"How Can I Use Digital Technology as a Pedagogical Approach in My Early Childhood Education and Care Setting to Enhance Children's Learning Opportunities"
An Action Research Study

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Abstract

Literature indicates that while the use of digital technology in young children's lives has increased over the last decade in their home environments the same is not being provided for them in Early Childhood Care and Education settings (Marsh et al., 2015). Perspectives and attitudes of early childhood educators towards the use of digital technology in ECEC are controversial specifically the challenges and barriers of integrating digital technology into educational practice. Educators have been found to lack knowledge, skills, abilities, in the use of digital technology, further there are challenges with funding, resources, self-confidence and availability of equipment (Marsh et al., 2017). Globally, due to the response to digitalisation the (OECD, 2023) made the request for the review of early childhood curriculum frameworks currently being used in ECEC to allow for the integration of digital technology to support children in all areas of their development. Whereas, in Irish context recommendations have been made for educators to introduce technology as a pedagogical tool into practice, so that exemplars can inform fellow associates of its effectiveness (DES, 2020). This research proposed to investigate and gain insights into how I can use digital technology as a pedagogical approach to enhance children's learning experiences in my early childhood education setting. An action research study using observations, field notes, children's artefacts and video recordings was employed as the method of data collection. This involved the participation of nineteen preschool children and three early childhood educators with a significant degree of experience working in diverse ECCE settings in Dublin. Key findings suggest that digital technology can be used as a pedagogical tool in ECEC to enhance children's learning opportunities. Specifically, stop motion to increase opportunity to engage in creative thinking processes, develop concrete concepts while supporting the promotion of children's communication, collaborative, language, and problem-solving skills. The role of the educator needs to be taken into consideration as findings from this research correspond with literature

that suggests early childhood educators endure barriers and challenges when integrating digital technology into ECEC practice (March et al., 2017).

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Chapter One: Introduction and Background

Introduction

This chapter provides an outline of the action research study including the aim and rationale. The topic of choice is summarised together with providing an outline of what the study hopes to achieve. This action research focuses on investigating and gaining insights into how I can use digitally animated stories as a pedagogical tool to enhance children's learning experiences in an early childhood education setting.

The topic choice was influenced by my role and experience as an early childhood educator and my observations of young children using digital technology. I noted that children's interests stream from their home environment. From my observations children use digital technology more so for recreational reasons, they mention social media apps such as "YouTube", "TikTok" and "Snapchat" and games such as "Fortnight".

My personal interest in this study is to gain insights into how digital technology can influence children's learning when used meaningfully so that in the future digital technology can be purposefully used for teaching and learning in my childcare setting.

Additionally, I hope from completing this research children will feel empowered with the knowledge that technology is more than just watching YouTube and playing online games but as a tool that when used appropriately will positively impact their development and lifelong outcomes (Johnson, 2021).

Lastly, I am hopeful that the results and insights from this study will provide further emphasis and add to the discourse on the topic of integrating digital technology into early childhood education.

Background

Previous research has endlessly asserted that children learn through play and while play is a child's preferred activity it is an essential means for the growth of young children's holistic

development (Sandberg et al., 2017; Howe, 2016; Whitebread et al., 2012). Dewey (1910) and Vygotsky (1978) collectively agree that play has an immense influence on young children's development and is a leading factor towards speech development, cognitive development, self-awareness and self-regulation in young children.

On the other hand, current literatures states that electronic and digital media has so extensively saturated children's daily lives in the last decade that it has now formed as the main means of culture inside and outside of young children's home environment (Levin, 2013; Marsh, et al, 2015). Research highlights how it is almost impossible to distinguish between children's traditional and digital play activities due to the variety of digital and non-digital play opportunities now available to children (Marsh, 2010). This links OECD (2019) recent report that suggests children today as young as two-years-old have immediate access to a broad range of digital technologies (Chaudron et al., 2018).

Although Aistear, the Early Childhood Curriculum Framework in Ireland for children aged between 0-6 years of age (NCCA, 2009) recommends for educators to utilise digital technology to support children's digital learning there is no policy guidance or stipulated expectations towards the integration of technology into early childhood curriculum. Respectfully, NCCA policy developers are currently in the process of revising Irelands ECCE curriculum framework which hopefully will address these gaps.

As a result of some children entering early childhood not knowing their world without digital media it needs to be recognised by educators that children may obtain an abundance of knowledge of digital technology. Therefore, strategies need to be put into place regarding how digital technology can be integrated into early childhood curricula that will positively impact children's learning, needs and interests.

However, perspectives and attitudes of early childhood educators towards the use of digital technology in ECEC are controversial specifically the challenges and barriers of

integrating digital technology into educational practice. Educators have been found a lack of knowledge, skills, abilities, in the use of digital technology, further there are challenges with funding, resources, self- confidence and availability of equipment (Marsh et al., 2017). While early childhood educators nowadays appear to be more competent and confident using digital technology in their personal lives it does not warrant that the same confidence is witnessed when used for teaching and learning purposes in ECE education (Fleer & Hammer, 2019; Hatzigianni & Kalaitzidis, 2018). This therefore adds to the discourse that a lack of CPD training, guidance, and support are the primary impediments for integrating digital technology into ECEC (Anisimova, 2020; DES, 2020; O'Connor, 2016).

In Irish context in a bid to try combat this the Department of Education and Skills (2020) inspectorate report of digital learning in early learning and care settings, primary and post-primary schools in Ireland made the recommendation for educators to receive guidance and CPD training. An additional proposal was suggested for educators to introduce technology as a teaching and learning tool into practice, so that exemplars can be shared of how effectively it can be used to inform fellow associates (DES, 2020 p.38).

Globally the NAEYC (2012) position statement supports educators by outlining best practice on the implementation of developmentally appropriate technology in preschool settings. This document is still relevant to educators a decade later while the debate on the use of technology in early childhood education is still being debated. Most recently, recommendations were specified by OECD (2023) for review of early childhood curriculum frameworks and pedagogical approaches currently being used in ECEC to allow for the integration of digital technology to promote and support innovative pedagogies in all areas of child development due to the response to digitalisation.

These findings are valuable as they further support the rationale for the undertaking of this study as the focus will be on investigating and gaining insights into how the inclusion of

digital animated stories can be used as a pedagogical tool to enhance children's learning experiences in early childhood education.

Aim

The aim of this action research is to investigate and gain insights into how I can integrate digital technology into my ECEC setting. Specifically, I want to explore how I can use digital technology as a pedagogical tool to enhance children's learning experiences in my early childhood education setting.

While the aim is to integrate digital technology into my early childhood setting through co constructing digital animated stories and explore how this technology supports children learning experiences, an additional outcome will perhaps be a contribution to the debate and discourse regarding the use of digital technology in early childhood education. Specifically, the three objectives of the action research are:

- To explore how I can use digital technology as a pedagogical tool through co-constructing digitally animated stories
- To identify children's responses to the co-construction of digitally animated stories in early childhood education
- To determine if digital animation can be used as a pedagogical tool to enhance learning experiences in early childhood education.

I address the research question through an action research approach - "How can I include digital technology as a pedagogical tool through the use of digitally animated stories in my early childhood setting to enhance children's learning experiences?".

Rationale

The rationale for the study steamed from observations I had made from listening to children in my preschool class talk about the games and apps they were using in their home environment. Through class discussion it was determined that children not only played some sort of online game daily but were confidently able to name and explain each game's purpose, which alarmingly was to either kill the baddie or shoot someone. Children

articulated further they watch YouTube every day before and/or after preschool. This links in with the Common-Sense data which reported that over a third of young children aged between zero to eight are watching more videos online nowadays than television (Rideout & Robb, 2020) and that 53% of children younger than eleven years of age watch YouTube daily (Auxier et al., 2020).

Furthermore, Radesky et al. (2020) report on young kids and YouTube key findings demonstrated that children aged eight years of age and under are watching videos that are inappropriate and targeted for an older audience. In addition, it was found that the content children are watching only 5% had educational value. Further findings suggest that children aged eight years and under are more likely exposed to content that exhibits physical violence, interpersonal violence, manipulative behaviours and sexual content (pg. 3). Preceding research corresponds with this by displaying how young children nowadays as a result of exposure to real life violence media content have a higher rate of aggressive behaviours together with sleep and attention problems (Boyd & Swanson, 2016; Browne & Hamilton, 2005).

Advertisement was a separate problematic issue as findings showed that it was occurring in 95% of early childhood online videos. It was seen that in over a third of early childhood videos such as “Peppa pig” there was three or more embedded advertisements that allowed young children to press on them and move into inappropriate content (Radesky et al., 2020). This ties in with previous literature that confirms that digital media such as YouTube provide deprived educational content through advertisement and videos (Tan et al., 2018; Coates et al., 2019). Within the report 63% of parents articulated they monitored their children while on online however it was determined they least likely checked videos in the early childhood category, which was found to contain content with the most violence, advertisements and harmful behaviours (Radesky et al., 2020). This calls for parents to become more proficient

about the possible harmful effects all digital media has on young children. Parents alongside educators need to be media teachers for children by safeguarding the content being watched is appropriate for their age and stage of development alongside obtaining educational opportunities.

What is more, Anisimova et al (2020) suggests a requirement for early childhood educators to re-examine pedagogical approaches and instruments for future teaching and learning due to the emergence of the digital age and society submerged in a digital transition (Marsh et al, 2005; 2014). Majority of studies obtained during this research only focus on teachers' perspectives and knowledge towards using digital technology leaving out the voice of the child and their decisions towards their own learning (Palaiologou, 2016). Consequently, this demonstrates a clear gap in research that needs more focus. Additionally, research gaps are identified in literature in terms of what young children truly understand about digital technology or how technology can be used as a pedagogical tool for the basis of obtaining knowledge towards their digital education (Edwards et al., 2018).

Further research needs to be conducted to determine how digital technology can be integrated into early childhood settings that will facilitate children's lifelong knowledge of digital technology. Together with, further research with emphasis and considerable consideration placed on how children believe digital technology through play contributes to their learning. Therefore, as an early year's educator, I am presented with the opportunity to investigate some of these issues in practice with the aim to enhance it and generate new insights (Edward, 2013; O'Mara & Laidlaw, 2011).

Outline of dissertation

This research study is organised using several sections. Section two will present a critical discussion of literature relevant to the research study with a key focus on the discussion within the current discourse of children's current use of digital technology and the integration of digital technology in early childhood education. An overview of how digital

technology is used as a pedagogical tool within ECEC in national and international policies and frameworks is addressed, with an emphasis on the views of others and the theories around how children learn.

A summary of the literature that examines digital technology, digital media/screen time, digital play and its presence in children's lives will be presented before moving onto digital storytelling and digital animated stories as part of ECEC curriculum.

Section three will outline the key factors in the action research process including the philosophy and paradigmatic underpinning which support the research approach. Data analysis, methods, sampling and ethical considerations is also considered. Section four presents the findings and discusses those in light of other research. Reference will be made to wider literature and the research question as part of the data analysis. In chapter five conclusions will be drawn that emerged throughout the study and a summary of the implication and contribution to the field will be discussed. Lastly, recommendations concerning practice, policy and future research will be conversed.

Conclusion

This chapter provided an outline of the action research study including the aim and rationale. The topic of choice was summarised together an outline of what the study hoped to achieve. Contemporary literatures states that electronic and digital media has so extensively saturated children's daily lives in the last decade that it has now formed as the main means of culture inside and outside of young children's home environment (Levin, 2013; Marsh, et al, 2015). Further research needs to be conducted to determine how digital technology can be integrated into early childhood settings that will facilitate children's lifelong knowledge of digital technology. Therefore, this action research will focus on investigating and gaining insights into how I can use digitally animated stories as a pedagogical tool to enhance children's learning experiences in an early childhood education setting.

Chapter Two: Literature review

Introduction

This chapter will provide a review of literature related to pedagogy and the tools used in ECEC, how children learn, children's current use of digital technology and the use of digital technology in early childhood education and educators' perspectives. It also presents a review of policies that talk about the use of digital technology in ECEC settings and theoretical underpinnings. The final section of chapter will summarise the literature, I identify the gaps, leading to the rationale of my research study.

Research on how educators and children can use digital technology as a pedagogical tool in their pedagogy is still relatively limited. Early Childhood Educators have been found to have inadequate knowledge, and skills in using digital technology in ECEC settings (Palaiologou, 2016; Sulaymani, Fleer & Chapman, 2018). Recently, OCED (2023) in their report on the review of ECEC in the digital world indicate that there have been some countries who have developed policies in the use of digital technology in ECEC in national and international contexts over the last decade.

Pedagogy in early childhood education

Many efforts have been made in literature to define the term pedagogy. According to Watkins & Mortimore (1999) pedagogy is defined as a conscious activity by a person designed to enhance the learning of another person. It is the discipline that helps educators understand the theory of education and how to teach in national and international contexts (Freire & Macedo, 1987). Siraj-Blatchford et al (2002) suggests that pedagogy is a set of instructional techniques and strategies which enables learning to take place through interactive processes between the teacher and the learner providing the opportunity for the acquisition of skills, knowledge, dispositions and attitudes (p.28). In early childhood education educators foster a holistic approach to pedagogy by using experiences, interactions,

care and education to support children's development. Through the understanding that children are active learners' experiences and relationships are connected for the promotion of child development and pedagogy is appropriately prepared, implemented and supported by educators (NCCA, 2009; Siolta, 2006).

Pedagogy relates to "how" educators teach however it is equally important to understand how learning opportunities are facilitated (Siraj-Blatchford et al., 2002). Pedagogical tools are the instruments and techniques that educators use to facilitate and enhance learning opportunities for children in their classroom. In early childhood education this differs depending on the age, gender, learning ability and developmental stage of each child. Although practically anything can be used as a pedagogical tool being aware of its purpose and appropriateness to meet the child at their current stage of development is an important factor to warrant children make direct connections with the pedagogical tool been used to develop concepts and a higher order of thinking (OECD, 2018). In modern society due to the advancements in technology a range of technology devices are being used in early childhood education as pedagogical tools to enhance children learning experiences these include but are not limited to, computers, laptops, tablets, digital cameras, smartphones, iPad, online software and apps (Nilsen, 2018; Abdullahi & Abdulganiyu, 2019).

Pedagogical approaches used in early childhood education

Pedagogical approaches in education are the materials, resources, environments, pedagogy and the role educators position themselves in with their choice that best fits in with the learning objectives of curriculum. Curriculum frameworks provide the guiding principles for educational outcomes on a national and international level and curricula stipulates the learning areas guided by those principles, however pedagogical approaches are often not equally exclusive or explicitly specified within frameworks. The use of various pedagogical approaches in ECEC are necessary to focus on different learning aspects one being the

promotion of development amongst children. For example, child centred and play based learning approaches are frequently used as it puts the focus on the child to initiate their own learning through play. Through play-based activities, children with the help of teachers, better understand what is being taught in an effective manner and in a way that suits their learning requirements. This is achieved through interactions with the aim of expanding children's thinking and understanding of the play. As play based approach is primarily used to focus on the promotion of children's learning it can involve free, guided, purposeful or facilitated play all which educators observe to get a better understanding to how children perform and discover how this type of play is facilitating learning (McGolerick, 2013).

How children learn

How young children learn and develop in early childhood is an important component for educators to understand in order to determine the appropriate pedagogical approaches and tools to implement into teaching practice. Educators observe, listen, and talk with children to gain understandings to what children are thinking and feeling and what they understand. This is documented by adults using different methods such as written narratives, photographs, learning stories (French, 2018). It is through this that "how" learning will occur is established particularly regarding the appropriate pedagogical approaches best suited to the children's learning styles.

Research holds the strong basis that children learn through a natural inquiry process in their play and play is a child's preferred activity (Sandberg et al., 2017; Howe, 2016; Whitebread et al., 2012). This concept is supported through Irelands national curriculum framework specifically play-based approach as identifying how and what children learn through play is an important aspect to then planning activities around children's emergent interests (NCCA, 2009; CECDE, 2006). Because young children have different perspectives than adults do towards learning that occurs through play it is vital that educators instil a high-

quality educational practice that embeds learning through play into pedagogy (Nilsson et al.,2018; Sandberg et al., 2017; Wall et al., 2015). Theorists such as Dewey and Vygotsky have spoken about child's play in their work and while they hold their own positions there is however an agreement that play has a massive influence on young children's development. Dewey (1910) identified children's natural experimentation in play related to a scientific inquiry process whereas Vygotsky (1978) associated play as a factor to the development of speech development, cognitive development, self-awareness and self-regulation in young children.

While we appreciate and understand that children learn through play preceding literature emphasises how it is almost impossible nowadays to distinguish between children's traditional play and digital play activities due to the variety of digital and non-digital play opportunities now available to children (Marsh, 2010). Plowman et al., (2008) corresponds with this by declaring that when it comes to digital and traditional play activities there is a smeared borderline between them. However, more recent literature suggests that the direction of play activities in which children engage in can no longer be identified due to the continuum and forms of digital and non-digital play opportunities that are available at children's leisure in the digital age (Kervin & Verenikina, 2018).

Further observations from research suggests that any type of play already constructed in early year environments whether it be role play, creativity, personal, social or emotional development, when digitalised, through a balanced approach has the capability to improve learning while promoting purposeful and exploratory pedagogy approaches (Barnardo's, 2006; Marsh, 2010; Mostafavi, 2019; Murdock et al., 2013). For instance, by educators broadening pedagogy approaches and tools by integrating technology has the potential for children to further expand on their learning and replicate play in a digital form (Barr, 2010; Fleer, 2014). This fits in with Piaget's position that play will give children the opportunity to

strengthen existing skills and develop a sense of mastery (Piaget & Cook, 1952). Consequently, by understanding how and why children play and then integrating technology as pedagogical tools to further enhance those learning opportunities will not only help to transform early childhood education but warrant that early year's educators are facilitating children in the highest from to develop holistically with the ability to thrive now and throughout their lives.

Current use of digital technology by young children

With the launch of the first iPad in January 2010 the development of touch screen software apps has immensely grown (Heick, 2022). Previous research suggests that due to children having straightforward access to technical devises and can manipulate them through touch screen as young as one years of age it has led to greater engagement and a broader variety of digital play (Lowrie & Larkin, 2020). Therefore, it does not come as a surprise that recent reports specify 91% of children aged between birth and sixteen have immediate access to digital media through the means of a digital tablet and 86% have immediate access to a smartphone (Marsh et al., 2019). This adds to the discourse that children today are becoming skilled towards digital use at a younger age, before even learning how to walk or talk (Chaudron et al., 2018; OECD, 2019).

Policy and Curricula

Irelands early childhood education comprises of the curriculum frameworks of Aistear and Siolta that is accessible to all children from birth to six years of age. The framework provides information to educators through principles, learning goals and objectives on how best to facilitate children's learning goals and foster development through a holistic approach (NCCA, 2009). Additionally, it offers suggestions to educators on how to develop curriculum within their childcare setting. For example, Aistear prescribes the use of play pedagogy in ECEC. Child centred play is seen as a fundamental aspect to children's learning therefore suggesting that educators' social interactions, relationships and partnership with

families are the key factors that support how children learn and develop (NCCA, 2009). Furthermore, Aistear states that pedagogical practice should be emergent with a balance between child and adult initiated play together with a mix of group and individual learning (Government of Ireland, 2020a). Although all ECEC settings in Ireland are required to implement Aistear and Siolta as their curriculum framework pedagogical approaches can differ. According to Pobal et al., (2019) the three most used approaches within Ireland's early childhood education are Montessori, high scope, and play-based approach.

DES (2020) inspectorate report of digital learning in early childhood education and care settings, primary and post-primary schools in Ireland findings found that the government have in fact acknowledged the digital transition and the rapidly changing learning environments. The report articulates that although there is no agreed approach to the use of digital technology in early childhood education and care, they did however observe ECEC educators using technology in practice though it was mostly for observations and parental communication. When asked, educators expressed in unity a lack of support, guidance, confidence and skills as the main barriers to introducing digital technology as a learning and teaching approach. The recommendation in the report was for educators to receive guidance, CPD training, and further research into the matter. With an additional proposal for educators to introduce technology as a teaching and learning tool into practice, so that exemplars can be shared of how effectively it can be used to inform fellow associates (DES, 2020 p.38). This links in with the most recent recommendations outlined by OECD (2023) for the immediate review of early childhood curriculum frameworks and pedagogical approaches currently being used in ECEC to allow for the integration of digital technology to promote and support innovative pedagogies in all areas of child development due to the response to digitalisation.

Therefore, as our curriculum framework is paramount to the progression and improvement of ECEC practice to guide and permit educators with the capability to support

children's learning and development whilst using digital technologies (Edwards et al., 2020; OECD, 2021), proper consideration needs to be given towards the revision of our early childhood curricula regarding the pedagogical use of digital technology and tools, in view of contemporary research (DCYA, 2020; Friedman, 2016; O'Connor, 2016; Undheim, 2022). Additionally, teacher training on how to use tools effectively to incorporate technology into pedagogical practice needs to be provisioned to ensure that technology that is engaged with serves as a pedagogical purpose (OECD, 2021).

Additional concerns can be raised towards Irelands commitment to adapt pedagogical approaches to integrate technology into early childhood educators to meet the learning needs of 21st century early childhood digital learners. The European Commission in (2019) reported twenty-six countries were listed as incorporating technology into early childhood education guidelines however, Ireland was not included. Moving forward in response to the digital transformation Starting Strong publication on empowering children in the digital age specified for current early childhood curriculum frameworks and pedagogical approaches to be reviewed and adapted to make ECCE more responsive to digitalisation to allow for integration of digital technology to promote and support innovative pedagogies in all areas of child development (OECD, 2023).

Across the board there is an international recognition for the importance of safeguarding all children have inclusive access to high quality Early Childhood Care and Education (UNESCO, 2022). The (OECD, 2021) report on the uses of technology in early childhood education underlined the immediate requirement for development of policies and procedures within ecce pedagogical practice regarding the use of technology. Conversely, less advantaged countries notwithstanding the massive progress over the past few years continue to face substantial challenges in accessing quality ECCE programmes. With the global expansion of digitalisation in early childhood environments and the necessity to include

digital technology into worldwide ECE curriculum and adapt pedagogical approaches has been recognised (Wyse & Ferrari, 2015). However, something needs to be done to reduce the disparities across countries. With that said, ECE international curriculum frameworks need to be reflected on to successfully create conditions for children to engage in digital play with competency (Caena & Redecker, 2019). Alongside, considering children as capable and powerful in this digital age (Craft, 2012). Furthermore, underlining the need for strategic thinking and significant guidance from national and international government bodies.

Internationally there appears to be a greater focus and formal recognition put on children's use of technology at a preschool age than in the Irish context. For example, Sweden formulated a preschool curriculum that made it mandatory for digital play to be incorporated throughout curricula so that children were fully supported in becoming digitally competent (Ministry of Education, 2017: Sweden National Agency for Education, 2018). The overarching aim was to provide each student and teachers with equal access to digital use to support digital competence development and the digitalisation of preschool settings. The European Commission (2019a; 2019b) defines digital competence as the responsible use and engagement with digital technologies for learning and participating in society and is listed as one of the eight competencies for lifelong learning (pg. 9).

Integration of technology in early childhood curriculum

Previous research highlights a massive number of key issues towards the integration of digital technology into Early Childhood Education. The main perspective being that digital technology may impede children's development (Mendoza, 2013). In addition, heightened concerns have been conveyed regarding how technology is presented to children and the augmented level of accessibility (Plowman, 2010). One example is that children may become addicted to technology such as smartphones and could potentially become upset or panicked if they could not gain access to their devices leading to mental health concerns

(Coughlan, 2019). Gaming addiction was another concern recognized and defined as a pattern of gaming behaviors by the World Health Organization (Who, 2018). It was described as children having impaired control over gaming where priority was given to digital gaming online over other activities and personal interests. Considering the mentioned concerns there is an immediate importance for further research that will give a greater insight into whether technology causes behavioral alterations or if a person's behaviors anticipate the use of technology (Gottschalk, 2019).

As children today are using technology more than previous generations and are exposed to a wider range of technology devices and tools the OECD (2019) has reported that there is a rise in children opting to swap real world for digital world experiences which has become an increasing concern amongst parents and educators that technology will have an adverse effect on children's learning and development (Heimann et al., 2021). This ties in with Lewin et al (2019) study that found parents and educators concerned with children's prolonged engagement with technology and believed it would have an adverse effect on their physical, social and cognitive development such becoming addicted to screens. Which is true to some extent as literature shows us that infants do not have the ability to engage with technology in meaningful ways and excessive use leads to negative effects on their cognitive development at this age (Plowman, 2020; Wilkinson et al., 2021; DeLoache et al., 2010).

However, Wilkinson (2021) notes that children from the age of around two and a half can engage with technology and make sense of what they are watching. Though, while this may be true in ECEC it is important that educators are aware that not all children will automatically understand how to effectively interact with technology devices just because they have reached a certain age or that children will show the same interest as their peers therefore, they may need additional help and support (Plowman, 2020). Other factors that

should also be considered are each child's currents cognitive, physical and socio-emotional developmental stage.

Ultimately, it is time to recognise that technology is not going away, and it does have a rightful role in early childhood education. It is not the technology itself that should be questioned but more so the type of technology that is being used and its purpose should be brought to the forefront of the discourse. As mentioned previously, digital play is not a separate from of play it is purely an additional tool that can be incorporated into the normal everyday play activities that children already do in preschool to enhance further learning and engagement of students (Edwards, 2013). A simple example being children using two cups and a string to talk to each other from across the room to then using battery operated walkie talkies and investigating how far a distance each can go and stay in range. From this type of digital play alone children will enhance development physically, cognitively, socially and emotionally and linguistically.

However, the effective integration of technologies into early childhood education remains a challenge and the literature demonstrates an immediate need to review the existing philosophy of early childhood pedagogy in national and international contexts (Edwards, et al., 2020). For example, Bianchi et al., (2022) thematic report found that digital learning was referenced as an evolving change and influence on ECE education with the recommendation for the integration of digital technology in early childhood education (CRC Committee, 2021). Additionally, it was determined that an amended international framework on human rights education which comprised evolving changes to pedagogy approaches was to be recognised (UNESCO, 2022b). While it does appear that European countries are attempting to get on board much work still needs to be done. For instance, Finland stipulated through their National Core Curriculum that all students will develop attitudes, skills, abilities and life perspectives amidst the promotion of their five areas of transversal competence. Included in

guidelines states the importance of developing digital education of all students with a vital aspect being the integration of digital technology through curriculum and approaches to support children's learning (Finish National Agency for Education, 2019, pg. 26-27).

However, Kontkanen., et al (2023) comparative study on children's digital competencies in Finland found that although the theoretical basis of digital competency such as the objectives were present the aims, content and practical guidelines on how best to apply digital technologies through the curriculum were vague (pg. 9). This calls for the recommendation of a greater emphasis and clarification through national curriculum concerning key elements required to implement digital technologies correctly into curricula using pedagogical approaches that will foster children the opportunity to accurately develop competence towards digital use. Although there is recognition of the integration of digital technology into international ECEC education there are no clear guidelines on how to accurately amalgamate it.

Subsequently, early childhood pedagogy and the use of digital technology is often seen as incompatible and invaluable regarding the influences it has on children's developmental learning outcomes (Marsh et al., 2017). This may be because there is an observable lack the knowledge of how to accurately integrate digital technology into pedagogy therefore leading to questions and confusion towards the value of digital technology in their practice (Hernwall, 2016; Vidal-Hall 2020; Johnston et al., 2020; Undheim, 2022). While some are fixed on "old ways of thinking" that real world play does not share the same play type as digital play it needs to be acknowledged, considering contemporary research, that digital play is in fact play just in another form (Fleer, 2014a). In order to be effective in merging traditional and digital play together through the integration of technology educators must firstly understand how to structure their learning environments so that technology can be integrated in keeping with current pedagogical approaches (UNESCO, 2010, pg. 83).

What is more, as there are still a lot of unanswered issues, confusion, a lack of training and support regarding the suitability of digital technology for children and its purpose as a pedagogical tool, it is not surprising that educator's expressive negativity and fear towards digital technology and the adverse impact it will have on children's development and health (Vidal-Hall, 2020; Jack & Higgins, 2019).

While the use of digital technology in early years practice should not be deemed as the overarching objective to supporting holistic development it should however be applied as an expansion to the overall curriculum approach to afford children the opportunity to learn that will positively impact their development and lifelong outcomes (Cheng et al., 2015; Edwards et al., 2020; Marsh et al., 2005; 2014; O'Connor, 2016; Undheim, 2022). This is further supported by position statement stipulated by (NAEYC, 2012) which recognises digital technology as a purposeful tool for early year's educators to effectively integrate into practice to enhance children's learning experiences and development. Therefore, adding to the discussion that digital technology is a necessary aspect of Early Childhood Education.

Screen based technology and apps in early childhood education

As we have come to understand digital play as the way in which children play and engage with digital technologies in almost the same way as they would in traditional play activities (Edwards, 2019) and since the launch of the iPad over a decade ago literature has evolved which highlights an agreement amongst researchers that screen-based technology and apps can be employed as a pedagogical tool in conjunction with other types of traditional pedagogical approaches in early childhood education . For example, creating stories such as animation or videos will present children with the prospect to learn and discover for themselves, make meaning, and harvest their own assumptions from diverse experiences and outcomes (Miller, 2018; Plowman, 2020).

Animation is the animated form of real-life objects which is created using photographic techniques such as taking a series of shots where small differences exist between each picture

and the previous one (Gao et al., 2019) and pictures can be created either manually, electronically drawn or photographed (Fedkiw, 2018). While the primary techniques of animation are hand drawing animation, computer animation and slow-motion animation for the purpose of the current research study slow motion animation will be investigated. The purpose of slow motion is to develop animation through the means of photography turning immobile objects mobile using everyday resources such as paper, modelling clay, playdough, play figurines. (Gao, He & Shang, 2019). A sequence of pictures is taken, and the object is moved slightly from the start to the end of the animation. As slow motion is said to be an engaging and interesting way to tell stories it can be presumed that children will be more eager to learn through a digital technique which will stimulate and challenge their current abilities in order to create their animation (Farrokhnia et al., 2020). As slow motion can be easily installed to electronic devices such as iPad it is deemed as a valuable modern educational tool that can be integrated into early childhood education as a purposeful pedagogy approach (Kahraman, 2015). This warrants children the opportunities to participate in activities that will support their willingness to participate, learn, create animation, and figure out ideas for themselves through investigation (Jitsupa et al., 2018).

In terms of its use as a pedagogical tool stop motion animation has been used by educators to reposition classroom pedagogy activities for learners (Grant, 2009). For example, a study conducted by Preradovic, Lesin & Boras (2016) discovered that children who engaged with technology for storytelling development developed a more complex understanding to mathematics and computer sciences compared to children whose learning was completed using the traditional methods of storytelling. Likewise, Cheng & Chuang (2019) found that as a result of merging digital technology with traditional storytelling methods children's abilities to investigate was increased as well as their development towards communication, collaborative skills and children eagerness to participate in storytelling

activities independently (Prasetya & Hirashima, 2018). This may be because through the method of using slow motion and using tools and objects to create animation children have an increased opportunity to engage in creative thinking processes and develop concrete concepts that makes learning more clearly seen and understood (Melinda, 2011). The sharing of knowledge, communicating with others and working together are skills necessary for children to learn. Using stop motion as a pedagogical tool for children to learn through play will promote active learning as they are given the opportunity to apply their creativity by themselves to the development of their own animation (Gao,He & Shang, 2019; Melinda, 2011; Kervin & Mantei, 2016; Palaiologou & Tsampra, 2018).

Educators' perspectives of digital technology

Research indicates that the integration of digital technology into educational practice has been identified as challenging especially for educators working in preschool environments who endure barriers such as lack of knowledge, skills, abilities, funding, resources, self-confidence and equipment (March et al., 2017). This ties in with additional research that is investigating the quality of training for future preschool teachers (Anisimova & Ibatullin, 2018; Marsh et al., 2017; Ahtarieva et al., 2018).

A study conducted by Marklund (2022) on Swedish preschool teachers' perspectives on digital technology in the workplace found that although there were many opportunities such as a heightened workplace practice alongside preparing children for their future, the challenges were far superior. It was found that although some preschool teachers appeared to be dedicated towards engaging in professional development towards the pedagogical use of digital technology not all colleagues shared the same dedication. Other challenges found were too little time to address challenges, technical organisational issues and reluctant parents (Pg. 179).

While early childhood educators nowadays appear to be more competent and confident using digital technology in their personal lives it does not warrant that the same confidence will be witnessed in their professional lives when used for teaching and learning purposes in ECE education (Hatzigianni & Kalaitzidis, 2018). As previously mentioned, educators lack the knowledge and skills to feel confident to properly integrate digital literacy into preschool education (Marsh et al., 2017). This therefore calls for educators to develop the skills, knowledge and understanding towards digital technology so that they have the confidence to apply it appropriately to teaching and learning practices. Digital technology needs to be considered by educators as an essential tool that can be integrated into preschool education and applied to pedagogical approaches to influence learning and achieve digital literacy developmental skills amongst learners (Sousa et al., 2019).

Furthermore, early year educators have expressed concern and difficulty towards offering support and co constructing knowledge with children when attempting to implement teaching methods in practice (Fleer & Hammer, 2019). This therefore verves back into the discourse regarding the barriers and challenges that educators face towards their own digital technology and literacy development such a lack of teacher knowledge, skills and competences (Arnott & Gillen, 2018; Marsh et al., 2017; Schriever, 2021; Undheim, 2022). While further emphasis on a lack of CPD training, guidance, support, resources, and no policy framework as the primary impediment has been discussed in more detail throughout these studies (Anisimova, 2020; DES, 2020; O'Connor, 2016).

Moreover, Edwards & Bird (2017) suggest that because teachers are unknowledgeable towards how children learn using technology, they are unable to appropriately observe and assess the authentic learning and development that does in fact occur. Which may be the main factor in educators' unwillingness to learn and change their old way of thinking (Schriever, 2021).

On the contrary, it has been observed in various contemporary studies that teachers displayed positive attitudes towards the use of digital technology as a pedagogical tool in practice (Jack & Higgins, 2019). It is seen that using digital technology in pedagogy practices allowed educators and children to collaborate with the technology in various ways such as exploring, inquiring, creating and processing. Further observations were that using technology in ECCE was not the same as sitting watching a screen (Edwards et al., 2020; Fleer, 2020).

As early childhood educators play a pivotal role in young children's learning and developmental outcomes it is their job to be clever when it comes to the integration of technology into practice one being reducing the negative uses of technology by safeguarding that how it is incorporated into pedagogy positively contributes to the teaching and learning needs of students (Hooft-Graafland, 2018). There is a body of global research supporting this that asserts digital technologies, specifically digital play, when used in an intentional and developmentally appropriate way provide children with an interactive multisensory affordance to progress further in their holistic development (Cheng et al., 2015; Cunningham et al, 2016; Edwards et al., 2017: 2020; Marsh et al, 2016). For instance, Marsh et al, (2016) conducted their study on preschool children in the UK. The purpose of the study was to determine if using apps in an effective way would enhance children's play and creativity skills. The study's findings demonstrated that through prolonged engagement with educational apps children not only enhanced play and creativity skills, but problem-solving skills, critical reflections and decision-making skills were exhibited and improved (pg. 250).

Likewise, Edwards (2020) discussed in his paper converged play for early childhood education in which three characteristics emerged including multi modal, global-local and traditional- digital through data analysis. It was stipulated that in the digital age these characteristics can help teachers develop a starting point for early childhood pedagogy. In

addition to better understanding teaching and learning these characteristics allow for greater engagement in play-based and traditional-digital activities.

Review of research related to use of digital technology in ECEC

Digitally animated storytelling is the incorporation of digital tools and software programs together with the traditional methods of storytelling to construct and deliver content in a digital format (Barber, 2016). Integrating digital story telling into early childhood education can been seen as an engaging pedagogy tool for children to use to develop a more defined understanding of storytelling which will make learning more clearly seen and understood in addition to fostering children the opportunity to becoming familiar with digital technology (Boerma et al., 2016). An important aspect to take into consideration when incorporating digitally animated stories as a pedagogical approach into practice is the importance of integrating technology and children's play activities together instead of separated (Edwards, 2013) which falls under the concept of digital play.

Digital play is defined as understanding the ways in which children engage in playful activities using digital and traditional toys (Edwards, 2018). Marsh et al., (2016) highlights digital play as the use of technology for play and learning activities while mentioning laptops, computer tablets, electronic devices, iPad, tablets, televisions, movies, MP3 players and smartphones as some of the valuable pedagogical tools that can be used in early childhood education (Levin, 2013, pg. 1). While digital play is said to be already situated in the experiences children encounter each day (Edwards, 2011) it can be implied that this type of play can be used as a pedagogical approach to motivate and promote children's learning and development. For example, employing digital play for the purpose of integrating digital animated stories as a pedagogical tool can be supported by utilising technologies such as an iPad with a child friendly educational app installed, for instance, digital storytelling. Through digital storytelling process children are involved in making-meaning experiences (Satriana et

al., 2021). Therefore, possibly leading to an innovative approach for improved and increased engagement with storytelling (Wessell- Powel et al., 2016).

Consequently, by educators integrating this type of play into curricula and adapting current pedagogical approaches this will not only improve the diversity of pedagogical approaches to teaching, and understanding towards the diverse learning styles of our learners but it will safeguard that children are awarded a socio-cultural approach to their individual learning and development (Taylor & Leunf, 2020). With the anticipation that children will become intrinsically motivated to take on a more self-directed approach to their learning (Butler, 2017).

However, digital play does not come without negative consequences such as a decrease in time children spend outdoors leading to a lack of physical activity (Kervin & Verenikina, 2016). To combat this, it is necessary that educators curate and monitor children's time spent engaging with technology (Mendoza, 2013) while safeguarding that interactions through digital play are conclusive to the promotion of their learning and development (Cheng et al., 2015).

Theoretical foundations

Although early childhood education and care settings choose pedagogical approaches best suited for the learning needs of the children it is not uncommon for educators to utilise elements from other approaches and combine approaches to foster teaching outcomes such as constructivism, collaborative inquiry-based learning and behaviourism. Vygotsky (1978) theory of social constructivism is most relevant within this study as it affords the implications for why and how children learn, and under the conditions of this research, the experience of children collaboratively using technology for learning in an early childhood educational setting. The learning theory suggests that language and culture play an essential role towards how people view their world and develop intellectually, and it is through these frameworks that humans experience, communicate and make meaning of their realities.

While further explaining that children's learning precedes development. Describing the process, Vygotsky explains that children learn higher order thinking skills through experiencing the world twice. At the first instance, children experience the environment in a social context and then in the mental domain intra-psychologically (Vygotsky, 1978, pg.57). Consequently, Vygotsky explains that knowledge is more so co-constructed in a social context first before it is internalised. In educational terms it can be defined as what students learn in collaboration with fellow peers or under the guidance of their teachers which falls under Vygotsky's (1978) concepts of zone of proximal development (ZPD) and scaffolding. Vygotsky's purposes that scaffolding is most effective when a child participates in an activity within or slightly above their competence and that ZPD is advanced with support from a more skilled peer.

Dewey (1916) theory of development through experiencing is a fit with Vygotsky's social cultural theory as he assets that social environments are more educative to an individual as a result of shared endeavours that stipulate knowledge. Concurrently both theorists place children and fellow peers as active participants in shared endeavours with stipulation that knowledge was dependent such activity and engagement. While interactions and collaboration are not central to Piaget's (1977) developmental theory it contributes to the discussion that knowledge is social constructed, and that cognition occurs when individuals and their peers resolves cognitive disputes as a result of different perspectives.

Vygotsky's (1978) theory of social constructivism is very relevant to this study as it is built upon the hypothesis that learning is a constant social process which takes place within cultural contexts. This permits educators and children to collectively explore, engage and interact with different tools with the outside world to co construct new knowledge through interactive and make meaning experiences and to warrant children the power to make decisions about their own learning within their social contexts.

Gaps in research

In terms of the use of technology in early childhood education Gottschalk (2019) suggests there is a need for additional research regarding the matter of the impact that technology usage has on young children's development. However, one important issue that appears to be overlooked or mentioned is cyberbullying, and the increased risk young children face towards their mental wellbeing when using technology as they have instant access to a wide range of media including social platforms such as Snapchat and TikTok (Hooft Graafland, 2018). It must be noted that young children do not acquire the mental ability to understand what to do if they are being bullied and may feel afraid to speak out therefore this is a gap in literature that needs further exploration. Additionally, Palaiologou (2016) research stipulated that further research was needed to understand how children use technologies in their play to learn.

As electronic and digital media has become the main means of culture in young children's daily lives there is an unequivocal obligation for Irelands policymakers to reconsider our current early childhood curriculum framework and re-examine pedagogical approaches used in ECEC. Specifically, guidance on how digital technology can be safely and appropriately embedded into play-based pedagogy to strengthen children's digital learning opportunities needs to be addressed. In Ireland the Department of Education and Skills in their inspectorate report touched basis on this by purposing a recommendation for early years educators to introduce technology as a pedagogical tool into practice, so that exemplars can be shared of how effectively digital technology can be used so to inform fellow associates in a bid to essentially bridge the gap in research to a certain degree (DES, 2020). Whereas, internationally there are specifications for early childhood curriculum frameworks and pedagogical approaches to be reviewed and adapted to make ECCE more responsive to digitalisation to allow for the integration of digital technology to promote and support innovative pedagogies in all areas of child development (OECD, 2023).

Furthermore, although there is extensive research that demonstrates young children's increased use of digital technology an absence of teacher and children collaborative use of digital pedagogical tools in practice for educational purposes is noticeable. What is more a lack of children's perspectives and their ideas towards what they feel is important to their learning is evident as majority of studies concentrate on the practitioners' perceptions of integrating digital technology into practice leaving out the voice of the child.

The finding from this research suggest that further research and studies needs to be completed to explore why and how children learn through the means of digital technology. Additionally, there is a requirement for educators and children to collectively explore and engage with developmentally appropriate technology through play-based pedagogy to co construct new knowledge through interactive and make meaning experiences to warrant children the power to make decisions about their own learning and not just have them made for them whilst adding to the current discussion of the integration of digital technology in Early Childhood Education.

Conclusion

The literature presented in this review provides the basis in which to ask the predominant research question "how can I include digital technology as a pedagogical tool through co-constructing digitally animated stories to enhance children's learning experiences in my early childhood setting". While the fulfilment of this study will answer the three objectives that will perpetually be referred to throughout the process, which are:

- To explore how I can use digital tech as a pedagogical tool through co-constructing digitally animated stories
- To identify children's responses to co-construction of digitally animated stories in early childhood education
- To determine if digital animation can be used as a pedagogical tool to enhance learning experiences in early childhood education.

Chapter Three: Methodology

Introduction

This chapter presents an overview and rationale for selecting the methodology, data collection and analysis to answer the research question. The paradigmatic and philosophical foundations that underpin action research will be explored and my ontology and epistemology position will be discussed. Additionally, the selection of participants, data collection, data analysis and my own positionality within the research will be considered and detailed. Lastly, quality and rigour, ethical considerations and limitations to the study will be addressed before summarising the section.

Using insights from the experiences and perspectives of myself and participants, the action research aimed to investigate and gain insights into how I can integrate digital technology into my ECEC setting. Specifically, I wanted to explore how I can use digital technology as a pedagogical tool to enhance children's learning experiences in my early childhood education setting.

While the aim was to integrate digital technology into my early childhood setting through co constructing digital animated stories and explore how this technology supported children learning experiences. With an additional outcome to perhaps contribute to the debate and discourse regarding the use of digital technology in early childhood education. Specifically, the three objectives of the action research:

- To explore how I can use digital technology as a pedagogical tool through co-constructing digitally animated stories
- To identify children's responses to the co-construction of digitally animated stories in early childhood education
- To determine if digital animation can be used as a pedagogical tool to enhance learning experiences in early childhood education.

I addressed the research question through an action research approach - “How can I include digital technology as a pedagogical tool through the use of digitally animated stories in my early childhood setting to enhance children’s learning experiences?”.

Methodology

According to Lincoln & Guba (1985) paradigm theories cannot be dismissed as merely philosophical differences. The philosophical underpinnings of research paradigms will hold consequences for the administration of the study and the understanding of findings. Understanding the underlying philosophical and paradigmatic assumptions within research and how these connect to a study’s findings will empower researchers the knowledge to comprehensively present their own findings.

This study employed an action research paradigm because one of the many advantages of this approach, within the field of education, is that fortifies teachers’ engagement within the research process (Corey, 1953). As action research places the teacher as a co researcher it is primarily utilized to research one’s own practice to generate new knowledge to improve the practice (McNiff and Whitehead, 2005). While conveying the knowledge that learning is socially constructed in a subjectively based reality and influenced by culture and history (Creswell, 2009) and fully understanding the studies aims and objectives it was required for me to embed myself as a co-researcher within the study in my ECEC classroom to answer my research question (Lassonde et al, 2009).

Lewin (1947) defined action research as a spiral of steps involving a circle of planning, action, and fact finding on the result of the action that leads to social action and social change. Unlike experimental studies that are conducted in contrived environments, action research studies are applied to real situations to solve real world problems. While action research is “strategies that tackle real-world problems in participatory, collaborative, and cyclical ways in order to produce both knowledge and action” (O’Leary, 2007, p. 2) this

research was constructed on the objective that participants and I would collectively construct new knowledge (Reason & Bradbury, 2001). A cyclical action research cycle was most suitable to generate knowledge in how to integrate digital technology as a pedagogical tool to enhance young children's learning from participants real life experiences (McNaughton & Hughes, 2009).

Reason & Bradbury (2001) defines action research as a participatory process concerned with developing practical knowledge. While McNiff (2013) ascertains that action research is concerned around transforming democratic practices through participation and teamwork. Although there are numerous theories of action research there is a collective consensus regarding the main objectives and concepts of action research and social change which are stipulated by Lewin (1946) in his article titled "Action Research and Minority Problems" (Bargal, 2006). The above theories strengthen the suitability of action research as my research paradigm, as the study sought to bring about a social change within my practice. Which was examined through the direct experiences and behaviours children obtained while using digital technology in a bid for me to make sense of their world through their own perspectives without the obstruction of existing presumptions (Bryman, 2016). Asking questions of why where and what will direct me to understand participants behaviours and perspectives which in turn will generate new knowledge and discovering how digital technology can be used as a pedagogical tool in ECEC (Guba & Lincoln, 1994).

According to McNaughton & Hughes (2009) "action research creates meaningful change through the process of several cycles of think-do-think (pg.3). Whereas Stenhouse (1981) stipulated "it is the teacher who in the end will change the world of the school by understanding it" (p.104). This introduced the teacher as the researcher in a bid to take charge of assessing and researching their own pedagogy instead of relying on outside agencies. However, before the start of any research, reflections must be made regarding our

practice by asking questions such as what are we doing and why are we doing what we are doing? (Sullivan et al., 2016, p.1). The theory of reflection was developed by Schon (1983) using reflection in action "thinking on our feet" and reflection on Action "reflection occurs after the activity or event has happened" (Smith, 2011).

Therefore, as an early childhood educator and through using action research I firstly needed to ask, "how I can improve what I am doing" (Whitehead, 2008). Action research was deemed most appropriate to allow me to go through this process as through the cycles of think-do-think described by McNaughton & Hughes (2009 it safeguarded that any knowledge generated within this study would have an immediate effect on the participants learning experiences within my ECEC classroom followed by the improvement of my practice rather than relying on outside agencies to make changes that have no connection (Elliott, 1994).

Action research allowed for me and children to collectively engage with technology through a cyclical process for the improvement and transformation of practice (McNaughton & Hughes, 2009). Through action and research, a change was brought to our ECEC classroom, to generate new knowledge and understandings towards the uses of technology as a pedagogical tool for the enhancement of children's learning experiences. Which then could be shared with others within my childcare setting to extend the improvement of practice within our setting (Lassonde et al, 2009).

Ontology and Epistemology According to Scotland (2012) it is impossible to conduct any form of research without committing to an ontology and epistemology position weather this is done implicitly or explicitly (p.9). While researchers differ in these positions it leads to different research approaches being expended such as scientific, interpretive and critical. Therefore, educators need to fully understand their ontology and epistemology position when conducting research as the paradigmatic structure informs the overall research process (Grix, 2004, p. 64).

Ontology is concerned with reality and the study of being (Crotty, 1998, p.10). While Epistemology is concerned with the assumptions to how knowledge is created and what it means to know (Cohen et al, 2018; Guba & Lincoln, 1994). As the aim of this research was for the researcher and participants to interact with digital technology in our social context and generate new knowledge through participants perceptions my ontological position within this study was relativism as the view of reality differs from person to person and is subjective (Guba & Lincoln, 1994; Scotland, 2012). In addition, it corresponds with the relativism position of ontology that the "what is" is not existent without human interaction and that reality is individually constructed (Crotty, 1998; Frowe, 2001; Scotland, 2012). While my epistemology position within this study is highly subjective towards that "what it means to know" I was therefore reliant on real world experiences to be interpreted by participants. While knowledge generated in action research is value based and subjective it allowed me to gain an understanding of the subjective world of human experience through the eyes of the participants (Cohan, Manion & Morrison, 2018).

Whilst one of the main aims of action research is to bridge the gap between research and practice (Somekh, 1995). In educational contexts, action research is used as a method to solve problems by generating knowledge and taking action to bridge a gap in social systems such as schools (Bourner & Brooke, 2019). Furthermore, action research is the process of action and reflection with the participation of others with the purpose to solve issues and improve the quality of practice (Bradbury, Lewis & Embury, 2019; Johnson, 2019). This attained action research as a favourable choice as it coincided with the main aim of the study to introduce and integrate digital play into ECCE practice through myself and participants collectively co constructing knowledge through "action" and making sense of what transformed throughout the study with an attempt to bridge the gap between theory and practice (Reason & Bradbury, 2001, p. 2). From doing so, the voices and realities of

participants were truthfully perceived and what they considered as important factors to their learning were brought to the centre of the study.

Nonprobability sampling was deemed most appropriate as this is the most common method for the exclusion and inclusion of criteria. The use of video recording, field notes and observations were considered the most suitable instruments to use as the means to collect rich data. Moreover, from using multiple instruments, it enhanced the trustworthiness of the action research as through multiple sources of data to analyse it enhanced evidence for findings (Dosemagen & Schwalbach, 2019).

Positionality

To further increase the trustworthiness of the research my own positionality within the study needed to be addressed. Alcoff (1988) articulates positionality as the recreational position of our identities rather than our qualities and that the acknowledgment of knowledge is essential to indicate a person's position in any context or situation. Research positionality is further explained by Maher & Tetreault (1993) as the experience's educators face in their classroom and personal life that determine how action research is conducted to create knowledge and how meaning is made from research findings (P. 118). As an avid user of digital technology for both personal and educational purposes while also been a co researcher within the study I was conscious that I brought my own values, beliefs, previous knowledge, preconceptions and assumptions to the fore of the research (Bryman, 2016).

Additionally, my positionality in this research contained the value placed on participants learning opportunities in early childhood education and the responsibility of early childhood educators in the future teaching. While having the belief that the participants perceptions are a result of experience and that perceptions can influence the way early years educators subsequently teach. Therefore, in order to determine participants honest perceptions of digital technology and to impede researcher bias a qualitative action research methodology was constructed to allow for free expression and perceptions of participants without

judgement or influence from the researcher.

Alternative approaches

Qualitative research according to Creswell (1994) is the process of understanding and distinguishing between them, such as post positivism, pragmatism, constructivism and participatory. While Miles, Huberman & Saldana (2014) stipulate the importance of researchers understanding philosophical assumptions and the impact it will have on the methodology and position they chose to determine how their research is carried out. Duberley & Cassell (2012) further suggest that methodological positions are unavoidable connected to philosophical assumptions that have insinuations for the research design and are classified as interpretivism, critical theory, ethnomethodology, neo-positivism and so on.

A post positivism ethnomethodology could have been used and considered to determine how people think and act in their social contexts. However, as this position distanced the relationship between me and participants with a more neutral position held during analysis, with a focus on establishing precise findings, it was prohibitive to the exploratory nature of research inquiry (Creswell, 2007). The aim of the research was to explore how I could integrate digital technology into ECEC practice. Therefore, it required an interactive, cooperative and participative approach in order to discovery subjective realities and how people think therefore a social constructionist approach was deemed most applicable (Guba & Lincoln, 1985).

An interpretivist qualitative case study methodology using interviews as the data collection tool and engaging numerous childcare settings to conduct research was also considered. This approach would have allowed for the collection of rich data which would have delivered an in-depth analysis and made significant contributions towards the identification of events, people or a situation (Gilgun, 2005; Yin, 2003). However, as my research was developed to solve an immediate problem alongside being a participant within the study it was important for me to choose a research design that would require me to fully

immerse myself through a process of inquiry, diagnose the problem, act and solve the problem. Therefore, as case studies generally observe and analysis situations, they do not provide solutions to immediate problems nor do case study approaches commonly permit for the researcher to be a part of the study it was determined that this did not fit in with the studies research aims and objectives.

Consequently, as action research is generally used by educators in the field of education to solve problems in their educational contexts through the means of research and action it was interpreted that action research was most appropriate to generate the data required to produce rich in-depth detailed interpretations from participants that would establish how I can use digital technology as a pedagogical tool to enhance young children's learning experiences in my ECEC classroom.

Participants

The site and research participants invited to participate in the study were situated in my own classroom in my ECCE practice located in Dublin. This is a small privately run childcare service with a total of 30 preschool children spread across two ECEC classrooms. I firstly needed to gain permission to conduct the study from my employer stipulating that all other children within the service not in my class would be excluded from the study (See Appendix A). This is because I had a personal interest in this and depending on the results of the study, pedagogical approaches used in my classroom would be re-examined to encourage children's learning in the future that included the integration of digital technology. Additionally, as I had a developed trusting relationship with children from my classroom, I perceived this as an advantage to the overall study outcome and their willingness to take part in their natural setting. The inclusion criteria for this research were that all participants must be aged between 3-5 years of age, must attend our preschool service, and must have a signed consent (See Appendix. B). Information forms were drawn up and given to parents of all participants prior to the research taking place (See Appendix C). The purpose of the

document was to explain the aim, rational, objectives, the role of participants, the research time frame and the digital technology we would be using. Once all forms were returned with parental consent and children's assent a flexible action research plan was developed (Robert-Holmes, 2018).

Consequently, justifying that participant selection was purposeful sampling (Seetharaman, 2020). This was chosen because any changes to pedagogical approaches due to findings from the research could not be generalised and only implemented in our service, in my classroom (Polit & Beck, 2010). It must be noted that participants had the option and the right to disengage from the study at any time if they chose to.

Methods

The use of reflective journal, observations, and field notes were the instruments employed to collect data.

Reflective journal – Throughout the research process I kept a reflective journal to record my own thoughts and reflections which as according to Sullivan et al., (2016) ongoing reflection is a feature of action research. The journal was utilised as a procedure to document my learning to reflect on my practice and thinking which was very supportive in permitting me to evaluate and reflect on the research as we progressed through it as well as monitoring how my thinking had been altered after each digital animation session in a bid to answering my research. The additional usefulness of the journal warranted me to collected field notes and document children's thinking, ideas, perspectives and words that would allow me to gain a rich perspective of the children's voices towards how digital technology could be used as a pedagogical tool to enhances children's learning (McNiff, 2014).

Observations – anecdotal observations were correspondingly used for data collection to record significant events such as direct quotes, and expressions that occurred during the digital play sessions. It is through this that I gained a more in depth understanding of

participants beliefs, values and ideas (Burns, 2009, p. 17). Respectfully, observations alone will not document and indicate the fundamental configurations of reality by themselves, therefore, I was required to interpret them in detail during data analysis (Rallis & Rossman, 2003). The advantage of observation in action research is that it permits the researcher the see exactly what the participants do in the moment and allows for the collection of data to occur when the experience happens. Additionally, it allows for the provision of real-world applications responding to the needs of its participants making it a universality of practice (Ekka, 2021). The disadvantage of observations in research is that findings cannot be generalised (Polit & Beck 2010). As the aim of this action research was to investigate and gain insights into how I can integrate digital technology into my ECEC setting I therefore did not wish to generalise the studies outcome further afield. However, I expectantly hoped to bring the findings overtime to the whole of the service to safeguard all children are warranted the opportunity to incorporate technology into their learning.

Additional instruments were employed such as children's artefacts and video recordings which safeguarded trustworthiness of the study as a multitude of techniques were used to support the studies data analysis and findings.

Children artefacts – children's drawings and images were used for data collection as they were evidence collected of children expressions and understanding of the research study. Through artefacts children presented their awareness of the characters of the digital story by drawing them from imagination and from printed photos they had researched. Hart (1997) suggests that drawing can improve the degree in which children participate. This was very relevant to this study as the creation of characters phase saw the highest number of participations from children. Children used their drawings to share their ideas, develop further to their story such as the characters, and to visually show others their thinking processes and developing perceptions (Adams & Ward, 1982). Childrens referred to their

drawings throughout the implementation phase which was then the basis of the narrative which is seen throughout the finding section. The children were able to determine exactly what characters were needed to be in the scene based on looking back at the previous scenes captured enabling them to continue with the digital story.

Video recordings – video recording was used to capture verbal and nonverbal communic ation between children that I may have missed if occupied with another child throughout the digitally animation sessions. Additionally, children's behaviours, facial expressions, body language and frequency in which it occurred was captured as a result of video recording.

A pilot digital play session was completed using a sample of one staff member who agreed to take part in a pilot session but who was not participating in the study. As an inexperienced action researcher, the pilot session was beneficial as it allowed for the trailing of the technology's features, the diverse use of props to create a digital story example, it allowed the researcher to determine the suitability of the stop motion app to gather data to answer the research question. Additionally, it allowed the researcher to deem how much participation and input was appropriate so to no run the risk of researcher bias by leading the study.

Additionally, through the planning phase as the children explored with the software a pilot animation story was created. Working from the children's initiatives I was able to instruct and conduct a pilot session with children's involvement. It was through this that children got to witness firsthand how a digital animation story was created alongside developing understanding towards the steps required to create a digital story.

Data collection

Data collection was completed using a digital device to conduct digital play sessions in May 2023. Six digital play sessions were completed using an iPad with "stop motion" app installed. The digital play sessions lasted approximately 15-20 minutes each sitting; however, this was solely dependent on how engaged the participants were throughout the

session. The digital play sessions were conducted throughout the participants ECEC hours, and the sessions took place at the same time on each occasion to obtain predictability to the participants daily routines. The digital play sessions were video recorded using an additional iPad with the participants prior assent and parental consent for the purpose to gather supplementary data to further support the research findings, if deemed relevant.

Procedures involved prior to commencing digital play session
Go to digital play session area
Bring script and read scene of the day
Get characters for scene and set up scene to the way we want it to look
Set up tripod
Make sure iPad is set up properly – camera fully fixed on scene
Rewatch last scene to make sure we have set up correctly
Once satisfied start digital play session

Procedures involved in data collection

In order to successful conduct action research, it was organised in three stages planning, implementing and evaluating.

The planning phase was the longest and lasted a total of ten weeks. This involved completing several steps such as downloading stop motion studio software and becoming familiar with it by creating digital animation story exemplars prior to introducing it to participants. Once confident that this software could be used and that I had the capability to employ it throughout the study information letters were distributed to parents outlining the study and letters seeking the study was explained to the participants alongside an explanation of the software and what we would be doing with it was articulated. All participants questions were answered, and participant were advised they can remove themselves from the study at any time without need to provide justification.

An additional aspect of the planning phase involved researching and watching an age-appropriate digital animated story with participants, then discussing and reflecting on the process. Once comfortable, participants were introduced to the technology and slow-motion studio app. It was explained to participants that they would be creating a digital animation story together as a group. Therefore, it was imperative that participants were given ample time to try out and play around with the feature of the app to take turns and experiment, investigate and explore. Through this was opportunity to determine current levels of understanding, attitudes, willingness towards using the software.

The final stages of planning involved collectively researching and exploring story topics using class books, stories from memory, and a digital format i.e., YouTube was utilized. The story idea was then developed through class discussions and writing down participants perspectives, visions, words, and reflections. Participant thoughts were organised using visuals which was displayed at child eye level so it could be always viewed. Once an agreement was made on the digital story that would be created, we reflected on the process and changed required parts before starting on writing the script. Using a storyboard, children's drawings, words, ideas and suggestions visually formed the basis of our story. Storyboarding the story allowed for the organisation and reflect of thoughts while developing the whole concept of the story from start to finish. However before commencing important decisions needed to be made such as the sequence in which the story would be told, the main characters, where would it be situated, was it going to be fictional/nonfictional, what was the main plot, what role would each child play.

Phase two, the implementation phase lasted three weeks which included a total of six digital sessions lasting approximately 15/20 minutes each session. While each session was different to each other a similar sequence was followed throughout each session which included using our storyboard and script as guide, setting the scene using props and materials

required for that session and then collecting and creating. Once each scene was finished the scene would be played back and as a group we would reflect on the process and consequence of the overall experiences by asking and answering question such as did we capture what we set out to do, what went right, did anything go wrong. This gave participants the control to reflect on the process, decide if they wanted to restart the session and repeat the procedure with a revised plan.

Data collection was conducted at the end of each of these digital sessions by recording observation in my action research journal, critical instances were recorded as field notes as they occurred, and video recordings were rewatched later and information I felt at the time would be relevant to the study's findings was recorded in my journal. Prior to moving into the evaluation phase all scenes needed to be pieced together to determine if the story needed to be tweaked or did, we need to remove or add images which was done by referring to the storyboard. Lastly, we reflected on the process through open ended discussion.

Phase three, the evaluation stage lasted three weeks which involved evaluating all data collected during data collection. Through evaluation, data was interpreted, and major themes were identified, and findings were conducted to determine if there is evidence of improvement and to offer recommendations for future improvement and next steps.

Data analysis

The data collected throughout digital play sessions, participatory observations, artifacts, and the field notes were analyzed using a six-phase thematic analysis framework identified by (Braun & Clarke, 2006. P. 94). I chose this framework to identify indicative patterns and themes that emerged through data analysis and to safeguard truthfulness of the research conducted as it is best to organize data in an organized way so that identifiable themes that emerge from the vast amount of data collected can be properly labeled (Smith et al., 2009).

Braun and Clarke (2006) require the researcher to familiarize themselves with the body of data.

The first step in this process was familiarizing myself with the entire body of data collected by reading and re reading the observations I had made during the digital play sessions. The video recordings were re-watched several times and respective notes were taken. All data from the video recordings could have been transcribed and analyzed using a transcription app. However, the recordings were only employed in case I was preoccupied and missed a significant occurrence during a digital play session.

Next initial codes were generated by scanning the data line by line, highlighting reflections made throughout the digital sessions, distinctive responses such as children's words and direct quotes, questions asked and making notes so that data could be organized in a systematic way on a separate document whilst keeping the research question to the forefront and the raw data as reference. As a result of employing an inductive analysis and reducing data codes were categorized and identifiable patterns were identified and developed into themes and subthemes (Cohen et al., 2018; Smith et al., 2009). The mentioned process was followed for all data analysis to support the quality and rigor of the study.

Lastly, the final themes and subthemes that emerged were further refined and additional analysis was completed to ensure that firstly each theme provided explanation that would contribute a rich thick description towards answering the research question and providing a narrative account of participants interpretation (Creswell, 2007) and secondly that the data supported the developed theme and subthemes (Braun & Clarke, 2006).

Quality and rigour

While quality and rigor in action research can be harder to measure than in quantitative research Guba & Lincoln (1994) suggest that in order to establish quality and rigor in qualitative action research credibility, confirmability, transferability and dependability

subsequently must be adhered to.

Through an inductive process of thematic analysis to conduct analysis I have granted others to acknowledge the experience and perspectives of participants throughout the findings chapter which defends the credibility of the research study (Smith et al., 2009; Braun & Clarke, 2006). Due to my prolonged engagement with participants and repeated observations throughout the action research it illustrated consistent findings which safeguarded the integrity of research conclusions (Denzin, 1989; Lincoln & Guba, 1985). My own positionality within the research was established early in the study therefore all procedures throughout the study were acknowledged with focus on reflexivity and reflection. My own personal and professional perceptions, values and beliefs was brought to the fore of the research (Bryman, 2016). However, measures needed to be put in place to safeguard dependability, this was addressed by ensuring that the same method was applied for both data collection and analysis while and, as stated above, I was aware of my own bias during analysis to preserve credibility.

Transferability can be difficult with qualitative research as the study is usually not designed to be replicated (Lincoln & Guba, 1985). While the findings from this study were not intended to be generalized (Polit, 2010) the thick descriptions, experiences and understanding interpreted by participants could be transferred to the rest of my service to generate knowledge that may be useful for my fellow colleagues to identify how to integrate digital technology as a pedagogical tool into pedagogy to enhance children's learning experiences which in turn will preserve the trustworthiness of the study. Lastly, confirmability was preserved by being aware of my own dispositions and avoiding prejudice by checking and recking the data throughout thematic analysis and ensuring findings can be linked back to the original collection of raw data to confirm thick descriptions and interpretation corroborated by participants (Guba & Lincoln, 1994; Creswell, 2007).

Ethical considerations

In any research study it is vital that ethical considerations are considered throughout the whole of the research. Potential issues and probable risk must be reflected on, and measures must be taken to safeguard rigour so that research can be conducted to a high standard. As with any study but particularly studies which involve vulnerable people, for example, children it is paramount that all participants are honourable protected. This involved the protection of anonymity, confidentiality, reciprocity and minimising harm (Hammersley & Traianou, 2012) alongside completing ethical procedures affiliated with National College of Ireland.

To minimise the risk of harm I ensured that all participants assent and their guardian's consent to the study was obtained before research was conducted. Additionally, as the study involved children, I acted in accordance with my settings policies and procedures alongside the regulatory principles stipulated in the United Nations convention on the rights of the child (UN, 1989) and the children's first guidance act (Government of Ireland, 2015) to maintain each child's safety, protection and wellbeing while respecting their rights and wishes throughout this research study. Stipulation was clearly made several times that any participate that wished to withdraw from the study could do so without prejudice or needing to justify their reasoning. There were two additional staff in the classroom that had supplementary activities planned to complete with participants who wished to decline in taking part in the study.

The mental, emotional and physical welfare of all participants was carefully taken care of throughout all stages of the research with integrity (O'Leary, 2017). Whereas anonymity was fortified and addressed throughout the whole research and transcribing process by blanking out names and location of participants to not implicate their identity and all data will be store in a password protected folder on my own NCI student password protected storage cloud warranting confidentiality.

Ethical considerations procedures were completed and approved by National college of Ireland prior to the undertaken of the study. The mentioned procedures were the guiding principles throughout the research process with a significance towards the protection of anonymity, confidentiality, reciprocity and minimising harm of each participant.

Limitations

Due to the flexibility of action research and the use of observations to collect data it is very difficult to replicate, making generalization a massive limitation (Polit & Beck, 2010). However, while this study sought to gain rich subjective understandings, experiences and perspectives from children within my own ECEC practice (O'Leary, 2017) these was never an intention to generalise finding further afield. Nevertheless, findings may be transferable to the rest of my service by generating knowledge that may be useful for my fellow colleagues to identify how to integrate digital play into pedagogy.

An additional limitation to action research was that it may be complicated to structure in an ethical manner as participants may feel pressured to participant in the study because of the relationship they hold with the researcher. To neutralise this risk the I sought the permission from both the participants guardians and the participants themselves (O'Leary, 2017). Additionally, it was stipulated several times throughout the study process to participants that they could remove themselves from the study at any time if they wished which some participants chose to do and went and completed separate activities with other staff in the classroom. However, being the teacher in the classroom and having developed a trusting relationship with the study's participants I found this to be an advantage to their willingness to take part in the study. To avoid bias and prejudice I was aware of my positionality throughout the whole of the research and constantly reflected and acknowledge on my values, beliefs and attitudes through reflexivity (Mukherji & Albon, 2018).

Conclusion

This chapter outlined the main elements of the research study together with providing a

rationale for selecting the methodology, data collection and the use of thematic analysis to answer the studies research question. The paradigmatic and philosophical foundations that underpinned the research approach was explored, and the ontology and epistemology perspectives were discussed and validated. Additionally, the selection of participants and my own positionality within the research was justified. Lastly, quality and rigour, ethical considerations and limitations to the study have been outlined and addressed.

Chapter four: Findings and Discussion

Introduction

This chapter presents the main findings and discusses them in light of other research. The aim of this action research was to investigate and gain insights into how I can integrate digital technology into my ECEC setting. Specifically, I wanted to explore how I can use digital technology as a pedagogical tool to enhance children's learning experiences in my early childhood education setting.

These findings are based on data analysis using data collected during the duration of the research using observations, video recordings, created artefacts and my field notes recorded in my research journal throughout the course of the action research including digital animation sessions. This included reflections and learning as recorded in my research journal during my own preparation for the study, planning for the intervention within the curriculum, implementing the intervention (selection of the story, creation of props and constructing the narrative) and finally evaluation (Digital animation sessions) of the intervention of constructing the story.

After reviewing the data, I coded information to determine and identify recurring themes across all data significant in answering my research question. This is organised chronologically to how the action research unfolded in order to answer the research question and the study's objectives. Which were the preparation phase, implementation phase and evaluation phase. Findings were present in chronological order to form a logical sequence without bias from myself and to allow the reader to interpret the information in a more comprehensible arrangement, see figure below.

Theme	Phase
Researcher participation	Preparation, implementation, evaluation
intervention activity	Planning & implementation
Children familiarity with technology	Planning & implementation
Opportunities for learning	Planning & implementation
Role of educator	Preparation, implementation, evaluation
Interest in using technology	Preparation, implementation, evaluation
Communication	Preparation, planning, implementation, evaluation
Story development	Preparation, planning, implementation
Constructing the narrative	Preparation, implementation, evaluation
Challenges faced	Preparation, implementation, evaluation
Creative skills	Planning & implementation
Opportunities to problem solve	Planning & implementation

Researcher Preparation

Lack of confidence in using digital technology: During the initial stages of planning, it involved my own independent research of how I could use digital technology to integrate digitally animated stories as a pedagogical tool in my ECEC classroom. Initially, I had doubtful thoughts about using slow motion app as it was a digital tool I had never engaged with prior to this research. My current reflections in my research journal currently stipulated "*not fully confident with software*" with another journal entry specifying "*not feeling confident in what I am doing is right*, *having a lot of self-doubt*".

Engaging with contemporary literature and exploring how others have used digital apps in their studies such as Cremin (2018), Fleer (2020 and Undheim (2022) allowed me to gain insights into my role as an educator throughout the action research alongside inspecting

exemplars for the steps and procedures involved in the creation of digital animation. For example, digital pedagogy is defined by Croxall & Koh (2013) as the use of electronic elements to enhance or change the experiences towards education and as an innovative method of teaching (Centre for Digital Humanities, 2013). However, while digital pedagogy is seen as a modern approach to how curricula is implemented in early childhood education how it is used and for what purpose needs to be properly considered as it will have a direct effect on children's experiences in their learning environment as well as children's development, learning and wellbeing (OECD, 2018; Shuey et al., 2019).

Manipulating the slow-motion app by practicing creating short digital stories enabled me to become more confident with the software and defined my understanding of how the app could possibly be used as a pedagogical tool. The lack of confidence of using digital tools by ECEC educators is also observed by other researchers (March et al., 2017; Anisimova & Ibatullin, 2018; Marsh et al., 2017; Ahtarieva et al., 2018).

Preparation – planning phase

The planning phase was the longest aspect of the entire action research, it involved various activities with children throughout the five weeks which comprised of numerous steps and preparation to bring the animation story from an idea to real life. These steps included introducing the activity of using digital technology to develop a story, selection of a story to digitally animate, preparation of props and finally digital animation.

Introducing the intervention activity

This phase included introducing the children to the study and informing them about the digital story. Starting off to gather some information questions were asked such as, who has a digital device at home and what did they use it for? Do you like using it? Why? Does anyone use apps on their iPad? If so, which ones? Do you learn anything from it. There was a consensus that technology was used mostly to watch Netflix and YouTube, whereas the

games played were Fortnite, ABC pets, candy crush and painting apps. From this I discovered that children used technology mostly for recreational reasons that held limited educational benefits and that games children were engaging with were not appropriate for their age which fits in with preceding research (Radesky et al., 2020).

From this, I went on to explain that stop motion was an app on the iPad that can be used to make a story that stays inside the iPad. As children did not seem to comprehend what exactly this indicated I referred to the children's favourite book "were going on a bear hunt". Using the iPad and YouTube I found the story in digital animation form and played it for the children. Stopping the video at various parts we spoke about the art materials and resources used to retell/create the story. This had more of an effect on their understanding as they visually could see what was been spoken about.

It was explained that an area would be set up in the room for the digital story to be created and at this time all children were encouraged to take part in the digital animated sessions. However, it was articulated that it was also okay to refuse participation and move onto another activity within their classroom with the other educator's. A digital session area was set up at the end of the classroom and children knew this was the designated area.

To further extend on children's understanding slow motion animation was introduced as a large group activity however we were quickly presented with challenges, one being that due the number of children it was difficult for each child to get the chance to accurately engage with the app.

18th April journal entry *"slow motion app explored today found this difficult with 19 children and only 1 app. Children took turns, but it got very loud, and children got over stimulated. Aim for next session: Reflect on alternative ways to explore app, possibly use smaller groups/ download app on additional tablets/ ask parents to download app to home"*

To combat this issue, I reflected on the experience to find a solution to minimise this problem. Solutions involved, breaking the class up into smaller groups, setting up everything in advance of the children's arrival to preschool and using additional apps with slow motion app installed. As a result of implementing the above, it resolved the problem and gave each child enough time to investigate, discover and consequently make their own observations and theories of the app. Throughout this phase most of the children took part which I discovered was because it was something new introduced within the classroom, and because it involved technology.

An entrée I wrote in my reflective journal on the 24th of April *"unexpected outcome was children's ability to access and initiate the software independently with little assistance or prior use. Using Smaller groups gave children the space and time to explore which ended in a creation of a simplistic digital animation which shows me that the power of opportunity to act or take charge has massive advantages to children's and teachers learning and development on the topic of digital technology"*

This instance is likewise recorded in former research that indicates that when given the opportunity, digital technology will provide children with the time to explore which potentially will empower them to take charge of their own learning by becoming leading actors in their inquiry (Fleer, 2020; Vartiainen, Leinonen & Nissinen, 2019).

Childrens familiarity with technology: Reflection on this instance firstly demonstrated to me that children as young as four years of age are familiar with and can use technology such as iPads, particularly for playing games. Adding to the discourse that children today are exposed to digital devices at a younger age than previous generations (Chaudron et al., 2018; OECD, 2019). Additionally, children's openness to the novelty indicated that even though technology was never used before for creating digital stories children are willing to try new things without knowing, once it fits in with their current interests and learning needs. This indicates the integration of digital technology as a pedagogical tool has the potential to

motivate children's willingness to learn essentially leading to the natural development of positive learning dispositions. Childrens ability to approach situations in learning environments in an intelligent manner by applying positive learning dispositions is likewise observed by other researchers (Carr, 2001).

Opportunities for learning during the co-construction of the story

Through the co constructing of the digital story children were presented with ample opportunities for learning. A conversation I recorded overhead between two children in the digital area reflects the above statement.

C1 "teacher said we are using the iPad to make a story"

C2 smiling at C1 "I don't know how to make a story on the iPad"

C1 "teacher said she is going to show us" "I am going to make my story about a pterodactyl" "do you want to help me make it together"

C2 "ye because I don't know how to make a story"

C1 "we get to use the iPad" "I've never used an iPad in school before"

C2 "I never used the iPad to make a story ever before"

C2 "I saw a dinosaur on my mams phone before, but it wasn't a story it was just a picture"

C1 "I have a dinosaur game on my iPad at home and he eats grass and walks around, and he even fly in the air" "but I don't think it's a story I think it's just a game".

This instance indicated that this process has the potential to provide children with the opportunity to be innovative in their thinking and to display their potential through a creative process. Additionally, observations made while children collaboratively explored demonstrated that taking photos has the potential to boost children's self-esteem and learn a new skill. For example, taking photographs has the potential offer valuable learning experiences that aids children's learning towards the cause of effects of taking photos, understanding what position the camera needs to be faced, and where objects need to be placed. Specifically, by children collaboratively exploring with the device to take photos,

they discovered the picture taken of their funny face stayed on the screen even after they had moved. Video recording captured this dialogue which entailed.

C1 "hahahha "C" I can still see you" "look teacher look teacher "C" is still on the picture".

Teacher "wow, so he is, how is he still there?"

C "I pressed this, and he just stayed there I think he is stuck there forever (laughing)"

C2 "yea I saw him do it"

Teacher "well I can see "C" standing right beside you so I don't think he is stuck in the iPad" "do you want to try do it again and see if we can take a picture of someone else" "do you want to get in the picture this time".

C1 "no I'm ok I don't want to get stuck in the iPad"

Teacher "C2 do you want C1 to take a photo of you"

C1 "do a funny face in there (pointing at the lens with his finger)"

C2 "(moving around to the front of the iPad) can you see me?"

C1 "yea do a funny face"

C2 "press the button when I say so" "ok go"

C1 "hahahah look teacher C2 is making a funny face" "look C2"

C2 "let me see, hahahah can I do one now"

Since children were provided with the opportunity to use the digital tool to take photos of things, they were interested in I discovered that participation for learning was increased. This links in with existing theory that suggests children need to have a hands-on opportunity in activities in order to learn and construct meaning from the activity (Piaget, 1955; Rogoff, 1990). Therefore, by acting on their own investigations and being fully engaged in their own learning they were active learners in their own inquiry which can support developing skills such as patience, turn taking and concept of self, which is observed by other researchers (Mayer & Wittrock, 2006; Fleer, 2020). While also demonstrating that the role of educator in this instance is to give children enough time to explore and learn for themselves with the digital technology so to empower them to become leading actors in their own inquiry (Fleer, 2020; Leinonen & Nissinen, 2019). By allowing children to experience for themselves and

take ownership they are intentionally constructing their own meaning to their experiences whereas seeing the pictures they have captured may provide them with a sense of mastery and accomplishment (Piaget, 1955).

Interest in using technology

Children displayed an immediate interest to engage with technology from the very start. Leaning on Siraj-Blatchford et al (2002) theory of pedagogy in this instance I used instruction as a pedagogical strategy to use the iPad and the slow-motion app. I suggested for one child to stand in front of the camera sidewards and instructed another child to take a photo, the child was then asked to move forward slightly by taking a small step and then we took another photo. We repeated this process until the child crossed the camera screen and vanished from the frame completely. Consequently, this demonstrated that by using instructional techniques and strategies it will allow learning to take place through interactive processes between the educator and the children to provide the opportunity for the acquisition of skills, such as knowledge, learning dispositions and attitudes (Siraj-Blatch et al., 2002, p.28).

Co-constructing the digital story allowed for children to engage in communication

Childrens curiosity towards the use of digital technology was conveyed by asking questions. This was highlighted in my fields notes 24th April *"Children had the ability to express their thoughts and ideas through words and asking questions during today's session. Questions children asked – why C is not moving he looks very funny standing like that, is C frozen, what will happen when C gets to the end, is C going to walk all the way to the end of the class, look teacher C is nearly gone off the tablet.*

From this instance it indicated to me that children obtain a sense of wonder towards using digital technology further demonstrating that as a pedagogical tool technology can aid in development of the phenomenon and that in partnership with adults' children will develop

and nurture their sense of curiosity, wonder and awe (Fleer, et al., 2014; NCCA, pg.17). Additionally, research suggests that children who have more experiences consume greater vocabulary development, consequently making them better prepared to learn (Connor, Morrison & Slominski, 2006). Through this experience children used vocabulary such as frozen and not moving that would not necessarily be words used every day within the classroom. Additionally asking questions and getting answers regarding what was happening allowed for the potential development of new concepts to be brought into the classroom. This experience, therefore, scaffolded on children's capabilities, for example, the ability to describe experiences that they may already encounter in their everyday lives but previously did not exhibit the right words to do so. For example, explaining that if someone is not walking it does not mean they are frozen it simply means they are not moving at this time.

An additional example of children expressing language was directly after finishing our pilot session when we pressed play back on the video came a stream of laughter (See Appendix. I) and questions were asked "how did you do that, can I have a shot, I want to do that". Using this example, it was explained to children that these would be the steps we would undertake to create our story.

Through the means of replay, asking and getting answers to their questions it indicated to me that children held a more established understanding of what they were being asked to do which gave the digital story creation a new sense of meaning. For example, giving the children the opportunity to re watch their play allowed them to develop a more complex understanding of their social practice. This indicated to me that technology supports children process of investigation allowing their ideas to unfold even if they are initially inaccurate. Additionally, this process encouraged children to start imaging and thinking about the tools needed for their story while also developing understanding towards the rules and assigned roles they would have to consume within the creation of the story. The use of digital

equipment in preschool to support children in their play to make the rules, assign roles and take actions is observed by other researchers (Fleer, 2020).

Implementation

The implementation phase involved the selection of the story, creation of props, constructing the narrative and storyboarding the digital story. This presented children with the opportunity to play a more active role towards the creation and construction of their digital story.

Story development – this stage involved steps such as collaborative discussions about storytelling, story boarding, script writing, creation of characters and setting the scene all of which was done throughout the digital animation sessions.

Story structure regarding the start, middle and end of a story was spoken about and explained prior to any child telling their story. Books that children were familiar were used to demonstrate the above requirements. It was through this method that we were able to distinguish the name, plot, structure and characters of the book.

Although this process at the time appeared unorganised, to bring order, children were given time one by one to tell their own story. Before starting, children were prompted to focus on the story structure in terms of the start middle and end. Additionally, asking probing questions related to the plot of the story, what would the title be, what would they pick from the materials in the class as the characters and what would the story scene look like was used to encourage children to expand on their thinking and language development. While all children got the opportunity to tell their story and instinctive observation made was that some children simply repeated what their peers had vocalised. My observational reflections on this matter articulated

"Although some children copied their friend's story as their own, I was satisfied that all children understood the structure in terms of the start, middle and end of a story as well as the plot of the story and, it is making sense".

This instance showed me that children will impersonate their peers to develop and scaffold on their current concepts which fits in with Vygotsky's (1978) theory of ZPD that the distance between actual development and potential development is determined by collaboration with more abled peers and educator.

Another observation recorded in my fields notes was

"*Majority of stories were based on aspects of stories read before, movies watched, tv shows and children's current interests".*

When reflecting on this process and looking for familiarities in each of the children's stories I noted in my field notes

"Dinosaurs, princess and barbies were mentioned the most"

It would now need to be determined if *"these characters would be the strength and basis of the story"* journal entry 26th April.

Through the development of this phase, it indicated to me that my role throughout was to listen and write down children's vocalised thoughts, visions and views on storytelling. Demonstrating that social constructivism is in fact very relevant to how children learn as it is built upon the hypothesis that learning is a constant social process which takes place within cultural contexts (Vygotsky, 1978).

Creation of characters – Throughout this process children created images of the characters they wanted to include in their digital story (See Appendix. D). By using digital technology children were encouraged and given the opportunity to researched princesses, castles,

dinosaurs and a prince and after many collaborative discussions and deliberating back and forth amongst each other they picked and printed out which ones best suited their story which positioned children as the creators of this creation process (Undheim, 2020; Fleer, 2020; Hatzigianni et al., 2020). Through this construction it illustrated that children were developing a more structured understanding of story creation at the same time stirring them away from consumers of technology to producers (Fleer, 2020). Which may be the reason why and how children had the confidence to very clearly express how they wanted the scene to be look like, for example

C1 – "so, there will be a sky that will be blue and there will be grass, we can use the pretend grass, and there will be trees"

C2 – "there is trees in the dinosaur box" (runs to the box).

C2 "this is the princess, and this is the prince"

C3 "and this is the dinosaur"

C3 "the castle can be there"

C1 "and the road can be here, and it can be a long one"

This conversation between children indicates that through processes such as creation of characters will potentially aid in the development of human thought and language as it brings further explanatory to children's current concepts. For example, children exited the digital session area to retrieve characters from their classroom toys to roleplay as the characters of the story (See Appendix E). The development of concepts through activity is observed in literature through Vygotsky's (1986) theory of sociohistorical learning. Using the characters as reinforcement, the children collectively were able to envision and construct the stories scene it in the moment. The use of roleplay to support active learning that is centred on children's social experiences is highlighted in previous research (Wagner, 2003)

Constructing the Narrative

The creation of our story was an instance of a critical moment which erratically occurred while the children were eating lunch.

"*Four children sitting eating lunch started talking amongst themselves about their story which involves a dinosaur, princess, castle and a prince*". – journal entry

Two more children involved themselves in the conversation and nearly without releasing an outline of their story was established. While the basis of the story involved a princess trapped in a castle by a dinosaur who was then saved by a prince before living happily after. The initial narrative was scattered before I intervened and refined children's thinking. The following conversation was recorded on the iPad using the pre-installed video recording app.

C1 "a princess was walking up the street"

C2 "Princess need castles to live in"

C3 "the prince saves her from the castle"

Teacher "from what"

C3 "the castle"

Teacher "we know she is in the castle, but how did she get there? Who put her there?"

C4 "the dinosaur"

Teachers "where did the dinosaur come from"

C2 "the road"

C5 "the same road the princess is on"

Teacher "ok so if the prince is going to save the princess something needs to happen to her"

C2 "the dinosaur captures her"

C1 "and flings her into the castle and locks the door"

C3 "with his tail"

C5 "yea because he is a t rex, and his hands are too small"

C6 "it's a pterodactyl"

C3 "no it's a t-rex"

Teacher "ok let's remember we need a start, middle and end. what's the start" "how do we start a story"

C1 “once upon a time”
Teacher “yesses, brilliant. Ok let’s go from the start, once upon a time”
C1 “there was a princess walking up the road
Rest of script (See Appendix F).

While the outcome of the children creating and agreeing on a rough script was achieved this occurrence indicated to me that specific activities related to storytelling and class discussions need to be completed repeatedly over time to achieve desired outcomes. I was very aware that my role in this circumstance was to instruct and facilitate children within their current capabilities towards the art of storytelling and providing them with appropriate story structure techniques. Furthermore, it was paramount I reinforced and scaffold on children’s skills so that they could create a story so that it was appropriately constructed, was unique and made sense to them. For example, children at the end were able to give explanation for why the start is the start and why the end is the end by saying,

“Every story starts with once upon a time and if we say they all live happily ever after it has to be the end”

This further demonstrates that children when given the right tools and guidance, such as instruction, will go through a learning process to develop a clear understanding towards the rules to the structure of storytelling. Preceding research relates to this by stipulating story creation opens new possibilities for children to learn (Undheim, 2022). More specifically, with the inclusion of technology children will go through the process of learning about photographing, editing videos, recording voice overs and creating animation. Which ties in with Vygotsky (2004) theory that play, and creativity are critical to children developing new skills, knowledge and understanding.

Storyboarding - The story board was assembled by children using researched images, creation pictures, words and story script. Once completed it provided children with the whole

concept of what they had created and what they were about to digitally create (See Appendix. G).

Reflecting on this process, it indicated to me that a consequence of creating a story board it induced children to actively think and talk out loud to express their feeling and thoughts about their story. Which as a resulted lead to the sharing of knowledge, communicating with peers, acting out scenes with their peers, and collectively telling the story to each other by pointing at images on the storyboard (See Appendix. H). Supported by literature this experience suggests that children's social, physical, emotional, cognitive and creative skills can be fostered through this style of play pedagogies (Parker & Thomsen, 2019). As such, activities like storyboarding are tools that be used by educators to facilitate children development towards necessary holistic skills required in order to learn. Which further indicates, with support from literature, that if given the opportunity children will gain knowledge and skills through this type of pedagogy approach as it promotes active learning to apply their creativity by themselves to the development of their own animation (Gao,He & Shang, 2019; Melinda, 2011; Kervin & Mantei, 2016; Palaiologou & Tsampra, 2018).

Furthermore, this instance indicated to me that initially educators need to play a more supportive role to facilitate children's understanding towards a learning experience and then take a lesser role once children become more confident as a result of their experiences within the learning, which is the kind of scaffolds that need to be put in place for children to become independent learners Vygotsky, 1978). This is observed in previous research that states digital technology can not only be used as a pedagogical tool to scaffold on children's learning with regards to them seeing themselves as future designers, innovators, engineers but also for the promotion of scientific inquiry and investigation (Hamlin & Wiseski, 2012; Hatzigianni et al., 2020). By the way of children initially learning about digital storytelling, the concepts involved, listening, explaining, asking questions and then testing out ideas it can

be indicated that they were directed through a scientific process in which scientific attitudes were developed. Therefore, resulting in a developed plan due to the generation of new information and knowledge (Hamlin & Wisneski, 2012; Fleer et al., 2014).

Challenge faced

One challenging aspect within this phase that I was faced with was removing myself as educator within the research. I recorded this reflection in my research journal stipulating,

"Certain children who were originally passionate about their story had zero interest in expressing ideas and thoughts today" Journal entry 28th April.

This was disputing to my values as an educator, however through reflection I noted in my journal

"I wondered whether this was because we had not used the iPads in a couple of days or was it just that children had lost interest in the story. I plan to monitor this and will be eager to see if children return when the iPad comes back into the sessions". - Journal entry

Conversely, as an educator and understanding the process of action research and being was aware that my positionality within this study was to facilitate and simply guide children in the decision-making process, not influence it. I therefore respected children wishes not to participate.

Evaluation – Digital Animation Sessions

The final phase of the digital animation sessions involved the construction of the digital story. Through this phase evidence of children enhancing their learning towards their communication skills, creative skills and opportunities to problem solve were most apparent. Challenges faced throughout this phase involved children leaving the digital animation sessions. Through reflection I determined that this activity potential did not meet their learning needs at this time, and they possibly may return to the digital sessions later.

Communication – throughout the digital animated sessions children asked questions and expressed their own opinions. It was through this that they were able to organise their ideas and construct narratives. A result of me asking open ended questions and prompting children to explain their thinking further and make their own predictions of what they thought would happen further promoted children to use language.

One instance that kept rising throughout the research was how many movements needed to take place for the object to get to where it needed to go. This was a consistent topic children spoke about and deliberated in. An entry in my reflective journal captured this moment as

"a child who doesn't normally use language to communicate displayed a vast range of vocabulary through the digital session to predict with her peer how many movements it would take them to get the dinosaur to the castle"

This demonstrates that digital technology when used as a pedagogical tool has the potential to develop voice and facility in children. Additionally, through collaborative use it has the capability to support and strengthen children's self-expressions through language, while giving them the ability to see themselves as content creators due to becoming storytellers. This process also indicted to me that when children support one another through constructive feedback, effective communicating and actively listening a sense of trust is developed within the group which will give children a sense of empowerment to voice their opinions as they feel their perspective is being respected (Gillies, 2003; Johnson & Johnson, 2009)

Journal entry – *"while it's great to use technology for the promotion of language development, it is equally important for face-to-face interactions".*

This links in with literature that suggests the use of digital technology in early years practice should not replace talking and playing nor should it be deemed as the overarching objective to supporting holistic development. It should however be applied as an expansion to the overall curriculum approach to afford children the opportunity to learn that will positively impact their development and lifelong outcomes (Cheng et al., 2015; Edwards et al., 2020; Marsh et al., 2005; 2014; O'Connor, 2016; Undheim, 2022). In this instance, it was indicating to me that this process has the potential to encourage and enhance children's communication and language development.

Creative skills – this research process indicated to me that digital technology used as a pedagogical tool has the potential to enhances children's creative skills. Creativity was evident throughout the whole research and consequently at the end with children developing the competence to use the slow-motion app enabled the construction of a make-believe story about a dinosaur and a princess. Creativity and creative thinking were promoted by watching digital animated videos on YouTube, making our own short digital stories, taking photos and drawing pictures. The key features that fostered creativity was the inclusion of open-ended activities which enabled children to experience for themselves and focus on the process rather than the product. By using prompt questions, it stimulated opportunity for myself and the children to explore further with the resources which in turn fostered the co production of a digital story.

The above is observed in research for instance, Edwards (2013) study conditioned that the only way teachers can bridge the gap between curriculum and technology is to understand the culture context of children and how this can be related to the development of creative thinking skills. Therefore, this is indicating that from children engaging in critical reflection using digital spaces, having a well-designed digital story with clear aims and subject knowledge has the potential for digital technology to be integrated alongside traditional

approaches to enhance creativity and lead to the development of creative skills. Which links in with previous research (Marsh et al., 2016).

Opportunities for problem solving - During the research process the children were presented with problems that they needed to solve as a group by working together. Due to the exploratory nature of the inquiry the digital animated session did not present children with predetermined solutions or answers therefore this led to engaging dialogues of opinions and sharing ideas in order to integrate resolvable solutions. For example, children had to work together to create their story, to decide which characters to use, and to decide which child carried which role throughout the story creation sessions. In order to reach common ground and referring to literature to support reflection children were required to engage in discourse and work together to consider all opinions before being able to resolve problems presented to them throughout the research process (Grau et al., 2018).

While this type of process could positively impact children's conceptual development it also indicates to me that it has the potential for the development of children's higher order thinking skills, for example, consuming the capacity cognitive ability to make their own interpretations to their experiences and essentially go beyond information given (Cohen et al., 1989; Gillies & Ashman, 1998).

Additionally, these examples demonstrate to me that educators' play a key role towards facilitating such exchanges in ECEC settings. For example, by using guided questions such as what will we use to get the feet to stick on the road? how will the prince get into the castle to save the princess? where will the dinosaur be? how will the prince know the princess is trapped? supported children in becoming critical thinkers and deliberate problem solvers. This then gave them the tools to go through this process independently further on in the research by generating their own questions in order to then solve their own problems with

little assistance from me. This example is indicating to me that digital technology has the potential for the development of problem-solving skills and higher order of thinking in young children. Which is supported by current literature that asserts through reflection and collaborative relationships where participants are effectively working together, they will identify, define and solve problems (Johnson & Johnson, 1999; Gillies, 2016).

Challenges faced

Early into the digital animation story sessions some children decided to leave and not participate. My Observation on this incidence was recorded in my field notes as *"some children lost focus, disengaged and abandoned the digital story"*.

This resulted in me going through a reflection process on the suitability of the digital technology and its purpose as a pedagogical tool (Vidal-Hall, 2020; Jack & Higgins, 2019). Other aspects I partitioned on was weather it was boredom to having to wait for their turn in the session that made them leave or was it something as simple as being distracted by their peers who were engaged with other play activities within the classroom. Confusion was another aspect I thought about and perhaps they did not fully understand what it is we were doing. However, while there were other children who very eagerly wanted to engage with the technology, I concluded that maybe this activity did not meet the age and stage of their development at this time and will leave it up to them to re-enter with the sessions later.

Conclusion

In answering the overarch research question "how can I include digital technology as a pedagogical tool through the use of digital animated stories in my ECEC setting to enhance children's learning experiences" findings from data analysis of the data collected as well as an embedded discussion supported by wider literature was presented within this chapter.

The key finding suggests that when manipulated in an intentional and developmentally appropriate manner together with being affiliated with children's current interests' digital

technology can be used as a pedagogical approach that will allow educators and children to collaborate in various ways such as exploring, inquiring, creating and processing. (Edwards et al., 2020; Fleer, 2020). Furthermore, it has the capability to support children with an interactive multisensory affordance that will enhance their learning experiences and support holistic development (Cheng et al., 2015; Cunningham et al, 2016; Edwards et al., 2017: 2020; Marsh et al, 2016).

Using digital technology to enhance children's learning opportunities was evidential throughout the action research phases, particularly their amplified aptitude to investigate, ask questions, and their continuous contribution to the construction of the story and scene development. Which supported development towards communication, language, creative, and problem-solving skills as well as a heightened eagerness to participate in future digital storytelling activities (Prasetya & Hirashima, 2018).

Specifically, using stop motion app as a pedagogical approach empowered children to actively learning through an explorative inquiry and creative process. As well as manipulate developing skills such as the sharing of knowledge, communicating with each other and working together in order to generate new intelligence. Therefore, making stop motion an ideal pedagogical tool for children to further learn and develop through this type of play (Gao,He & Shang, 2019; Melinda, 2011; Kervin & Mantei, 2016; Palaiologou & Tsampra, 2018).

However, a key finding in answering my research question was that the role of the educator needs to be taken into consideration as findings from this research collectively agrees with contemporary literature that suggests early childhood educators endure barriers and challenges when integrating digital technology into ECEC practice (March et al., 2017). Although I confidently use digital technology in my personal life, I relied on a body of literature to educationally inform myself on how to use digital technology as a pedagogical

tool to enhance the learning experiences of the children in my ECEC classroom. Therefore, based on my research findings I believe that digital technology should be introduced to children through fun, interactive and appropriate ways that fit in with children's current interest and learning needs so that children are warranted the opportunity to participate in activities that provision their willingness to participate, learn, and through investigation figure out for themselves (Jitsupa et al., 2018). For example, using slow motion app to create digitally animated stories provide the opportunity for children to engage in creative thinking processes and develop concrete concepts (Melinda, 2011). Consequently, digital technology as a pedagogical tool encourage children to share knowledge, communicate, and work together at the same time as promoting active learning as they are given the opportunity to apply their creativity by themselves to the development of their own animation (Gao,He & Shang, 2019; Melinda, 2011; Kervin & Mantei, 2016; Palaiologou & Tsampra, 2018).

Conclusion

This chapter concludes the research study which sought to answer the research question "How can I include digital technology as a pedagogical tool through the use of digitally animated stories in my early childhood setting to enhance children's learning experiences". The rationale for undertaking this research was influenced by my role and experience as an early childhood educator and observations of young children using digital technology. I noted that children's interests were streaming from their home environment. Whereas a personal interest I possessed was to gain insights into how digital technology could influence

children's learning when used meaningfully, so that digital technology could be used going forward for teaching and learning in my childcare setting.

The aim of the study was to integrate digital technology into my ECEC setting through co constructing digital animated stories and explore how this technology supported children's learning experiences. The three objectives that were referred to throughout the study to meet the aim, purpose and to answer the research question were, to explore how I can use digital technology as a pedagogical tool through co-constructing digitally animated stories, to identify children's responses to the co-construction of digitally animated stories in early childhood education, to determine if digital animation can be used as a pedagogical tool to enhance learning experiences in early childhood education.

To gain deep and meaningful insights, a qualitative action research approach located in an interpretative paradigm was deemed most suitable as it aligned with the exploratory nature of the study. McNaughton & Hughes (2009) suggests that "action research creates meaningful change through the process of several cycles of think-do-think (pg.3). Whereas Stenhouse (1981) stipulated "it is the teacher who in the end will change the world of the school by understanding it" (p.104).

As I sought to make changes to how learning opportunities were presented to children in my own ECEC classroom action research was deemed most appropriate as it safeguarded that any knowledge generated within this study would have an immediate effect on the participants learning experiences within their ECEC classroom.

Following thematic analysis of the data, Information which was collected from observations, video recordings, created artefacts and my field notes was coded to determine and identify recurring themes across all data in which I felt would be significant in answering my research question. This was organised chronologically to how the action research

unfolded in order to answer the research question and the study's objectives. Chapter four presented a comprehensive discussion of these findings in the context of wider literature and addressing the research question.

In terms of quality and rigour Chapter three addresses the limitations of this research study for example, while this action research study sought to gain rich subjective understandings, experiences and descriptions from participants experiences, findings could not be generalised (O'Leary, 2017). Nevertheless, due to the value and richness of the data discussed in Chapter four findings can be transferred to my fellow colleagues to generate knowledge in relation to identifying how to integrate digital technology into pedagogy. The implications of the findings in educational practice and policy are comprehensively discussed in this concluding chapter together with recommendations for practice, policy and future research.

Overall Conclusion and Contribution

The main conclusions drawn from this research study based on the findings discussed in Chapter 4 indicates that digital technology when manipulated in an intentional and developmentally appropriate manner and affiliated with children's current interests can be used as a pedagogical approach that will allow educators and children to collaborate in various ways such as exploring, inquiring, creating and processing. (Edwards et al., 2020; Fleer, 2020). Furthermore, it could support children with an interactive multisensory affordance to enhance further in their holistic development (Cheng et al., 2015; Cunningham et al, 2016; Edwards et al., 2017: 2020; Marsh et al, 2016).

Using digital technology to enhance children's learning opportunities was evidential throughout the action research phases, particularly their amplified aptitude to investigate, ask questions, and continuous contribution to the construction of the story and scene development. Which indicated that learning was supported towards communication skills,

collaborative skills, language development and problem-solving skills as well as a heightened eagerness to participate in future storytelling activities (Prasetya & Hirashima, 2018). Specifically, using stop motion as a pedagogical approach empowered children to manipulate developing skills such as the sharing of knowledge, communicating with others and working together in order to generate new intelligence. Therefore, making stop motion an ideal pedagogical tool for children to further learn and develop through this type of play as it promotes active learning through an explorative inquiry and creative process (Gao,He & Shang, 2019; Melinda, 2011; Kervin & Mantei, 2016; Palaiologou & Tsampra, 2018).

The role of the educator needs to be taken into consideration as findings from this research collectively agrees with contemporary literature that suggests early childhood educators endure barriers and challenges when integrating digital technology into ECEC practice. With an agreement that a lack of knowledge, skills, abilities, funding, resources, self- confidence and equipment are the main causes (March et al., 2017).

Although I would confidently use digital technology in my personal life, I relied on a body of literature to educationally inform myself how digital technology could be used a pedagogical tool to enhance the learning experiences of the children in my ECEC classroom which is comprehensively outlined in Chapter two. Consequently, teacher training needs to be provisioned on how to effectively use digital technology as a pedagogical approach in ECEC practice to ensure that digital technology as a purposeful pedagogical approach can be used in an engaging, innovative, and meaningful way (OECD, 2021).

Limitations

The limitations of this research study in terms of quality and rigour were comprehensively addressed in Chapter three. In summary, due to the flexibility of action research and the combination of various instruments to collect data it is very difficult to replicate, making generalization a massive limitation (Polit & Beck, 2010). However, while this study sought to gain rich subjective understandings, experiences and perspectives from

children to bring a change within my own ECEC practice (O'Leary, 2017) there was never an intention to generalise finding further afield. Nevertheless, given the richness of data collected within this study, findings may be transferred and replicated within my ECEC setting, awarding my fellow colleagues the prospect to explore, identify and integrate digital technology as a pedagogical approach in their preschool classrooms.

An additional limitation to this action research was that due to the relationship participants held with the researcher it may be deemed complicated to structure in an ethical manner. In a bid to neutralise this risk the I sought the permission from both the participants guardians and the participants themselves (O'Leary, 2017). Additionally, it was stipulated several times throughout the study process to participants that they could remove themselves from the study at any time if they wished which some participants chose to do and went and completed separate activities with other staff in the classroom. However, being the teacher in the classroom and having developed a trusting relationship with the study's participants I essentially found this to be an advantage to their willingness to take part in the study. To avoid bias and prejudice I articulated my positionality within this research study at the start of this research study and through the process I constantly reflected on and acknowledged my values, beliefs and attitudes through reflexivity (Mukherji & Albon, 2018).

Time was another limiting factor when undertaking this study as I took on the role as co researcher which embedded me in the study. However, as room leader of the preschool classroom I also oversaw its daily's running and curriculum planning therefore a flexible plan had to be put in place that allowed the plan to be spread over a couple of months to combat this. Additionally, inexperience of conducting action research and using slow motion was initially a particular restricting factor however to negate this inexperience I researched the topic immensely, investigated, piloted and plan appropriately. Having no expectations of what knowledge would be generated helped massively as it allowed me to focus on the

process instead of the product.

A post positivism ethnomethodology was a considered approach as it sets out to determine how people think and act in their social contexts. However, as this position distanced the relationship between me and participants with a more neutral position held during analysis, it was prohibitive to the exploratory nature of the research question (Creswell, 2007). The aim of the research was to explore how I could integrate digital technology into ECEC practice. Therefore, it required an interactive, cooperative and participative approach in order to discovery subjective realities and how people think therefore a social constructionist approach was deemed most applicable (Guba & Lincoln, 1985).

Additionally, an interpretivist qualitative case study methodology was considered a possible alternative which would have allowed data to be collected from a large sample. However, as case studies generally set out to observe and analysis situations, they do not provide solutions to immediate problems nor do case study approaches commonly permit for the researcher to be a part of the study, it was therefore determined this did not fit in with the studies research question, aims and objectives.

As this research question was designed around making a change to my practice it was important for me to choose a research design that would require me to fully immerse myself and the participants through a process of research and action to then act and solve the problem. Therefore, action research was deemed the most suitable due to its ability to generate rich in-depth detailed interpretations from participants to solve a problem and make changes to practice. Alongside, it met the exploratory aims and objectives of the study which was to investigate how I can use digital technology as a pedagogical tool to enhance young children's learning experiences in my ECEC classroom.

My positionality within this research has been addressed through reflection and

understanding my role as a researcher and educator. I was conscious that I brought my own values, beliefs, previous knowledge, preconceptions and assumptions to the fore of the research (Bryman, 2016). Therefore, in order to generate rich data of participants honest perceptions and to impede researcher bias a qualitative action research methodology was deliberately employed to allow for participants to freely express their perspectives without judgement or influence from the researcher.

Implications and recommendations for practice and policy

This study has implications for practice and policy at both ECEC and government level in that digital technology is in fact an innovative tool that can be used as a pedagogical tool in practice to further enhance children's learning opportunities. However, this can only be done though if teacher training is provisioned that facilitates educators with the properly support and training to develop the skills, confidence and ability to identify how digital technology when used in engaging and meaningful ways can support children's diverse learning needs to further enhance children's learning experiences.

While this action research study cannot be generalised to all ECEC settings in Ireland it can however add to the current discourse on the topic of the use of technology in ECEC practice as well as generating knowledge within my own childcare setting.

Due to the richness of data collected by participants perspectives which were relayed in Chapter four it further emphasises and strengthens that digital technology has an equitable place in ECEC and if used correctly and purposely as a pedagogical tool it could positively influence children's learning experiences while they are in preschool.

Recommendations for future research

Given the nature of this action research there was a need to conduct a small-scale study to investigate and integrate change within my own setting. However, additional qualitative approaches such as case studies using interviews/ questionnaires would allow data to be collected from a larger sample which would permit a triangulation of data collected across

more of Ireland's ECEC population.

Additionally, further research needs to be conducted that highlights how training can be provisioned to early childhood educators towards the effective use of technology, in conjunction with other pedagogical approaches, for teaching and learning purposes in ECEC settings.

Moreover, research needs to be completed that looks at the adverse effects technology has on children's health and wellbeing due to prolonged use.

Conclusion

The rationale for undertaking this research study was influenced by my role and experience as an early childhood educator and observations of young children using digital technology. I noted that children's interests were streaming from their home environment. Whereas my personal interest within this study was to gain insights into how digital technology could influence children's learning experiences and development so that digital technology could be used purposefully going forward for teaching and learning in my childcare setting.

The aim of the study was to integrate digital technology into my ECEC setting through co constructing digital animated stories and explore how this technology supported children's learning experiences and my role in introducing digital technology. Additionally, I sought to use the insights from the participant's experiences to inform my fellow colleagues in my childcare setting of the effective use of digital technology in practice. While also contributing to the debate and discourse regarding how and why children learn through using digital technology in early childhood education by asking "How can I include digital technology as a pedagogical tool through the use of digitally animated stories in my early childhood setting to enhance children's learning experiences".

Observations, video recordings, created artefacts, field notes and opening ended questions

were used to enable participants to express and speak freely about their experiences whilst using digital technology. From doing so, the voices and realities of participants were truthfully perceived and what they considered as important factors to their learning were brought to the centre of the study.

Following thematic analysis of the data, information was coded and organised chronologically to how the action research unfolded in order to answer the research question and objectives. Chapter four presented a comprehensive discussion of these findings in the context of wider literature and addressing the research question.

While the findings from this study cannot be generalised or transferred at a larger scale it does provide rich subjective understandings, experiences and perspectives from children using digital technology within my own ECEC setting. Which highlights that when used appropriately digital technology can be innovatively used as a pedagogical approach to enhance children's learning experiences. These findings therefore may be beneficial for educators within my own setting to replicate in their own classrooms to explore, identify and integrate digital technology as a pedagogical approach.

For policy makers at government level more needs to be done. A review of Ireland's current curriculum framework is a good place to start that sees the implementation of suitable guidelines and procedures towards integrating digital technology into ECEC practice for teaching and learning purposes to meet the needs of children's current interest. However, this can only be done if it aligns with educators being properly supported and trained to develop the necessary skills, confidence and abilities to identify how to utilise digital technology in the appropriate meaningful way to support children's current learning needs and further enhance learning experiences.

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Appendices

Appendix. A Request for permission to conduct research

Dear Carol

As part of my 2nd year MA in Educational Practice in National College of Ireland that I am currently enrolled as a student I am required to carry out independent research that is ethically and appropriately carried out.

The aim of my research is to safely integrate digital technology through the means of digital play to support children's digital literacy development and enhance learning experiences in Early Childhood Education. While the overall objective is to positively merge traditional and digital play together to broaden children's categorization of play opportunities to establish better-quality educational practice.

Therefore, the research I wish to conduct titled "How can I include digital technology as a pedagogical tool through the use of digitally animated stories in my early childhood setting to enhance children's learning experiences" requires the participation of all children in our 2nd year ECCE classroom. I plan to observe preschool children in my ECEC classroom only, engaging with technology using observation as my research method combined with video and audio recording as my instrumental tools to conduct data collection. Ethical considerations will be considered throughout to reduce the risk of probable harm and potential issues.

I am writing this letter to seek your permission for the above said research. This study will be conducted under the supervision of Dr Meera Oke, assistant professor and programme director in early childhood education in National College of Ireland.

Thanking you

Kelly

Appendix. B Consent Form

Dear parents/guardians

I wish to thank you for considering your child's participation in this research study.

Please find attached an informed consent form and a detailed information sheet outlining specifies involving the research study. I would appreciate if you would read through these documents carefully and if you have any questions related to the study, please do not hesitate to contact me on 18100279@student.ncirl.ie or you can arrange for us to have a meeting outside of preschool hours.

If you are happy to consent for your child to participate in this research study, please return the completed consent form to me at your earliest convenience.

Kind regards

Kellymarie

Informed Consent form

As part of the final year of my MA in Educational Practice at the Centre for Education and Lifelong Learning, National College of Ireland I am conducting independent research that I would like your child to take in.

Purpose of study

The aim of the study is to explore how I can use digitally animated stories as a pedagogical tool to enhance children's learning experiences in my early childhood education setting.

Objectives:

- To explore how I can use digital technology as a pedagogical tool through co-constructing digitally animated stories
- To identify children's responses to the co-construction of digitally animated stories in early childhood education

- To determine if digital animation can be used as a pedagogical tool to enhance learning experiences in early childhood education.

How long will the study take

Children will take part in an action research study for the duration of two to three weeks situated in their preschool classroom.

Voluntary participation

Participation in this study is completely voluntary. Your child has the right to withdraw from the study at any time.

Protecting confidentially of data

(first person) Anonymity of participants will be protected to the best of my abilities by not naming or implicating identities.

Benefits of participating the study

This research will have direct benefits to your child. The value of being involved in this study is that you are contributing to a potential revised pedagogical approach to teaching and learning in our preschool in the future. Participation will likely help a wider study that is investigating digital technology and play in Early Childhood Education that is beneficial for the promotion of enhanced learning experiences.

Risks

This study poses no obvious risks

Sharing the results

Following the completion of the study, an electronic report can be sent if you like.

If you require further information, you can contact me through email @ 18100279@ncirl.student.ie or you can arrange to have a meeting with me outside of preschool hours

Please tick the boxes for each section to consent then print and sign below

I have read the information sheet, or it has been read to me. I have had the opportunity to ask questions about the research Questions, that I have asked, have been answered to my satisfaction. I fully understand the information that has been provided to me I consent voluntarily for my child to participate in this study I consent to the use of video, audio and photographic records I consent to have all digital play sessions recorded I consent to having anonymised quotations from the digital play sessions used in final report	

Print Name of Participant_____

Signature of Participant _____

Date _____

Appendix. C Information sheet

Dear parent/guardian

I am writing to inform you about the research study I am currently undertaking as part of my MA in Educational Practice at the Centre for Education and Lifelong Learning in National College of Ireland.

Introduction to research study

Research Question:

How can I include digital technology as a pedagogical tool using digitally animated stories in my early childhood setting to enhance children's learning experiences?".

Research Aims:

The aim of the study is to explore how I can use digitally animated stories as a pedagogical tool to enhance children's learning experiences in my early childhood education setting.

Research Objectives:

- To explore how I can use digital technology as a pedagogical tool through co-constructing digitally animated stories
- To identify children's responses to the co-construction of digitally animated stories in early childhood education
- To determine if digital animation can be used as a pedagogical tool to enhance learning experiences in early childhood education.

Details of enquired involvement in the research study

Participants will be asked to engage in an action research study that will take place in their preschool classroom. The children will engage with digital technology using a digital device (iPad) that will have a digital animation app installed (slow- motion). Children will be encouraged to explore the animation app with the anticipation that they will express themselves creativity with a result of creating a digital story.

This study will involve children taking a hands-on approach to their individual learning experiences while expending several roles such as an artist, actor, editor, designer and photographer throughout the digital story creation process. To help children organize their thoughts and ideas a storyboard will be created to give them a concrete understanding and a visual of what the main story is and animation they will create.

Instruments will be used to collect data. This will include a video camcorder alongside taking pictures to gather photographic evidence for analysis. In addition, field notes will be taken by myself during digital play sessions.

Benefits of involvement in the research study

The benefit of consenting for your children to be involved in this study is that you are contributing to a potential revised pedagogical approach to teaching and learning in our

preschool in the future. The aim of the study is to safely integrate digital technology through the means of digital play to support children's digital literacy development and enhance learning experiences in Early Childhood Education with the purpose to implement changes into our organisation.

Arrangements to be made to protect the confidentiality of data

Anonymity will be addressed throughout the whole research and transcribing process by blanking out names and location of participants to not implicate their identity. All data collected throughout the research will be confidential and transcriptions will be stored in a password protected folder on my own NCI student password protected storage cloud. Only I will have access to the data and will be analysed privately.

Advice that data will be destroyed after a period.

Data collected and stored on NCI storage cloud will be securely deleted in five years in line with NCI policies.

Statement that participation in the research study is voluntary

Participation in this research study is voluntary and all information gathered with be regarded as anonymous and confidential. Personal information will not be requested for this study, and participants have the right to withdraw consent from the study at any time, without justifications or prejudice.

Any other relevant information

Only participants invited to contribute to this study will be enrolled in 2nd year ECCE in our preschool. No other children situated in the organisation will be included.

If you consent to your child participation in this study, please sign the consented letter attached.

If you require additional information about the study or have queries, please do not hesitate to contact me.

Appendix. D Childrens drawings of story characters

Dinosaur

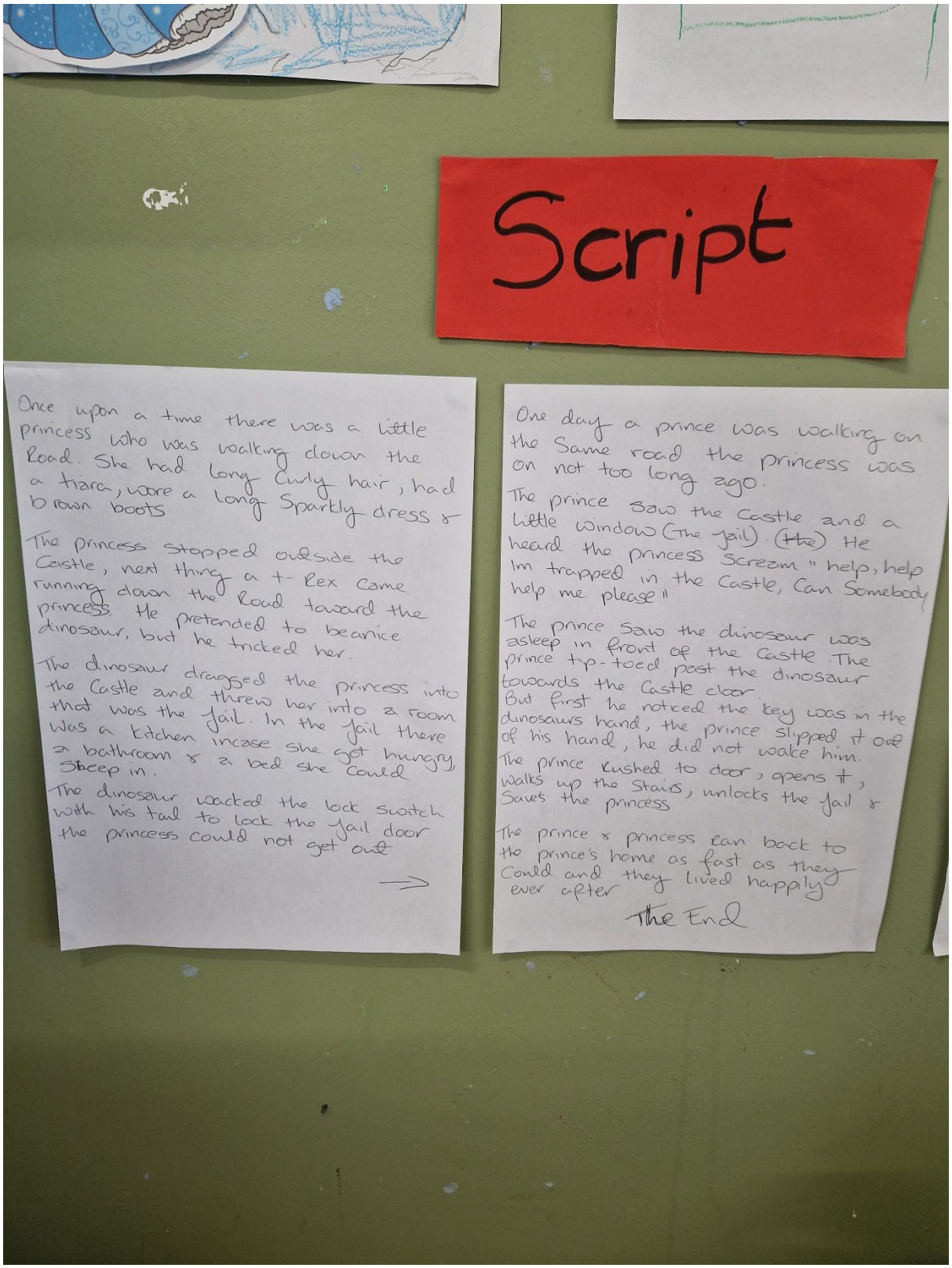
Castle

Princess

Appendix. E Collection of characters

Retrieving dinasours for digital story

Appendix. F Script



Appendix. G Storyboard

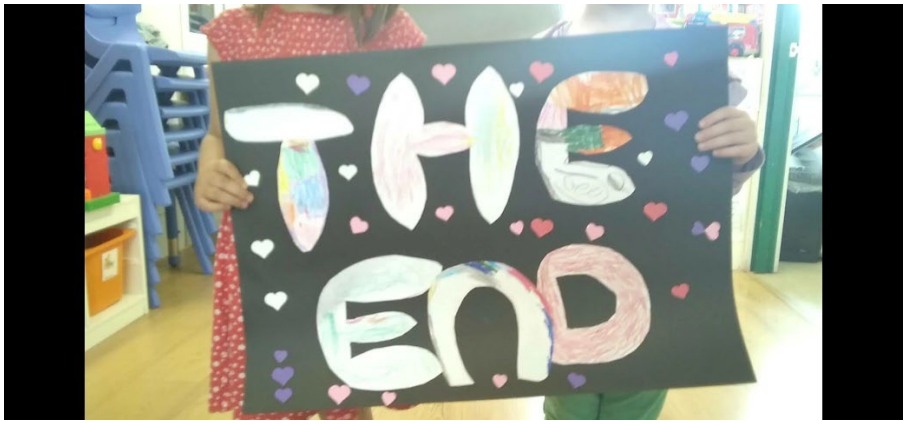
Story Title


Storyboard
Princess
Prince
Castle
Dinosaur
Script
The
Princess
and
the
Dinosaur
A fairy-tale story created by
Little Monkeys Preschool
Children

Appendix. H Children using storyboard to reinforce their play

Appendix. I Children watching pilot digital animation story

Appendix. J Digital animation story snippets


THE
END