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REIMAGINING EARLY CHILDHOOD EDUCATION WITH EMOTION-AWARE ARTIFICIAL INTELLIGENCE

OLALEKE JANET OLUSOLA

Department of Computer Science, Adeyemi Federal University of Education, Ondo, Nigeria
*Corresponding email: shollyjane@gmail.com

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Abstract

Early Childhood Education (ECE) serves as a cornerstone for cognitive, emotional and social development of individuals. Hence, the efficacy of ECE does not rely only on the curriculum design but also on the emotional experiences that impact children's ability to engage and retain knowledge. However, maintaining children's engagement and knowledge retention remains a challenge in contemporary classrooms. This is because most early learning environments still depend on generalised teaching methods that ignore children's emotional differences. This study presents a conceptual review of Emotion-Aware Artificial Intelligence (AI) in ECE by examining its theoretical foundations, educational benefits, and implementation challenges. Relevant scholarly publications were identified through academic databases using keywords related to early childhood education, artificial intelligence, affective computing, and emotion-aware AI. The selected literature was examined and synthesised to develop a coherent conceptual understanding of how emotion-aware AI can support emotionally responsive learning environments. The review indicates that emotion-aware AI technologies driven by affective computing can detect and interpret learners' emotional states such as frustration, boredom, confusion, excitement and enthusiasm. Although challenges such as ethical issues, data privacy, bias and overdependence on technology can affect the effective integration of these technologies into early childhood education, strategies can be employed to mitigate these challenges. This study therefore concludes that incorporating emotion-aware AI into early childhood education is a progressive step toward enriching early childhood learning outcomes in a rapidly evolving digital age.

Keywords: Early Childhood Education, Emotion-Aware AI, Affective Computing, Retention and Engagement

1. Introduction

Early Childhood Education (ECE) is acknowledged as a crucial phase of human growth. According to Yu et al. (2025), children's cognitive, social, and emotional development is rapidly expanding during this crucial period of their lives. During this stage, children do not learn through cognition alone; emotion plays a vital role in memory formation, attention, engagement and interpersonal interaction. Despite this, traditional educational models in early childhood prioritise literacy, numeracy and motor skills while neglecting emotional development as a centre of learning outcomes. However, recent developments in Artificial Intelligence (AI) have made it possible for robots to recognise and react to human emotions through gestures, speech patterns, facial expressions, and physiological indicators. The developmental ethical and pedagogical complexities of early childhood contexts remain insufficiently addressed (Kosta et al., 2026). Hence, this study advances the position that Emotion-Aware AI can serve as a catalyst for redefining ECE as emotionally intelligent, adaptive and inclusive (Katsampoxaki-Hodgetts et al., 2025).

The adoption of emotion-aware AI in early childhood education requires a principled, equity-focused approach that prioritises child rights, data privacy, bias mitigation and cultural sensitivity (Kosta et al., 2026). This is because young

children represent a uniquely vulnerable population; therefore innovation must be properly guided by ethical safeguards and human-centred design thereby positioning educators and not the algorithms at the heart of decision-making. Emotion-aware AI should be viewed as a supportive scaffold that enhances teacher insight, promotes inclusive engagement and fosters self-regulation skills among children and not a replacement for educators (Barker et al., 2025). It is against this background that this study emphasises that by advancing the aforementioned principles, reimagining early childhood education with emotion-aware AI for building resilient, inclusive and developmentally responsive educational systems in the age of AI is possible. Emotion-aware systems, if designed with interdisciplinary collaboration among educators, psychologists, AI researchers and policymakers can contribute to more compassionate, adaptive and inclusive learning environments, thereby placing children's emotional well-being at the heart of intelligent educational design

2. Literature Review

2.1. Theoretical Framework

To comprehend how emotion-aware AI affects young children's cognitive, social, and emotional development, theoretical frameworks are essential. Lev Vygotsky's socio-cultural theory of cognitive development from 1934 and John Bowlby's attachment theory from 1958 serve as the foundation for this research. According to Vygotsky's socio-cultural theory, a child's cognitive development is shaped by social interactions and tools (Cimino et al., 2025; Vygotsky, 1978). This theory provides a strong foundation for integrating emotion-aware AI into early childhood education. Central to this theory is the idea that learning is a social process occurring through interaction with a More Knowledgeable Other (MKO). The MKO typically refers to a teacher, parent, caregiver, or a more capable peer who provides scaffolding or temporary support to the learner. Within this theoretical framework, Emotion-Aware AI should not be a replacement for the MKO. It should be regarded as a mediating technological tool which complements the MKO by identifying learners' emotional states within their Zone of Proximal Development (ZPD) which differentiates what a child can accomplish on his own and what he can accomplish with assistance. This theory also emphasises that cognitive development is closely linked to emotional development, where emotions such as motivation, anxiety, curiosity, frustration and confidence directly influence the effectiveness of scaffolding within the ZPD (Eguchi, 2024). In the context of emotion-aware AI, this theory provides a strong justification for adaptive learning systems that respond to both cognitive and emotional cues. However, it also stresses that AI should enhance and not replace teacher-guided interaction. This theory can be applied to this study because emotion-aware AI can be conceptualised as an adaptive scaffolding mechanism that strengthens the alignment among emotional states, guided support and cognitive development when designed responsibly.

Bowlby's attachment theory asserts that children's early emotional bonds with caregivers form the foundation for psychological security and exploratory behaviour (Bowlby, 1969). Nevertheless, Pianta (1999) and García-Rodríguez (2023) extended the attachment theory by emphasising that teachers can serve as important attachment figures that provide emotional support and create a secure classroom environment which promotes learning in the classroom. According to the theory, the attachment relationships are categorised into secure and insecure patterns. A secure pattern develops when a teacher/caregiver consistently responds to a child's emotional needs with sensitivity and reliability (Olisaeke, 2025). This fosters a sense of safety that facilitates confidence, emotional regulation and a willingness in a child to actively engage with the learning environment. On the other hand, inconsistent or unresponsive caregiving may lead to insecure attachment patterns such as anxiety, avoidance or emotional instability, all of which negatively impact educational outcomes.

In relation to emotion-aware AI, attachment theory underscores the importance of recognising and responding sensitively to emotional states in real time. This technology is capable of detecting indicators of emotions such as frustration and anxiety and providing timely information which helps teachers to identify children who may require additional emotional or instructional support. However, the theory maintains that secure attachment is fundamentally relational and human-centred (Bowlby, 1969; Pianta, 1999). Hence, this technology is not a replacement of emotional bonds but should serve as a complementary tool that alerts teachers to children's emotional cues, enabling more timely and informed human responses while preserving the central role of teacher–child relationships. In line with this perspective, this study conceptualises emotion-aware AI as a decision support tool under human oversight to facilitate teachers' emotional responsiveness and maintain a secure classroom environment in early childhood education.

2.2. Conceptual Review

2.2.1. Early Childhood Education

The term "Early Childhood Education" (ECE) describes educational practices and activities offered to children from birth to roughly age five. In many countries, the age bracket for early childhood education spans from birth to eight years (Eva & Claire, 2022). Pathak (2016) defines early childhood care and education as kindergarten, preschool, prekindergarten, day

care, nursery school, or nursery education with the goal of preparing young children for their entry into elementary school. Early childhood education's main goal is to support a child's overall personality development. Beyond instruction and academic preparation, it encompasses the provision of foundational care that supports children's physical, emotional, social and cognitive well-being. Hence, ECE integrates nurturing, protection and guided learning to foster balanced and comprehensive development during the formative years (Eva & Claire, 2022).

Moreover, across many societies, it is a common practice to establish diverse programmes for early childhood education for children under the legal school-entry age, primarily to facilitate a smooth transition into primary education. These programs are designed not only to enhance school readiness but also to lay a strong developmental foundation during the formative years. Globally, institutions such as United Nations Educational, Scientific and Cultural Organization (UNESCO) and United Nations International Children's Emergency Fund (UNICEF) recognise ECE as the cornerstone of lifelong learning and sustainable development. In Nigeria, for instance, the significance of early childhood education is formally acknowledged by the Federal Government. Its importance is reflected in the National Policy on Education, where ECE is recognised as a distinct and integral component of the Nigerian educational system (Federal Republic of Nigeria, 2024). This policy emphasises the government's commitment to structured early learning as a strategic investment in national development.

2.2.2. Emotion and Emotional Development in Early Childhood

Emotion refers to organised psychological and physiological responses to events that are perceived as personally significant. It involves coordinated changes in thoughts, bodily reactions and outward behaviours that prepare an individual to respond to situations in adaptive ways. Emotions arise when individuals evaluate or interpret experiences as beneficial, threatening, rewarding or challenging (Thuillard & Dan-Glauser, 2020). Based on this definition, emotion comprises three interconnected components that have a great impact on emotional development of children. According to Thuillard & Dan-Glauser (2020), these components are:

i. **Cognitive Appraisal**: This refers to the mental process through which an individual interprets or evaluates a situation in order to determine its emotional meaning and significance. Young children must learn how to interpret situations accurately. For instance, a child may initially perceive a minor classroom challenge as threatening, resulting in distress. With developmental growth and guided support, the child begins to reinterpret such experiences as manageable, demonstrating emotional maturation.
ii. **Physiological Activation**: This refers to the automatic physical changes that occur in the body when an emotion is experienced. This also underscores the importance of emotional development. Young children experience strong body reactions such as excitement, fear or frustration but often lack the internal mechanisms to regulate these responses independently. Emotional development therefore includes the gradual acquisition of self-regulation skills.
iii. **Expressive or Behavioural Response**: This refers to the observable ways in which emotions are shown outwardly through actions such as facial expression, voice and body movement. Because emotion includes observable expression, early childhood becomes a critical period for learning socially acceptable ways of displaying feelings. Through interactions with caregivers and teachers, children learn empathy, cooperation and emotional awareness.

Hence, emotional development in early childhood can be understood as the maturation of the emotional system. That is, emotional development involves moving from instinctive, externally regulated reactions to more controlled, internally managed responses. It also refers to having empathy for other people's feelings as well as the capacity to identify, communicate and control emotions at various phases of life (Saini & Saraswat, 2021). This developmental progression is essential for effective learning, positive social interaction and overall well-being in early education settings (Denham et al., 2012; Thompson, 2011).

2.2.3. Artificial Intelligence (AI) in Education

Changes in the demands of education require innovation in teaching and learning and AI has emerged as a transformative tool that supports flexible and learner-centred instruction while addressing key challenges and advancing the pursuit of quality education (UNESCO, 2023). In education, AI refers to intelligent systems that perform tasks such as learning, reasoning, pattern recognition and decision-making to enhance teaching and learning processes. Its applications include adaptive learning systems, intelligent tutoring, automated grading and learning analytics, all of which improve quality of education through personalised learning, timely feedback, instructional efficiency and inclusive delivery (Baidoo-Anu & Owusu, 2023; Jaca, 2024). Nonetheless, the significance of AI in Education depends on several factors which include

teachers' pedagogical competence, teachers' mediation, institutional readiness, ethical implementation and broader educational context (Jaca, 2024). However, most conventional AI systems focus mainly on cognitive performance, content delivery and assessment, often overlooking learners' emotions and behavioural differences (Abdul-Rasheed, 2025). This highlights the need for emotion-aware AI, as emotion strongly influences attention, motivation, and engagement, and knowledge retention.

2.2.4. Emotion-Aware Artificial Intelligence (Affective Computing)

The goal of the new technology known as "emotion-aware artificial intelligence" (AI), or "affective computing," is to make it possible for computer systems to recognise, understand, process and react to human emotions (Picard, 1997). In order to identify and analyse human emotions through facial expressions, voice patterns and behavioural signals, it integrates several data sources and sensor technologies (Kalburgi et al., 2025). The advent of artificial intelligence (AI) and machine learning in the late 20th and early 21st centuries has brought about a significant change that makes it possible to create complex algorithms that can analyse vast amounts of data in order to identify and categorise emotional states (Praveena et al., 2020).

Additionally, the development of deep learning has significantly improved the accuracy, scalability, and resilience of emotion identification technologies, whereas early intelligent systems mostly depended on rule-based methods and manually created features. Real-time multimodal emotion identification is thus made possible by recent developments in neural network topologies, such as convolutional neural networks (CNNs) for visual analysis and recurrent neural networks (RNNs) for sequential data processing (Ko, 2018; Schuller, 2018; Vinola et al., 2015).

2.2.5. Components of Emotion-Aware AI

Emotion-Aware AI consists of interconnected components that collectively work together and facilitate the perception, understanding and response to users' emotional states. These components are discussed below:

i. **Data Acquisition**: This is also called the input module. This component collects multimodal emotional data such as textual inputs, facial expressions, audio signals, and physiological data from users, such as skin conductance, temperature, and heart rate. The inputs are collected via cameras, microphones, sensors and other wearable devices.

ii. **Preprocessing Module**: Raw data are often noisy and inconsistent, so this component cleans and filters the collected data to ensure quality and consistency. This stage takes care of the noise reduction, missing data and synchronisation of multimodal inputs.

iii. **Emotion Perception**: This component focuses on detecting and identifying emotional states from the processed data. It involves feature extraction (facial landmarks or vocal tone), emotion classification using deep learning to classify emotions such as happiness, sadness and anger and emotion intensity estimation to measure how strong the emotion is (Jadhav et al., 2024). This stage is crucial as it forms the foundation for other emotional reasoning.

iv. **Emotion Understanding**: After emotions are detected, this component interprets them within context, since the same expression can have different meanings in different situations (Jadhav et al., 2024). It uses contextual awareness, user profiling and temporal analysis to determine the meaning and implications of detected emotions. However, contextual interpretation of emotions in young children is highly sensitive because emotional expressions are influenced by developmental stage, cognitive maturity, cultural norms, and interpersonal context. Consequently, emotion-aware AI systems should not rely solely on observable emotional cues but should integrate different sources of information and should be complemented by human judgment to minimise the risk of misclassification and biased interpretations (Picard, 1997).

v. **Response Generation**: This component determines the most appropriate system reaction based on the interpreted emotional states. It selects appropriate communication strategies, manages dialogue flow and uses empathy-driven models to produce supportive, context-relevant responses. In education, it can adjust instructional difficulty, provide encouragement, or offer extra support based on the learner's emotional needs (Praveena et al., 2020).

vi. **Response Delivery and Feedback**: This component communicates the system's response through text, speech or adaptive actions while at the same time monitoring users' reactions to evaluate the effectiveness. The feedback loop enables continuous learning and system refinement thereby allowing the system to become more personalised and responsive over time.

vii. **Cross-Cutting Elements**: These support all system components to ensure effectiveness, accuracy and efficiency. They include data management for secure storage, organisation and annotation of emotional data;

privacy and ethics to ensure consent, data protection and fairness, model training and learning to improve the system using datasets and feedback; and evaluation to assess system performance. These components are depicted in Figure 1 below:

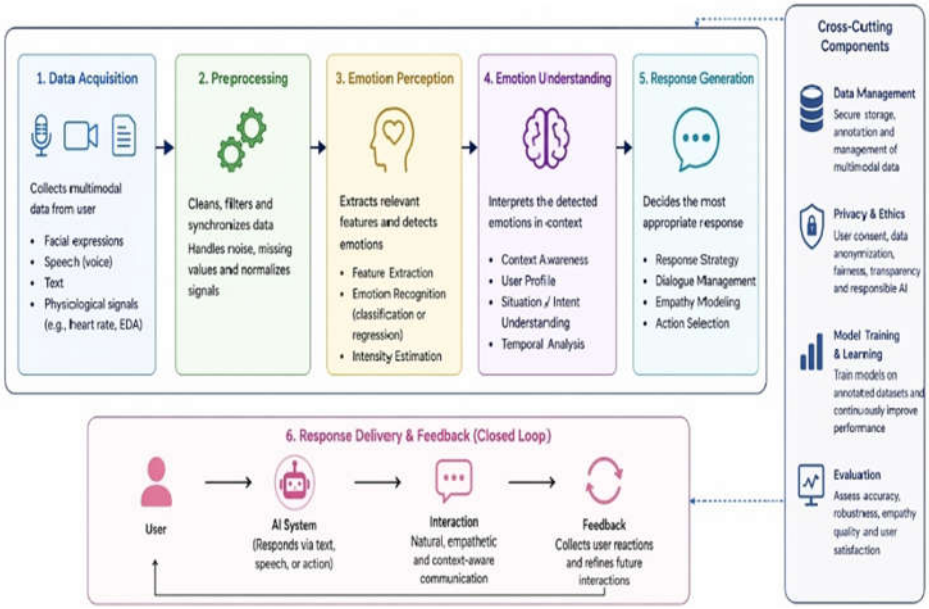


Figure 1: Components of Emotion-Aware AI

2.2 6. Emotion-Aware AI in Early Childhood Education

Emotion-Aware AI is reshaping the landscape of early childhood education (ECE) by introducing intelligent systems that are capable of detecting, interpreting and responding to children's emotional states. In early learning environments, emotions play a vital role in shaping children's attention, retention, motivation, engagement, behaviour and overall learning outcomes. Unlike traditional AI systems, emotion-aware AI in ECE focuses on the children's emotional aspect of learning, bridging the gap between cognitive and emotional intelligence. It enables the continuous monitoring of children's emotional states through different modalities such as facial expression, voice tone and behavioural patterns during learning activities to identify emotions like joy, confusion, anxiety, frustration, engagement, calmness among others.

2.2.7. Exmples of Emotion-Aware AI in Early Childhood

Having examined emotion-aware AI in early childhood, this section highlights some examples of emotion-aware AI used in early childhood education and these examples are also depicted in Figure 2.

i. **QTrobot**: This is an emotion-aware humanoid robot used in early childhood education to support learning and social development. It interacts with children through speech, gestures and facial expressions, making lessons more engaging and easier to understand. It helps children develop emotional recognition, communication and social skills in a structured and supportive environment.
ii. **Affectiva**: This is an emotion-aware AI system that analyses facial expressions and other cues to detect human emotions. It helps identify learners' engagement and emotional states, enabling more responsive and personalised learning support.
iii. **NAO Robot**: NAO robot is an interactive teaching tool to support young children's learning and development. It engages learners through speech, movement and guided activities, helping to improve attention, communication and basic social-emotional skills in a fun and structured way (Belpaeme et al., 2018; Kanero et al., 2018).
iv. **PopBots**: This is an AI-based learning platform designed for young children, using simple robots and interactive lessons to introduce foundational concepts of AI. It helps children explore ideas like emotions, thinking and decision-making in a playful and engaging way.
v. **FocusPocus**: This is an emotion-aware AI tool designed to help young children improve attention and self-regulation skills. It uses interactive activities and real-time feedback to monitor focus levels and gently guide children back to tasks when they become distracted, thereby making learning more engaging and structured.

vi. **Roybi Robot**: This is an AI-based learning companion used in early childhood education to support learning through interactive lessons and voice-based communication. It helps children learn languages, basic literacy and numeracy skills using personalised and engaging activities that adapt to the child's pace of learning.



Figure 2: *Examples of Emotion-Aware AI in Early Childhood Education*

(**Sources**: https://luxia.com; https://shutterstock.com; https://robot.media.mit.edu)

2.2.8. Contributions of Emotion-Aware AI to Early Childhood Education

Emotion-aware AI contributes immensely to early childhood education by improving how learning processes are supported and enhanced through intelligent systems. This section therefore discusses some of these key contributions.

i. **It Enhances Personalised and Adaptive Learning**: Emotion-Aware AI enables personalised and adaptive learning by adjusting instruction to a child's emotional and developmental needs. For instance, when a child is frustrated, it can slow the pace and offer encouragement (Nafiz & Ali-Ahmad, 2025; Kanero et al., 2018). When high engagement is detected, it can increase task complexity to sustain interest and deepen learning.

ii. **It Improves Focus and Engagement**: Emotion-Aware AI creates a more responsive learning environment where children are actively engaged rather than passive learners. When a child appears distracted or disengaged, it can adjust the lesson by introducing interactive content, simplifying instructions or adding playful elements to regain attention. Also, when a child shows excitement or curiosity, it can deepen the activity to sustain interest.

iii. **It Supports Social-Emotional Learning**: It aids kids in comprehending and controlling their feelings while engaging in educational activities. The system detects a child's emotional state and responds appropriately by offering encouragement when frustrated or reinforcing positive behaviour when happy. This supports the development of self-control, empathy and positive social interaction.

iv. **It Builds Confidence and Reduces Anxiety**: Emotion-Aware AI creates a supportive and responsive learning environment for children. When it detects emotional signs such as fear, stress or confusion during learning, it responds with guidance, encouragement or simpler tasks. This helps children feel understood and less pressured during learning. With empathetic feedback and appropriate support, they become more confident and less anxious about making mistakes.

v. **It Enhances Teacher Insights**: Emotion-Aware AI provides educators with real-time information about children's emotional states during learning activities. This helps teachers better understand each child's needs, thereby allowing for proactive interventions that improve learning outcomes.

vi. **It Supports Inclusive and Special Education**: Emotion-Aware AI helps teachers better understand and respond to the emotional and learning needs of the children with special needs. When it detects emotional cues, it adjusts learning activities accordingly. This creates an inclusive and adaptive environment where

children receive personalised support, improving their participation and learning outcomes in the same classroom settings (Cimino et al., 2025).

2.2.9. Challenges of Emotion-Aware AI in Early Childhood Education

Despite the potential of emotion-aware AI in education, its application also comes with certain challenges that may affect how effectively it can be implemented in early learning environments. Among these challenges are:

i. **Privacy and Data Protection**: Emotion-aware AI systems possess the capability to collect and process sensitive personal information, including children's facial expressions, voice recordings, behavioural patterns and physiological signals to deduce their emotional states. The collection and processing of such data raise concerns relating to data privacy**,** biometric data governance**,** and child protection**.** While data privacy focuses on how children's personal information is collected, stored, shared and used, biometric data governance refers to the policies, legal frameworks and ethical principles which regulate the collection, storage, processing, sharing and protection of biometric data**.** This is with a view to ensuring data privacy, security, accountability and compliance with applicable laws and ethical standards. Hence, biometric data governance is essential in an emotion-aware system in ECE because it ensures that biometric data such as facial expressions, voice recordings and eye movements are collected only when necessary, processed securely, protected against unauthorised access and used in ways that respect children's rights, dignity and privacy (Praveena et al., 2020). Child protection, on the other hand, refers to the legal, ethical and institutional measures taken to safeguard children from harm, exploitation, abuse, discrimination and violations of their rights during the design, deployment and use of AI technologies (UNESCO, 2023). Hence, informed parental consent, transparency regarding data use, complying with relevant child protection and data protection regulations and conducting regular risk and impact assessments are significant before deploying emotion-aware AI in educational settings (UNESCO, 2023).

ii. **Accuracy and Misinterpretation of Emotions**: The precision of emotion-aware AI systems determines their efficacy. However, cultural differences, individual behaviour and technical limitations can lead to misinterpretation of children's emotions and inaccurate responses. This can be addressed by training systems with diverse datasets covering different cultures, languages and behavioural patterns, along with rigorous testing and validation processes (Praveena et al., 2020). Combining AI outputs with teachers' observations (human-in-the-loop approach) also helps improve reliability.

iii. **Financial Barrier**: The high cost of acquiring, implementing and maintaining emotion-aware AI systems limits their adoption in many schools (Cimino et al., 2025). This can be mitigated through financial support or subsidies from governments, educational agencies and non-governmental organisations. Developers can also design more affordable, scalable and cost-effective systems to improve accessibility across early childhood education settings.

iv. **Technology Dependency**: Overreliance on emotion-aware AI can reduce meaningful human interaction between educators/caregivers and children, potentially hindering the development of essential social and emotional skills. To address this, it should be used as a support tool rather than a replacement, ensuring a balanced approach that keeps human interaction central in early childhood education.

v. **Teacher Training and Acceptance**: Many teachers lack the skills to effectively use emotion-aware AI. Also, resistance to new technology or fear of replacement can hinder its adoption. This can be addressed through regular training and by involving teachers in the implementation process to build confidence and acceptance.

2.3. A Multi-Stakeholder Framework for Emotion-Aware AI in Early Childhood Education

Building on the preceding discussions, the successful adoption of emotion-aware AI in early childhood education depends on collaboration among key stakeholders. This study therefore presents a multi-stakeholder framework in Figure 3 to guide the integration of emotion-aware AI in ECE. The framework outlines the key stakeholders, their roles and interactions necessary for effective implementation. The proposed framework in Figure 3 is a **conceptual framework** that is developed by the author **through** a critical synthesis of the theoretical frameworks and literature reviewed on emotion-aware AI, affective computing, social-emotional learning, ECE and human-centred AI. The framework illustrates how key stakeholders interact in implementing emotion-aware AI within early childhood education. The framework draws on the principles of affective computing (Picard, 1997), social robots in education (Belpaeme et al., 2018), AI governance for education (UNESCO, 2023), and the theoretical foundations of Vygotsky's Socio-cultural Theory and Bowlby's Attachment Theory. It was conceptualised to demonstrate the relationships among policymakers, school leaders, AI developers, teachers, parents, counsellors, learners and the emotion-aware AI system, highlighting their complementary roles in supporting children's social-emotional development and learning.

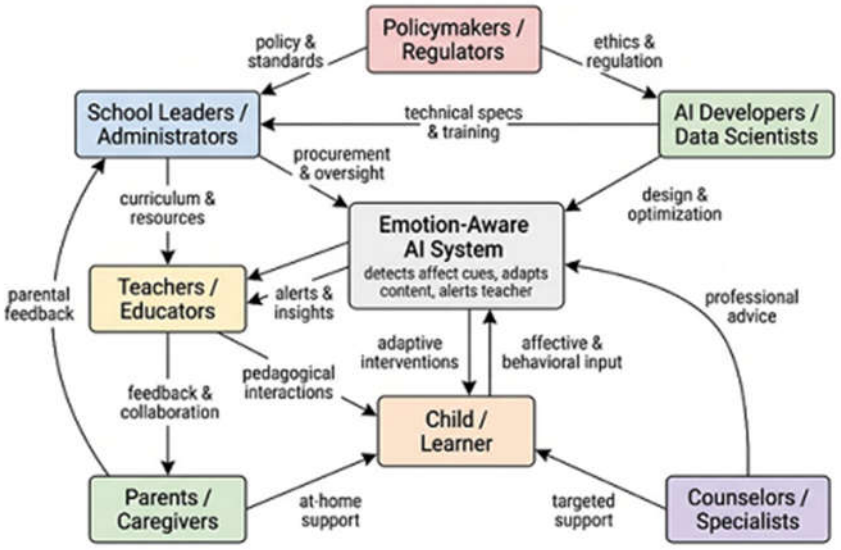


***Figure 3**: A Multi-Stakeholder Framework for Emotion-Aware AI in ECE*

i. **Policymakers/Regulators**: They set policies and ethical standards, ensure data protection and equitable access.
ii. **School Leaders/Administrators**: They manage procurement, oversight, curriculum and resources. They also establish requirements and provide the necessary support to teachers.
iii. **AI Developers/Data Scientists**: Build and improve the system through design, optimisation, technical specifications and training.
iv. **Emotion-Aware System**: The central system that detects emotions, adapts content, and alerts teachers when needed.
v. **Teachers/Educators**: Use the AI in the class and respond to alerts and insights; they also provide pedagogical interactions and human emotional support.
vi. **Parents/Caregivers**: Provide at-home support and give feedback about the child.
vii. **Counsellors/Specialists**: Offer targeted support and professional advice based on the child's needs.
viii. **Child/Learner**: The main user receiving support, adaptive learning and interventions.

3. Conclusion

This study has reimagined early childhood education through the lens of emotion-aware AI, grounded in theoretical perspectives on early learning, emotional development and AI integration in education. It argued that while emotion-aware AI holds significant promise for enhancing effective learning and socio-emotional development, its effectiveness depends on ethical design, accurate emotion interpretation and strong human involvement. It also highlights that challenges such as misinterpretation of emotions, high cost, data privacy and excessive reliance on technology cannot be ignored. The study therefore argues that successful integration of emotion-aware AI in ECE requires collaborative efforts among the stakeholders and a balanced approach where technology complements rather than replaces human interaction. Having taken all these into consideration, emotion-aware AI can significantly reshape ECE.

4. Recommendations

The following recommendations are put forth to direct the successful integration of emotion-aware AI in early childhood education based on the ideas discussed in this study:

i. Development of clear ethical and child protection policies for emotion-aware AI use.
ii. Training of teachers/educators to effectively use AI emotional feedback in classrooms.
iii. Development of affordable and scalable systems.
iv. Strengthening data privacy and security measures for children's data.
v. Promoting culturally sensitive and inclusive AI system design.
vi. Encouraging collaboration among all key stakeholders.
vii. Conduct pilot studies and continuous evaluation in real classrooms.

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Conflict of Interest

The author declare no conflict of interest.

References

Abdul-Rasheed, P., Krishnan, B., Chandrasekhar, V., Narmatha, A., Charumathi, S., & Abbas, S. H. (2025). Emotion-aware and ethically adaptive AI learning platform for personalised, inclusive and real-world student engagement. In *Proceedings of the 1st International Conference on Research and Development in Information, Communication, and Computing Technologies (ICRDICCT'25)* (pp. 710–717). ISBN 978-989-758-777-1.

Baidoo-Anu, D., & Owusu Ansah, L. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI, 7*(1), 52–62. https://doi.org/10.61969/jai.1337500

Barker, D., Tippireddy, M. K. R., Farhan, A., & Ahmed, B. (2025). Ethical considerations in emotion recognition research. *Psychology International, 7*(2), 43–49. https://doi.org/10.3390/psycholint7020043.

Belpaeme, T., Kennedy, J., Ramachandran, A., Scassellati, B., & Tanaka, F. (2018). Social robots for education: A review. *Science Robotics, 3*(21), eaat5954. https://doi.org/10.1126/scirobotics.aat5954.

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. Basic Books.

Cimino, S., Icro Maremmani, A. G., & Cerniglia, L. (2025). The use of artificial intelligence (AI) in early childhood education. *Societies, 15*, Article 341. https://doi.org/10.3390/soc15120341.

Denham, S. A., Bassett, H. H., Zinsser, K., & Wyatt, T. M. (2012). How preschoolers' social-emotional learning predicts their early school success. *Early Education and Development, 23*(5), 673–691.

Eguchi, A. (2024). AI-powered educational robotics as a learning tool to promote artificial intelligence and computer science education. In *Robotics in education*, 279–287. Springer. https://doi.org/10.1007/978-3-030-85739-4_25.

Nabanoba, E., & Mukamazimpaka, M. C. (2022). Early childhood education and the development of behaviour at nursery level in Rwanda. *International Journal of Recent Research in Social Sciences and Humanities, 9*(3), 151–164. https://doi.org/10.5281/zenodo.7104983

Federal Republic of Nigeria. (2024). *National Policy on Education* (latest edition). Nigerian Educational Research and Development Council (NERDC) Press.

García-Rodríguez, L., Iriarte Redín, C., & Reparaz Abaitua, C. (2023). Teacher-student attachment relationship, variables associated, and measurement: A systematic review. *Educational Research Review, 38*, 100488. https://doi.org/10.1016/j.edurev.2022.100488

Jaca, C. A. L. (2024). Artificial intelligence in education: A threat or a tool for teaching. In *The Asian Conference on Education & International Development 2024 official conference proceedings*, 1007–1017. IAFOR. https://doi.org/10.22492/issn.2189-101X.2024.81.

Jadhav, S., Kushwaha, E., Tripathy, A., & Bhatia, C. K. (2024). Emotion aware AI for mental health monitoring. *International Journal of Advanced Research in Science, Communication and Technology, 4*(2), 63–69.

Kalburgi, A., Dudhe, V., Kadam, S., Andhale, S., & Panmand, T. (2025). Emotion aware AI and productivity cycle. *International Journal of Progressive Research in Engineering Management and Science, 5*(12), 242–246. https://doi.org/10.58257/IJPREMS45309.

Kanero, J., Geçkin, V., Oranç, C., Mamus, E., Küntay, A. C., & Göksun, T. (2018). Social robots for early language learning: Current evidence and future directions. *Child Development Perspectives, 12*(3), 146–151.

Katsampoxaki-Hodgetts, K., Kotsidis, K., Papadakis, S., & Anastasiades, P. (2025). Reimagining preschool pedagogy: AI-enhanced teaching through multiliteracies-informed curriculum innovation. In *Proceedings of the 6th International Baltic Symposium on Science and Technology Education (BalticSTE2025)*, 104–119. https://doi.org/10.33225/BalticSTE2025.104

Ko, B. C. (2018). A brief review of facial emotion recognition based on visual information. *Sensors, 18*(2), 401. https://doi.org/10.3390/s18020401

Kosta, A., Lili, I., Ceni, A., Ktona, A., Xhina, E., Kika, A., & Loka, E. (2026). A review of AI techniques for emotion recognition in communication with applications in child safety and education. *International Journal of Education, Learning and Development, 14*(2), 1–10. https://doi.org/10.37745/ijeld.2013/vol14n2110

sAli-Ahmad, N. A. (2025). Using artificial intelligence to enhance social-emotional learning in kindergarten. *ISRG Journal of Arts, Humanities and Social Sciences*, 268–280. https://doi.org/10.5281/zenodo.15165435

Olisaeke, L. C. (2025). Understanding childcare through the lens of attachment theories: An exposition. *Journal of Arts and Sociological Research, 7*(6), 299–310. https://doi.org/10.70382/ajasr.v7i6.034

Pathak, V. K. (2016). Early childhood care and education: International perspective. *Dominion Law Reports, 8*(1), 33–47.

Pianta, R. C. (1999). *Enhancing relationships between children and teachers*. American Psychological Association. https://doi.org/10.1037/10314-000

Picard, R. W. (1997). *Affective computing*. MIT Press.

Praveena, K. B., Suresh, B., & Patrer, D. (2020). Emotion recognition with AI: Techniques and applications. *World Journal of Advanced Research and Reviews, 8*(2), 344–352. https://doi.org/10.30574/wjarr.2020.8.2.0362

Saini, P., & Saraswat, C. R. (2021). Emotional development: Factors affecting emotional development. *Psychology and Education Journal, 58*(2), 8876–8880.

Schuller, B. W. (2018). Speech emotion recognition: Two decades in a nutshell, benchmarks, and ongoing trends. *Communications of the ACM, 61*(5), 90–99.

Thompson, R. A. (2011). Emotion and emotion regulation: Two sides of the developing coin. *Emotion Review, 3*(1), 53–61.

Thuillard, S., & Dan-Glauser, E. S. (2020). The simultaneous use of emotional suppression and situation selection to regulate emotions incrementally favors physiological responses. *BMC Psychology, 8*, Article 133. https://doi.org/10.1186/s40359-020-00495-1.

UNESCO. (2023). *Guidance for generative AI in education and research*. https://unesdoc.unesco.org

Vinola, C., & Vimaladevi, K. (2015). A survey on human emotion recognition approaches, databases and applications. *ELCVIA: Electronic Letters on Computer Vision and Image Analysis*, 14(2), 24–44.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Yu, E., Burns, S., Wiebe, J. P., Schmeichel, A., & Perlman, M. (2025). Application of artificial intelligence in early childhood development: A scoping review protocol. *BMJ Open*, 1–9. https://doi.org/10.1136/bmjopen-2025-106044

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