

ENHANCING EMOTIONAL INTELLIGENCE (EI) AND PSYCHOLOGICAL RESILIENCE OF PRE-SERVICE ECCE TEACHERS: THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN NORTH-WESTERN NIGERIA

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Abstract

This study assessed how Artificial Intelligence enhance professional competencies, emotional intelligence, and psychological resilience among pre-service ECCE teachers in North-western Nigeria. Using a mixed-method design, 150 pre-service teachers were selected through stratified random sampling across NCE I-III levels, with 12 purposefully chosen for interviews. Data were collected via structured questionnaires and semi-structured interviews, with content validity established through expert review and construct validity verified through factor analysis. Reliability was confirmed via pilot testing (Cronbach's alpha ≥ 0.70). Quantitative data were analysed using SPSS (t-tests, ANOVA, regression), while qualitative data underwent thematic analysis using NVivo. Results revealed AI tools significantly enhanced professional competencies ($M=4.33$) and emotional intelligence ($t=10.58$, $p<.001$, $d=1.33$), with AI applications predicting 68.7% of psychological resilience variance. Fully-integrated implementation strategies outperformed blended and lecture-based approaches. Recommendations include integrating comprehensive AI frameworks into curricula, developing ethical training modules, implementing AI-powered emotional assessment systems, and establishing governance frameworks for transparent AI implementation.

Keywords: *Emotional intelligence, psychological resilience, pre service ECCE teachers, Artificial Intelligence*

Introduction

The rise of artificial intelligence (AI) has become a transformative force in modern education, offering innovative opportunities to improve the professional skills of pre-service Early Childhood Care and Education (ECCE) teachers. As educational models continue to evolve with technological progress, AI technologies present unmatched potential to customize learning experiences and enhance teaching strategies, thereby supporting both technical abilities and socio-emotional skills that are crucial for effective early childhood education (Abualrob, 2025). Martineau and Walker (2023) highlight the unique ability of AI-powered tools to assist in collaborative lesson planning, which can boost creativity and teaching effectiveness among future educators. This integration of technology is not just an improvement of current teaching methods but a significant rethinking of how pre-service teachers develop the diverse skills needed for today's ECCE environments.

Beyond developing technical skills, cultivating emotional intelligence (EI) is a crucial part of pre-service teacher training. It helps educators handle complex classroom situations effectively while also supporting their own well-being and

mental health (Valente, 2022). The deliberate growth of emotional intelligence has been shown to improve stress management and build psychological resilience, which are vital for overcoming the many challenges faced in early childhood education settings (Schoeps et al., 2021). Additionally, incorporating AI technologies into teacher training can allow for ongoing assessment of emotional states, offering real-time feedback that boosts resilience and encourages adaptive coping strategies among future educators (Vistorte et al., 2024).

Emerging research shows a growing acceptance among pre-service teachers of AI as an essential educational tool that can supplement traditional teaching methods while also promoting emotional skill development (Mingyeong, 2023; Alejandro, 2024). Nah et al. (2023) further highlight generative AI's transformative role in education, especially its ability to increase student engagement and encourage creative thinking. However, as AI technologies become more integrated into educational systems, the need for responsible and ethical use remains critical. Rodríguez-García et al. (2021) call for transparent and accountable AI practices that prevent misuse and ensure that technology aligns with core educational values and ethical standards.

This paper aims to thoroughly evaluate the diverse role of artificial intelligence in improving professional skills while also promoting emotional intelligence and psychological resilience among pre-service ECCE teachers. Through this analysis, the study tackles current educational challenges by exploring the interconnected relationship between technological innovation and human development, ultimately adding to the ongoing discussion on effective teacher preparation in an increasingly digital educational environment.

Statement of the Problem

Despite the increasing use of AI in teacher education, there is limited empirical knowledge about how AI specifically supports the development of emotional intelligence and psychological resilience in pre-service ECCE teachers. Although research recognizes AI's potential to enhance technical skills, the ways these technologies promote socio-emotional abilities vital for early childhood practice are not yet well understood, creating a gap in evidence-based teacher training methods.

Research Objectives

This study pursues the following objectives:

1. To assess how artificial intelligence tools improve the professional skills of pre-service ECCE teachers.
2. To evaluate how AI-based training programs affect the development of emotional intelligence in pre-service ECCE teachers.
3. To explore how artificial intelligence tools help develop psychological resilience in pre-service ECCE teachers.
4. To examine pre-service ECCE teachers' perceptions, attitudes, and acceptance levels of AI technologies.
5. To identify effective strategies and best practices for integrating artificial intelligence into ECCE teacher preparation programs.

Research Questions

1. To what degree do artificial intelligence tools improve the professional skills of pre-service ECCE teachers?
2. What is the effect of AI-integrated training programs on developing emotional intelligence in pre-service ECCE teachers?

3. How do artificial intelligence applications help develop psychological resilience in pre-service ECCE teachers?
4. What are pre-service ECCE teachers' perceptions, attitudes, and acceptance levels toward the use of AI technologies in their professional training?
5. What are the most effective strategies and best practices for incorporating artificial intelligence into ECCE teacher preparation programs?

Scope and Delimitations of the Study

This study examines the impact of artificial intelligence on improving professional skills, emotional intelligence, and psychological resilience among pre-service Early Childhood Care and Education (ECCE) teachers. The research explores how AI-enabled tools, such as collaborative planning platforms, emotional assessment systems, and personalized learning technologies, support teacher development within formal training programs, while also investigating pre-service teachers' perceptions, attitudes, and acceptance of these technologies.

The study is limited to pre-service ECCE teachers currently enrolled in the Teacher College of Education and does not include in-service teachers or educators at other educational levels. It focuses specifically on existing AI technologies rather than future innovations or general educational tools, and examines emotional intelligence and psychological resilience only in relation to AI-supported competencies. The findings are restricted to college of education settings and specific timeframes, recognizing differences in AI integration practices across regions and institutions. The study does not claim universal applicability or offer comprehensive ethical frameworks beyond those directly related to teacher preparation and competency development.

Significance of the Study

This study greatly contributes to understanding how artificial intelligence improves professional skills, emotional intelligence, and psychological resilience among pre-service ECCE teachers. The findings will help teacher educators and training programs develop effective AI-based preparation, guide policymakers in creating suitable frameworks for technology integration, and equip pre-service teachers with knowledge of useful AI tools for their professional growth. By filling the gap in research on AI's role in fostering social-emotional skills alongside technical abilities, this study advances scholarly discussion on technology-enhanced teacher training and ultimately helps develop better-prepared, more resilient early childhood educators.

Review of Related Literature

The integration of artificial intelligence into teacher education marks a significant shift in how future educators develop the diverse skills required for modern teaching. This literature review examines existing research on AI's role in enhancing professional skills, fostering emotional intelligence, and building psychological resilience among early childhood care and education pre-service teachers, while also exploring the broader effects of technology use in teacher training programs.

Artificial Intelligence in Teacher Education

The rise of artificial intelligence as a transformative educational tool has fundamentally changed the way teachers are prepared and trained. Abualrob (2025) shows that AI technologies offer new opportunities to customize learning experiences for future teachers while enhancing teaching methods that develop both technical skills and social-emotional abilities crucial for effective early childhood education.

This technological integration goes beyond simply adding to current approaches; instead, it presents a complete rethink of how teachers are trained. Martineau and Walker (2023) specifically emphasize AI-based tools' unique ability to support collaborative lesson planning, which then boosts creativity and teaching effectiveness among new educators. Their research finds that collaborative AI platforms not only improve the quality of lesson plans but also foster critical thinking and problem-solving skills that are highly valuable in real classroom settings.

The growing acceptance of AI among pre-service teachers reflects shifting perceptions about technology's role in education. Mingyeong (2023) highlights increasing recognition among new educators that AI is a vital pedagogical tool capable of enhancing traditional teaching methods while also fostering emotional skill development. Likewise, Alejandro (2024) notes positive attitudes toward AI integration, especially when technologies are seen as supportive rather than replacements for human instruction. This acceptance is essential for successful implementation, as teacher support significantly influences the effectiveness of technology-enhanced training programs.

Nah et al. (2023) emphasize the potential of generative AI to transform education, especially in increasing student engagement and encouraging creative thinking. Their research shows that generative AI tools assist pre-service teachers in exploring different teaching methods, experimenting with various instructional strategies, and receiving instant feedback on their skills. This ongoing learning process, supported by AI's adaptable features, accelerates professional growth and builds confidence in making teaching decisions. The authors point out that the purpose of generative AI is not to replace teachers but to improve the intellectual and creative parts of teacher training.

Emotional Intelligence Development in Teacher Preparation

Emotional intelligence is a vital component of effective teaching, especially in early childhood education settings where educators must handle complex interpersonal dynamics while supporting young children's social-emotional growth. Valente (2022) explains that developing emotional intelligence helps pre-service teachers manage classroom challenges effectively and also maintain their own professional well-being and mental health. This dual role of supporting both children's needs and teachers' wellness highlights emotional intelligence as a fundamental aspect of teaching competence rather than an optional skill.

Schoeps et al. (2021) provide evidence that systematic emotional intelligence development improves stress management and psychological resilience among educators. Their longitudinal study shows that pre-service teachers who receive clear emotional intelligence training have better coping skills when facing the many challenges of early childhood education settings. These results indicate that intentionally developing emotional skills during training programs offers lasting benefits that endure throughout teachers' careers, possibly lowering burnout and attrition rates affecting the profession.

The integration of AI technologies provides innovative methods to enhance emotional intelligence in teacher preparation. Vistorte et al. (2024) examine how AI-enabled systems can support ongoing emotional state assessments, offering real-time feedback that helps build resilience and promotes adaptive coping strategies among pre-service educators. Their research indicates that AI-powered emotional recognition systems can identify patterns in emotional responses, alert educators to potential stress

signs, and suggest evidence-based interventions tailored to individual needs. This personalized approach to emotional skill development represents a significant advance over traditional one-size-fits-all training methods, enabling more responsive and effective support for the socio-emotional growth of future educators.

Psychological Resilience and Teacher Well-being

Psychological resilience is the ability to adapt positively to adversity and remain effective despite challenges, it becomes increasingly vital for teacher retention and success. The demanding nature of early childhood education, with its emotional labour, complex family dynamics, and diverse needs of children, requires practitioners to have strong resilience skills. Research shows that developing resilience during pre-service training significantly impacts teachers' long-term careers and job satisfaction.

AI technologies provide new opportunities for building psychological resilience through personalized support systems and adaptable learning environments. These tools can monitor stress indicators, offer timely interventions, and supply resources tailored to individual resilience needs. By creating supportive digital ecosystems that enhance human mentorship, AI-powered programs can assist pre-service teachers in developing the adaptive skills they need to face professional challenges while protecting their well-being and effectiveness.

Ethical Considerations and Responsible Implementation

As AI technologies become more deeply integrated into educational systems, the need for ethical implementation and responsible use grows increasingly important. Rodríguez-García et al. (2021) advocate for transparent and accountable AI integration practices that prevent potential misuse while ensuring that technological interventions align with core educational values and ethical principles. Their framework emphasizes the importance of human oversight, data privacy protections, and fairness considerations in AI deployment within teacher education settings.

Implementing ethical AI requires careful attention to potential biases in algorithms to ensure AI systems support, rather than hinder, educational equity. Additionally, maintaining the importance of human judgment and pedagogical expertise is essential, with AI serving as a helpful tool rather than a controlling authority. Teacher preparation programs should include critical examination of AI technologies, enabling future teachers to evaluate tools thoughtfully and use them responsibly in their practice.

The literature shows AI's strong potential to transform teacher preparation by improving professional skills, developing emotional intelligence, and building psychological resilience. However, research also highlights the need for careful and ethical use that focuses on human development while using technological tools. Existing studies show increasing acceptance of AI among pre-service teachers and highlight promising uses across different parts of teacher preparation. Still, there are gaps in understanding how AI specifically helps develop social and emotional skills and what the long-term effects of AI-enhanced preparation are on teaching success and career paths, calling for more research in this growing field.

Methodology

This study employed mixed-methods design combining quantitative surveys and qualitative interviews to examine AI's role in enhancing professional skills, emotional intelligence, and psychological resilience among pre-service ECCE teachers. A sample of 150 pre-service teachers was selected through stratified random sampling across different levels, from NCE I to III, with 12 participants purposefully

chosen for interviews. Data collection included a structured questionnaire comprising four sections (demographics, professional competency, emotional intelligence/resilience, and AI perceptions using 5-point Likert scales) and semi-structured interview guides. Content validity was confirmed through reviews by five experts in the Department of Early Childhood Care and Education, while construct validity was verified via factor analysis. Reliability was established through pilot testing with 30 participants, calculating Cronbach's alpha ($\alpha \geq 0.70$) and test-retest correlations. After securing ethical approval and informed consent, questionnaires were administered during class, and interviews were conducted over six weeks. Quantitative data were analyzed using SPSS version 26 with descriptive and inferential statistics (t-tests, ANOVA, correlation, regression), while qualitative data were analyzed thematically using NVivo, with results triangulated for better understanding.

Results

Table 1: Extent to which AI Tools Enhance Professional Competencies of Pre-service ECCE Teachers

Professional Competency	Mean	SD	Interpretation
Collaborative teaching skills	4.47	0.58	Very High
Lesson planning and design	4.41	0.62	Very High
Creativity in teaching	4.38	0.65	Very High
Content knowledge	4.33	0.68	Very High
Instructional strategies	4.24	0.74	Very High
Assessment skills	4.12	0.81	High
Composite Mean	4.33	0.68	Very High

Note: $n=150$. Scale: 4.21-5.00=Very High; 3.41-4.20=High; 2.61-3.40=Moderate; 1.81-2.60=Low; 1.00-1.80=Very Low.

AI tools greatly improve professional skills ($M=4.33$, $SD=0.68$), with collaborative teaching and lesson planning showing the greatest effectiveness, supporting Martineau and Walker's (2023) findings on AI-enabled collaborative platforms.

Table 2: Impact of AI-Integrated Training on Emotional Intelligence Development

EI Dimension	Pre-test M(SD)	Post-test M(SD)	t-value	p-value	Cohen's d
Self-awareness	3.45(0.82)	4.18(0.68)	8.42	<.001	1.08
Self-regulation	3.38(0.85)	4.15(0.71)	9.15	<.001	1.15
Social awareness	3.52(0.78)	4.26(0.66)	8.88	<.001	1.12
Relationship management	3.48(0.80)	4.32(0.64)	10.21	<.001	1.28
Overall EI	3.46(0.81)	4.23(0.67)	10.58	<.001	1.33

Note: $n=150$. $p<.001$. Paired samples t-test. Effect size: Small (0.20-0.49), Medium (0.50-0.79), Large (≥ 0.80)

AI-integrated training greatly enhanced emotional intelligence ($t=10.58$, $p<.001$, $d=1.33$), showing large effects across all dimensions, which confirms Vistorte

et al.'s (2024) findings on the effectiveness of real-time feedback for emotional growth.

Table 3: Multiple Regression Analysis of AI Applications on Psychological Resilience

Predictor Variable	β	t	p	VIF
AI emotional assessment	.382	4.918	<.001	1.42
Personalized feedback	.315	3.967	<.001	1.58
Adaptive learning platforms	.268	3.386	.001	1.51
AI-enhanced mentorship	.295	3.600	<.001	1.63
Model: $R^2=.687$, Adjusted $R^2=.676$, $F(4,145)=79.42$, $p<.001$				

Note: $n=150$. Dependent Variable: Psychological Resilience

AI applications significantly predict psychological resilience ($R^2=.687$, $p<.001$), with AI-based emotional assessment emerging as the strongest predictor ($\beta=.382$), explaining 68.7% of the variance in resilience outcomes among pre-service teachers.

Table 4: Factor Analysis of Pre-service Teachers' AI Technology Acceptance

Factor	Mean	SD	A	Variance (%)
Perceived Usefulness	4.28	0.66	.892	32.4
Ease of Use	3.88	0.78	.856	18.6
Behavioral Intention	4.22	0.69	.878	15.8
Trust and Confidence	3.82	0.84	.845	12.3
Total Variance Explained: 79.1%				

Note: $n=150$. $KMO=.894$; Bartlett's $\chi^2=1847.52$, $p<.001$

Factor analysis yielded four acceptance dimensions explaining 79.1% variance. Perceived usefulness ($M=4.28$) demonstrated strongest influence, while trust ($M=3.82$) requires targeted interventions, confirming Alejandro's (2024) technology acceptance framework.

Table 5: ANOVA Comparing the Effectiveness of AI Integration Strategies

Integration Strategy	Lecture-based M(SD)	Blended M(SD)	Fully-integrated M(SD)	F	p	η^2
Hands-on workshops	3.85(0.88)	4.28(0.71)	4.68(0.52)	28.42	<.001	.279
Collaborative projects	3.78(0.92)	4.32(0.68)	4.72(0.48)	32.56	<.001	.307
Mentorship systems	3.92(0.80)	4.35(0.66)	4.78(0.42)	35.12	<.001	.323
Ethical AI training	4.05(0.78)	4.38(0.65)	4.75(0.45)	24.67	<.001	.251

Note: $n=150$ (50 per group). $p<.001$. Post-hoc: Fully-integrated>Blended>Lecture-based

ANOVA showed significant differences in strategy effectiveness across contexts ($p < .001$), with fully integrated programs showing better results ($M = 4.73$) than blended ($M = 4.33$) and lecture-based ($M = 3.90$) programs, producing large effect sizes.

Discussion of Results

The findings show that AI technologies significantly improve professional skills among pre-service ECCE teachers, especially in collaborative teaching and lesson planning, which scored the highest effectiveness ($M=4.47$ and $M=4.41$ respectively). This aligns with Martineau and Walker's (2023) research on AI-enabled collaborative platforms enhancing instructional design.

Similarly, AI-integrated training greatly enhanced emotional intelligence across all areas ($t=10.58$, $p<.001$, $d=1.33$), with relationship management and empathy showing the largest improvements. These substantial effect sizes support Vistorte et al.'s (2024) claims that AI-powered feedback systems effectively develop socio-emotional skills that traditional methods might not fully address. The multiple regression analysis also showed that AI tools account for 68.7% of the variance in psychological resilience, with AI-based emotional assessment being the strongest predictor ($\beta=.382$). This confirms that personalized, data-driven interventions systematically strengthen adaptive coping skills, extending Schoeps et al.'s (2021) research on resilience development in teacher preparation.

The factor analysis of technology acceptance identified four dimensions that explain 79.1% of the variance, with perceived usefulness ($M=4.28$) dominating acceptance decisions. However, moderate trust and confidence ratings ($M=3.82$) indicate implementation challenges that require attention. These findings support Alejandro's (2024) framework, which suggests that while pre-service teachers recognize AI's practical benefits, building user confidence through transparent communication and ethical practices remains crucial for successful adoption.

The ANOVA results showed significant differences in how effective strategies are across different implementation settings, with fully integrated programs consistently outperforming blended and lecture-based approaches ($p<.001$, large effect sizes). Mentorship systems and collaborative projects demonstrated especially strong results in comprehensive integration environments, confirming Nah et al.'s (2023) focus on experiential learning. These results indicate that the level of implementation depth is more important than the specific strategy chosen, although even limited AI exposure still benefits pre-service teachers.

Conclusion

This study thoroughly examined the role of artificial intelligence in improving professional skills, emotional intelligence, and psychological resilience among pre-service ECCE teachers. The results show that AI technologies greatly aid teacher preparation, with very high effectiveness in developing professional competence ($M=4.33$), notable improvements in emotional intelligence ($d=1.33$), and strong predictive power for psychological resilience ($R^2=.687$).

AI-enabled collaborative platforms, personalized feedback systems, and emotional assessment technologies have the potential to significantly improve how we address complex developmental needs that traditional methods may struggle to handle. Pre-service teachers showed strong acceptance driven by perceived

usefulness, although trust aspects need focused interventions. Fully-integrated implementation strategies consistently outperformed blended and lecture-based approaches, highlighting the importance of comprehensive systemic integration.

The research fills important gaps in understanding how AI enhances socio-emotional skills alongside technical abilities, advancing scholarly discussion on technology-driven teacher preparation. These findings support developing better-prepared, emotionally intelligent, and psychologically resilient early childhood educators who are equipped to face modern challenges while maintaining professional well-being and effectiveness in increasingly digital educational environments.

Recommendations

Based on the findings of this study, the following recommendations are suggested:

1. Integrate fully-developed AI frameworks into teacher preparation curricula rather than using isolated or additional implementations.
2. Develop structured training modules that focus on AI transparency, data privacy, ethical use, and reliability demonstrations.
3. Integrate AI-powered emotional assessment systems that provide personalized feedback to support socio-emotional growth and resilience development.
4. Invest in comprehensive professional development programs equipping educators with AI integration knowledge and pedagogical application skills.
5. Develop clear frameworks to ensure transparent, accountable, and equitable AI implementation, incorporating continuous evaluation mechanisms and human oversight.

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