVID-19 pandemic piqued her interest in our topic and research question. The curricular approaches from her experience 10 years ago focused on analysis of the influence of theoretical philosophies on practice in Montessori settings and other early childhood curricula models, such as Reggio Emilia and full-day play-based kindergarten programs. There was no technology component. Nevertheless, as a kindergarten teacher in a full-day kindergarten programme, she employs technological skills by using digital tools and in communicating with kindergarten children. She also uses observational skills acquired through training to ensure kindergarten children's safety, and

to assess their developmental skills and interests to support and implement the relevant curriculum. She draws on the corroboration of these factors to imagine what the curriculum will look, and should look, like for kindergarten teachers. Among other competencies, there is need for comprehensive training in technology to improve kindergarten teachers' digital competencies in the current changing times.

We used reflective journal writing to record incidents relating to ECE pre-service and kindergarten curriculum delivery, including observations, informal conversations (written and verbal), as well as our own experiences. Bashan and Holsblat (2017) asserted that reflective journals constitute the point of departure for the writer's experience, and a way to return to it through personal reflections. Thus, in the context of this paper, we illustrated the implementation of ECE pre-service curriculum delivery during the COVID-19 lockdown to evaluate the contribution, challenges, and/or success of the process or change.

The authors shared their reflective journals and started coding to find the common issues from their COVID 19 pre-service and kindergarten curriculum delivery experiences. The codes were classified. These classifications were informed by the contextualized proponents of design thinking theory adapted from (Kimbell, 2011), namely: Challenges facing pre-service and kindergarten teaching and learning, the socio-economic critique of online learning practices and design process that can convert problems into opportunities. The proponents were contextualized and adapted to suit this paper because design thinking theory is rarely applied to public services or social problems. (Kimbell, 2011) asserted that one should rather acknowledge design thinking in practice instead of making a distinction between "thinking" and "doing".

RESULTS

As indicated in the methodology section of this paper, the results from the two reflective journals are reported using the design thinking theory as the theoretical lens. The codes from the reflective journals were categorized according to the contextualized and adapted proponents of design thinking theory. Consequently, the results from the reflection journals are presented in accordance with the contextualized and adapted proponents.

Challenges facing pre-service and kindergarten teaching and learning

The single most striking observation to emerge from the reflective journals' comparison was that they both reported some challenges faced by pre-service and kindergarten teaching and learning spaces including the closure of learning institutions. "*It was a swift response to my government's mandate to stay home and be safe*" (second author). The identified challenges include the closing of teaching and learning institutions to reduce the spread of COVID-19 and the shift from traditional methods of teaching from face-to-face to online or virtual teaching. The second author regarded the quick shift of learning methods as emergency remote teaching (ERT), the term which was recommended by Hodges et al., (2020). Hodges et al., (2020) viewed ERT as different from online teaching because while the latter is carefully planned, the former runs the possible risks of having untrained staff in virtual learning or inadequate resources to implement online learning. On the other hand, the second author highlighted the challenge of lack of, or limited, online teaching skills, including pedagogical, technical, communication, and collaborative skills that may not match those that kindergarten teachers are familiar with. To add to this challenge, the second author raised the question: *"How do I effectively teach kindergarten children who are not used to virtual schooling?"* She further stressed that "*It is a matter of daily trial and error, and constantly thinking of the possibility of not reaching every kindergarten child".*

The first author recorded some of the challenges she experienced with her students, which affected the teaching and learning activities. This is a reflection from one of the pre-service teachers' messages that were sent to the first author: "*I have a problem. I was busy with my practical before Covid-19 started so I only attended for 18 days, and my question is how can I submit this form with empty spaces because there is a space where mentor and student need to sign to*" (query). This message presented the frustrations experienced by some of the pre-service teachers who could not access the kindergarten schools due to the COVID 19 lockdown.

Socio-economic critique of online learning practices

The COVID-19 pandemic revealed the digital inequality brought on by socio-economic imbalances in the communities where most of the pre-service teachers enrolled in the first authors' institution are from. The first author found it difficult to offer her online lessons after finding out that most of her pre-service teachers experience challenges with access to some of the digital tools, such as devices needed for effective virtual learning. Notably, the following are some of the pre-service teachers' queries that could be

related to the socio-economic challenges. "*Please help me. When will we receive our study materials? I cannot afford the cost of printing the whole portfolios of 70 pages*". Another pre-service teacher pointed out that she only depends on internet café to access online learning. "*Internet cafe and stationary shops closed for printing*".

There is some evidence to suggest that the socio-economic imbalances contribute toward lack of, or limited, digital literacy skills in most communities. The second author in her reflections noted inadequate resources to implement online learning as a possible issue resulting from implementing ERT. The first author recorded some of the pre-service teachers' experiences which reveals the limited digital literacy skills which affect the implementation of online learning. "*I struggle to download the email of my school placement form from my phone to my laptop*" (query). Some pre-service teachers feel that online learning is costly. "*It's very much expensive I tried doing it*". Some of the pre-service teachers registered in the ODL institution are employed. Those who are not employed find it difficult to get data bundles to participate in the learning activities. "*As an unemployed student how would I manage to….*". The second author found the situation of inability to reach every kindergarten child overwhelming. "*It is a matter of daily trial and error and constantly having the fear of not reaching every student*" (Second author).

The design process that can convert problems into opportunities

Drawing from design thinking theory, the challenges brought by COVID-19 in the ECE pre-service teaching can be converted into opportunities such as the following:

- adopt appropriate pedagogical strategies
- develop interactive assessments and work collaboratively
- developing an adaptable mindset

The second author expressed that working with kindergarten children has been both a learning opportunity and a challenge. In this global digital age, many kindergarten children are already attuned to manipulating digital devices. "*However, when it comes to the effective use of digital devices to engage in teaching and learning and maintaining a classroom environment online, it becomes a challenge*". The authors view this challenge as an opportunity to explore how to present knowledge in online environments and how to support pre-service teachers and kindergarten children interact and learn in such an environment.

The first author, after receiving queries from students about challenges they experienced such as the inability to go to internet shops to

do assignments, created learning forums on the university's Learning Management System (LSM) where she guided the pre-service teachers, and encouraged peer collaboration. She advised them to view their assignment questions on their smartphones, and those without can request the smartphone from a friend or relative just for a few minutes. She told them to handwrite their assignment and scan the pages using the smartphone and submit on the LSM. Some of the students shared their experiences of how they were handling the new normal as a result their peers learned from them.

DISCUSSION

In this section, we integrate the findings into the existing literature, to explore the approaches needed to mitigate the influence of the COVID-19 in the ECE pre-service curriculum delivery. The findings are discussed within the identified gap, the assumptions central to this paper, and the design thinking theory.

The gap created by the influence of COVID-19 on ECE pre-service teachers' curriculum delivery

Crawford et al. (2020), Moorhouse (2020), and Toquero (2020) described how COVID-19 affected the teaching and training of students in higher education. Linking the views of these authors with the findings of this study, presented under the sub-heading "challenges facing pre-service and kindergarten teaching and learning", it becomes apparent that the closing of teaching and learning institutions to reduce the spread of COVID-19 affected the delivery of pre-service and kindergarten curriculum negatively. Linking the shift to online teaching and learning with the ERT as reflected by the second author, which according to Crawford et al. (2020) was driven by COVID 19 regulations, brought the imaginations about the ECE pre-service and kindergarten curriculum delivery. Since kindergarten children develop their cognitive and executive functioning skills through personal interactions and play with teachers and peers, as argued by Hamre (2014) and Meloy, et al. (2019), the researchers conclude that COVID-19 has created challenges for ECE pre-service and kindergarten teaching and learning.

Effect of online learning on children stimulation

McLachlan, et al (2018) revealed the importance of engaging kindergarten children in play-based teaching and learning. Our own

experiences of teaching in the ECE field taught us the need and the importance of continuously observing and documenting kindergarten children's learning experiences (positive and negative) during play, and plan and implement lessons to support these early learning experiences. The findings of this study suggest a shift from traditional methods of teaching, such as face-to-face, to online or virtual teaching raised the challenge of planning online lessons that can still provide the necessary stimulation for preschool children during the COVID 19 lockdown. In the case of ECE, pre-service teachers need to learn skills that can stimulate children's physical, social, emotional, behavioral, language, and cognitive processes and skills. The reflections from the first author, which arose from queries from her kindergarten children, showed a lack of digital literacy skills, and from the second author, it was evident that her kindergarten children were not used to online learning. There is thus some evidence to suggest the need for digital literacy for pre-service teachers, so that when they become kindergarten teachers, they will be able to cope in future cases where ERT is required.

Evidence of design thinking in the ECE pre-service kindergarten curriculum delivery

An unanticipated finding was that many kindergarten children are already attuned to manipulating digital devices. This finding relates to the views of scholars about the skills needed for ECE pre-service curriculum delivery during and post COVID-19. It should be noted, however, that the ECE pre-service curriculum delivery should not exclude the quality of the spaces which the children occupy and where they learn.

CONCLUSIONS AND SUGGESTION

We identified institutional, pedagogical, and logistical challenges to pre-service teaching and learning brought on by the COVID-19 pandemic. The findings aligned with the revelations in recent literature on the effects of COVID-19 on ECE pre-service and kindergarten curriculum. These findings and the views of the scholars presented in the literature review brought the authors closer to the answers to the main research question of this paper: "*What are the approaches needed to mitigate the influence of the COVID-19 in the ECE pre-service and kindergarten curriculum delivery*?" Drawing from their reflections through the lens of design thinking theory, the authors suggest that the following digital literacy skills are needed to mitigate the

influence of COVID-19 on ECE pre-service curriculum delivery. The skills are adapted from Kerkhoff, et al (2018):

- Locating and consuming digital content – searching for information and evaluating its accuracy and relevancy for ECE pre-service and kindergarten curriculum
- Creating digital content – using digital resources to cater to kindergarten children's physical, social, emotional, behavioral, language, and cognitive processes and skills
- Communicating digital content – Using mobile devices such as cell phones and tablets for social networking; and
- Understanding how to deliver ECE pre-service and kindergarten curriculum in multiple formats.

IMPLICATIONS

The data presented in this article was collected from only two institutions, one ODL university in South Africa, and one kindergarten in Canada. Therefore, the findings cannot be generalized to other institutions of similar nature. However, we believe that the suggestions put forward based on the findings may be of benefit to others. While the authors were able to present their reflections through the lens of design thinking theory, some questions remain for future research. For example, the effect of digital content on kindergarten children's physical, social, emotional, behavioral, language, and cognitive processes and skills. Exploring the pre-service teachers' and kindergarten children's engagement in online learning was beyond the scope of this paper due to its reflective nature. Further research, therefore, should focus on collecting empirical data from the pre-service and kindergarten teachers regarding their use of online learning.

REFERENCES

Ahmed, H., Allaf, M., & Elghazaly, H. (2020). COVID-19 and medical education. *The Lancet. Infectious Diseases*. *https://*doi:10.1016/S1473-3099(20)30226-7

Akbari, E., & McCuaig, K. (2014) *Early childhood education report 2014*. Institute for Studies in Education.

Allen, J. M., & Wright, S. E. (2014). Integrating theory and practice in the pre-service teacher education practicum. *Teachers and Teaching*, *20*(2), 136–151.

Annink, A. (2017). Using the research journal during qualitative data collection in a cross-cultural context. *Entrepreneurship Research Journal, 7*(1), 1–17. https://doi:10.1515/erj-2015-0063

Atiles, J. T., Jones, J. L., & Kim, H. (2012). Field experience+ inclusive ECE classrooms= increased preservice teacher efficacy in working with students with developmental delays or disabilities. *Educational Research Quarterly*, *36*(2), 63–87.

Bashan, B., & Holsblat, R. (2006). Reflective journals as a research tool: The case of student teachers' development of teamwork. *Cogent Education,* 4(1), 1-15

Barblett, L., Knaus, M., & Barratt-Pugh, C. (2016). The pushes and pulls of pedagogy in the early years: Competing knowledge and the erosion of play-based learning. *Australasian Journal of Early Childhood*, *41*(4), 36–43.

Barnett, S., Yarosz, D., Thomas, J. & Hornbeck, A. (2006). *Educational effectiveness of a Vygotskian approach to preschool education: A randomized trial*. National Institute for Early Education Research.

Bashan, B., & Holsblat, R. (2017). Reflective journals as a research tool: The case of student teachers' development of teamwork. *Cogent Education, 4*(1). https://doi:10.1080/2331186X.2017.1374234

Blewitt, C., O'Connor, A., Morris, H., Mousa, A., Bergmeier, H., Nolan, A., Skouteris, H. (2020). Do curriculum-based social and emotional learning programs in early childhood education and care strengthen teacher outcomes? A systematic literature review. *International Journal of Environmental Research and Public Health, 17*(3), 1049.https://doi:10.3390/ijerph17031049

Cohrssen, C., Church, A., Ishimine, K., & Tayler, C. (2013). Playing with maths: Facilitating the learning in play-based learning. *Australasian Journal of Early Childhood, 38*(1), 95–99. http://doi:10.1177/183693911303800115

Connelly, M. F., Clandinin, J. D. (1990). Stories of experience and narrative inquiry. *Educational Researcher*, 19(5), 2–14.

Crawford, J., Butler-Henderson, K., Rudolph, J., & Glowatz, M. (2020). COVID-19: 20 Countries' Higher Education Intra-Period Digital Pedagogy Responses. *Journal of Applied Teaching and Learning (JALT)*, *3*(1).

Devercelli, A. (2020, April 16). Supporting the youngest learners and their families in the COVID-19 (coronavirus) response.

Ducharme, E. R., Ducharme, M. K., & Dunkin, M. J. (2002). Teacher education. In J. W. Guthrie (Ed.), *Encyclopedia of education* (2nd ed.), Vol. 7. (pp. 2438–2448). Macmillan.

Elo, S., Kääriäinen, M., Kanste, O. (2014). Qualitative Content Analysis: A Focus on Trustworthiness. *SAGE Open,* 4(1), 1-10.

Ferrel, M. N., & Ryan, J. J. (2020). The impact of COVID-19 on medical education. *Cureus, 12*(3), e7492. https://doi:10.7759/cureus.7492

Fullan, M. (2013). *Stratosphere: Integrating technology, pedagogy, and change knowledge*. Pearson.

Garvis, S., Lemon, N., Pendergast, D., & Yim, B. (2013). A content analysis of early childhood teachers' theoretical and practical experiences with infants and toddlers in Australian teacher education programs. *Australian Journal of Teacher Education*, *38*(9), 3.

Goh, P., & Sandars, J. (2020). A vision of the use of technology in medical education after the COVID-19 pandemic. *Mededpublish, 9*(1). https://doi:10.15694/mep.2020.000049.1

Gong, X., & Wang, P. (2017). A comparative study of pre-service education for preschool teachers in china and the united states. *Current Issues in Comparative Education, 19*(2), 84–110.

Hamre, B. K. (2014). Teachers' daily interactions with children: An essential ingredient in effective early childhood programs. *Child Development Perspectives, 8*(4), 223–230. https://doi:10.1111/cdep.12090

Hatch, J. A., & Grieshaber, S. (2002). Child observation and accountability in early childhood education: Perspectives from Australia and the United States. *Early Childhood Education Journal*, *29*(4), 227. https://doi.org/10.1023/A:1015177406713

Hewes, J. (2006). *Let the children play: Nature's answer to early learning*. Early Childhood Learning Knowledge Centre.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*, *27*.

Institute of Medicine and the National Research Council. (2015). *Transforming the workforce for children birth through age 8: A unifying foundation*. The National Academies Press.

Jale, A., & Ozcan, S. (2009). Early childhood education pre-service teachers' images of teacher and beliefs about teaching. *Journal of Inonu University Faculty of Education, 10*(3), 105–122. Retrieved from https://doaj.org/article/d3fd64363beb4f63a62dc0b2f697a902

Kankam, G., & Abroampa, W. K. (2015). Early childhood education pre-service teachers' pedagogical content knowledge in teaching psychosocial skills across the kindergarten curriculum in Ghana. *Asia-Pacific Journal of Research in Early Childhood Education, 10*(1), 67–86. doi:10.17206/apjrece.2016.10.1.67

Kerkhoff, S., Paul, C., & Spires, H. (2018). Digital literacy for the 21st century. In M. Khosrow-Pour (Ed.), *Encyclopedia of information science and technology: Cu-ed* (pp. 2235–2242). IGI Global.

Kimbell, L. (2011). Rethinking design thinking: Part I. *Design and Culture, 3*(3), 285-306. https://doi:10.2752/175470811X13071166525216

Kolucki, B., & Lemish, D. (2011). *Communicating with children: Principles and practices to nurture, inspire, excite, educate and heal*. United Nations Children's Fund. https://www.unicef.org/cwc/files/CwC_Final_Nov-2011(1).pdf

Lee, Y. A., & Hemer-Patnode, L. (2010). Developing teacher candidates' knowledge, skills, and dispositions to teach diverse students. *Journal of Instructional Psychology*, *37*(3), 222–235.

McKie, B., Manswell Butty, J.-A., & Green, R. (2012). Reading, reasoning, and literacy: strategies for early childhood education from the analysis of classroom observations. *Early Childhood Education Journal*, *40*(1), 55–61. https://doi.org/10.1007/s10643-011-0489-2

McLachlan, C., Fleer, M., & Edwards, S. (2018). *Early childhood curriculum: Planning, assessment and implementation*. Cambridge University Press.

Meloy, B., Schachner, A., & Learning Policy Institute. (2019). *Early childhood essentials: A framework for aligning child skills and educator competencies*. Learning Policy Institute.

Melrose, S. (2010). *Encyclopedia of case study research: Naturalistic generalization*. SAGE.

Moen, T. (2006). Reflections on the Narrative Research Approach. *International Journal of Qualitative Methods,* 5(4), 56-69.

Moorhouse, B. L. (2020). Adaptations to a face-to-face initial teacher education course 'forced' online due to the COVID-19 pandemic. *Journal of Education for Teaching*, 1–3. https://doi:10.1080/02607476.2020.1755205

National Association for the Education of Young Children. (2010). *NAEYC standards for initial and advanced early childhood professional preparation programs*. NAEYC.

Nuttall, J., & Ortlipp, M. (2012). Practicum assessment of culturally and linguistically diverse early childhood pre-service teachers. *European Early Childhood Education Research Journal, 20*(1), 47–60. https://doi:10.1080/1350293X.2012.650011

Ragpot, L. (2017). Knowledge of child development in the interface of theory and practice in foundation phase teacher education. *South African Journal of Childhood Education, 7*(1), 6–e6. https://doi:10.4102/sajce.v7i1.501

Razzouk, R., & Shute, V. (2012). What is design thinking and why is it important? *Review of Educational Research, 82*(3), 330–348. https://doi:10.3102/0034654312457429

Ridgway, A., & Quinones, G. (2012). How do early childhood students conceptualize play-based curriculum? *Australian Journal of Teacher Education*, *37*(12), n12.

Rose, S. (2020). Medical student education in the time of COVID-19. *Jama,* https://doi:10.1001/jama.2020.5227

Rowe, P. G. (1987). *Design thinking*. MIT Press.

Stake, R. (1995). *The art of case study research*. SAGE.

Theoret, C., & Ming, X. (2020). Our education, our concerns: Medical student education impact due to COVID-19. *Medical Education,* doi:10.1111/medu.14181

Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 Pandemic: The Philippine context. *Pedagogical Research*, *5*(4).

White, E. J., Peter, M., Sims, M., Rockel, J., & Kumeroa, M. (2016). First-year practicum experiences for preservice early childhood education teachers working with birth-to-3-year-olds: An Australasian experience. *Journal of Early Childhood Teacher Education: Preparing Early Childhood Teachers for Infant Care and Education, 37*(4), 282–300. https://doi:10.1080/10901027.2016.1245221

Wood, E., & Hedges, H. (2016). Curriculum in early childhood education: critical questions about content, coherence, and control. *The Curriculum Journal, 27*(3), 387–405.

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