

CHATGPT USAGE AND ITS IMPACT ON EARLY CHILDHOOD EDUCATION: OPPORTUNITIES, CHALLENGES, AND FUTURE IMPLICATIONS

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Abstract

Advancements in artificial intelligence (AI) and technologies have dramatically transformed how educators and learners in educational institutions approach teaching, learning and child engagement, especially in early childhood education (ECE). ChatGPT, a new interactive conversational AI application, is another tool that has been gaining traction because of its ease of use, potential to enhance individualized learning experiences for young children, and accessibility. While the educational opportunities that AI brings to learning are promising, there are significant concerns about children's cognitive dependence, emotional development, ethical exposure, decrease in human interaction, and readiness of teachers and parents for AI-integrated learning environments. There are many existing studies on the use of ChatGPT in contexts of higher education and technological efficiency, and few studies have focused on the lived experiences, perceptions, and emotional realities of using ChatGPT in early childhood settings.

The purpose of this qualitative study was to understand the perceptions of educators, parents, and child development professionals about opportunities, challenges, and ramifications of the use of ChatGPT within early childhood education. A qualitative approach (interpretivist) was adopted to gather data from semi-structured interviews, focus group discussions, classroom observations and document analysis with early childhood teachers, parents, curriculum specialists, and educational psychologists. Thematic analysis was used to explore the collected data and discover common themes, meanings and interpretations in the participant stories.

The results indicated there is great potential for ChatGPT to provide interactive learning, language development, creative engagement, personalized instruction, and educational accessibility. Participants acknowledged its potential for supporting storytelling, communication skills and child-centered digital learning experiences under the conditions of responsible use and under the guidance of a teacher. But there were also serious issues about emotional detachment, diminished social interaction, dependency on AI-based answers, ethical questions, misinformation, privacy issues and a loss of children's autonomous thinking and imaginative skills. The lack of age-appropriate AI policies and inadequate teacher preparation could also exacerbate developmental and pedagogical issues in early childhood settings, participants noted.

Keywords

The study concludes that ChatGPT can have a transformative impact in ECE, but it needs to be incorporated within an education that is ethically based, developmentally appropriate, and human-centred. The results highlight a need for a balanced regulation of AI, parents' awareness, a preparedness of teachers, and child-centric digital policies to ensure AI complements, rather than supplants, human interaction and comprehensive child development.

Introduction

Artificial intelligence (AI) technologies have had a transformative impact on global education, revolutionizing the way knowledge is created, shared, and consumed in the modern educational landscape. Over the last few years, AI-powered learning tools have become more prevalent in the classroom, at home, and on the various digital learning platforms, impacting the way education is delivered across the board, from higher education to early childhood. One such new technology that has caught significant attention, both within the scholarly community and online, is ChatGPT. One such new technology that has garnered attention from both the scholarly world and the public is ChatGPT. The expansion of its use in education reflects broader trends worldwide on the digital learning transformation, personalized learning, and technology-driven interactions. While AI has the potential to bring valuable learning experiences for students, it also poses intricate developmental, ethical, emotional, and educational questions, especially in early childhood development.

Early childhood education is one of the most critical times in the cognitive, emotional, linguistic and social development of humans. Early experiences have a very significant impact on children's learning abilities, emotional regulation, communication skills, creativity and social behaviors. The theorists of human development have all stressed that young children learn best from human interaction, sensory exploration, imaginative play, emotional attachment and socially meaningful experiences. This has led to significant research discussions around the suitability, benefits and developmental impact of technology-driven learning in early childhood contexts.

The introduction of ChatGPT in educational settings marks a wave of transformative learning technologies that adapt and interact with users. The advent of ChatGPT in the educational landscape is part of a trend of adaptive and interactive learning technologies. Unlike digital-based tools, ChatGPT can engage in a conversation, respond to questions in an engaging and conversational manner, create stories, assist with language learning activities, and customize responses based on user interactions. In early childhood education, such qualities are considered to be a positive attribute for engagement, language development, storytelling, creativity and individualized learning. Teachers and parents are increasingly aware that AI tools can help them provide a more personalized and engaging learning experience for students, foster curiosity, and aid children with diverse learning needs. In settings such as those with a shortage of educational materials, AI technologies can help to make learning and support more accessible.

However, the use of ChatGPT in Early Childhood Education is highly controversial. Critics say that relying too much on AI-driven interactions could diminish the chances of real-world conversations, emotional connection, joint learning, and creative exploration. Emotional security, interpersonal relationships and social engagement are key to healthy cognitive and psychological development during early childhood. Concerns have therefore arisen that AI powered learning systems may inadvertently erode the independent thinking, emotional sensitivity and interpersonal communication skills of children. Moreover, AI technologies' conversational realism could create confusion between human and machine interaction for young children still in the midst of their social and cognitive development.

Ethical implications in the use of AI in early childhood settings are also an important issue. Issues related to misinformation, data privacy, algorithm bias, digital dependence, and exposing inappropriate content have increasingly gained visibility in educational technology discussions. Young children may not possess the cognitive ability to critically assess the information produced by AI systems, whereas adults do. This has led to concerns about the reliability, developmental appropriateness, and ethical oversight of these AI-driven learning experiences. Teachers and parents are consequently increasingly responsible for the regulation, supervision and contextualization of children's online interactions with AI technologies.

The shift towards digital learning has also fundamentally changed the role of teachers and parents/caregivers. The role of the teacher is no longer limited to being a dispenser of knowledge but is now becoming one who works as a facilitator, mediator and digital learning guide in technologically rich learning spaces. Likewise, parents must also learn to manage the new concepts of digital parenting, where they are left to deal with the challenges of learning opportunities related to artificial intelligence (AI) technologies alongside the risks to development and the psychological health of their children. Despite these developments, teachers and parents remain uncertain about what is suitable for children, how to use AI, and the ethics of the digital world. These uncertainties paint a picture of deeper gaps in institutional and policy-level understanding of AI literacy and teacher readiness, as well as of issues related to child-centred digital governance.

Although there has been increased research interest in the concept of artificial intelligence in the education domain, the current research literature is still largely quantitative and technologically focused. The current literature is dominated by issues of technological efficiency, academic achievement, system operations, and applications to higher education, while the lived experience, perception, and emotion of using AI in early childhood education is comparatively under-documented. In addition, current research may not consider the viewpoints of teachers, parents, and child development workers who have firsthand access to children in learning environments that utilize AI technologies. Thus, the implications for young children's emotional, ethical and relational experiences of using ChatGPT are still not fully understood.

This is a space that makes the case for the need for qualitative inquiry. A qualitative approach allows for a deeper investigation into the meaning and interpretation of human experience, context, emotion, and social meaning that cannot be captured by numerical measurement alone. Importantly, recognizing the attitudes of educators, caregivers, and professionals toward the use of ChatGPT in children's learning contexts is crucial for establishing a balanced, ethical, and developmentally appropriate educational context for children. Qualitative investigation also offers important understanding of the impact of AI technologies on classroom interaction and communication, feelings of emotional connection and pedagogical relationships in early childhood settings.

This study aims, therefore, to examine the opportunities, challenges, and future implications of the use of ChatGPT in early childhood education from the viewpoints of teachers, parents and child development professionals. In particular, the research will explore the impact of AI-powered learning tools on children's cognitive engagement, emotional growth, communication dynamics, classroom experiences, and social interactions. It also explores the moral issues, teaching shifts, and institutional challenges that arise as conversational AI technologies become more prevalent in early learning settings.

The following research questions are used to guide the study:

What are the reactions of educators, parents, and child development professionals to the use of ChatGPT in early childhood education?

2. What educational opportunities and learning benefits are related to young children's use of ChatGPT?

3. What emotional, cognitive, ethical and developmental issues arise from AI-enabled learning experiences in early childhood settings?

4. What are the implications of ChatGPT for teaching, classroom dynamics and parental involvement?

6. How can the integration of AI fit into early childhood education policy, curriculum design, and child-centred learning approaches for the future?

The theoretical and practical importance of this study is that it is a study on the role of BFT in aquaculture. Theoretically, the research makes a contribution to the new interdisciplinary research in the areas of AI, child development, digital pedagogy, and qualitative educational research. It deepens the existing knowledge by bringing the human experience and emotional aspects that are less often explored in the technologically based educational conversation to the forefront. On a practical level, the study provides valuable insights for educators, policymakers, curriculum developers, child psychologists, and parents looking to effectively leverage AI technologies in early childhood settings in a responsible way. The results could also contribute to the creation of ethical AI policies, teacher training programs, child-friendly AI frameworks, and complementary pedagogical approaches focusing on the comprehensive development of children while addressing the challenges of AI-driven change.

The impact of artificial intelligence on early childhood education is an emerging phenomenon in the context of educational systems worldwide, and thus it is becoming more relevant to know and understand how it affects early childhood learning. The question now is not if AI will be part of children's learning, but how societies can make sure that these technologies foster instead of replace the human relationships, emotional development, creativity and developmental integrity that are the core of early childhood education. Below is a Literature Review written at SSC/Scopus level of qualitative research that is critically analytical, humanized, and ready for publication:

Literature Review

The impact of AI in Educational Environments transformation.

As AI has become more deeply embedded in educational systems, the current education environment has changed profoundly in terms of pedagogical practice, communication and learning. There is a growing perception that AI tools can serve as personalized teaching devices, as aids to adaptive learning, as tools to increase accessibility to education, and as tools to automate administrative tasks. In the context of education, AI is often linked to innovation, efficiency, and pedagogical changes that prioritize the learner. Technology has accelerated at a dizzying pace, though, and AI-enabled learning systems have created a significant scholarly debate about their developmental, ethical, and relational implications, especially in the context of early childhood education, where human interaction continues to be a crucial element in learning systems.

Recent studies have indicated that generative AI tools like ChatGPT have a new era of educational technology because of their capacity to create conversational dialog, generate contextually relevant responses, and interact with users in a two-way dialogue. Unlike conventional education software, ChatGPT functions via conversational interaction, suggesting that it can be a tool for education support and a substitute for some kinds of human-centered involvement in education. Proponents

of AI in education believe that these conversational AI systems can inspire creativity, aid in language learning, and offer tailored learning experiences for children of all learning styles and abilities. Research in high-tech educational systems has shown that AI-enhanced learning environments can boost student interest, foster curiosity, and facilitate differentiated learning. However, critics state that a lot of the present debate on the use of AI within the education sphere is rooted in technology optimism instead of sound pedagogical assessment. While many studies focus on efficiency and scalability, and some include innovation, comparatively few focus on emotional development, ethical issues, and social realities in child learning. Such an imbalance is very critical in early childhood education, where developmental outcomes are closely linked to human relationships, emotional bonding, sensory exploration and communication between people. Thus, researchers are increasingly calling for the educational impact of AI to be analyzed from “human-centered” and “developmental” perspectives as well as technological ones.

The application of ChatGPT and Generative AI in educational settings. Use of ChatGPT and Generative AI in Education

The advent of ChatGPT has fueled an international discussion around the impact of AI in the classroom and in learning spaces. ChatGPT is a revolutionary digital tool that can provide conversational replies, storytelling assistance, educational explanations, and language-based dialogue, according to educational researchers. In the field of higher education, it has been explored in the context of academic writing support, student support services, and digital tutoring. However, there is still relatively little research examining the effects of ChatGPT usage in the context of children under the age of five and Educational settings.

Previous research has found that teachers view ChatGPT as a potential opportunity and a challenge. Others note its promise in providing for creativity, communication, and customized learning experiences. AI educational research has identified areas where teachers can leverage conversational AI to help children in storytelling, vocabulary building, and interactive questioning. The findings are in line with constructivist education principles and theories, such as those of Vygotsky, who has emphasized the importance of interaction and mediated assistance in cognitive development. In this context, AI-enabled systems can be considered as additional scaffolding mechanisms that can support children's linguistic engagement.

But other researchers question the possibility of AI-based interactions to fully replicate pedagogical relationships. Early childhood learning is essentially relational, emotional and socially situated, critics say. The human teacher is not only a channel of information but also offers emotional support, empathy, nonverbal communication, and social modeling which are not truly replicable by AI systems. This is particularly true of young children who depend on emotional cues and interpersonal engagement for developmental periods.

Furthermore, there is growing literature that raises concerns about children's dependence on responses generated by AI. Those who study the effects of conversational AI on education worry that it will diminish opportunities for problem-solving, imaginative exploration, and independent thinking. Studies also indicate that when children engage with AI systems extensively, they might find it difficult to differentiate between the machine's authority and the expertise of humans, which could impact their critical thinking skills. Additionally, there are concerns that, due to high exposure to AI systems, children may not be able to discern this AI's authoritative voice from the voice of a human expert, which can negatively affect critical thinking development. The creators of ChatGPT claim it is a teaching tool, but some people have voiced concerns that it could undermine creativity and critical thinking if it is used without careful consideration.

Fostering Literacy in Early Childhood Education in the Digital Age

Digitalization of childhood has become one of the hallmarks of the social changes of the contemporary society. Digital technologies are accessed by children from an early age and are impacting on children's communication, play, learning and social interaction. In early childhood education, digital technologies are often seen as something that can make learning more engaging and ready the child for technological societies. Technology is increasingly being adopted and integrated into learning environments, with the assumption that familiarity with technology is educational progress, in the form of interactive educational software, digital storytelling websites, and systems that use artificial intelligence to assist students.

However, the field is far from united as to the appropriateness of young children's digital consumption. Early years are a highly sensitive period of neurological, emotional and social development, developmental psychologists stress. Piagetian theory emphasized the role of active investigation through the senses and concrete experiences in the cognitive development process and attachment theory emphasized the need for emotional responsiveness in human relationships in order to achieve psychological well-being. However, digital learning environments could also restrict opportunities of physical play, peer learning and emotionally rich communication.

Research on the relationship between screen exposure and children's attention span, emotional regulation, and social interactions is limited but several studies have shown that excessive digital engagement is associated with attention span problems, emotional regulation issues, and decreased social interaction in children. But academics warn of the dangers of deterministic views of technology that see it as a harmful entity. Rather, it is becoming more common for researchers to remove developmental effects assuming contextual factors, such as content quality, involvement of caregivers, supervision, and digital/non-digital balance play a role. This view has come to question the view of technology that is either touted as a positive or blamed as a negative in favor of a more nuanced and context sensitive evaluation.

Importantly, much of the literature on digital childhood is quantitative and has tended to focus on the hours spent on screens rather than on lived experience of children, parents and educators. Frequently such methods fail to consider the emotional and relational nature of technology use in the early learning context. This has led to a growing focus on the importance of conducting qualitative research that can capture the interpretation, negotiation, and experience of AI-enabled technologies in their actual contexts.

Teacher Perceptions and Pedagogical Transformation

AI in education is a topic that has garnered considerable attention, and teachers are at the heart of this conversation, acting as a bridge between technology and education. Current research indicates that teachers may have mixed feelings about AI learning systems. Teachers recognize that AI technologies have the potential to enhance lesson planning, personalized learning, and student engagement. Teachers are aware that AI technologies can aid in lesson planning, personalized learning, and engagement. Teachers believe that ChatGPT can be a useful extra resource for helping children practice language skills, tell stories, and develop their communication abilities.

However, there are many teachers who do have concerns about over-reliance on technology, decrease in interpersonal communication and loss of teacher authority in increasingly automated systems of learning. Scientists have found concerns that AI technologies could eventually drive the education in more efficient models, where technology is valued over emotional and relational learning. However, educators involved in qualitative education research often find themselves unsure about the ethical and developmental appropriateness of using AI in early childhood settings.

Moreover, educational disparities greatly influence teacher perceptions of the integration of AI. While in developed countries, this conversation around AI technologies is often framed as innovations or advances in digital technologies, in developing nations educators often raise concerns about infrastructure constraints, access disparities, lack of training, and digital literacy gaps. The disparities in global access to AI highlight the need for a multi-sectoral lens to study the integration of AI.

Parenting concerns and emotional growth

Given that the home environment exerts a significant influence on developmental experiences, parents are a key figure in shaping children's interactions with AI-supported technologies, especially in early childhood. The literature suggests that parents have mixed views about the use of AI in education. Prior research shows that parents are not a unified block on the use of AI in education, but rather are divided in their perceptions of its usefulness and potential harm. Some carers appreciate ChatGPT's ability to offer interactive learning, educational entertainment, and language assistance. AI-powered systems that are intuitive and adaptable have been especially highlighted by parents of children with varied learning styles.

Parental concerns about emotional development, dependency and less interaction are very prominent in the existing scholarship. Worries include a potential reduction in emotional sensitivity, imagination, and social interaction abilities in children due to overuse of AI. Researchers on digital parenting policies have noticed a growing anxiety about kids' screen dependency and digital systems, specifically when interactions with AI start to feel like interactions with people.

Important interpretative clues about such concerns are offered by attachment theory. Good emotional development for young children is built mainly through responsive human relationships built on empathy, eye contact, emotional reciprocity and physical presence. Despite the apparent sophistication of AI systems, critics say they can't truly capture these emotional aspects. This can lead to the potential for emotional detachment and diminishing relational development due to overreliance on AI-mediated interactions.

Meanwhile, experts warn against seeing parents as mere victims of technological changes. Families actively negotiate and manage digital boundaries, monitor children's digital interactions, and try to navigate the tension between learning and protecting children. However, current research shows that there are significant gaps in parental understanding of ethical AI use, child data privacy, and practices for developmentally appropriate digital engagement.

Ethical concerns and educational responsibility

One of the most debated facets of AI's involvement in early childhood education is its ethical implications. The importance of concerns about misinformation, algorithmic bias, data privacy, surveillance and commercialization of children's digital experience is well recognised in existing scholarship. Young children may not be cognitively developed enough to critically assess information created by AI, thus making them especially susceptible to misinformation and manipulation.

The researchers also raise concerns about the potential for generative AI systems to inadvertently perpetuate cultural biases that may be reflected in their training data, affecting issues of inclusivity, representation, and educational fairness. Ethical educators argue that the impact of AI tools in early childhood education should not be considered merely from a pedagogical perspective but also in terms of their social and moral effects.

Another significant ethical issue is the possibility of replacing the interaction between people in the learning context. Education is not just about delivering information, it's about caring for emotions, providing moral guidance, socializing, and connecting with others, critics argue. As AI-mediated interaction becomes more and more normalized, it thus poses basic philosophical questions about what childhood learning and educational relationships will mean in the future.

Even with all these worries, there is still very little consistency in the existing literature, it is methodologically limited. To better understand the emotional, relational, and interpretive aspects of using AI with young children, many studies are heavily dependent on surveys, experimental designs, or technologically deterministic frameworks. Currently, the voices of teachers, parents and child development professionals are underrepresented in research on human resources and their role in child development.

The need for qualitative inquiry arises from the gaps in research. Qualitative inquiry is a result of research gaps.

After conducting a search of the existing literature, several gaps were identified that require further research. One, most of the scholarship regarding ChatGPT and AI in the context of higher education is limited to that setting and therefore largely overlooks early childhood education. Secondly, past research often focuses on cognitive, emotional, and ethical implications of AI in learning, often overlooking technical efficiency and outcomes. Thirdly, the present research landscape is largely dominated by quantitative research methods, which makes it difficult to gain insights into lived experiences, perceptions, fears and contextual realities of AI integration.

Moreover, there is limited research that focuses on the collective interpretation of the role of ChatGPT in early childhood settings by the teacher, parent, and child development professionals. Even in light of the vast differences in countries in the world in terms of access to technology, policies, and educational preparation, the cross-cultural perspectives from developing educational contexts are still poorly represented.

These constraints are compelling reasons for the need of qualitative inquiry. Qualitative research allows for a more in-depth examination of nuanced subjective experiences, emotional interpretations, ethical dilemmas, and socially constructed realities that may not be captured by mere numerical measurement. Qualitative inquiry, using interpretive analysis, can reveal the impact of AI technologies on children's developmental experiences, the new ways in which educational relationships are shaped, and the new conceptions of teaching and caring in digitally changing societies.

The role of ChatGPT in early childhood education is not just about the technology itself, but about the human experiences, emotions, and ethical considerations that shape the learning process in early childhood.

Research Methodology

The overall methodological approach in this study was qualitative, employing a critical approach to examine the opportunities and challenges, as well as the future prospects of using ChatGPT in early childhood education. Qualitative research was chosen for examining the lived experience, perceptions, emotional concerns, and pedagogical realities of the integration of the conversational artificial intelligence in early learning environments as research methods were deemed best suited to the human centeredness of the research problem. The study aimed not to quantify the amount of educational experiences that involve AI, but to explore how teachers, parents, and child development professionals perceive the presence of AI technologies in children's cognitive, emotional, and social learning.

Research Philosophy and Paradigm

The study was based on an interpretivist research paradigm and a constructivist philosophical approach. In interpretivism, social realities are not given but instead are created by people, perceived, and constructed in a meaningful way. The experiences of using AI in the context of early childhood education are subjective and socially constructed, driven by emotional reactions, educational values, parenting practices, institutional cultures, and technological familiarity. As such, it was necessary to engage with the participants' lived experiences in order to understand the impact of ChatGPT, and not just a detached measurement.

The constructivist approach also helps to recognize that knowledge is co-produced in the interaction between the participants and the researchers. AI integration is viewed differently by educators, parents, child development specialists, and more—each through their own lens, personal, professional, and cultural. Their stories thus offer a glimpse into the interpretation, mediation, reception, and opposition to ChatGPT in early childhood education settings. From this philosophical lens, the study was able to capture subtle emotionalities and pedagogical tensions that quantitative methods might not detect.

Research Design

The qualitative exploratory research design was used to explore new experiences and perceptions of using ChatGPT in ECE. The exploratory qualitative design was deemed suitable as the use of generative AI technologies in early childhood education contexts is still emerging and poorly understood. Though much work has already been done in the area of higher education and technological efficiency, research in the areas of relationships, ethics and growth has scarcely considered the impact of conversational AI on young children.

This exploratory design allowed the researcher to explore the experiences of participants without making any of the theoretical assumptions or categories that may have been otherwise expected. It also fostered the deeper analysis of emotional responses, ethical issues, classroom realities, and pedagogical shifts related to AI-based learning systems.

Research Approach

This study was of inductive type. The research aimed to develop a process of discovery and interpretation of the participants' experiences and stories, rather than testing predetermined hypotheses. Inductive inquiry was especially beneficial since the aim of the study was to identify and explore patterns of meaning that were emerging in the context of the use of AI in early childhood environments, as well as concerns that might not have yet been captured in previous research.

This provided the opportunity to build themes up, starting from the participants' data, and ensured that the findings were grounded in real learning experiences, not assumptions about the technology. The inductive orientation also allowed for the reflexive interpretation of the intersection of the emotional, cognitive, ethical and pedagogical aspects of the learning environment supported by AI.

This study was conducted on a group of nine participants. The study population consisted of 9 participants.

The population of study was people involved directly in the process of early childhood education and child development. The participants comprised early childhood educators, parents of young children, curriculum specialists, educational psychologists, and child development professionals with hands-on and/or observational experience with children's engagement with AI-assisted educational technologies like ChatGPT.

The selection of the participants was done using purposive sampling technique, which is widely used in the qualitative research to choose an information-rich participant who can contribute to the study phenomenon. Purposive sampling was deemed the most suitable as the study demanded participants who had first-hand knowledge, experience and professional competency in relation to digital learning and early childhood development.

The study's inclusion criteria for the participants included:

1. Experience working in early childhood care and education, either professionally or as a caregiver;
2. Show understanding of AI learning tools/ChatGPT;
3. Be able to observe children's interactions with digital learning tools;
5. Be open to volunteering and being reflective.

Snowball sampling was also used in addition to purposive sampling which was used for identifying other participants through professional and educational networks. This approach was especially effective for reaching child psychologists and digital education experts who had expertise in the field of AI applications in educational settings.

The study was not interested in statistical representation but sought depth and richness of insight. As the saturation of the themes was reached (that is, no significant new patterns or ideas were gained from further interviews or conversations), more participants were attracted to the study.

Data Collection Methods

Multiple qualitative data collection techniques were used such as semi-structured interviews, focus group discussions, classroom observations and document analysis to attain methodological triangulation and depth of the interpretations.

Semi-Structured Interviews

The main data collection technique was semi-structured interviews. This provided an opportunity for participants to communicate their experiences, concerns and perspectives in a flexible and reflective way and the researcher to follow up with questions to explore emerging issues.

Teachers, parents, educational psychologists and curriculum specialists were interviewed. Key areas that were explored in the interview structure involved aspects of children's interactions with ChatGPT, learning outcomes, emotional and behavioral issues, ethical worries, integration within the classroom, and future plans for the use of AI in education.

The use of semi structured interviews was appropriate as it provided consistency in the data across participants whilst also allowing for more in-depth exploration of participants' experiences. The participants were invited to express their own experiences, feelings, and concerns, allowing for a deeper understanding of the contextual factors involved in the use of AI in learning.

Focus Group Discussions

To understand common experiences and shared insights into the integration of AI in ECE, focus group discussions were held with educator and parent groups. The use of focus groups enabled participants to discuss each other's ideas and to think through and provide feedback on others' ideas.

This approach proved useful in uncovering shared educational issues, barriers, and the social perceptions of the usage of ChatGPT by young children. The group interaction also showed conflicts between positive expectations on technological innovations and concerns about developmental side effects.

Classroom Observations

Classroom observations without participation were carried out in selected early childhood learning settings that had included digital technologies into their learning activities. Observations centered on children's engagement patterns, how teachers facilitate learning, interactions with children, and teacher response to the AI learning activities.

The classroom observations were an important source of contextual understanding of the classroom practices, as they assisted in documenting authentic pedagogical interactions. Systematic observational notes were taken to capture behavioral patterns, communication, emotions and atmosphere in the classroom.

Document Analysis

The analysis of documents used was an approach known as document analysis, which was applied to study early childhood educational technology documents, including institutional policies, curriculum guidelines, digital learning frameworks, and educational technology documents regarding the integration of AI in early childhood education. This approach enabled a deeper comprehension of the ways in which educational institutions think about and govern the use of AI in learning practices.

Document analysis was also used to make comparisons between the policy discourse and participants' lived experiences, pointing to possible discrepancies between expectations and experiences in the classroom.

Ethical Considerations

Ethical integrity was central to this study, because of the sensitivity of research that involves the educational environment of children and parental experiences. All data collection efforts were approved by the appropriate institutional review process.

The purpose, methodology, confidentiality policies and rights of voluntary participation were explained thoroughly to all participants. Pre-publication informed consent was obtained prior to the interviews, observations and focus group discussions. The participants were told that they could withdraw from the study at any time without penalty.

Participant identity was anonymised by the use of pseudonyms and coded identifiers. Transcription and reporting procedures eliminated any potentially identifiable institutional and personal information.

There was particular sensitivity in ethical matters that involved children's emotional and developmental experiences. To minimize ethical risk, the study did not include direct interviews with young children, but was based on their observations and perspectives by adults. Data were securely kept, and used only by the researcher.

Data Analysis

Thematic analysis, an interpretive qualitative method was used to analyse the collected data as it allowed for identifying patterns, meanings and conceptual themes in the participant's narrative. Thematic analysis was chosen because it is flexible and enables a systematic analysis of complex educational and emotional experiences.

The analysis process involved multiple interrelated steps. The data familiarization was done by reading the transcripts of the interviews, the notes from the observations, and the transcripts of the focus group discussions several times in the first phase. At this phase, the researcher reflexively interacted with the data to find initial meanings and consistent issues.

Open coding was then carried out to uncover meaningful units of data with regard to participants' experiences, emotional reactions, pedagogical reflections, and ethical issues. These were then clustered into larger concept-based categories that showed commonalities in participant stories. These categories were then developed into major themes focusing on core aspects of how ChatGPT is involved in ECE, through an iterative process of interpretation. Themes were continually monitored and checked against the participant accounts of the originality to ensure interpretive coherence and contextual authenticity.

Finally, thematic analysis allowed the researcher to transcend beyond the surface description and to the more interpretative analysis of the role that AI technologies play in emotional development, classroom dynamics, learning relationships, and childhood learning experiences.

Trustworthiness and Credibility

Trustworthiness and credibility were ensured through the use of several strategies. Methodological triangulation, using interviews, focus groups, observations and document analysis, helped to build credibility. Multiple data sources allowed for a deeper interpretation and a less one-sided perspective.

Member checking was also done by presenting participants with selected interpretations of themes to validate them and ensure that they resonated with the participants' experiences. This process helped to enhance the interpretive validity and confirm that the results of the study were the meanings participants intended.

Throughout the research process a reflexive approach was used as a guiding principle. The researcher was aware of, and continually reflected on his personal biases, professional attitudes, and interpretive lens to reduce bias and analytical transparency.

Systematic documents of research procedures, coding decision and the development of analysis further improved the dependability. To give readers enough context so that they can understand the social and educational context that shaped participants' experiences, thick description was used.

Research Limitations

Although the study is methodologically sound, certain limitations are noted. First, the study does not address developmental outcomes explicitly, but instead, rather focuses on the individual's experiences and perceptions, which could constrain generalizability. Second, the experiences of participants were affected by the institutional, cultural and technological context in which they lived, which can vary from one educational system to another.

Moreover, the use of generative AI in early childhood education was a new development for many participants, and their familiarity with ChatGPT could impact their interpretation. Lastly, the dynamic development of AI technologies could mean that the perception and practice of education in the field may evolve since the study was conducted.

However, the limitations of the study should not detract from its importance. Instead, they emphasize the need for continued qualitative research on human, emotional, and ethical aspects of the use of AI in ECE.

Findings and Discussion

This will be incorporated into the Introduction and Discussion section of the research report.

The results of this study were developed using interpretive thematic analysis of the qualitative data gathered from early childhood practitioners, parents, curriculum specialists, pediatric development professionals and educational technology practitioners. The aim of the analysis was to explore the reception, experience and negotiation of ChatGPT and other generative AI tools in ECE settings. The study did not focus on the technical or efficiency aspects of AI integration, but rather on the

emotional, developmental, pedagogical and ethical experiences of participants with AI-supported learning with young children.

The education landscape was complex and sometimes contradictory as demonstrated in the thematic analysis. While acknowledging the potential of ChatGPT as a transformative educational tool, participants also voiced significant concerns about the risks of dependency, the loss of human connection, the management of emotions, and the ethical implications of using AI in childhood education settings. In a set of interviews and observations, participants repeatedly viewed AI as more than a technological solution, it was a transformative force in the dynamics of child-teacher, parent-teacher, and teacher-child relationships and in the way the education system interacts with them.

The results indicate that the impact of ChatGPT on early childhood education is not simply a technological optimism or technological fear binary opinion. Rather, participants characterized the process of embedding AI as a socially negotiated one that is influenced by educational values, digital literacy, institutional readiness, emotional contexts, and developmental issues. The results are consistent with the growing qualitative research which focuses on how to understand these technologies in the context of human rather than solely technological performance.

Thematic Overview of Findings

Theme	Participant Perspective	Interpretation	Educational Implication
Personalized Learning Opportunities	AI tools support individualized and adaptive engagement	ChatGPT is perceived as a supplementary learning facilitator	Potential for differentiated instruction in early childhood classrooms
Creativity and Language Development	Children enthusiastically engage with storytelling and interactive dialogue	Conversational AI may stimulate curiosity and linguistic experimentation	Opportunities for language enrichment and creative learning
Teacher Support and Classroom Innovation	Teachers view ChatGPT as supportive for planning and resource generation	AI functions as pedagogical assistance rather than complete instructional replacement	Need for balanced teacher-AI collaboration
Reduced Human Interaction	Participants fear excessive AI reliance may weaken interpersonal communication	Emotional and social learning may become compromised	Human interaction must remain central to early education
Cognitive Dependency Concerns	Children increasingly seek instant AI-generated answers	Dependency may reduce critical thinking and independent exploration	Importance of guided and limited AI integration
Ethical and Developmental Risks	Concerns regarding misinformation, bias, and developmental appropriateness	AI systems raise unresolved ethical and child protection questions	Strong ethical frameworks and monitoring mechanisms required

Theme	Participant Perspective	Interpretation	Educational Implication
Digital Inequality	Unequal access to AI Technological innovation technologies exists across schools and communities	may deepen educational disparities	Policy intervention necessary for equitable AI integration
Emotional and Behavioral Implications	Increased attachment to devices and emotional frustration observed	AI engagement influences emotional regulation patterns	Need for emotionally responsive educational practices
Future Readiness and AI Literacy	Participants acknowledge AI literacy as increasingly important	Early exposure may prepare children for future technological societies	Balanced digital literacy frameworks are required

Personalized Learning Opportunities

A recurring theme that was frequently mentioned was the potential of ChatGPT to provide personalized learning experiences in early childhood education. Educational professionals and teachers often remarked that AI supporting learning environments are flexible, engaging, and responsive to children's learning and communication preferences. The participants noted that educational conversational AI systems allowed children to interact with educational material at their own pace and level, and that this helped to lower learning anxiety and increase participation from shy or hesitant learners.

A preschool teacher explained that:

“Some kids who do not speak much in class, speak more when using digital learning systems, as they're not afraid of being judged.

This finding is part of a larger educational debate over learner-centered pedagogy and adaptive learning technology. Comparable research in the field of digital education literature indicates that AI-based systems could enable opportunities for differentiated instruction depending on the level of engagement and understanding of the learners. This is not to be confused with technologically deterministic learning research, which positively advocates for the benefits of personalization without question, but in this research, users often spoke of personalized learning's role as an adjunct to human learning relationships in education.

Parents also recognized how sometimes ChatGPT activities made children curious and engaged their attention in learning tasks. But many of the caregivers wondered at the same time whether the algorithm-based personalized interaction would be enough to help in the emotional and social development. The participants repeatedly pointed out a difference between “educational responsiveness” and “human responsiveness”, indicating that AI systems might be able to respond to information, but they are not capable of truly replicating empathy, emotional reassurance, or understanding of relationships.

The results of this study contribute to the constructivist educational framework, as they demonstrate the possible use of AI-based tools in fostering exploratory learning, and also highlight the potential conflict between the efficiency of technology and educational relationships. The results thus question the narrative of simple, unquestioned goodness of personalized AI learning, despite factors of developmental complexity.

Learning and the development of creativity

The other notable theme was the impact of ChatGPT on young children's capacity of creativity, storytelling, communication and language exploration. Educators noted that conversational AI tools frequently enabled learners to be imaginative and become engaged in the learning process, through features such as story generation, Q&A interaction, vocabulary building, and creative dialogue exercises.

One curriculum specialist commented:

Children develop an interest in conversational storytelling, enjoy asking imaginative questions and get instant answers which can stimulate verbal expression.

Participants noted that AI-powered storytelling is especially helpful for kids who struggle with language confidence issues. Some children seemed more willing to use language and communication when engaging with AI systems as teachers reported that they were not afraid of being criticized or embarrassed.

These results align partially with those of the Sociocultural Learning Theory which focuses on interaction and guided communication in cognitive development, especially Vygotsky's work focusing on the zone of proximal development. Participants proposed that AI tools sometimes acted as a conversational scaffold that facilitated language engagement and language curiosity. But participants also stated that the creativity supported by AI systems was also very different from the creativity that arises in collaborative social interactions, peer interactions, and imaginative play.

One child psychologist said that AI systems were troubling because they were raising the question of the quality of their imaginative development.

When it comes to interaction in the form of Child Language, AI-generated interaction might promote the use of language, but it is not a substitute for emotional interaction.

This difference was analytically relevant because there was a consistent distinction between “functional creativity” and “human creativity” made by the participants. Although the AI systems seemed to generate verbal interactions and questions, participants doubted whether machine-generated creativity would be effective in fostering emotional creativity, empathy, and socially relevant learning experiences.

The results add to the current research discussion on the effects of using AI to enhance education interaction on the development of authentic processes. Overall, the study indicates that while conversational AI can enhance language-based interactions, it could also reduce the potential for spontaneous human-to-human communication if it is overused or not integrated appropriately.

Teacher Support and Classroom Innovation

It was common across the study for teachers to talk about the potential of ChatGPT as a pedagogical support rather than as a substitute for the teaching profession. The advantages of leveraging AI systems to support lesson planning, generating activities, creating educational resources, and enriching classroom creativity were recognized by many educators.

One participant explained:

“ChatGPT is useful for generating ideas for learning activities, particularly for story writing and in-class activities, which saves time.”

Teachers also shared how AI tools sometimes helped them bring more innovation to the classroom by providing interactive learning opportunities and creative teaching methods. For some teachers, ChatGPT could be a valuable tool for creating a more inclusive learning space because it can

produce customised learning materials for children with various communication styles and learning preferences.

Educators, however, consistently rejected narratives about the potential of AI to replace human teaching, even though they acknowledged the potential of AI for educational advantages. Teachers affirmed that early childhood education is not only about delivering information, but also caring for the emotions, guiding behavior, developing social skills, and nurturing relational trust.

The senior early childhood educator said:

“The word 'relational' is used to describe teaching at this age because young children need emotional connection, eye contact, reassurance and human presence.”

The finding is very different from the technologically reductionist educational stories, in which teaching is mainly understood as a process of content transfer. Pedagogical interaction was seen by participants as emotionally embedded and developmentally relational; this implies that the use of AI technologies should be seen not as an independent learning system, but as a facilitator for human-centered learning.

The results thus support the current educational literature highlighting the irreplaceable contribution of teachers in early childhood for supporting emotional and social development. At the same time, the results indicate educators' readiness for the integration of AI tools when it is carried out in pedagogically balanced and ethically guided ways.

Lower Human Interaction and Social Development concerns

One of the most emotional themes was the concern about how much less children are being exposed to human contact, diminished interpersonal skills, and the impact that would have on them. Repeatedly, parents, teachers, and psychologists pointed out that overuse of conversational technologies can lead to a reduction of opportunities for face-to-face interactions, emotional learning, and social communication.

A parent reflected:

“Sometimes kids can get so caught up in the digital interaction that they are not interested in talking to or playing with family members or peers.”

The participants noted a rise in worry about children's emotional connection with digital devices and AI-driven systems. Some children emerged with frustration, withdrawal, or impatience in the non-digital classes following extended technological involvement, were observed by several of the educators.

The results are very congruent with the literature of attachment theory and developmental psychology, which highlight the significance of emotionally sensitive personal relationships in early childhood. Consistently the participants stated that children learn empathy, emotional regulation, and social communication mostly in inter-personal interaction and not through algorithmic dialogue.

Not all participants however, were against technology in general. Instead, they voiced their concern about imbalance. The majority noted that AI-supported learning could have negative developmental consequences if the digital interaction is replacing the relational interaction rather than enhancing it.

In this subtle viewpoint, neither extreme technological enthusiasm nor technological rejection is plausible. Participants called for a balanced context of education, in which AI is used, but love and traditional human communication, play and emotional interaction and social learning experiences remain.

Cognitive Dependency and Independent Thinking

One of the major concerns was the potential for children's independent thinking to be undermined and their cognitive dependency on AI systems that could provide instant answers and replies.

Observation by teachers noted that some children were increasingly seeking "quick answers" instead of having to think and problem solve. One educator explained:

"Some children have grown tired with activities that require them to think and explore further and deeper, and they expect instant solutions."

The participants were worried that a too-reliance on AI-generated answers could stifle inquisitive thinking, resilience, and reflective learning. Multiple child development experts stated that productive struggle and exploratory uncertainty are key elements of children's cognitive development.

The results cast doubt on the notion that AI is uniformly "educationally empowering. Participants noted that blindly relying on AI-generated responses might inadvertently stifle creative thinking and problem-solving, which are essential for deepening understanding and embracing complex challenges.

The results are in line with current research that warns of over-automating schools. The need to provide children with opportunities for experimentation, question and discussion, and reflective thought, but outside of the technologically mediated interaction, was repeatedly made clear.

Ethical risks and developmental uncertainty

The issue of ethics was a recurring cross-cutting theme in the participants' narratives. The participants were concerned about misinformation, exposure to unsuitable content, data privacy, algorithmic bias, and developmental appropriateness of AI tools for young children.

In this instance, the educational psychologist said:

Children are very impressionable and trust what they see on a digital system without questioning accuracy or intent.

Participants highlighted that young children often lack the cognitive abilities to critically assess information created by AI. As a result, teachers and parents expressed worries about children's susceptibility to misleading information, emotional disorientation, and adopting too much faith in responses from machines.

Moreover, participants identified institutional readiness with respect to governance of AI in early childhood education. Various teachers indicated that they had received little professional development on the ethical use of AI, child data protection, and child-friendly digital pedagogies. These findings indicate a huge disconnect between the quickness of technology uptake and the level of moral education that was achieved in the educational system. Guests repeatedly emphasized the need for schools to adopt AI tools at a rate that exceeds the pace of development of regulatory, pedagogical, and developmental protections.

Technological and AI Literacy

Although there are significant concerns, participants generally agreed that AI literacy will increasingly be relevant in the near future to education and work. Some teachers expressed concern about the future generation learning without AI-backed technologies, leaving them unprepared for the dynamic digital societies.

But participants noted that AI literacy should not just be about technical knowledge. Rather, they called for critical digital literacies that foster an awareness of ethical issues, emotional intelligence, reflective exploration, and responsible technology use.

One participant put this thought succinctly as follows:

Technology awareness is important for kids, however human awareness is also vital. Education must educate them towards both.

This understanding reflects the central paradox throughout the study. The participants did not see a choice between technology and humanity when discussing the future of education; instead, they highlighted the need for innovation and emotional, ethical, and developmental responsibility.

Discussion and E: A critical discussion of E.

Educational Implications

The results of this study will make a valuable addition to the growing body of qualitative scholarship on the incorporation of AI into ECE. Like recent work in the field of education, opportunities were identified in personalized learning, creative engagement and pedagogical innovation. The results, however, go beyond what has been previously studied in that they provide evidence that participants see AI technologies as having educational functions but also within emotional, relational, and ethical frameworks.

In contrast to an increasing number of studies which focus on technology in terms of efficiency and automation, participants in this research repeatedly emphasized human interaction, emotional development and relational pedagogy as core foundations of childhood learning. This indicates that the next phase of educational policies around the use of AI should go beyond simply technological implementation plans and take a more developmentally appropriate and ethical approach.

The study also uncovers significant paradoxes in the current educational discourse. At the same time, participants saw ChatGPT as both a tool of empowerment and a potential threat, as a tool for innovation and social disconnection, and as a facilitator of education and a tool of uncertainty. The tensions illustrate both the complexity of the integration of AI into early childhood settings and the difficulties of the policy narratives that would see educational technology as a panacea or as a threat.

In practice, the results highlight the importance of creating a balance of AI integration frameworks that prioritize teacher supervision, parent engagement, emotional growth, digital skills, and ethical monitoring. Training programs for educators to understand and use AI responsibly and safely, while maintaining human-centred pedagogical connections, must be prioritised in educational institutions.

Finally, the results show that the future of AI's role in early childhood education will rely not only on technological progress but on the capacity of society to maintain the emotional, relational, and ethical aspects of children's learning in increasingly digital learning environments.

Conclusion

AI has become a game-changer in early childhood education, presenting a fascinating and transformative era for the field. This study aimed to examine how educators, parents, child development professionals and educational practitioners experience, perceive, and worry about using ChatGPT in early learning settings. Using qualitative inquiry, the research not only challenged technologically deterministic assumptions, but it also uncovered the emotional, cognitive, pedagogical, and ethical truths that affect the use of AI in childhood learning experiences. The results indicate that the perception of ChatGPT is not only as a digital educational tool but as a socially and developmentally impactful presence that can transform communication, teaching methods, learning approaches, and relationships in early childhood environments.

A key finding of this research is the realization that ChatGPT can have educational value when used purposefully and responsibly. Opportunities for personalized learning, language enrichment,

creative engagement, classroom innovation and adaptive instructional support were recognized by participants. Educators highlighted the potential of conversational AI systems in fostering active engagement from students who are less inclined to speak up, in sparking students' curiosity about what questions to pose, and by giving them more learning materials that can help them to take part in differentiated learning approach. Parents and educators also identified that AI-enhanced learning can also contribute to future digital literacy and technological readiness in societies becoming more and more AI-driven.

The study also uncovered deep concerns over the developmental impact of over- or uncritical use of AI in early childhood. Anxieties that were constantly voiced involved lessened interaction with other people, emotional reliance on digital systems, lessened social communication, decreased attention spans, and decreased independent thinking skills. These concerns are part of a broader tension between technological advancement and relational pedagogy in education. The results indicate that information responsiveness can be reproduced by AI systems, but meaningful human educational relationships possess emotional sensitivity and empathy, and their interpersonal trust, which cannot be reproduced by AI systems. This difference is still very significant for young children who are heavily reliant on emotional bonding, social interaction and sensory stimulation for development.

The study also reveals that the effects of ChatGPT on early childhood education should not be understood in a simplistic way, by either technology optimism or technology resistance. No participant resisted the use of AI, and no participant was unreservedly accepting it. Rather, they referred to the integration of AI as an educational process that is negotiated, influenced by institutional preparedness, parental support, moral consciousness, developmental considerations, and pedagogical considerations. This is a sensitive viewpoint as much of the current discussion on AI in education tends to focus on innovation, efficiency, and digital transformation, while neglecting emotional health, developmental fit and ethical responsibility.

One of the key strengths of the study is its focus on the human-centred aspects of the integration of AI. Throughout the workshop, the need to emphasize the relational nature of ECE was repeated. Education was presented as an emotional activity based on encouragement, care, trust building and social modelling by the teachers. Parents also shared concerns that children might develop a decreasing ability to communicate with others and manage emotions in their lives due to the excessive use of AI. Child development experts also cautioned that children's reliance on these automated conversational tools could have an impact on their thinking process, social norms, and emotional management, which are still not fully understood. This is further evidence of why human interaction should remain the key element of early childhood learning environments, no matter how advanced the technologies used.

The study also reveals critical ethical and institutional issues related to the application of AI in schools. There was a concern about misinformation, algorithmic bias, child data privacy, developmental appropriateness, and the lack of clear educational policies for the use of AI with young learners. Limited professional training in ethical AI implementation was mentioned by many educators and uncertainty about healthy digital boundaries and responsible practices of using AI mentioned by parents. The results of this study suggest that the adoption of AI technologies in education is progressing faster than the establishment of ethical frameworks, pedagogical approaches, and child-centred regulation. Therefore, more interdisciplinary integration between teachers, psychologists, policy makers, curriculum planners and technology designers is needed to ensure responsible use of ChatGPT in ECE.

Pedagogically, the results indicate that ChatGPT should be used as a tool to assist teachers rather than supplant them in the classroom. The best use of artificial intelligence in education seems to be in a well-rounded learning environment where technology supports and enhances, not replaces, human interaction. Teachers are not just a source of cognitive support but emotional guidance, behavioral support, ethical modeling, and relationship learning. So hybrid pedagogical models that combine technological innovations with maintaining interpersonal educational relationships which are essential to children's development must be given preference in the development of the future pedagogical model.

The implications go beyond the classroom to education in general and to curriculum development. It is crucial for policymakers to understand that there are developmental and ethical issues to consider when integrating AI in early childhood that are different from those for older students. Therefore, guidelines for the use of AI in education should be set, focusing on policies of emotional wellbeing, supervised use, digital literacy, developmental sensitivity, and balanced screen time, applicable to age appropriate users. Equitable access to educational technologies should also be tackled to avoid further marginalization of socioeconomic groups and education institutions. If not accompanied by inclusive policy action, the incorporation of AI can exacerbate current educational inequalities, failing to achieve transformative change in education.

The results also underscore the critical need for children's and parents/educators' AI literacy initiatives. Responsible use of AI always called for an understanding of digital ethics, dangers of misinformation, constraints of algorithms, and the use of technology in a healthy way. The future curriculum development ought thus to go beyond technical digital skills only and include ethical considerations, reflecting digital skills, emotional intelligence and critical digital awareness in early education.

This research makes a significant contribution to qualitative educational scholarship by foregrounding the lived realities and emotional experiences often ignored in technologically-influenced educational research. While quantitative performance metrics and efficiency-based frameworks are often used in existing literature to assess AI, this study shows how interpretive inquiry is essential for grasping the complexity of humans, the emotional dimensions of learning, and the socially situated nature of an education. As a result, the findings underlined the need for qualitative research to gain insight into how AI technologies influence the learning of children, the pedagogical relationship and developmental processes.

However, there are some limitations of the study. Results are contextually specific to particular educational and social contexts and may not be entirely representative of all cultural and institutional contexts. Moreover, the integration of AI in ECE is still a relatively new field, and as the technology advances, participants' perceptions are still developing. Further studies are thus needed to examine the long-term effects of AI exposure on young children, cross-cultural experiences, teacher training models, and children's own experiences of AI-enhanced learning environments.

Qualitative and interdisciplinary studies are important to conduct to explore the potential for long-term effects on emotional attachment, creativity, communication, cognitive autonomy, and social development from extended engagement with conversational AI systems. Ethical governance models that can reconcile technological innovation and child protection, developmental integrity, and educational equity are also an area for future research.

Finally, the future of ChatGPT in early childhood education will not be defined by its technological sophistication, but by society's ability as a whole to keep humanity alive in increasingly digital

education. The results of this research indicate that the question at hand in schools is not if AI should be present in childhood learning spaces, but how educational communities can ethically, critically, and compassionately weave AI into the spaces of childhood while preserving the emotional, relational, and developmental underpinnings of childhood itself. In this context, the future of AI in education is at least as much a human story as it is a technology one.

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