

Integrating Artificial Intelligence and Drama in ELT: Pathways to Sustainable Teacher Education

Manolya Sağlam

Biruni University, Istanbul, Türkiye

The rapid advancement of Artificial Intelligence (AI) has transformed educational practices, yet its integration with experiential pedagogies such as drama remains underexplored in English Language Teaching (ELT), particularly in pre-service teacher education. This study examines how AI-supported drama pedagogy contributes to the professional development of pre-service English teachers, focusing on reflective practice, pedagogical adaptability, creativity, intercultural awareness, and sustainability-oriented teaching perspectives. Grounded in sociocultural theory, experiential learning, and Education for Sustainable Development (ESD), the research adopts an interpretive qualitative case study design conducted over a 12-week elective course titled “Drama in ELT” at a foundation university in Istanbul, Türkiye. Participants included 40 second-year pre-service teachers, with 15 volunteers taking part in semi-structured focus group interviews. Data were collected through open-ended questionnaires and focus groups and analyzed using reflexive thematic analysis. Four interrelated themes emerged: creativity and pedagogical innovation, intercultural awareness and empathy, problem-solving and adaptability, and reflective professional growth with ethical awareness. Findings suggest that AI acted as a mediational scaffold that enriched drama-based learning while preserving human agency. The study concludes that integrating AI with drama offers a meaningful model for sustainable teacher education aligned with SDG 4 (Quality Education) and SDG 9 (Industry, Innovation and Infrastructure).

Keywords: drama applications, Artificial Intelligence, English Language Teaching (ELT), digital pedagogy, sustainable teacher education

Introduction

The rapid advancement of Artificial Intelligence (AI) has fundamentally transformed contemporary educational environments, reshaping pedagogical practices, modes of interaction, and knowledge construction processes. In English Language Teaching (ELT), AI-driven technologies—such as conversational agents, generative storytelling platforms, and immersive simulation environments have expanded opportunities for personalized, interactive, and adaptive learning experiences (Luckin, Holmes, Griffiths, & Forcier, 2016). These tools enable learners to engage with language in dynamic, contextualized, and multimodal ways, thereby fostering deeper linguistic and cognitive development. Consequently, AI has emerged not merely as a technological innovation but as a catalyst for pedagogical transformation in language education.

In parallel with this digital shift, drama-based pedagogy has long been established as a powerful experiential approach within ELT. Rooted in sociocultural and constructivist perspectives, drama facilitates embodied learning, authentic communication, and meaning-making through role-play, improvisation, and narrative exploration (Kao & O'Neill, 1998; Stinson & Freebody, 2006). By positioning learners as active participants rather than passive recipients of knowledge, drama fosters communicative competence, emotional engagement, critical thinking, and intercultural awareness. Through dramatic enactment, learners not only acquire linguistic skills but also develop empathy, collaboration, and reflective capacities essential for socially responsible citizenship.

Despite the growing body of research on AI in education and the well-documented benefits of drama in ELT, empirical investigations integrating these two domains remain limited particularly within teacher education contexts. Existing studies tend to examine AI applications and drama pedagogy in isolation, overlooking their potential synergies in preparing future language educators for increasingly complex and technologically mediated classrooms. This gap is especially critical in pre-service teacher education, where pedagogical beliefs, professional identities, and instructional practices are still being shaped.

To address this gap, the present study explores how the integration of AI-supported drama applications within an ELT course contributes to the professional development of pre-service teachers. Specifically, it examines how such integration influences their reflective practice, adaptive pedagogy, and commitment to sustainable teaching approaches. The study is grounded in the framework of Sustainable Teacher Education, which emphasizes educators' capacity to innovate, critically reflect, and respond ethically to social, cultural, and environmental challenges.

This framework aligns with United Nations Educational, Scientific and Cultural Organization (UNESCO)'s Education for Sustainable Development (ESD) agenda and the United Nations (UN) Sustainable Development Goals (SDGs), particularly SDG 4: Quality Education, which advocates inclusive, equitable, and lifelong learning opportunities (United Nations, 2015), and SDG 9: Industry, Innovation and Infrastructure, which highlights the role of digital innovation in educational transformation (Agarwal, 2025). By situating AI-supported drama within this global sustainability framework, the study positions teacher education as a dynamic process that integrates creativity, technology, and ecological responsibility in shaping future language educators for the 21st century.

Purpose of the Study

The purpose of this study is to examine the pedagogical implications of integrating AI-supported drama applications within English Language Teaching (ELT) and to explore their contributions to pre-service teachers' professional growth. Specifically, the study aims to investigate how such integration influences pre-service teachers' professional development, enhances their capacity for reflective thinking, fosters adaptive pedagogical decision-making, and supports the development of sustainable teaching perspectives. By adopting a qualitative case study approach, the research seeks to provide in-depth insights into how the convergence of AI technologies and drama-based pedagogy can inform innovative, responsive, and sustainability-oriented teacher education practices in the 21st century.

Aligned with this overarching purpose, the study is guided by the following research questions:

1. How do pre-service teachers conceptualize and experience the integration of Artificial Intelligence within drama-based ELT pedagogy?
2. In what ways does AI-supported drama shape pre-service teachers' creativity and capacity for pedagogical innovation?

3. How does engagement with AI-supported drama contribute to the development of intercultural awareness and sustainability-oriented teaching perspectives among pre-service teachers?

4. How does AI-mediated reflective practice influence the formation of pre-service teachers' professional identity and ethical awareness as future educators?

Literature Review

Drama-Based Pedagogy in ELT

Drama-based pedagogy in English Language Teaching (ELT) is fundamentally rooted in sociocultural theory, which emphasizes that learning is mediated through social interaction, cultural tools, and collaborative meaning-making within the Zone of Proximal Development (Vygotsky, 1978). From this perspective, drama provides a dialogic and participatory learning space in which learners co-construct knowledge through role-play, negotiation of meaning, and shared imaginative activity, thereby facilitating deeper cognitive and linguistic development.

Complementing this view, drama aligns closely with experiential learning theory, which posits that knowledge is constructed through concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 2014). Within ELT contexts, drama enables learners to engage in authentic communicative situations, reflect on their linguistic performance, and iteratively refine their language use through embodied practice.

Empirical research has consistently demonstrated that drama-based pedagogy contributes to multiple dimensions of language learning and teacher development. Studies indicate that drama enhances oral fluency and communicative competence by immersing learners in meaningful, contextualized language use rather than decontextualized drills (Kao & O'Neill, 1998). Through improvisation and role enactment, learners are required to process language spontaneously, which supports both accuracy and fluency in real-time interaction.

Furthermore, drama has been shown to reduce foreign language anxiety by creating a low-stakes, playful, and supportive learning environment where errors are normalized as part of the learning process (Stinson & Freebody, 2006). This affective dimension is particularly significant in ELT, as anxiety often inhibits oral participation and risk-taking in language classrooms.

Research also suggests that drama significantly enhances learner motivation and engagement, as it situates language learning within emotionally meaningful narratives and collaborative tasks that resonate with learners' lived experiences (Dörnyei, 2014). By integrating imagination, embodiment, and storytelling, drama transforms language learning from a primarily cognitive activity into an affectively rich and socially embedded process.

From a sociocultural and ethical perspective, drama fosters empathy and intercultural understanding by encouraging learners to inhabit perspectives different from their own, thereby promoting reflective dialogue about culture, identity, and social responsibility (Coudray, 2017; Kao & O'Neill, 1998). This aligns with critical pedagogy, which views education as a means of cultivating socially aware and ethically responsible individuals (Freire, 1970).

In the context of teacher education, drama has been found to support reflective teacher identity formation by enabling pre-service teachers to experiment with multiple professional roles, classroom dynamics, and pedagogical approaches in a safe, simulated environment (Stinson & Freebody, 2006). Through embodied reflection and collaborative debriefing, teachers develop greater self-awareness, adaptability, and pedagogical sensitivity.

Additionally, drama resonates with situated learning theory, which posits that learning is fundamentally shaped by participation in authentic communities of practice (Lave & Wenger, 1991). Within drama-based ELT, pre-service teachers engage in collaborative meaning-making that mirrors real classroom interactions, thereby bridging the gap between theory and practice.

Finally, drama supports dialogic learning, as articulated by Bakhtin (2010), by positioning language as a dynamic, socially mediated process rather than a static system of rules. Through dialogic interaction in drama, learners negotiate meaning, challenge assumptions, and co-create knowledge, reinforcing both linguistic competence and critical thinking.

Consequently, this body of scholarship underscores that drama-based pedagogy is not merely a creative teaching strategy but a theoretically grounded, multidimensional approach that integrates language development, affective engagement, intercultural learning, and professional identity formation in ELT.

Artificial Intelligence in Language Education

Artificial Intelligence (AI) has become increasingly embedded in language education through a range of applications that support learning, assessment, and instructional design. In ELT specifically, AI has been implemented via intelligent tutoring systems and adaptive learning platforms that individualize pacing and task difficulty, thereby enabling more personalized language practice (Luckin et al., 2016). AI is also widely used through conversational agents and chatbots, which can facilitate interactive speaking practice, increase learners' engagement, and support confidence in oral communication, as evidenced in recent synthesis work on chatbot-supported EFL speaking development (Du & Daniel, 2024). In parallel, AI-driven automated writing evaluation (AWE) systems provide rapid, scalable feedback on linguistic form and certain discourse features, and recent research syntheses highlight the growing complexity of learner engagement with AWE in L2 classrooms and its implications for feedback practices (Y. Karatay & L. Karatay, 2024). These developments have been accelerated by generative AI tools, which broaden access to language-rich resources (e.g., story generation, dialogic prompts, and content adaptation) while raising new questions about curriculum, assessment, and teacher expertise (Miao & Holmes, 2023).

At the same time, the expansion of AI in language education foregrounds the need for critical and ethical engagement rather than purely instrumental adoption. Policy guidance and scholarly critique emphasize that educational AI can reproduce or amplify social inequities through unequal access, opaque systems, and biased data practices, thereby intensifying digital divides if governance and implementation are not equity-oriented (UNESCO, 2021; Selwyn, 2022). In applied terms, teacher education programs are increasingly urged to address data privacy, transparency, and accountability, particularly because many AI systems depend on large-scale data collection and automated decision-making that may be difficult for educators and learners to scrutinize (Miao & Holmes, 2023; UNESCO, 2021). Moreover, concerns regarding algorithmic bias and discriminatory outcomes remain central to discussions of responsible AI, reinforcing the importance of preparing future teachers to question how training data, design assumptions, and evaluation metrics can shape learning opportunities and judgments about learner ability (Barocas & Selbst, 2016).

Accordingly, a growing strand of scholarship calls for critical AI literacy in language teacher education—an orientation that equips teachers to evaluate AI tools pedagogically (effectiveness and appropriateness), ethically (fairness, privacy, accountability), and socially (power, equity, and inclusion), while also understanding limitations such as overreliance and the risk of superficial “performance gains” without

deeper learning (Prilop et al., 2025; Tacelosky, Sue Kasun, Shapiro, Liao, & Harris, 2025). From this perspective, the educational value of AI in ELT depends not only on what the tools can generate or automate, but also on teachers' capacity to integrate AI in ways that strengthen human agency, reflective practice, and equitable participation in language learning.

Sustainable Teacher Education

Sustainable teacher education is grounded in the principles of Education for Sustainable Development (ESD), which advocate for the cultivation of educators who are not only competent in subject matter and pedagogy but also capable of responding ethically and adaptively to social, technological, and environmental challenges (Rieckmann, 2017). Within this framework, teacher preparation extends beyond technical skills to include critical reflection, digital responsibility, intercultural sensitivity, and a commitment to ecological stewardship. Scholars emphasize that sustainable teacher education should empower educators to navigate uncertainty, foster inclusive learning environments, and engage in continuous professional learning throughout their careers (Wals, 2015).

In contemporary digital societies, sustainability-oriented teacher education increasingly incorporates ethical digital literacy, recognizing that teachers must critically evaluate the implications of emerging technologies for equity, privacy, and democratic participation (Selwyn, 2022). Rather than positioning technology as a neutral tool, sustainable frameworks call for reflective engagement with digital innovations to ensure that they serve human and societal well-being rather than exacerbate existing inequalities.

The integration of Artificial Intelligence (AI) with drama-based pedagogy aligns closely with this sustainability agenda by bridging technological innovation with human-centered, experiential learning. AI-supported drama can enhance adaptability by enabling teachers to design flexible, personalized, and context-responsive learning experiences while maintaining the relational, collaborative, and empathetic dimensions of teaching. Moreover, drama's emphasis on embodied reflection and ethical dialogue complements AI's capacity to generate diverse scenarios, simulations, and reflective prompts, thereby fostering deeper professional learning (Miao & Holmes, 2023).

From a sustainability perspective, this integration supports the development of educators who are technologically proficient, socially responsible, and ecologically conscious. By engaging pre-service teachers in creative, reflective, and digitally mediated drama experiences, teacher education programs can cultivate professionals who are capable of integrating innovation with ethical and sustainable pedagogical practices in the 21st century.

Methodology

Research Design

This study adopted an interpretive qualitative case study design to explore in depth how pre-service English teachers experienced AI-supported drama pedagogy and how these experiences shaped their professional development, reflective thinking, and sustainability-oriented perspectives. A qualitative case study approach is particularly appropriate when the aim is to investigate a contemporary phenomenon within its real-life context and to understand participants' meanings, interpretations, and sense-making processes rather than to test hypotheses or produce statistical generalizations (Tisdell, Merriam, & Stuckey-Peyrot, 2025; Yin, 2018).

The study was framed as an instrumental case study, in which a specific case is examined not for its own sake but to generate broader insights into teacher education, reflective practice, and technology-mediated pedagogy (Stake, 1995). In this research, the “case” was bounded by three key parameters such as a single elective course titled “Drama in ELT”, a 12-week academic term, and one foundation university in Istanbul, Türkiye.

In addition, the research design is consistent with Creswell and Poth’s (2016) principles of qualitative inquiry, which emphasize the examination of phenomena in their natural contexts, the centrality of participants’ perspectives, and the recognition of the researcher’s interpretive role in constructing meaning. Creswell and Poth (2016) further argued that qualitative case studies are especially suitable when the goal is to understand how individuals experience a particular phenomenon, how they make sense of these experiences, and how such meanings are shaped by broader social, cultural, and institutional influences. The bounded nature of the case strengthened the methodological coherence of the study by clearly delineating its parameters and distinguishing what fell within its scope from what lay beyond it (Stake, 1995). Moreover, the interpretive stance of the research acknowledged that participants’ experiences were socially constructed, contextually embedded, and shaped through their ongoing interactions with both drama pedagogy and AI technologies. In line with this orientation, the present study sought to explore the lived experiences of pre-service teachers as they engaged with AI-supported drama in their professional learning, prioritizing depth of understanding over measurement of predetermined variables or testing of causal relationships.

Participants and Setting

Setting. The study was conducted at a foundation university in Istanbul, Türkiye within an undergraduate elective course titled “Drama in ELT”. The course ran for 12 weeks and combined traditional drama-based pedagogy with structured integration of AI-supported activities. The course aimed to prepare pre-service teachers to design creative, reflective, and inclusive language learning environments.

Participants. The participants consisted of 40 second-year pre-service English teachers enrolled in the course. In qualitative research, such a cohort is appropriate when the goal is to achieve depth of understanding rather than statistical representativeness (Tisdell et al., 2025).

To gain richer insights, 15 volunteers from this group participated in focus group interviews. Volunteer sampling for qualitative interviews is commonly used when researchers seek participants who are willing to articulate their experiences in detail and engage in reflective dialogue (Patton, 2015).

AI-Supported Drama Intervention

Over the 12-week period, participants engaged in a structured AI-supported drama intervention that integrated traditional drama techniques with digital AI tools. The drama component included role-play and improvisation which are widely recognized as experiential and interactional approaches that promote communicative competence, empathy, and reflective learning (Kao & O’Neill, 1998; Stinson & Freebody, 2006). These practices were complemented by AI tools that served as pedagogical scaffolds rather than replacements for human creativity or teacher judgment. Participants used:

- AI-driven character simulations to rehearse dialogues, explore multiple perspectives, and develop narrative complexity;
- interactive digital storytelling tools to construct and expand classroom scenarios;
- reflective dialogue generators to prompt post-activity reflection and critical questioning;

- virtual role-play environments to simulate classroom interactions and intercultural communication contexts.

Over a 12-week period, pre-service teachers participated in a structured AI-supported drama intervention that integrated traditional drama techniques such as role-play and improvisation with pedagogically purposeful AI tools, positioning AI as a mediational scaffold that supported creativity, reflection, and adaptive decision-making rather than replacing human agency. Within this design, four main AI applications were implemented: AI-driven character simulations that enabled participants to rehearse dialogues, explore multiple perspectives, and create more complex, emotionally rich narratives; interactive digital storytelling tools that supported groups in constructing and expanding realistic classroom scenarios related to equity, culture, and digital access; reflective dialogue generators that prompted structured post-activity reflection and encouraged deeper ethical and pedagogical analysis of teaching decisions; and AI-mediated virtual role-play environments that simulated authentic classroom and intercultural situations, allowing participants to practice real-time problem-solving in low-risk settings. Throughout the intervention, participants interacted with conversational AI systems (e.g., ChatGPT, Character.AI, Google Gemini, Microsoft Copilot) for character simulations; used AI-supported digital storytelling tools such as Canva Magic Write, Book Creator AI, Storybird, and Padlet AI for scenario design; employed AI-based reflective prompt generators including ChatGPT, Eduaide.AI, and Mentimeter AI for post-activity reflection; and engaged in AI-mediated virtual role-play environments such as Mursion and TeachLivE to rehearse classroom and intercultural interactions. AI was positioned as a mediational resource that supported ideation, creativity, and reflection, consistent with ethical guidelines that advocate for pedagogically purposeful and responsible AI use in education (UNESCO, 2021).

Data Collection

Data were collected in two sequential and complementary stages to capture both breadth and depth of participants' experiences. Multi-source data collection strengthens credibility through triangulation and allows for richer interpretation of findings (Denzin, 2017; Patton, 2015).

Stage 1: Open-Ended Questionnaire: At the end of the intervention, all 40 participants completed an open-ended questionnaire designed to elicit reflective accounts of their learning, pedagogical development, and perceptions of AI-supported drama. Open-ended questions are effective in qualitative research because they allow participants to articulate experiences in their own words without being constrained by predefined response categories (Patton, 2015).

The questionnaire included the following prompts:

1. How did AI influence your approach to drama-based teaching?
2. What new teaching ideas did you develop through AI-supported drama?
3. How did AI help you reflect on your teaching identity?
4. How did AI-supported drama shape your views on sustainability?
5. What challenges did you experience while using AI?

Stage 2: Focus Group Interviews: Following the questionnaire phase, semi-structured focus group interviews were conducted with 15 volunteer participants. Focus groups were chosen because they facilitate collective reflection, interaction, and co-construction of meaning among participants who share a common experience (Patton, 2015).

Key prompts included were as below:

- What were the main benefits of AI-supported drama?

- How did AI influence your creativity and pedagogical decision-making?
- What ethical concerns did you have regarding AI use?
- How might you use AI-supported drama in your future classrooms?

Interviews were audio-recorded and later transcribed verbatim for analysis.

Data Analysis

Data were analyzed using reflexive thematic analysis, a rigorous qualitative approach that identifies patterns of meaning while acknowledging the researcher's interpretive role in knowledge construction (Braun & Clarke, 2006; 2021).

The analysis followed these stages:

1. Familiarization: Repeated reading of all questionnaire responses and interview transcripts to develop holistic understanding.

2. Open coding: Generating initial codes that captured meaningful units of data related to professional growth, creativity, reflection, ethics, and sustainability (Saldaña, 2021).

3. Category development: Grouping related codes into broader conceptual categories.

4. Theme construction and refinement: Developing overarching themes and verifying them against the dataset to ensure coherence and credibility (Braun & Clarke, 2006; 2021).

5. Triangulation: Comparing findings from questionnaires and interviews to identify convergence and divergence across data sources (Denzin, 2017).

6. Analytic memoing: Maintaining reflective notes throughout the process to document interpretive decisions and enhance transparency (Miles, Huberman, & Saldaña, 2014).

This process resulted in themes that illuminated how AI-supported drama influenced participants' professional identity, pedagogical creativity, ethical awareness, and sustainability-oriented teaching perspectives.

Findings

Data from the open-ended questionnaires and focus group interviews were analyzed through reflexive thematic analysis involving iterative cycles of open coding, category development, theme construction, and cross-source triangulation. This process generated four interrelated themes that illuminate how AI-supported drama shaped pre-service teachers' professional learning: (1) Creativity and Pedagogical Innovation; (2) Intercultural Awareness; (3) Problem-Solving and Adaptability; and (4) Reflective Professional Growth. These themes were consistently evidenced across both data sources, indicating convergence between written reflections and collective interview accounts.

Theme 1—Creativity and Pedagogical Innovation: Participants consistently described AI as a catalyst for expanding their pedagogical imagination and diversifying drama-based instructional designs. Initial open codes such as “new scenario ideas”, “richer characters”, “multilayered narratives”, and “unpredictable storylines” were clustered into the broader category of pedagogical creativity, which evolved into the overarching theme of Creativity and Pedagogical Innovation.

Pre-service teachers reported that AI-driven character simulations and storytelling tools enabled them to construct more complex, emotionally textured drama scenarios than they would have designed independently. Rather than replacing their creativity, AI functioned as a co-creative partner that stimulated ideation and experimentation. One participant explained:

“AI helped me design drama scenarios that felt real and emotionally rich; I could explore perspectives I had never imagined before”. (P7)

Similarly, another participant emphasized how AI broadened their repertoire of teaching strategies:

“Before this course, my drama activities were very simple role-plays. With AI, I started designing layered scenes with conflict, tension, and resolution”. (P12)

Triangulation with focus group data confirmed that AI-supported drama encouraged risk-taking and pedagogical experimentation. Participants noted that AI-generated prompts pushed them beyond familiar teaching routines and enabled more innovative classroom planning. This suggests that AI-supported drama can foster pedagogical innovation by expanding teachers’ creative boundaries and supporting more dynamic instructional designs.

Theme 2—Intercultural Awareness: A second major theme concerned the development of intercultural awareness and empathy. Codes such as “perspective-taking”, “cultural sensitivity”, “emotional understanding”, and “global awareness” coalesced into this theme. Participants frequently highlighted how AI-mediated role-play enabled them to inhabit identities and lived experiences different from their own.

One particularly illustrative example emerged from a role-play scenario in which participants enacted the role of a refugee teacher. A participant reflected:

“When I played a refugee teacher, I did not just act — I felt their struggles. I realized how language barriers, trauma, and displacement affect teaching”. (P3)

In focus groups, participants further elaborated that AI-generated contextual details (e.g., classroom settings, social constraints, and emotional states) deepened their understanding of inequity, marginalization, and cultural complexity. Rather than treating intercultural competence as abstract knowledge, AI-supported drama facilitated embodied empathy and situated understanding.

These findings align with the view that drama, when combined with AI-driven simulations, can move teacher learning from cognitive awareness to affective engagement, thereby strengthening socially responsive pedagogy.

Theme 3—Problem-Solving and Adaptability: A third theme captured participants’ experiences of navigating unpredictability and ambiguity within AI-mediated drama scenarios. Open codes such as “unexpected turns”, “real-time decision-making”, “classroom crisis management”, and “flexible thinking” were grouped into the category of adaptive problem-solving, which crystallized into the theme of Problem-Solving and Adaptability.

Participants frequently described moments when AI altered a scenario in unforeseen ways, compelling them to think on their feet. One participant noted:

“When AI suddenly changed the storyline, I had to adapt instantly and rethink my teaching moves”. (P9)

Another participant linked this to real classroom realities:

“Teaching is never predictable. AI scenarios trained me to handle surprises rather than panic”. (P14)

Focus group discussions reinforced that these experiences strengthened participants’ confidence in managing uncertainty, a key competency for 21st-century educators. AI-supported drama thus functioned as a safe rehearsal space for practicing adaptive decision-making before entering real classrooms.

Theme 4—Reflective Professional Growth: The final theme, Reflective Professional Growth, encompassed changes in participants’ self-understanding as future teachers, their ethical awareness, and their conception of professional responsibility. Codes such as “teacher identity”, “ethical reflection”, “responsibility”, and “critical self-questioning” were central to this theme.

Participants consistently reported that AI-supported drama prompted deeper reflection on their values, beliefs, and roles as educators. One participant stated:

“AI made me rethink my teacher identity and my ethical responsibilities towards students”. (P2)

Others highlighted how reflective dialogue generators encouraged them to critically examine their assumptions:

“After each activity, AI asked questions that made me question my biases and teaching choices”. (P6)

Finally, taken together, these four themes demonstrated that AI-supported drama operated as a mediational space in which creativity, empathy, adaptability, and reflection intersected to shape pre-service teachers’ professional development. Rather than functioning as a technical tool, AI served as a pedagogical and ethical catalyst that transformed how participants conceptualized teaching, learning, and sustainability. Triangulation revealed that reflection was not merely individual but also collective. In focus groups, participants engaged in shared ethical deliberation about issues such as data privacy, fairness, and the limits of AI in education. This suggests that AI-supported drama can cultivate ethical reflexivity alongside pedagogical competence.

Table 1

Summary of Key Themes

Theme	Core contribution to teacher education
Creativity and Pedagogical Innovation	Expanded pedagogical imagination and instructional design
Intercultural Awareness	Greater empathy and global perspective
Problem-Solving and Adaptability	Enhanced real-time decision-making and flexibility
Reflective Professional Growth	Deeper self-awareness and ethical consciousness

Table 1 shows how each theme contributed to pre-service teachers’ development: AI-supported drama enhanced their creativity, strengthened intercultural empathy, improved adaptability in unexpected situations, and deepened reflective and ethical awareness in their emerging teacher identities.

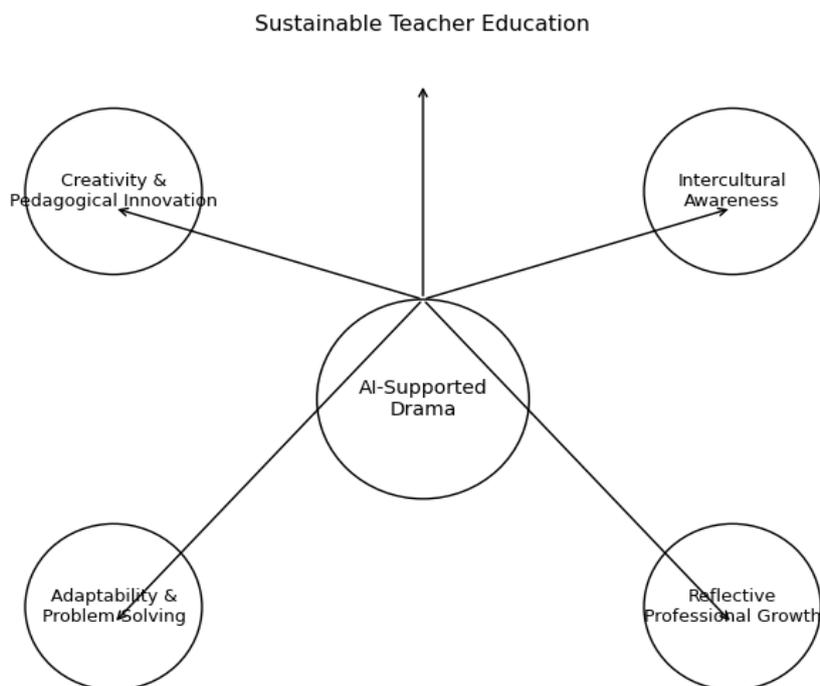


Figure 1. Conceptual framework of AI + drama integration.

In Figure 1, conceptual model illustrates how AI-supported drama mediates pre-service teacher learning through interconnected processes of creativity, intercultural engagement, adaptability, and reflective professional growth, contributing to sustainable teacher education.

Discussion and Conclusion

The findings indicate that AI-supported drama created a mediated learning ecology in which pre-service teachers' professional learning emerged through the interaction of embodied, collaborative meaning-making (drama) and digitally supported scaffolding (AI). This interpretation is consistent with sociocultural theory, which conceptualizes learning as mediated through tools and social interaction within situated activity systems (Vygotsky, 1978). In our study, participants' reported gains in creativity, intercultural awareness, adaptability, and reflective professionalism can therefore be understood as outcomes of human-technology co-mediation, rather than the influence of either drama or AI alone.

Creativity and pedagogical innovation: Participants' accounts that AI expanded their scenario design and pedagogical imagination are supported by prior scholarship describing the convergence of drama and digital media as "the digital (code) and the analogue (human) working together to generate new realities and worlds", emphasizing creativity and playfulness as shared foundations for meaningful learning design (Cameron et al., 2017, as discussed in Ding, 2024). In Ding's model, participatory drama combined with text-based generative AI is framed as transformative practice that centers learners' meaning-making across cognitive, affective, and embodied domains. Complementing these conceptual insights, empirical evidence from AI-enhanced video drama-making demonstrates that AI features (e.g., GPT-generated sentences, AI-provided lexical resources) can significantly enhance learners' performance and engagement in drama-based language production in authentic contexts (Hwang, Luthfi, & Liu, 2024). Taken together, this literature supports interpreting our Theme 1 as a form of pedagogical innovation where AI functions as a creative partner that broadens teachers' instructional design possibilities rather than replacing human creativity.

Intercultural awareness and empathy: Participants' reflections that role adoption deepened empathy and intercultural understanding align with research indicating that drama-making can cultivate intercultural communicative competence by enabling learners to engage with diverse cultural contexts, challenge stereotypes, and develop empathy (e.g., Chen et al., 2020, as reviewed in Hwang et al., 2024). Moreover, work on digital drama and sustainability emphasizes that drama-based experiences can enhance empathy through perspective-taking and emotional engagement. This convergence strengthens the argument that AI-supported drama can serve SDG 4-oriented aims (inclusive quality education) by supporting teachers' development of culturally responsive, empathy-based pedagogy.

Problem-solving and adaptability: The finding that participants developed flexibility when AI altered scenarios unexpectedly is consistent with scholarship emphasizing that effective AI integration requires pedagogical adaptability, not only technical competence. The systematic review in our uploaded corpus further synthesizes that teachers in AI-rich EFL environments need competencies that combine technical fluency with creative lesson design and adaptive teaching practices. These claims help explain why participants interpreted unpredictability as productive: AI-supported drama approximated the real classroom's uncertain conditions and provided a structured rehearsal space for responsive decision-making.

Reflective professional growth and ethical awareness: The findings for Theme 4 align with scholarship emphasizing that the integration of drama and AI should be accompanied by guided observation and structured

reflection, enabling learners to interpret AI-mediated experiences critically rather than accepting them unproblematically (Ding, 2024). In AI-enhanced drama contexts, reflective debriefing helps pre-service teachers interrogate how scenarios were generated, whose perspectives were centered, and how meaning was co-constructed between human participants and digital tools, thereby deepening professional sense-making (Ding, 2024). Similarly, recent systematic evidence shows that contemporary EFL teachers are expected to cultivate critical thinking and ethical awareness as core AI-related competencies, particularly with regard to algorithmic bias, data privacy, and responsible handling of student information. Laoha, Chomthong, and Pongpanich (2025) identified “Ethical and Critical Use of AI” as one of the ten essential competencies for EFL teachers, stressing the need for vigilance about fairness, transparency, and digital equity in classroom applications of AI. Taken together, these bodies of work support interpreting the participants’ concerns about bias, privacy, and dependency not as peripheral anxieties but as constitutive dimensions of AI-mediated professional identity formation, in which reflective judgment and ethical responsibility become central to what it means to be a teacher in the AI era.

Sustainability-oriented teaching: The sustainability literature provides direct support for the claim that digitally supported drama can enhance sustainability awareness while simultaneously developing critical thinking, problem-solving, creativity, and decision-making skills among learners. Zakopoulos, Makri, Ntanos, and Tampakis (2023) further argued that digital drama can be personalized, can facilitate creative engagement with real-world sustainability challenges, and can foster empathy and emotional involvement—features that closely align with the principles of Education for Sustainable Development and contemporary teacher preparation frameworks. Taken together, these findings strengthen the argument that AI-supported drama contributes to sustainable teacher education by connecting technological innovation (SDG 9) with human-centered, ethical, and socially responsive pedagogy (SDG 4).

In conclusion, this study shows that integrating Artificial Intelligence with drama-based pedagogy in ELT provides a valuable model for sustainable teacher education. AI-supported drama enhanced pre-service teachers’ creativity, intercultural awareness, adaptability, and reflective professionalism while maintaining the human-centered nature of teaching. The findings suggest that the synergy between AI and drama can prepare future teachers to be both digitally competent and ethically responsible, responding effectively to the pedagogical and societal demands of the 21st century.

Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings. First, the research was conducted at a single foundation university in Istanbul, which restricts the transferability of the results to other institutional or cultural contexts. Second, the relatively small sample size limits the generalizability of the findings beyond the specific cohort examined. Third, the data were based primarily on self-reported perceptions obtained through questionnaires and focus groups, which may be subject to response bias. Finally, the study did not include a longitudinal follow-up, preventing assessment of the sustained impact of AI-supported drama on participants’ teaching practices over time.

Future studies should expand the scope of this research by including multiple universities across different regions to enhance contextual diversity and transferability. Employing mixed-methods designs that integrate qualitative and quantitative data would provide a more comprehensive understanding of the effects of AI-supported drama on teacher development. Additionally, classroom observations and analysis of actual

teaching practices could offer deeper insights into how pre-service teachers apply AI-supported drama in real educational settings. Finally, longitudinal research is needed to examine the long-term influence of AI-supported drama on teachers' professional trajectories, classroom practices, and sustainability-oriented pedagogy.

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