USE OF TECHNOLOGY IN SUPPORTING ECD CENTRES' PEDAGOGY AND MANAGEMENT FUNCTIONS TO PROVIDE QUALITY EDUCATION

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Abstract

Numerous studies focus on the advantages and elements of high-quality early childhood education but few to none concentrate on how technology tools are used to support their pedagogy and administrative functions. This study explored the provision of quality education through the use of technological tools of the selected ECD centres. Activity theory is employed to understand the technology tools and how they support and offer quality education at the participating centres. This study adopted a qualitative research approach and collected data through face-to-face interviews with eight participants purposively selected from four ECD centres situated in Pretoria. The data were analysed thematically. The findings reveal that participants believe that the use of technology tools will help the centre principals and teachers in their administrative duties and the teaching-learning processes. Although many of the participants lack tools and skills in technology usage. For instance, some participants said they cannot use digital applications to engage learners, maintain accounting records, or connect with parents. The study contributes to awareness and adherence to quality early childhood education by suggesting that ECD centres, principals and teachers should engage in relevant and practical training on establishing systems on the use of technology to enhance the provision of quality education. The study recommends a further empirical study on the topic of the digitalisation of administrative and teaching duties of ECD centre principals and teachers.

Keywords: Technology tools, management, pedagogy, quality early childhood education.

1. Introduction

1.1. Quality ECE

Quality early childhood education (ECE) is acknowledged as having a long-term positive impact on children's lives as well as on society at large. Quality early childhood education includes those elements of the process and structural quality that stimulate, encourage and increase child outcomes in one or more of the development domains (Litjens & Taguma, 2010). Furthermore, according to Excell (2016), there are five indicators of quality ECE namely practitioners, leadership and management, environment, support systems and pedagogy resources. The quality ECE indicators identified by Excell (2016) are viewed as essential input resources when available and can improve quality learning at the ECD centres when used properly. Similarly, in South Africa, quality in early childhood development centres is mainly determined by the presence of structural and process quality indicators such as physical infrastructure, the learning programme, developmentally-appropriate education equipment, materials and resources, governance and financial management (Atmore, 2019). Concerning the ECE quality indicators, this study is intended to understand how technological tools are used to support pedagogy and management functions at some selected ECD centres in Pretoria South Africa.

1.2. Technology tools in early childhood education

The potential of technology in the 21st century to contribute to a dynamic, accessible, and comprehensive teaching and learning environment has led to its widespread acceptance around the world, notably in the educational sector (Alrefaie et al., 2020). Recently, the argument over whether technology should be used in early childhood education has evolved to concerns about how technology should be used and whether it has an impact on children's learning and development (Ko & Chou, 2014; Parette et al., 2010). Several studies show that using technology in a developmentally appropriate way can improve young children's learning, especially in the areas of emergent literacy, communication, problem-solving, and social skills through cooperation, and aiding children with disabilities and special needs (Darling-Hammond, Flook, Cook-Harvey, Barron & Osher, 2020). This implies that the use of technology tools has become the order of the day and has in one way or another enhanced the quality of

teaching and learning in early childhood education (ECE) in recent times (Ng'ambi et al., 2016). As such, it is vital to understand how technological tools are used to enhance teaching and management roles which are part of quality indicators in early childhood education. Computers, interactive books, interactive whiteboards, mobile devices, motion sensors, multi-touch tables, e-books, and programmable tools are examples of technology tools that can be used to support ECD centre practices (Hernandez et al., 2015).

1.3. Use of technology to support pedagogy and management functions in ECE as a quality indicator

In the context of early childhood education, pedagogy includes all instructional methods that promote learning (Agbagbla, 2018). Through play and routine daily activities, children are eager to learn from one another (Gashaw, 2014). Play contributes to children's development and helps them to practice newly acquired skills and concepts (Wood, 2010; Piaget, 1952). This suggests that playing should be emphasized in the pedagogy and curriculum for teaching young children as a useful way to improve the quality of education. Hernandez et al., (2015) state that ECD practitioners commonly employ computers and conventional software to teach curricular content to children. They further indicate that ECD practitioners use technology tools for their formal and informal professional development and also to connect with other ECE professionals. Therefore, technology tools can benefit both children and the human and material resources that are already present in their learning environment.

Although management responsibilities are important for improving the quality of ECD programs, many ECE processes lack this quality indicator (Myers, 2010). In the South African context, according to Mbarathi et al., the management systems and monitoring and evaluation tools required to oversee the performance of ECD centres are insufficient. Atmore (2019) also claims that Inadequate management and administrative mechanisms are a common problem at community-based ECD centres. However, the use of technology might help to solve the challenges with the ECD centres' management responsibility.

This study aimed to explore how the selected township ECD centres in Pretoria, South Africa, offered quality education by strengthening their teaching and management duties with technological tools. The research question to address the aim of the study is, '*How are technology tools used in ECD centres to enhance the pedagogy and management functions in sustaining quality education*?' The findings of this study are intended to help fill in the gaps in the knowledge concerning building technology-inclined quality ECE. Hence, this study is positioned to make recommendations concerning achieving one of the United Nations Sustainable Development Goals – quality education as well as the provision of quality services for South African young children.

2. Theoretical framework

The Activity Theory of Engeström (1996) was used as a lens to understand the use of technology tools in supporting the pedagogy and management functions at the selected ECD centres. Activity Theory sees technology integration as a facilitator of social action (Hashim and Jones, 2014). As sure using tools and technology to help facilitate is not a static process; the tools will have an impact on how the subject and the object interact. Engeström (1996) states that the work activity system is comprised of *subjects, tools, motives, rules, community, and division of labour*. The Activity theory is important and relevant for this study because it helps to identify and understand what to look for concerning the *tools* (what technology tools are available at the ECD centres). And how these tools were used – understanding the *subjects* (ECD practitioners), *rules* (principles that guide them), *motives* (reasons for using the tools), and *division of labour* (system in place).

3. Methodology

A qualitative research approach was used to explore the topic of this study which allows the gathering of data directly from the source and also to understand the participants' points of view (McMillan, 2014). A multiple case study design was engaged since it provides a greater scope of analysis. The purposive sampling technique was used to select four ECD centres situated in the township area of Pretoria, South Africa. One centre principal and one practitioner were chosen from each centre, in total, eight participants were selected. Participants' profiles are shown in Table 1.

Table 1. Participants' Profile.

ECD centre	Participants' pseudonyms	Position at the centre	Highest qualification	Gender	Years of experience in ECE
1	PR1	Principal	Diploma in ECE	Female	16
	PA1	Practitioner	Certificate in ECE	Female	5
2	PR2	Principal	Certificate in ECE	Female	9
	PA2	Practitioner	Diploma in ECE	Female	4
3	PR3	Principal	Certificate in ECE	Female	10
	PA3	Practitioner	Certificate in ECE	Female	4
4	PR4	Principal	Diploma in ECE	Female	11
	PA4	Practitioner	Diploma in ECE	Female	6

Data was collected through face-to-face semi-structured interviews at the participants' centre. The interview sessions were audio-recorded and transcribed to provide material for reliability checks. Data analysis was done thematically through coding and categorizing the generated data into themes that emerged from the data. Theoretical framework and research questions also served as a guide for the methodical study of data and its categorization into themes. To observe ethical standards, permission to conduct research was obtained from the centre principals, the aim of my study was explained to all the participants and consent forms were signed before any data is collected.

4. Findings and discussion

Two themes that emerged from the data analysis are discussed in the sub-headings below.

4.1. Limited use of technology tools

The findings revealed that the participants have positive beliefs and attitudes towards the use of technology in engaging young children and performing their administrative activities. However, the majority of the participants were unable to use technology tools to enhance the quality of services they provide at their centres. The reasons for their inability to use technological tools in supporting their practices are what Johnson et al., (2016) referred to as external challenges to technology integration in the learning environment. These reasons are grouped and discussed below under theme two. Below are a few direct statements from the opinions of the participants.

Things are changing and I believe that using technology to teach our children will help us and also help the children. I can say that I use technology like my phone to use rhymes, letters and numbers (PA2).

Yes, I like the idea of using technology to teach young children, so in our school, I downloaded songs for children, stories and animal pictures. I borrow teachers my laptop to use if am not busy with them (PR 3).

I cannot say that we are using technology tools to teach the children but we are trying our best... (PA 1).
In our centre, our parents prefer face-to-face communication to send emails, so using technology for administrative work is not regular but I know that it can help us to keep records and also reduce paperwork (PR 4).

I downloaded some Apps on my tablet and I use them to teach them animals, colours, numbers and letters. I believe when young children see pictures and hear sounds at the same time, they don't forget quickly, so that is also good about technology tools (PA 4).

The limited use of technological tools hinders the participants from giving a thorough explanation of how they use these tools in enhancing the quality of education but they displayed some level of confidence and positive attitude towards the use of technology. The positive attitude displayed by the participants towards the use of technology contradicts the claim of Peterson et al., (2018) that many ECE teachers find it difficult to adjust to a technology-enhanced learning environment because of their ingrained attitudes and beliefs. However, the reality still stands that limited technology use may result in lower-quality instruction for young children.

4.2. Lack of technological resources

The data reveal that the participating township ECD centres do not have sufficient technology-based pedagogical knowledge, although they displayed some level of confidence and positive attitude towards the use of technology. Data also reveal limited technology tools in the centres to enhance their practices. The participants provided the following snippets as descriptions of these.

Our greatest challenge is the lack of technology gadgets to teach children. I know that we can play songs on a big screen where the children can learn and also move their bodies but we don't have such equipment in our centre (PA 1).

As the principal, I want to learn more about how I can manage the staff members and parents using technology. Most times, I want to do online meetings and send important messages to our parents but I struggle in getting this done (PR 2).

In our centre, we need support in buying the latest technology tools and also training on how to use them to teach our children (PA 3).

I need more knowledge on how to prepare the school accounts on the computer, this will reduce my workload and stress (PR 4).

The data reveals a lack of technological tools and sufficient technology-based pedagogical knowledge as factors that hinder the effective use of technology in enhancing the quality of ECE. This finding is similar to Johnson et al., (2016) extrinsic challenges to technology integration such as access to resources, training, and support. The need for support to make effective use of technology devices is also mentioned by Ogegbo and Aina (2020). The finding backs up Engeström's (1996) Activity Theory, which contends that technology tools are crucial to achieving a goal. The finding suggests that inadequate or absent technological tools may compromise the quality of early childhood education.

5. Conclusion and recommendations

Many studies concentrate on the benefits and components of quality early childhood education (Moore, Qaissaunee, & Sherretz, 2019; Excell, 2016), but very few, if any, look into how technology tools are used to support their pedagogical and administrative processes. This study explored the use of technological tools in supporting the pedagogy and managerial functions of the selected ECD centres. The study reveals that the participants have a positive attitude and confidence in the use of technology tools. They also believe that the use of technology tools would improve the quality of their teaching and administrative duties. However, technology tools are rarely used due to external challenges like limited technology tools, and lack of technological pedagogical knowledge and support. The absence of these essential technological resources will negatively affect the quality of early childhood education. Therefore, this present study recommends that training support and pedagogical orientation on the use of technology should be provided for early childhood principals and practitioners. The ECD centres should also be supported with technological tools by the government and parents and business organizations. Further study is recommended on the digitalization of ECD centre administrative activities.

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