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Whimsical Wonders or Digital Dangers: Exploring the Influence of Artificial Intelligence During Story Reading in an Early Years Classroom

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Abstract

This qualitative research explored the integration of Artificial Intelligence (AI) technology into story-reading sessions in an early years classroom. It focused on the strategies employed by a kindergarten educator in a Maltese state school to maintain a balance between technological innovation and traditional storytelling elements. Both the Early Childhood and Care National Policy Framework for Malta and Gozo (MEDE, 2021) and the Digital Education Strategy 2024-2030 (MEYR, 2024) emphasise integrating digital technology in early education to develop multi-literacy skills, foster creativity through digital storytelling and animation, and ensure a safe environment for communication and collaboration. The study aimed to identify innovative ways to use AI to enhance learning experiences and improve student outcomes while still preserving the essential aspects of human story reading. The goal of this research was to explore the thoughtful methods used by the kindergarten educator to blend AI into story reading, underlining how this integration benefits education by creating better learning environments for young students. Grounded in a qualitative framework, the research employed classroom observations and semi-structured interviews with the educator as primary data sources. This study not only enhanced theoretical understanding but also provided practical insights, offering useful perspectives for educators navigating the evolving realm of technology in early childhood education (ECE). Additionally, it aimed to assist policymakers in supporting educators with the effective integration of AI in their classrooms.

Keyword

AI technology, early years education, story reading, technological innovation, traditional story reading elements

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Introduction

The integration of AI into early childhood education (ECE) has garnered significant interest, as emerging technologies present new opportunities for enhancing learning experiences. AI in education refers to using intelligent systems to support and augment traditional educational practices, with researchers advocating for engagement with AI tools as early as possible, even from preschool (Williams et al., 2019). These systems can adapt to individual learning needs, provide real-time feedback, and facilitate a more interactive and engaging learning environment (Zawacki-Richter et al., 2019). The potential of AI to transform education is vast, encompassing applications such as intelligent tutoring systems, personalised learning environments, and automated assessment tools (Mousavinasab et al., 2021).

From a theoretical perspective, the integration of AI in ECE can be understood through the concepts of digital literacy and emergent literacy. Digital literacy refers to the ability to access, understand, and critically engage with digital technologies (Buckingham, 2015). It is increasingly recognised as a crucial skill for young learners in the 21st century (Hague & Payton, 2010). In ECE, AI-driven tools can serve as an effective way to help children develop these foundational digital literacy skills, allowing them to navigate and make sense of digital content in an age-appropriate manner.

Similarly, emergent literacy theory emphasises the gradual development of reading, writing, and communication skills from infancy, facilitated by rich, interactive experiences with language (Whitehurst & Lonigan, 1998). Recent advances in technology have led to the emergence of social robots as educational tools that have the potential to enhance early language and literacy skills in young children (Neumann, 2020). By incorporating AI tools into storytelling, ECE educators can promote both emergent literacy and digital literacy, creating meaningful, technology-mediated learning experiences that support cognitive and social development.

Story reading is a fundamental pedagogical tool in ECE. It fosters language development and initial literacy skills, allowing children to understand, produce, and make predictions about narratives. This practice also helps children incorporate formal aspects of written language in their approaches to reading and writing (Cárdenas-García et al., 2017). By integrating AI, educators can create dynamic story reading and storytelling sessions that captivate young learners' attention and provide personalised learning experiences. Research by Kewalramani et al. (2021) indicated that children's interactions with AI robots enhance creative, emotional, and collaborative inquiry skills. However, the introduction of AI in such a sensitive educational stage also raises concerns about maintaining the human touch and the traditional elements that are crucial in ECE. The integration of AI in education is a complex and debated issue, especially concerning the ethical principles that guide its design and development. While AI applications in schools continue to grow, it is crucial that we pay more attention to ethical considerations (Karagkouni & Sotiropoulou, 2023).

This study aimed to explore the use of AI during story-reading sessions in a kindergarten classroom in a Maltese state school, with a focus on balancing technological innovation and

the preservation of traditional story-reading elements. Through observations of classroom interactions and semi-structured interviews with an early years educator, the research sought to identify effective strategies for integrating AI in a manner that enhances engagement and learning outcomes, while preserving the essence of human storytelling interactions.

The study is based on the following research question:

What strategies can educators employ to integrate AI technology into storytelling sessions effectively, ensuring a balance between technological innovation and the preservation of traditional story-reading elements?

Conceptual and Research Foundations

Story Reading in ECE

Story reading, particularly in ECE, involves the active engagement of young children with written narratives through a shared, interactive experience (Piasta et al., 2012). It is a crucial pedagogical tool that fosters the development of early literacy, language comprehension, and socio-emotional skills (van der Wilt et al., 2022). In preschool settings such as kindergartens in Malta, story reading typically involves an adult reading aloud to children, creating an environment that encourages language exposure, vocabulary acquisition, and an understanding of narrative structures (Brodin & Renblad, 2020). This shared experience allows children to engage in discussions, ask questions, and relate the story to their personal experiences, further enhancing their cognitive and emotional development (van der Wilt et al., 2022). The practice of story reading at an early age is foundational for emergent literacy and future academic success (Sofri et al., 2023). Multiple studies confirm that early engagement with reading is key to developing critical literacy and communication skills (Brodin & Renblad, 2020; van der Wilt et al., 2022).

The positive effects of story reading on ECE have been well documented in the literature (Gallets, 2005; Cárdenas-García et al., 2017; Piasta et al., 2012; Sofri et al., 2023). Van der Wilt et al. (2022) examined two methods of shared book reading: traditional interactive reading and interactive reading with mind maps. Both approaches were found to significantly enhance children's language skills. The study highlighted dialogic scaffolding, where educators engage children in meaningful discussions around the story. This interactive method not only improved thematic vocabulary but also promoted narrative competence and critical listening skills. Importantly, both methods demonstrated effectiveness in enhancing children's language skills, suggesting that various forms of interactive reading, when structured properly, positively contribute to early literacy development (van der Wilt et al., 2022).

Similarly, Brodin and Renblad (2020) conducted a large-scale study in Swedish preschools, emphasising the importance of reading aloud in supporting preschool children's speech and language development. They found that regular reading sessions significantly enhanced children's communication abilities, concept development, and vocabulary. Furthermore, they stressed the compensatory role of preschools, particularly for children from linguistically

deprived backgrounds, in fostering early literacy skills. The authors argued that reading aloud helps children with speech and language difficulties to catch up with their peers, provi ded educators are well-trained and prioritise literacy activities in the classroom (Brodin & Renblad, 2020). This aligns with the broader consensus in ECE that literacy-rich environments significantly influence language outcomes for young children (Hargrave & Sénéchal, 2000; Piasta et al., 2012).

Traditional vs. Innovative Approaches to Story Reading

Traditional story reading, typically characterised by an adult reading aloud, remains one of the most popular and effective methods of fostering literacy in young children. Sofri et al. (2023) examined how children's emotional engagement during traditional story-reading sessions is linked to school readiness. Their findings indicated that emotional competencies, such as identifying with story characters, understanding the narrative lessons, and connecting personal experiences to the story, are closely linked to improved verbal abilities, social skills, and learning behaviours. Similarly, Mol and Bus (2011) found that frequent storybook reading is associated with accelerated vocabulary growth and improved comprehension skills. This emphasises the dual role of story reading in enhancing both literacy and emotional and social development, which are essential for school readiness (Sofri et al., 2023).

In contrast, more innovative approaches to story reading, such as those involving visual aids like mind maps, offer additional benefits, particularly for cognitive development. Van der Wilt et al. (2022) demonstrated that mind-mapping, a technique where information from the story is visually represented, helped reduce cognitive load and improve causal reasoning by allowing children to see connections between story elements. While no significant difference was found between traditional interactive reading and mind-mapping in terms of overall language competence, both methods positively impacted children's understanding of narrative structures and improved their critical thinking skills. In a similar study, Wulandari (2019) discovered that both story mapping and mind mapping are effective techniques for enhancing students' reading comprehension. This indicates that combining traditional story reading with innovative methods could provide a balanced approach, benefitting multiple developmental areas.

Brodin and Renblad (2020) emphasised the importance of a balanced approach to reading aloud and storytelling. They highlighted that while traditional methods are effective, educators should also use intentional strategies to enhance engagement and comprehension. The authors noted that the quality of interactions during reading sessions, such as asking questions, encouraging predictions, and making connections between the story and real-life experiences, significantly impacts the educational benefits of storytelling. These findings are consistent with previous research, which indicates that both the content of the reading material and its presentation influence children's literacy and cognitive development (Mol & Bus, 2011).

The literature strongly supports the notion that story reading is a critical component of ECE, with numerous studies stressing its role in fostering language, cognitive, and emotional development (Brodin & Renblad, 2020; Sofri et al., 2023; van der Wilt et al., 2022). Whether through traditional reading aloud or more interactive approaches such as mind-mapping, story reading offers significant benefits that contribute to children's readiness for school. Additionally, the emotional engagement elicited during story reading provides valuable insights into children's cognitive and social development, further supporting its role as a vital pedagogical tool. Integrating various story reading strategies in early childhood classrooms offers educators flexible methods for supporting diverse learners and enhancing literacy outcomes, particularly for those who may need additional language support (Brodin & Renblad, 2020; Sofri et al., 2023). Therefore, a combined approach that incorporates both traditional and innovative techniques may provide the most comprehensive benefits for young learners. Consequently, the integration of AI in reading stories is being explored.

AI in ECE

AI refers to the capacity of machines to perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation. These technologies can be categorised into narrow AI, which is designed to perform a specific task such as facial recognition, and general AI, which would have the ability to understand and reason across a wide range of tasks (Zawacki-Richter et al., 2019). AI systems leverage techniques such as machine learning, where algorithms learn from and make predictions based on data, and natural language processing, enabling machines to comprehend and generate human language (Ng et al., 2021). As the prevalence of AI technologies grows in everyday life, understanding their implications and applications becomes essential, particularly in educational contexts. Jocius et al. (2021)emphasise the need for formal training programmes to prepare educators with the skills and knowledge necessary to teach computational thinking, particularly in environments where such training is not yet standardised.

The integration of AI in ECE has gained traction as researchers and educators recognise its potential to enhance learning experiences. AI tools are increasingly being employed to facilitate personalised learning, improve engagement, and support educational outcomes for young children. For instance, platforms like PopBots allow kindergarten children to interact with social robots, promoting understanding of foundational AI concepts such as knowledge-based systems and supervised machine learning (Williams et al., 2019). Such interactions have shown that they can not only improve children's comprehension of AI but also shape their perceptions of robots, with younger children viewing them as intelligent toys and older children recognising their limitations (Williams et al., 2019).

ChatGPT, a natural language processing model, represents another innovative application of AI in ECE. Its capabilities can be leveraged to enhance teaching activities. By providing rich, interactive resources tailored to children's learning needs, ChatGPT can facilitate personalised learning experiences that engage children and help them better understand abstract concepts (Zhang, 2024). Additionally, ChatGPT encourages autonomous and

collaborative learning, allowing children to explore content and communicate with peers in a supportive environment. This flexibility can significantly benefit early childhood educators by aiding them in activity design and facilitating more effective teaching strategies.

Several studies have demonstrated the effectiveness of AI applications in ECE. For example, AI-driven educational tools have been found to enhance skills such as creativity, emotional regulation, and collaborative inquiry among children (Su & Yang, 2022). Moreover, educational robots have proven to improve social interactions and engagement in learning activities, fostering a more participatory environment. Beran et al. (2011) found that children naturally exhibit curiosity and a willingness to explore and interact with new objects, including robots. They appear inherently inclined to engage positively with these technologies, as demonstrated by Beran et al.'s finding that 83.7% of children believed the robot could engage with them in various ways. This highlights the need for robots to be multifunctional and adaptable to different interactions. Druga et al. (2019) also conducted a study focusing on AI literacy among children, emphasising the importance of inclusive education in this domain. Their research highlights the need for accessible AI learning experiences tailored to diverse populations, aiming to democratise AI education for young learners. However, despite these advancements, there remains a significant gap in comprehensive research on AI's role in ECE, highlighting the need for further investigation into its applications and outcomes (Su & Yang, 2022).

As children increasingly interact with AI technologies in their everyday lives, the need for digital literacy becomes paramount. Digital literacy encompasses the skills required to effectively navigate, evaluate, and create information using digital technologies. The Early Childhood and Care National Policy Framework for Malta and Gozo emphasises the importance of creating "Meaningful opportunities for learning about, with and through digital technology to enhance the development of responsible multi-literacy communicative repertoires enabling children's successful participation in a digital society" (MEDE, 2021, p. 15). Similarly, the Digital Education Strategy 2024-2030 states that "Early Years education should foster creativity in children by allowing them to create their own digital stories, drawings or animations using age-appropriate tools. Further to this early childhood education shall create a safe digital environment where children can share and discuss their creations to enhance communication skills" (MEYR, 2024, p. 32). Therefore, in the context of ECE, this may include understanding the principles of AI, recognising its applications, and developing critical thinking skills to assess the information presented by AI systems (Ng et al., 2021).

Research indicates that while young children are adept at using digital devices, they often lack a foundational understanding of how these technologies operate (Marsh, 2016). This gap can lead to misconceptions about AI and its capabilities. For that reason, fostering AI literacy in ECE is essential for equipping children with the skills they need to thrive in a technology-driven society. Incorporating AI literacy into early childhood curricula prepares children for future technology interactions and fosters a critical understanding of the ethical considerations and limitations of AI tools (Su et al., 2023). The integration of AI in ECE offers significant opportunities to enhance learning and development. As educators increasingly utilise AI technologies, it is crucial to prioritise the development of digital literacy among

young learners, ensuring they possess the necessary skills to engage with these advanced tools responsibly and effectively.

The use of AI in ECE is a burgeoning field, particularly in enhancing children's learning experiences during story reading (Maureen et al., 2020; Wang et al., 2024). However, the specific role of AI in story reading and storytelling for kindergarten students remains underexplored, with existing research providing glimpses into both its potential and limitations (Rahiem, 2021; Tolksdorf et al., 2021). Several studies, nonetheless, illustrate the innovative applications of AI in storytelling, including digital storytelling platforms (Maureen et al., 2020; Rahiem, 2021), storytelling robots (Tolksdorf et al., 2021), and augmented reality books (Wang et al., 2024), each offering distinct opportunities for improving educational outcomes.

Maureen et al. (2020) demonstrated that structured digital storytelling significantly improved both literacy and digital literacy among kindergarten students, even more so than traditional storytelling methods. The use of digital elements, such as audio and visual aids, engaged children more deeply and fostered emergent literacy skills through interactive and play-based learning experiences. This finding aligns with Rahiem (2021), who studied the use of digital storytelling in a storytelling club in Jakarta. The study reported that digital tools made storytelling sessions more captivating and engaging, thereby enriching the learning experience and enhancing children's comprehension. This increase in engagement through digital storytelling is further supported by the integration of multimedia and interactivity, allowing children to explore stories in new ways. For example, Wang et al. (2024) introduced an AI-driven augmented reality platform, which offered immersive story experiences and fostered greater interest in reading and comprehension.

The integration of AI into story-reading sessions for young children offers a transformative approach to ECE. AI tools such as digital storytelling platforms, storytelling robots, and augmented reality books provide opportunities to enhance literacy and engagement in innovative ways. Research demonstrates that these tools not only make learning more interactive but also foster critical cognitive and emotional skills. For instance, augmented reality systems like 'Metabook' enhance engagement through immersive experiences, combining visual and conversational AI for deeper story comprehension (Wang et al., 2024). The need for balanced integration with traditional story reading practices to ensure the human elements vital for young learners' socio-emotional development requires more exploration (Rahiem, 2021; Tolksdorf et al., 2021).

Methodology

This study employed a qualitative case study approach to explore the integration of AI into story-reading sessions in a state kindergarten classroom. Qualitative methodologies are particularly effective in capturing the nuances of educational practices and the contextual factors that influence their implementation (Creswell & Poth, 2013). The research design included five classroom observations and two semi-structured interviews with the kindergarten educator to gain comprehensive insights into the application of AI tools in ECE.

"The value of observation is that it permits researchers to study people in their native environment in order to understand 'things' from their perspective" (Baker, 2006, p. 171). In this study, classroom observations were important as they provided hands-on data about real-time interactions, teaching strategies, and student engagement. The number of observations was based on the sessions needed to read the entire book with the students. Observations allowed the researcher to capture the dynamics of shared book reading, dialogic scaffolding, and interactive activities using AI tools such as ChatterPix Kids, OZOBOT, and other applications. These observations were essential for identifying how AI tools influenced student behaviour, engagement, and learning outcomes during story-reading sessions. By situating the research in an authentic classroom setting, the study provided a nuanced understanding of the practical benefits and challenges of AI integration.

Two semi-structured interviews were conducted with the kindergarten educator, one before the classroom observations and one afterwards. The first meeting established the context, goals, and strategies for integrating AI into story reading. The participant had the freedom to select the strategies and methods for implementation. The post-observation interview was crucial for gathering the educator's insights on the observed sessions, the perceived impact of AI tools, and the challenges encountered. This interview served as a reflection which is vital in educational research as it provides opportunities for educators to articulate their experiences, enabling a deeper understanding of the practical implications of pedagogical innovations (Broeder & Stokmans, 2012). The discussions during the interviews also helped validate the observational data by comparing it with the educator's perspectives, ensuring a holistic analysis of the findings.

The researcher's positionality is essential for ensuring objectivity and minimising bias during data collection (Darwin Holmes, 2020). With extensive experience in primary and kindergarten education, the researcher was well-acquainted with the classroom environment, which facilitated a comfortable and natural observation process. This immersion proved to be an enriching experience. While some minimal interaction with kindergarten students was maintained to ensure their sense of safety, participation was intentionally limited to prevent any undue influence on their engagement during activities (Flewitt, 2005). Data collection involved detailed note-taking, along with photographic documentation to capture key moments throughout the sessions. Ethical guidelines were strictly adhered to, with informed consent obtained from the parents and the educator before the study commenced, aligning with established research ethics in ECE (Spriggs et al., 2010).

By combining classroom observations and reflective meetings, this study captured the observable outcomes and the underlying thought processes involved in integrating AI tools into story reading. This methodological approach ensured a comprehensive understanding of the research problem, aligning with established practices in qualitative educational research (Creswell & Poth, 2013).

Findings and Analysis

The Choice of AI Tools and their Integration

The educator used five different AI tools, which were introduced to the children either on an interactive panel or on the kindergarten educator's mobile device. The selected book was "The Paper Dolls", which aligned well with the class project. This project-based approach is seamlessly integrated into the emergent curriculum pedagogy, allowing children's interests and real-world experiences to guide their learning. It fosters inquiry, collaboration, and critical thinking. Educators observe children's curiosity, co-construct learning experiences, and facilitate in-depth exploration through hands-on projects that evolve over time. This child-centred methodology encourages active participation and is adaptable to individual developmental needs, making learning more meaningful and engaging (Sampson & McLean, 2021). In Malta, the emergent curriculum approach was implemented in kindergartens in 2018, marking a shift from prescriptive education to a more inquiry-based model (Bonello et al., 2022). The kindergarten educator follows an emergent curriculum approach to teaching, and one project that emerged from the students' interests was Rock, Paper, Scissors.

Each reading session followed a consistent format: it began with the children singing a song about their love for reading. The educator would then ask questions to gather information about the book's cover, author, and illustrator. After that, the kindergarten educator would read the story, encouraging the children to join in by repeating rhyming phrases, singing, dancing, or predicting what might happen next. Each new part of the story was followed by two activities: one involving AI and the other being a hands-on activity.

The AI tools and activities were the following:

1. An AI sketch-to-image generator called Scribble to Art was used on simplified.com. The children drew paper dolls on an interactive panel, which was then uploaded to the site. In response to the prompt "paper doll" each child could see a new paper doll being generated. During this hands-on activity, they drew and cut out paper dolls.

2. An AI text-to-image generator was used on simplified.com. This time, the educator asked the students what they knew about dinosaurs: Where did they live? What did they eat? The various answers were used as prompts to create a picture of the dinosaurs' habitat. Following this, the children participated in an activity where they crafted the dinosaurs' habitat using play dough, stones, and other materials.

3. After the part of the story where the paper dolls arrive on a farm, the children started building their own farm. Each child selected an animal to place behind the fence, in the barn, or under the trees. They then used an app on the KGE's mobile phone called ChatterPIX. This time, they took a photo of their chosen animal, recorded its sound, and added emojis.

4. The next AI tool introduced to the children was Animated Drawing on sketch. metademolab.com/canvas. The children listened to the KGE reading about paper dolls holding hands as they hopped and danced. Inspired by the story, the children then drew their own paper dolls on the interactive panel, making sure the dolls joined hands. Soon, they could see their drawings animated, as the paper dolls began to dance.

5. The final AI tool used was the Ozobot. After listening to the story multiple times, each child was asked to draw their favourite part. Together with the KGE they created a story map featuring all the different sections, with each part connected by a line from beginning to end. The children had a fantastic time watching the Ozobot follow the storyline.

Student Engagement and Learning Outcomes

Integrating AI tools into story-reading sessions significantly enhanced students' engagement and learning outcomes, aligning with existing literature on interactive and technology-enhanced storytelling. Observations revealed that children were highly engaged during the sessions, demonstrated by their active participation and enjoyment of the story being read aloud. They exhibited strong recall skills, remembering story details, including character names such as the paper dolls' names, and maintaining continuity across sessions. This mirrors the findings by Isbell et al. (2004), who highlighted that interactive story reading promotes children's comprehension and narrative retention. The children eagerly joined in during repeated phrases, reflecting their enthusiasm for the story and their growing familiarity with its structure, a key factor in developing early literacy skills (van der Wilt et al., 2022). The sessions also encouraged social interaction and collaboration, as the children accepted turn-taking and were encouraged to engage in discussions while the educator was reading the story and during the hands-on activities. Such behaviours align with the principles of dialogic reading, which emphasise active participation to foster language and communication skills (Grolig, 2020).

Creativity was another notable outcome, as the children expressed their understanding of the story through hands-on tasks and described their work in detail. This supports Maureen et al.'s (2020) findings that digital and interactive storytelling platforms enhance children's ability to engage imaginatively while reinforcing their comprehension. In this case study, the combination of traditional story-reading elements with AI tools not only sustained high levels of student engagement but also facilitated learning outcomes such as recall, narrative comprehension, and collaborative interaction, essential components of early childhood development.

Integrating AI into Story-Reading Sessions

The findings from this study reveal a deliberate and balanced approach to integrating AI into story-reading sessions, reflecting key themes of preparation, maintaining balance, enhancing student engagement, and fostering motivation. Data collected during the semi-structured interviews show that preparation involved selecting an appropriate storybook that

aligns with the project they were working on, and researching AI tools that could effectively complement traditional methods. This aligns with the literature, which emphasises the importance of selecting context-appropriate resources to support educational innovation (Maureen et al., 2020; Rahiem, 2021).

The findings from the educator interviews provide valuable insights into the integration of AI into early years education, particularly in enhancing story-reading experiences. The educator highlighted the practical challenges and benefits of adopting AI tools, emphasising the transformative potential of technology. "I used AI to help me use AI," the educator explained, reflecting on the proactive approach to identifying suitable resources and strategies for working with young learners. This iterative use of AI resources underscores their accessibility and capacity to empower educators by streamlining tasks and enhancing teaching strategies. For instance, AI can assist in lesson planning, generate educational content, and provide personalised student feedback, thereby reducing administrative burdens and allowing teachers to focus more on student engagement (Shikhrakar, 2024). The educator also emphasised the necessity of embracing AI in modern education by stating, "We are no longer in a situation where we can ignore AI and its developments. We need to show our children the pros and cons. We need to use it responsibly." This perspective aligns with the growing consensus in educational literature, which advocates for fostering AI literacy among young learners to prepare them for a technology-driven society (Su et al., 2023).

Reflecting on the experience, the educator noted that AI tools did not replace traditional storytelling but instead enriched the process: "Storytelling was always engaging and interactive; AI just enhanced the experience … holistic development, creativity, oracy, digital competence." This statement encapsulates the complementary role of AI in supporting fundamental development goals. By enabling children to explore stories through interactive and digital platforms, educators can nurture creativity and critical thinking while maintaining the essential human elements of story reading (Rahiem, 2021; Wang et al., 2024). The educator's enthusiasm for integrating AI tools was also evident in the comment "Once you involve yourself in one activity, you always want more." This sentiment highlights the iterative and evolving nature of integrating technology into teaching practices, fostering continual professional growth and innovation. The educator encouraged others to embrace AI's potential, stating, "Everything is so connected; all we have to do is to give it a go." This optimistic view reinforces the importance of building educators' confidence and capabilities to explore new technologies, ensuring that AI integration is both effective and sustainable in early years classrooms. These reflections underscore the transformative potential of AI in education when implemented thoughtfully and responsibly.

The study's findings align with digital literacy frameworks, which emphasise the need for educators and students to develop AI literacy skills to navigate a technology-driven world. The iterative use of AI tools in story-reading sessions reflects the principles of digital literacy, where engagement with digital tools fosters comprehension, creativity, and communication (Ng et al., 2021). According to Su and Yang (2022), AI literacy in early childhood education supports children's cognitive, creative, and collaborative inquiry skills, reinforcing the argument that AI enhances rather than replaces traditional storytelling practices.

From the perspective of emergent literacy, the integration of AI into story-reading sessions can be viewed as an extension of interactive reading strategies that support early literacy development. AI-facilitated reading aligns with Vygotsky's sociocultural theory, which highlights the role of interactive and scaffolded learning experiences in early childhood development (Williams et al., 2019). Research also suggests that AI-enhanced storytelling fosters oracy, digital competence, and multimodal literacy, supporting children's ability to engage with narratives in dynamic and interactive ways (Kewalramani et al., 2021). However, the findings also highlight the need for ethical considerations and balanced integration of AI in early childhood education. Educators' concerns about preserving the human touch align with existing debates on AI ethics in education, where scholars caution against over-reliance on digital tools that may compromise traditional literacy development and social-emotional learning (Su et al., 2022). The educator's emphasis on responsible AI use reflects the principles of critical digital literacy, where children must be guided in recognising both the affordances and limitations of AI (Druga et al., 2022).

Challenges in Integration

Despite the benefits, several challenges were identified. Limited access to resources, such as having to use the educator's mobile phone, and having only one computer in class, combined with difficulties encountered due to internet bandwidth and lack of classroom space, posed logistical hurdles. Technical issues, including firewalls and tool compatibility could also pose difficulties in proceeding with the planned activities, highlighting the need for robust infrastructure to support digital tools effectively. The continuous disruptions throughout the day and the addition of children from other classes also presented a challenge. Additionally, the educator noted the need for professional development to enhance confidence and proficiency in using AI tools, a concern echoed in broader research on the use of digital technology in classrooms (Su et al., 2023).

Research shows that educators face several challenges in implementing AI in ECE, primarily due to limited AI literacy, lack of professional development, and ethical concerns. Many educators struggle with insufficient knowledge and confidence in using AI tools, which hinders effective integration into the classroom (Su & Yang, 2022). Additionally, the lack of structured curricula and pedagogical guidelines for AI in early learning settings creates uncertainty about best practices for implementation (Ng et al., 2021). Ethical considerations, including concerns about data privacy, screen time, and the balance between technology and human interaction, further complicate AI adoption in early childhood settings (Druga et al., 2022). Moreover, inequities in access to AI resources contribute to a digital divide, where some educators and schools have limited technological infrastructure, affecting the equitable implementation of AI-enhanced learning experiences (Kewalramani et al., 2021). Addressing these challenges requires targeted teacher training, ethical AI frameworks, and the development of age-appropriate AI literacy curricula to support early childhood educators in navigating AI integration effectively.

Recommendations

Based on these findings, recommendations emerge for practitioners and policymakers. First, investing in reliable infrastructure, such as high-speed internet and secure digital platforms, is essential to support seamless integration of AI tools in classrooms. Second, professional development programmes should be prioritised to equip educators with the skills and confidence to navigate and utilise AI tools effectively. These programmes could include hands-on workshops, collaborative webinars, and peer-learning opportunities to build a culture of innovation among educators.

A vital recommendation is to incorporate AI literacy into early childhood curricula. As children increasingly interact with AI tools, it is essential to prepare them to use these technologies responsibly and critically. Activities should aim to help children understand basic AI concepts, evaluate AI outputs analytically, and recognise the ethical considerations associated with its use. This method encourages digital literacy and prepares children for a technology-driven society (Su et al., 2023).

Finally, additional research is needed to examine the long-term effects of AI integration in ECE. Future studies should investigate various educational environments to understand how AI tools impact learning outcomes across different sociocultural contexts. Furthermore, research should focus on the potential of AI to support socio-emotional development and creativity, which are essential components of holistic childhood development.

Conclusion

The findings of this study call attention to the transformative potential of integrating AI into story-reading sessions in ECE while highlighting the importance of maintaining a balanced approach that respects traditional storytelling methods. Through the deliberate use of AI tools alongside traditional story-reading practices, this research has demonstrated that AI can enhance engagement, foster creativity, and contribute to holistic development in young learners. However, successful integration requires careful planning, adequate training, and robust infrastructure to address challenges and maximise the benefits of this innovative approach.

Integrating AI tools such as interactive image generators, animation platforms, and robots like Ozobot enriched the story-reading experience and supported essential developmental outcomes, including narrative comprehension, social collaboration, and creativity. These findings are consistent with existing literature that emphasises the role of technology in enhancing interactive learning and fostering cognitive and emotional development in young children. For example, Wang et al. (2024) highlighted how AI tools such as augmented reality storytelling platforms can create immersive learning environments that captivate children's attention and encourage active participation.

One of the key insights from this study is the complementary relationship between AI and traditional methods. The insights of the educator indicate that while storytelling has always

been a compelling approach, AI tools serve to enhance rather than replace these traditional techniques. This is an important point, as literature emphasises the necessity of preserving human elements in ECE to foster social-emotional learning and interpersonal connections (Rahiem, 2021). By integrating the interactive and engaging aspects of traditional storytelling with the innovative capabilities of AI, educators can create a balanced and enriching learning environment.

The study also revealed several challenges that must be addressed to ensure the effective integration of AI into classrooms. These include technical issues such as limited resources, internet bandwidth constraints, compatibility problems, and logistical difficulties like limited classroom space and frequent interruptions. The educator also mentioned the need for professional development opportunities to build confidence and proficiency in using AI tools. These challenges mirror broader concerns in educational technology literature, which often emphasises the need for investments in infrastructure and continuous teacher training (Su et al., 2023).

This study shows that, while integrating AI into story-reading sessions offers significant opportunities for enhancing ECE, careful planning, adequate resources, and ongoing professional development are essential for successful implementation. By addressing these challenges and leveraging the strengths of both traditional and AI-enhanced storytelling, educators can foster a dynamic and inclusive learning environment. As the educator aptly noted, we can no longer disregard AI and its developments. It is important to explain to children both the advantages and disadvantages of using AI. This sentiment captures the essence of the research: embracing innovation responsibly to empower the next generation.

Notes on Contributor

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