Abstract

Angklung is a traditional Indonesian musical instrument made from bamboo tubes and typically performed in an ensemble, where each player is responsible for a single note. Because of its ensemble nature, angklung performance heavily relies on a conductor who uses hand-sign cues to coordinate timing and note transitions. While ensemble playing fosters communal learning, it poses challenges for novices who wish to practice individually—especially when a human conductor or structured rehearsal setting is not available. This study addresses that gap by developing a **cue-guided angklung training system** that supports individual self-practice while maintaining pedagogical elements based on traditional hand-sign methods.

The main objective of this research is to develop and evaluate a **cue-guided training system** using two types of instructional approaches: **visual-cue** and **handsign-cue**, focusing on usability, user engagement, and learning impact for novice players. Three digital training methods were introduced: **Notebar (NB)**, which provides visual timing through color-coded bars; **Hand-Sign Bot (HB)**, which presents gestures in sync with note timing, allowing players to follow along during practice; and **Hand-Sign Bot with Preview (HBP),** which enhances HB by adding anticipatory gesture cues to support predictive timing. This study explores how such a system can be developed, how it affects player performance and experience, and how experts perceive the role of hand-sign-based instruction in angklung learning.

To achieve these aims, a four-phase methodology was used: research design, system development, experimental testing, and evaluation. The system was tested with 36 participants from diverse backgrounds—both Indonesian and international, with varying levels of music experience—divided into novice and experienced groups. The experimental procedure included pre- and post-test performance assessments, followed by usability and engagement surveys using the System Usability Scale (SUS) and the User Experience Questionnaire (UEQ-S). Additionally, expert interviews were conducted and analyzed using Framework Analysis to gather qualitative insights.

The findings show that all three training methods effectively support novice skill development, as the Friedman test indicated no statistically significant difference in performance improvements. However, there were notable differences in usability and engagement. **NB** was rated highest in usability, particularly by novice and non-musician participants, due to its simplicity and visual clarity. **HBP** was considered the most inventive and engaging, especially by users with prior musical experience. **HB**, while grounded in traditional pedagogy, received mixed responses because of its rigid format and steeper learning curve. Expert evaluations confirmed that HB and HBP successfully replicate essential aspects of human conducting gestures, making them pedagogically valid for instruction, though limited in expressive nuance and adaptability. Experts also recommended improvements such as customizable hand-sign libraries, alternate conductor avatars, and more unified visual cue designs across all training modes.

This research contributes a novel digital approach to angklung training by simulating conductor-led instruction in a self-directed learning environment. It bridges traditional music pedagogy with digital education while preserving cultural authenticity. The study concludes that cue-guided systems can effectively support individual angklung practice and recommends future developments in group-based and remote training, along with expanded visual personalization and expert-defined gesture customization.

Keyword:
Cue-guided system, Visual-Cue, Handsign-Cue, Novice Angklung Player, Digital Music Pedagogy, Usability Evaluation, User Engagement.