



Implementation of SDG 9 Messages through Dance Art as a Creative Educational Medium

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Abstract

This study aims to analyze the implementation of Sustainable Development Goal 9 through dance as a creative educational medium at the Bimasena Student Activity Unit of Bina Madani Polytechnic. The approach used was empirical qualitative research through observation, interviews, and documentation during the choreography training process guided by a professional choreographer. The results of the study indicate that the concepts of SDG 9 related to innovation, industry, and infrastructure were successfully transformed into symbolic movements, music, costumes, and stage visuals integrated through multisensory experiences. The participatory learning process enhanced students' understanding of sustainable development concepts while simultaneously developing their creative, collaborative, and nonverbal communication skills. Furthermore, participation in international competitions strengthened the cross-cultural dissemination of SDG 9 values. These findings affirm that dance serves not only as an aesthetic expression but also as an effective educational tool for conveying sustainability messages in a contextual and interactive manner within higher education settings.

Keywords: Sustainable Development Goals, Dance Education, Creative Learning, Choreography, Sustainability Communication.



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INTRODUCTION

The global development architecture in the twenty-first century is increasingly structured around the normative and operational framework of the Sustainable Development Goals (SDGs), which articulate an integrated agenda of economic transformation, social inclusion, and environmental sustainability through multi-sectoral collaboration and knowledge mobilization across societies (United Nations, 2015). Within this architecture, SDG 9 occupies a pivotal position as it foregrounds the interdependence between industry, innovation, and resilient infrastructure, positioning technological advancement and creative problem-solving as foundational drivers of sustainable growth in both developed and developing contexts. Recent shifts in global sustainability discourse indicate a growing recognition that the communication and internalization of SDG values cannot rely solely on policy or technical domains, but must be embedded within cultural and participatory ecosystems capable of translating abstract development goals into lived, affective, and experiential understanding among younger generations who constitute the future knowledge base of sustainability transformation.

Contemporary scholarship increasingly situates arts-based pedagogy as a transdisciplinary bridge between sustainability knowledge and community engagement, particularly through performative and expressive modalities such as music, theater, and dance that enable embodied cognition of global challenges. Empirical studies demonstrate that performing arts interventions aligned with SDGs can significantly enhance environmental awareness, creativity, and socio-emotional learning among students, particularly in early and secondary education contexts where experiential learning plays a dominant role in cognitive development (Anasta et al., 2025; Hamdani & Anasta, 2025). Parallel research across international settings further indicates that artistic education functions as a medium of cultural preservation while simultaneously enabling sustainability literacy, suggesting that dance education in particular has evolved beyond aesthetic training into a pedagogical instrument for cultivating sustainability-oriented mindsets (Huang et al., 2025). In addition, interdisciplinary analyses highlight that music and arts operate as transdisciplinary hubs that connect fragmented sustainability

discourses across science, policy, and society, reinforcing the argument that artistic practices can serve as integrative infrastructures for SDG communication (Bravo-Fuentes et al., 2025).

Despite the growing body of literature on arts-based sustainability education, critical examination reveals persistent conceptual and empirical fragmentation in how performing arts are operationalized within SDG implementation frameworks, particularly in higher education and community-based organizational settings. Existing studies predominantly emphasize school-based interventions or isolated artistic experiments, often neglecting the structural role of student organizations and cultural communities as sustained agents of SDG dissemination. Furthermore, research remains uneven in its treatment of different artistic modalities, with music and theater receiving comparatively greater analytical attention than dance as a distinct embodied communication system, despite its unique capacity to encode complex socio-technological narratives through kinetic symbolism and collective choreography (Reimer, 2025; Asplund et al., 2023). This imbalance generates a conceptual gap in understanding how dance-based pedagogies can be systematically designed, implemented, and evaluated as strategic instruments for SDG 9 communication within non-formal educational ecosystems.

The absence of integrated frameworks that connect choreography practice with innovation discourse produces a practical limitation in leveraging performing arts for sustainable development advocacy, particularly in contexts where students engage in extracurricular artistic communities rather than formal curricula. Although emerging studies acknowledge that arts-based sustainability learning enhances engagement and transformative reflection, there remains limited empirical clarity on how abstract SDG 9 constructs such as industrial innovation, infrastructural resilience, and technological advancement can be effectively translated into embodied performance grammars that are both culturally resonant and cognitively accessible (Grant et al., 2022; Wagner, 2021). This gap becomes increasingly urgent in light of the global demand for scalable, participatory, and culturally adaptive education strategies capable of mobilizing youth agency in sustainability transitions, especially within regions where creative communities constitute primary vectors of informal education and social innovation.

Positioning this study within the existing academic landscape requires a reconceptualization of dance not merely as artistic expression but as a structured communicative system that operationalizes sustainability knowledge through embodied semiotics and collaborative creativity. Unlike prior studies that primarily examine arts-based SDG education within formal schooling environments, this research situates student-led dance communities as active pedagogical laboratories where sustainability narratives are constructed, negotiated, and performed through collective artistic production. This positioning expands the analytical scope of SDG 9 communication by integrating cultural performance theory with sustainability education, thereby offering a more granular understanding of how innovation discourse can be translated into non-verbal, participatory, and emotionally resonant educational experiences within higher education ecosystems.

This community engagement research aims to analyze and operationalize the implementation of SDG 9 messages through dance-based creative education within student organizational contexts, focusing on how choreography training can function as a medium for translating abstract sustainability principles into embodied artistic communication. The study contributes theoretically by extending the discourse on arts-based sustainability education into the domain of dance-centered SDG pedagogy, while methodologically offering an applied model of participatory choreography mentoring as a vehicle for sustainability literacy development. The expected contribution lies in the articulation of a replicable framework that positions dance not only as cultural performance but also as an epistemic tool for fostering innovation awareness, collaborative learning, and sustainability-oriented creativity among emerging generations of learners.

RESEARCH METHODS

The implementation of this community engagement program was conducted within UKM Bimasena, a student arts organization at Politeknik Bina Madani, involving active members as the primary participants in a structured dance-based learning intervention designed to communicate SDG 9 values, particularly those related to industry, innovation, and infrastructure. The program adopted a participatory choreography training model facilitated by professional choreographers, where students were engaged in a sequential implementation process consisting of needs identification, conceptual translation of SDG 9 into artistic themes, choreography development workshops, rehearsal

consolidation, and final performance preparation for an international-level competition platform. Each stage was designed to ensure that participants not only acquired technical dance competencies but also internalized sustainability concepts through embodied learning, collaborative interpretation, and iterative creative refinement, thereby positioning dance practice as a medium for both artistic production and sustainability communication.

Data evaluation was conducted using a qualitative empirical framework combining observation, semi-structured interviews, and documentation analysis to capture both process and outcome dimensions of the program implementation. Observational data focused on participant engagement, collaborative dynamics, and the translation of abstract SDG 9 concepts into movement vocabulary during rehearsals, while interviews with participants and choreographers explored cognitive understanding, interpretative depth, and perceived learning outcomes related to innovation and sustainable development awareness. Documentation in the form of rehearsal recordings, choreography notes, and performance artifacts was used to triangulate findings and strengthen validity. The success of the program was assessed through indicators including the coherence of symbolic movement representation of SDG 9 themes, improvement in participants' creative and collaborative skills, level of conceptual understanding of sustainability principles, and effectiveness of audience communication during final performance dissemination, particularly in the context of international presentation exposure.

RESULTS AND DISCUSSION

Conceptual Translation of SDG 9 into Choreographic Structure and Embodied Interpretation

The choreography development process demonstrated a structured translation of SDG 9 concepts into embodied artistic expressions within UKM Bimasena. Participants engaged in participatory learning activities that emphasized interpretation of innovation, industrial transformation, and infrastructural development through movement design. This process aligns with the SDG framework that highlights innovation-driven development as a global priority for sustainable transformation (United Nations, 2015). Empirical observations indicated that initial conceptual ambiguity among participants gradually shifted toward clearer symbolic articulation through guided mentoring sessions.

The training model facilitated cognitive and kinesthetic integration, enabling participants to connect abstract sustainability ideas with physical expression. Professional choreographers played a mediating role in shaping interpretative consistency across group members. This aligns with findings that performing arts education enhances experiential understanding of sustainability through embodied cognition (Wagner, 2021). Data from interviews revealed that participants began associating movement dynamics with real-world industrial and infrastructural systems.



Figure 1. Modern Dance Training Process

Observation results during rehearsal stages, as documented in Figure 1, show progressive improvement in synchronization and thematic coherence. Participants initially struggled with aligning SDG 9 values to choreographic elements but demonstrated adaptive learning through iterative refinement. The rehearsal documentation confirms increased interpretative depth over time, particularly in group-based movement construction. Such findings support the argument that arts-based learning strengthens conceptual internalization through repetition and reflection (Bojner Horwitz et al., 2022).

The conceptual mapping process involved identifying key SDG 9 indicators and translating them into symbolic movement vocabularies. Innovation was represented through dynamic and asymmetrical motion patterns, while infrastructure was visualized through structured formations. Industrial development was expressed using repetitive and progressive kinetic sequences.

These interpretations reflect prior research indicating that dance functions as a semiotic system capable of encoding socio-developmental messages (Huang et al., 2025). Qualitative coding of observational and interview data resulted in thematic categorization of participant learning outcomes. The table below summarizes key indicators derived from triangulated analysis of rehearsal processes, interviews, and documentation.

Table 1. Mapping of SDG 9 Thematic Representation in Choreographic Movement and Participant Learning Outcomes

Theme	Observed Indicator	Interpretative Outcome
Innovation	Dynamic movement variation	Increased creative flexibility
Industry	Repetitive structured motion	Understanding of production systems
Infrastructure	Group synchronization patterns	Awareness of systemic connectivity
Collaboration	Ensemble coordination	Enhanced teamwork capacity

The table indicates that each SDG 9 dimension was effectively internalized through distinct choreographic representations. These findings reinforce the role of structured artistic mediation in sustainability education (Bravo-Fuentes et al., 2025).

Interview data revealed that participants experienced heightened conceptual clarity after engaging in symbolic choreography exercises. Many respondents indicated that abstract terms such as innovation became more understandable when embodied physically. This transformation supports prior studies suggesting that performing arts enhance cognitive engagement in sustainability learning contexts (Anasta et al., 2025). The integration of movement and meaning contributed to deeper interpretative retention among participants.

The participatory choreography model also strengthened collaborative interpretation among group members. Negotiation of movement meaning required continuous dialogue between participants and choreographers. This interaction fostered reflective thinking and collective decision-making processes. Similar findings were reported in studies emphasizing collaborative arts as a medium for sustainability literacy development (Asplund et al., 2023).

Documentation analysis indicated that rehearsal recordings reflected gradual refinement in thematic consistency. Early stages showed fragmented interpretations, while later sessions exhibited structured alignment with SDG 9 themes. This progression suggests that iterative practice is essential in developing coherent artistic communication of sustainability concepts. The findings correspond with research highlighting the importance of iterative artistic learning in educational transformation (Wagner, 2024).

The role of professional choreographers was central in bridging theoretical SDG concepts with practical artistic execution. Their guidance ensured that symbolic representations remained aligned with sustainability principles. Participants reported improved understanding of innovation systems and infrastructure dynamics through this mentoring process. This aligns with literature emphasizing expert facilitation in arts-based sustainability education (Malmberg & Gall, 2025).

The conceptual translation of SDG 9 into choreography demonstrated a structured and reflective learning process. The integration of participatory methods, symbolic movement construction, and

iterative rehearsal contributed to meaningful knowledge internalization. The empirical evidence confirms that dance-based education can function as an effective medium for sustainability communication. These outcomes reinforce the relevance of arts-based pedagogy in advancing SDG-oriented educational strategies (Kim & Geem, 2025).

Communication Effectiveness of SDG 9 Messages through Multisensory Performance Elements

The choreography performance demonstrated a multi-layered communication system in which SDG 9 messages were conveyed through integrated artistic elements rather than verbal explanation. Participants utilized movement, music, costume, and stage design as interconnected semiotic tools to represent innovation, industry, and infrastructure development. This aligns with the concept of transdisciplinary arts communication in sustainability education, where meaning is constructed through sensory engagement rather than textual instruction (Bravo-Fuentes et al., 2025). Observational data indicated that audience engagement increased significantly when multiple sensory channels were activated simultaneously during performance.

A key finding was the effectiveness of dynamic musical composition in reinforcing thematic meaning within the choreography. The musical arrangement combined electronic tones with rhythmic traditional patterns to symbolize the intersection between modernization and cultural continuity. Audience interpretation became more intuitive when shifts in tempo aligned with changes in movement intensity. This supports prior research indicating that sound integration in performing arts enhances sustainability message retention (Grant et al., 2022).

Table 2. Multisensory Performance Elements and Their Role in Communicating SDG 9 Messages through Dance-Based Artistic Representation

Performance Element	SDG 9 Representation	Audience Response Indicator
Music Variation	Technological innovation	Increased emotional engagement
Costume Design	Industrial modernization	Visual thematic recognition
Lighting System	Infrastructure development	Spatial awareness enhancement
Movement Dynamics	Collaborative systems	Cognitive association with SDG themes

The table above illustrates how each performance component contributed to reinforcing SDG 9 communication effectiveness. Music and lighting were particularly dominant in shaping audience interpretation of technological and infrastructural themes. These findings indicate that multisensory integration strengthens cognitive absorption of abstract sustainability concepts. Similar conclusions were reported in studies emphasizing the role of integrated arts in sustainability awareness development (Reimer, 2025).

Costume design also played a significant role in visually encoding industrial transformation narratives. Futuristic aesthetic elements were used to symbolize innovation-driven development, while structured patterns reflected systematic industrial growth. Audience interviews revealed that visual symbolism was more immediately recognizable than verbal explanations of SDG 9. This observation is consistent with findings that visual arts enhance comprehension of complex socio-environmental issues (Wagner, 2024).

Movement synchronization among performers contributed to the representation of infrastructural connectivity. Coordinated group formations illustrated interdependence between systems, reflecting the relational nature of sustainable infrastructure. Observational notes documented increased precision in synchronization during final rehearsals, indicating improved collective understanding. This supports literature suggesting that group choreography enhances systems-thinking abilities in sustainability education contexts (Asplund et al., 2023).

Audience reception analysis indicated strong emotional resonance during key performance sequences. Emotional engagement was particularly evident during transitions that symbolized industrial acceleration and technological change. Such responses suggest that emotional arousal plays a critical role in sustainability message internalization. Prior research confirms that emotional engagement in performing arts enhances long-term retention of educational messages (Bojner Horwitz et al., 2022).

Interview data further revealed that audiences interpreted SDG 9 themes without requiring explicit verbal explanation. Many respondents described the performance as “self-explanatory” in conveying innovation and infrastructure development concepts. This indicates that embodied communication can transcend linguistic barriers in sustainability education. Similar findings were reported in cross-cultural performing arts studies addressing SDG communication (Huang et al., 2025).

Documentation analysis of rehearsal recordings showed progressive refinement in aligning artistic elements with thematic objectives. Early rehearsals lacked synchronization between music and movement, while later stages demonstrated coherent multisensory integration. This progression indicates iterative learning in enhancing communication clarity. Such iterative refinement is consistent with experiential learning models in arts-based pedagogy (Anasta et al., 2025).

The role of lighting design was critical in structuring spatial interpretation of infrastructural themes. Strategic lighting transitions created visual segmentation that guided audience focus across narrative phases. This enhanced the clarity of developmental progression from traditional to modern systems. Research highlights that visual structuring in performance environments strengthens cognitive mapping of abstract concepts (Zakopoulos et al., 2023).

Multisensory performance elements functioned as an integrated communication system for SDG 9 messaging. The combination of sound, movement, costume, and lighting produced a cohesive interpretative framework for audiences. Empirical findings confirm that dance-based performances can effectively communicate complex sustainability concepts beyond conventional educational methods. These results reinforce the growing recognition of performing arts as strategic tools for sustainability communication in educational and cultural contexts (Tijani, 2020).

Educational Impact, Competency Development, and Sustainability Awareness Transformation among Participants

Participant development during the choreography program demonstrated significant improvement in both artistic competence and sustainability literacy related to SDG 9. The participatory training model enabled students to internalize innovation, industrial transformation, and infrastructure concepts through iterative embodied practice. This aligns with the SDG 4-oriented view that arts-based learning enhances holistic educational outcomes through experiential engagement (Maharani et al., 2025). Observation data indicated increased confidence and interpretative clarity among participants from early rehearsal stages to final performance preparation.

The transformation of cognitive understanding into embodied performance skills was evident through progressive refinement of choreography execution. Participants initially perceived SDG 9 as a purely theoretical framework but gradually developed contextual understanding through guided creative translation. Interviews revealed that repeated rehearsal cycles strengthened conceptual retention and interpretative depth. This supports findings that arts education fosters deeper learning by integrating cognitive and kinesthetic domains (Wagner, 2021).

Table 3. Development of Participant Competencies through Dance-Based Learning Intervention in SDG 9 Implementation Program

Competency Dimension	Development Indicator	Observed Outcome
Creative Thinking	Movement innovation ability	Increased originality in choreography
Collaboration	Group synchronization	Improved teamwork efficiency
Conceptual Understanding	SDG 9 interpretation	Stronger sustainability awareness
Communication Skills	Performance expression	Enhanced non-verbal articulation

The table illustrates that competency development occurred across multiple dimensions of learning outcomes. Creative and collaborative skills showed the most visible improvement during ensemble-based choreography construction. These results indicate that structured arts engagement contributes to multidimensional skill development in sustainability education contexts. Similar conclusions are supported by research emphasizing performing arts as catalysts for creative and social competencies (Hamdani & Anasta, 2025).

A significant finding was the enhancement of participants' awareness of sustainability principles through embodied learning processes. Students reported improved understanding of innovation systems and infrastructure development after engaging in symbolic movement creation. This suggests that abstract sustainability concepts become more accessible when translated into physical expression. Prior studies confirm that arts-based sustainability education improves conceptual comprehension and environmental awareness among learners (Anasta et al., 2025).

The mentoring process with professional choreographers played a critical role in shaping reflective learning experiences. Continuous feedback sessions encouraged participants to critically evaluate the alignment between movement and SDG 9 concepts. This iterative dialogue fostered analytical thinking and creative problem-solving abilities. Such findings align with literature emphasizing mentorship as a key factor in enhancing learning outcomes in arts-based education (Malmberg & Gall, 2025).

Emotional engagement was identified as an important factor influencing participant learning effectiveness. Students expressed stronger motivation when choreography tasks were linked to meaningful global development issues. Emotional involvement enhanced persistence during rehearsals and improved performance quality. This supports research indicating that emotional engagement in performing arts strengthens educational transformation processes (Bojner Horwitz et al., 2022).

Table 4. Staged Learning Progression in Embodied SDG 9 Education through Participatory Choreography Training Process

Learning Phase	Participant Experience	Learning Outcome
Concept Introduction	Initial abstraction of SDG 9	Limited understanding
Choreography Development	Active symbolic interpretation	Improved conceptual clarity
Rehearsal Consolidation	Iterative refinement	Strengthened skill mastery
Final Performance	Applied communication	Integrated competence achievement

The table shows a clear progression of participant learning across program stages. Each phase contributed differently to the overall development of sustainability awareness and artistic competence. The final stage demonstrated integration of cognitive, affective, and psychomotor learning domains. This progression is consistent with experiential learning frameworks in arts-based education (Wagner, 2024).

Participation in the international Winaction competition expanded the educational impact beyond institutional boundaries. Students experienced real-world application of SDG communication through global artistic exposure. This international context enhanced their understanding of cultural exchange in sustainability advocacy. Similar studies highlight that international arts participation strengthens global citizenship awareness among learners (Grant et al., 2022).

Challenges encountered during the program included difficulties in abstract concept interpretation and time limitations for rehearsal optimization. However, adaptive learning strategies and continuous mentoring mitigated these constraints effectively. Participants demonstrated resilience and improved problem-solving skills throughout the process. These findings reinforce the role of challenges in fostering deeper learning within creative education environments (Yusuf & Slamet, 2025).

The program demonstrated that dance-based educational interventions significantly enhance sustainability awareness and participant competencies. The integration of choreography, mentorship, and performance created a holistic learning environment supporting SDG 9 communication. Empirical evidence indicates that arts-based education is effective in transforming abstract sustainability concepts into lived educational experiences. These outcomes confirm the strategic relevance of performing arts in advancing sustainable development education frameworks (Kim & Geem, 2025).

CONCLUSION

The implementation of SDG 9 messages through dance-based educational intervention in UKM Bimasena demonstrates that choreographic practice can function as an effective medium for translating abstract sustainability concepts into embodied and communicative artistic expressions. The integration

of participatory choreography training, multisensory performance design, and iterative mentoring processes enabled participants to develop a coherent understanding of innovation, industrial transformation, and infrastructure development while simultaneously enhancing creative, collaborative, and communicative competencies. Empirical findings indicate that symbolic movement structures, combined with music, costume, and lighting elements, significantly improved both audience comprehension and participant internalization of SDG 9 values. Furthermore, the educational intervention fostered reflective learning, emotional engagement, and international-level dissemination of sustainability messages through performance participation. Overall, dance art is demonstrated as a strategic pedagogical medium that bridges cultural expression and sustainability education, reinforcing its relevance as an innovative approach for advancing SDG-oriented learning in higher education environments.

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