# Enhancing Indonesian Higher Students' Dance Performance and Creativity through the Implementation of Mirrors and Self-Recording Video

Fuji Astuti[1,*], Desfiarni[1], Nurul Haniza Samsudin[2], and Annisa Tishana[3]

[1]Sendratasik Department, Faculty of Languages and Arts, Universitas Negeri Padang, Padang, Indonesia
[2]Academy of Malay Studies, Universiti Malaya, Kuala Lumpur, Malaysia
[3]Electrical Engineering, Universitas Malikussaleh, Aceh, Indonesia
Email: astuti@fbs.unp.ac.id (F.A.); desfiarni@fbs.unp.ac.id (D.); haniza_85@um.edu.my (N.H.S.); annisatishana@unimal.ac.id (A.T.)
*Corresponding author
Manuscript received September 1, 2025; revised October 20, 2025; accepted December 3, 2025; published April 15, 2026

***Abstract*—The use of technology in dance education has received considerable scholarly attention, particularly in movement acquisition. However, many studies focus primarily on the application and importance of technology for improving students' dance performance, leaving a gap regarding its integration with traditional tools like mirrors. This quasi-experimental study examines the combined effect of mirrors and Self-Recorded Video (SRV) on students' dance performance, creativity, and perceptions toward the effectiveness of the method. Data were collected from 46 students through performance and creativity tests, along with a closed-ended questionnaire. A paired sample t-test revealed that the combination of mirrors and SRV significantly improved dance performance ($p$ = 0.003). Furthermore, a significant difference in creativity was found between the combined method and the use of SRV alone ($p$ = 0.031). Survey results confirmed that the integrated approach helped students construct their own dances, correct movements from multiple angles, and practice audience engagement.**

***Keywords*—creativity, dance performance, mirror media, Self-Recording Video (SRV)**

## I. Introduction

Digital technology is crucial to dance education, recognized for its potential to enhance how students construct movement and develop creativity [1, 2]. Tools such as motion capture, Augmented Reality (AR), and mobile applications can create interactive, student-centered learning experiences by allowing students to visualize movement, experiment with spatial patterns, and receive immediate feedback to their dance creations [3]. These technologies support both technical skill development and critical thinking. Furthermore, digital platforms can facilitate collaborative choreography and broaden access to dance education [4]. Despite these advancements, many educators still face challenges in adopting technology effectively due to limited training and institutional support, underlining the importance of professional development programs that equip dance teachers with the necessary digital competencies to transform choreography instruction in the 21st century [5].

While consistent practice is fundamental in dance, encouraging students to push their creativity in constructing dances is the most important thing in dance choreography courses [6]. Technology can be a valuable tool for this, serving to increase motivation and provide inspiration; for example, exploring YouTube videos focusing on dance performance and identifying diverse movements, costumes, and techniques [7]. However, it is crucial to maintain a balance between technology usage and in-person, hands-on learning experiences. Technology should not replace traditional teaching methods but rather complement them by providing students with additional avenues for exploration and inspiration [8]. In doing so, dance educators can cultivate an atmosphere that not only challenges students to think creatively but also equips them with the skills and confidence to experiment and innovate within their choreography. Ultimately, the goal is to nurture students' artistic growth while ensuring they remain grounded in the fundamental principles of dance [9]. Several studies have demonstrated the effectiveness of integrating technology into dance education. who investigated the perceived usefulness of online videos among 56 teachers and 569 students from universities in Japan and the United States, found that such media can stimulate students' creativity and make the learning process more enjoyable [10]. who focused on one of Indonesia's state universities, stated that the use of social media significantly influences the exploration of local cultural values, which serve as the foundational ideas and concepts in dance creation. Connor *et al.* [11] successfully engaged male students in dance classes. After watching several videos provided by the instructor at each stage of brainstorming in class, male students were able to successfully participate in dance performances and dance music. Hong *et al.* [12] also added that the use of videos in the classroom contributes positively to students' intentions and attitudes toward dance performances.

Although technology has a positive impact on the learning process and positively affects students' dance performance, traditional media, such as mirrors, cannot be ignored. These media also contribute to the dance creation process. Mirrors have been considered a traditional medium that can help students control their dance movements [13]. Through mirrors, students can evaluate their dance movements according to the correct form. They can explore techniques that allow them to improve imperfect movements by observing themselves in the mirror. As a traditional tool, mirror media serves as a dance guide in the training process to achieve maximum results [14]. While previous researchers have only examined the benefits and relationship of mirror media to students' success in ballet and modern dance learning processes, this medium could also be integrated into choreography class instruction, particularly for regional dances, and our research aims to address this gap [15].

Building on this perspective, the integration of mirror media into choreography classes for regional dances offers a promising opportunity to enhance students' kinesthetic awareness and cultural expression. In the context of traditional Indonesian dances, which often emphasize intricate gestures, facial expressions, and synchronized group movements, mirrors can serve as an effective tool for real-time self-correction and refinement [16]. When students observe themselves while rehearsing, they become more aware of the accuracy and aesthetics of each movement, enabling deeper engagement with the stylistic and symbolic elements embedded in the dance [17]. Moreover, combining mirror use with other learning tools—such as video self-recordings—can provide a comprehensive feedback loop that strengthens both technical execution and interpretative skills. Despite the strong potential of this approach, scholarly exploration of mirror media in regional dance pedagogy remains limited, highlighting the need for empirical research that examines its effectiveness in diverse cultural and educational settings [18].

In addition, with the help of technology, such as video recording, the quality of the dance produced will be even better. Video self-recording is one of the derivative methods of video-based learning, where students maximize the use of recording technology for educational purposes and enhance learning outcomes. In this method, students are asked to record their learning process and evaluate each activity they perform based on the recordings [19]. This activity can boost students' self-confidence, motivate them to learn independently, and significantly improve their learning outcomes In the Indonesian context, the Self-Recording Video (SRV) method has also been implemented by many researchers across various fields of study [20]. They argue that self-recorded videos can increase students' motivation and confidence in improving their learning abilities. However, in the field of dance education, the application of the SRV method has received little attention. Yang [21] who focused on the use of video in ballet teaching, found that providing students with video can enhance their critical thinking in refining dance movements and is highly beneficial in improving their self-evaluation skills. However, their research was limited to ballet classes, and there is no research focusing on the application of this method in local dance classes.

Therefore, it is essential to explore the potential of the Self-Recording Video (SRV) method in the context of local dance education in Indonesia, where traditional dances are deeply rooted in cultural identity and require a high level of precision, expression, and memorization [22]. By incorporating SRV into local dance classes, students can not only observe and reflect on their own performances but also gain a deeper understanding of the nuances of traditional movements, rhythms, and expressions unique to Indonesian culture [23]. Furthermore, this method allows instructors to provide more targeted and individualized feedback, as they can analyze the recordings together with the students. Considering the limited number of studies in this area, further research is needed to examine how SRV can support the development of both technical and expressive aspects of local dance, while also fostering student autonomy, critical thinking, and cultural appreciation.

Based on the literature mentioned above, it can be said that the use of mirror media and technology has a positive effect on dance performances. However, the benefits of these media are only felt in ballet and modern dance, while the implementation of technology-assisted mirror media has not yet been seen in choreography dance learning, especially in developing local dances in Indonesia [16]. Additionally, there has been no research attempting to examine the impact of combining mirror media and the SRV method in enhancing dance development and creation skills in choreography courses within the context of higher education. Therefore, this article aims to explore the impact of using mirror media integrated with the SRV method on students' dancing abilities, creativity in constructing dance, and their perceptions of the application of this method [24].

The integration of mirror media in dance education, particularly when paired with the SRV method, holds the potential to bring about significant improvements in students' dance performance and creativity. While the benefits of technology-assisted mirror media have been widely recognized in ballet and modern dance, their application in the context of local Indonesian dances remains largely unexplored. Local dances, with their rich cultural heritage and intricate movements, may benefit from such technological integration, as it could offer students a new perspective on body movement, gestures, and spatial awareness, which are crucial in preserving traditional forms [25, 26]. The research aims to investigate how mirror media, which is integrated with the SRV method, influences students' dance performance, dance creativity, and their perceptions toward the application of the method.

## II. Materials and Methods

This mixed-method study was conducted at one of public universities in Padang, West Sumatra, Indonesia. To test the effect of mirror media with SRV on students' dance performance and creativity, a quasi-experimental study was conducted, while to explore their perceptions of the implementation of media with SRV, a survey study was conducted. In the quasi-experimental study, the independent variable was the application of mirror media with the SRV method, and the dependent variables were the students' dance performance and creativity. Sampling was conducted using cluster random sampling and involved two groups, consisting of an experimental group (46 students) and a control group (46 students). To ensure that both groups were normal and homogeneous, Lavene's and Shapiro-Wilk tests were used (See Tables 1 and 2). This quasi-experimental design facilitated a clear comparison between an experimental group, which received the intervention integrating mirror media with the (SRV) method, and the control group, which was instructed using conventional teaching methods. The objective was to determine whether the integration of mirror media and SRV significantly enhanced students' dance performance and creativity. Throughout the intervention, the experimental group utilized mirror media and SRV to regularly record and critically reflect on their movements via video. In contrast, the control group continued without this technological component. Following the intervention period, both groups underwent a practical evaluation to assess dance performance. Creativity was measured by evaluating the

originality and innovation demonstrated in choreographic tasks. Complementing this quantitative data, a supplementary survey provided qualitative insights into the students' perceptions of the mirror media and SRV method. This survey captured student feedback on the method's effectiveness in developing their technical skills, fostering creativity, and enhancing self-awareness during the learning process. This mixed-methods approach enabled a comprehensive analysis of the intervention's impact. The results offer a detailed perspective on student learning outcomes, underscoring the potential benefits of incorporating technology into dance education.

Table 1. Comparison of pre-test scores using the independent sample t-test

| Test Type | Assumption | F-value | Significance (Sig.) | t-value | Degrees of Freedom (df) | Two-tailed Significance (Sig. 2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Lower | Upper |
| Levene's Test | Homogeneity of Variances | 0.025 | 0.875 | – | – | – | – | – | – | – |
| t-test | Equal variances assumed | – | – | −0.524 | 90 | 0.602 | −0.40549 | 0.77448 | −1.94413 | 1.13315 |
| t-test | Equal variances not assumed | – | – | −0.524 | 89.988 | 0.602 | −0.40549 | 0.77448 | −1.94414 | 1.13315 |

Table 2. The normality of both groups using shapiro wilk test

| Group | Shapiro-Wilk Statistic | df | Sig. |
|---|---|---|---|
| Mirror with SRV | 0.958 | 46 | 0.096 |
| Conventional | 0.954 | 46 | 0.069 |

Note: Lilliefors Significance Correction was applied.

In conducting the intervention, the similarity between the two groups lies in two activity frameworks, namely teaching and training [14]. The intervention was carried out in six meetings that included teaching, practice, and final product assessment. In the teaching process, both groups were given several materials, such as understanding local dances. The pedagogical content for both groups focused on the theoretical and practical aspects of Minangkabau dance, with a specific emphasis on the *sumbang* duo *baleh* values—a philosophical system central to the dance's movements and choreography.

During the teaching phase, instructors demonstrated fundamental Minangkabau movements that embody the *sumbang* duo *baleh* values, which students then observed and practiced. These values, which emphasize the balance and harmony between different elements, were central to the choreography that students were tasked with creating. The lecturers demonstrated the fundamental movements of the Minangkabau dance, which students were required to replicate, ensuring that they understood both the technical and cultural significance of each step [27]. For the experimental group, the integration of mirror media with SRV provided an additional layer of learning, allowing them to record their practice sessions and reflect on their movements. This reflection process helped them refine their performance by providing immediate feedback on their body alignment, posture, and movement dynamics. The control group, however, relied solely on traditional methods of teaching and direct observation, without the aid of technology. In the subsequent practice sessions, both groups applied the movements they had learned in the teaching stage, with the experimental group benefiting from the enhanced ability to self-assess their choreography through recorded videos. Finally, in the assessment phase, both groups presented their dance compositions, which were evaluated based on creativity, execution, and adherence to the values of *sumbang duo baleh*, allowing for a direct comparison of the effectiveness of the two teaching approaches in fostering student creativity and dance performance.

They studied dance, observed movements, and practiced them themselves. The difference between the two groups lay in the media and methods used in the practice activities, particularly in the dance creation process. The experimental group's learning environment was structured around Douglah's [14] conceptual framework (see Fig. 1). In this condition, students were trained to employ mirror media with the SRV method for choreography. The instructor tasked students with recording their dance sequences, then evaluating and critiquing their own movements to inform and refine subsequent practice iterations. Conversely, the control group utilized a different approach, drawing inspiration from publicly available videos on YouTube to create their dances. In the final session, both groups presented the culminating products of their choreographic work.

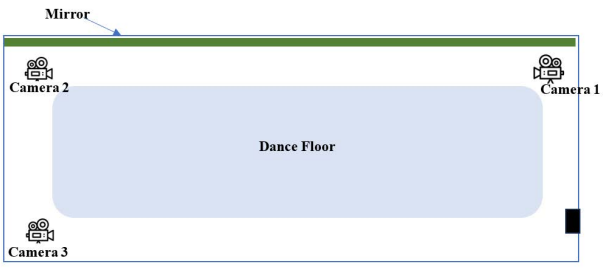


Fig. 1. Classroom situation.

To collect data, four instruments were used, namely a rubric to assess students' dance performance, a rubric to measure students' dance creativity, a questionnaire to examine students' perceptions, and semi-structured interview guidelines. The rubric developed by Astuti [1] was used to assess students' dance performance and to measure their dance creativity, with the validity of the dance performance rubric and dance creativity rubric at 90% and 88%, respectively (See Tables 3 and 4). Additionally, the reliability of the dance performance rubric and the creativity rubric were measured using Cronbach's alpha, with results of 0.88 and 0.82, respectively. Thus, both are claimed to be highly reliable assessment rubrics.

Table 3. Rubric to assess students' dance performance

| No | Dimension | Indicators | Scores |
|---|---|---|---|
| 1 | Originality | Movement source | 20 |
| | | Specification | 10 |
| 2 | Quality | Dynamic | 10 |
| | | Design | 10 |
| | | Movement | 20 |
| 3 | Form | Floor Pattern | 10 |
| | | Dramatic | 10 |
| | | Music | 10 |
| Total | | | 100 |

Table 4. Rubric to assess students' creativity

| Variable | Indicators | Descriptors | Scores |
|---|---|---|---|
| Students' Dance Creativity | Fluency | Various pose demonstration | 10 |
| | | Movement re-organization | 10 |
| | | Series of head, legs, hand movement forming | 10 |
| | | Basic level of head, hands, and legs movement series | 10 |
| | | Themed movement arrangement | 10 |
| | Flexibility | Series of movements with property | 10 |
| | Elaboration | Themed movement demonstration with music | 20 |
| | Originality | A unique movement | 20 |
| | Total | | 100 |

To examine students' perceptions and responses to the use of mirror media with SRV, a questionnaire was modified from Astuti [28] that covered the usefulness of mirrors with SRV in creating movements, attitudes, and creativity during the dance creation process (Table 5).

Table 5. Indicators of the questionnaire

| Variable | Indicators | Sub-Indicators | No |
|---|---|---|---|
| The usefulness of mirror with SRV in creating dances | Movement | Sitting movement | 1 |
| | | Standing movement | 2 |
| | | Walking movement | 3 |
| | | Pattern movement | 4 |
| | Attitude | Silent | 5 |
| | | Speaking | 6 |
| | | Viewing | 7 |
| | | Asking | 8 |
| | | Responding | 9 |
| | | Getting along | 10 |
| | | Acting | 11 |
| | Costume | Dressing | 12 |
| | Creativity | Movement | 13 |
| | | Theme | 14 |
| | | Costume | 15 |

## III. Findings

### A. Comparison of Post-Test Scores of Students from the Experimental Group and Control Group in Terms of Dance Performance

Based on the results of descriptive statistical analysis, the dance performance of students taught with mirrors using SRV and conventional methods can be seen in Table 6.

Table 6. Descriptive statistics of post-test scores between the two groups

| Group | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Mirror with SRV | 81.0048 | 46 | 5.14397 | 0.75844 |
| Conventional | 79.5326 | 46 | 6.64251 | 0.97938 |

A paired sample t-test was used to measure the effect of both media on students' dance performance. The results of the statistical analysis are shown in Table 7.

Statistical data using a paired t-test in Table 7 shows that there is a significant difference in post-test scores between the experimental group (mirror with SRV) and the control group (conventional) ($p$-value = 0.003). When looking at the average scores, we found that the average score of students in the experimental group (mirror with SRV) (81.004) was higher than the average score of students in the control group (conventional) (79.5326). In other words, it can be concluded that students taught using mirrors with SRV achieved better dance performance than those taught using conventional methods.

Table 7. Comparison of post-test scores between the two groups

| Paired Group | Mean Difference | Std. Deviation | Std. Error Mean | 95% Confidence Interval Lower | 95% Confidence Interval Upper | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| Mirror with SRV—Conventional | 1.47217 | 3.22390 | 0.47534 | 0.51479 | 2.42955 | 3.097 | 45 | 0.003 |

### B. Comparison of Dance Creativity between Students Taught Using Mirrors with SRV and Students Taught Using Conventional Methods

The average creativity scores of students taught using mirrors with SRV and those taught using conventional methods can be seen in Table 8.

After conducting inferential statistical analysis, significant differences were observed between the two groups in terms of dance creativity (Table 9). Referring to Table 8, it can be concluded that the creativity of students taught with mirror media with SRV was also higher (81.22) than that of students taught with conventional methods (80.64).

Table 8. Descriptive statistics of dance creativity scores between the two groups

| Group | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Mirror with SRV Creative | 81.2283 | 46 | 5.53244 | 0.81571 |
| Conventional Creative | 80.6413 | 46 | 5.81823 | 0.85785 |

Table 9. Comparison of dance creativity scores between the two groups

| Paired Group | Mean Difference | Std. Deviation | Std. Error Mean | 95% Confidence Interval Lower | 95% Confidence Interval Upper | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| Mirror Creative—Conventional Creative | 0.58696 | 1.78980 | 0.26389 | 0.05545 | 1.11846 | 2.224 | 45 | 0.031 |

### C. Students' Perceptions of the Usefulness of Mirror Media with SRV in Dance Performance

Based on the results of the questionnaire distribution, students' perceptions of mirror media with SRV were obtained (Table 10).

Table 10. Comparison of dance creativity scores between the two groups

| No | Statements | M | SD |
|---|---|---|---|
| 1 | Mirror with SRV dance makes me more selective in choosing sitting movements concerning the ethics of local dancing. | 4.32 | 0.51 |
| 2 | Mirror with SRV makes me more selective in choosing body gestures concerning the ethics of local dancing. | 4.63 | 0.48 |
| 3 | Mirror with SRV gives me knowledge about the volume of legs, head, and hand movement forming. | 4.5 | 0.54 |
| 4 | Mirror with SRV gives me knowledge about choosing the dance movements that are appropriate to the characters, themes, and movement patterns of female and male dancers. | 4.43 | 0.53 |
| 5 | Mirror with SRV gives me rules during dancing in a couple of ways. | 4.47 | 0.49 |
| 6 | Mirror with SRV gives me knowledge of how to communicate and interact with audiences. | 4.45 | 0.54 |
| 7 | Mirror with SRV provides me knowledge of eye movement forming during dancing. | 4.5 | 0.54 |
| 8 | Mirror with SRV provides me with some rules on how to ask and give opinions in terms of creating dances in teams. | 4.37 | 0.48 |
| 9 | Mirror with SRV provides me with some knowledge on how to respond and share with others in terms of creating dances. | 4.41 | 0.53 |
| 10 | Mirror with SRV provides me with some knowledge on how to discuss and work together with teams in terms of creating dances. | 4.58 | 0.49 |
| 11 | Mirror with SRV gives me rules on how to accommodate head, hand, and leg movement forming which are appropriate to the characters, themes, and movement patterns of female and male dancers. | 4.5 | 0.5 |
| 12 | Mirror with SRV gives me knowledge about choosing the costumes which are appropriate to the characters, themes, and movement patterns of dancing. | 4.41 | 0.57 |
| 13 | Mirror with SRV increases my creative thinking in terms of producing a unique movement. | 4.54 | 0.49 |
| 14 | Mirror with SRV increases my creative thinking in terms of producing a unique theme. | 4.45 | 0.57 |
| 15 | Mirror with SRV increases my creative thinking in terms of producing a unique costume. | 4.47 | 0.58 |

The results of the study indicate that the response scores of all students to the mirror media with SRV were positive in terms of determining movements while sitting, interacting, and observing (items #1, #6, #7), constructing and organizing movements (items #2, #3, #4), discussing dance creations with partners (items #8, #9, #10), and behaving (items #5, #11).

## IV. Discussion

This study examines the impact of integrating traditional mirror media with the SRV method on students' dance performance, creativity, and perceptions of the method. The Self-Recording Video (SRV) method was adapted from the principles of Mobile-Assisted Language Learning (MALL) [19], which typically uses personal devices to record activities. While SRV aims to boost motivation, self-regulation, and self-awareness, our implementation used a multi-camera setup for greater detail. Three cameras were strategically placed to the right, left, and back, capturing dance movements from multiple angles. Students used these recorded videos for indirect self-evaluation after class.

Regarding the first objective, the findings indicate that this integration led to a statistically significant improvement in dance performance compared to conventional teaching methods. The instructional framework conceptualized in this study empowered students with autonomy, allowing them to explore diverse sources of inspiration—such as online videos, external dance classes, and community discussions—and adapt these influences into their original choreography. This aligns with the scholarly consensus that higher education dance curricula should foster creativity by giving students the freedom to seek inspiration from various sources, thereby unlocking their creative potential [29, 30]. We included opportunities to maximize the use of technology in obtaining sources [31], such as watching dance videos or they can attend external classes and engage in discussions with the broader dance community. This method not only refines technical skills but also encourages critical thinking and innovation in choreography [32].

In this study, students practiced in a classroom integrated with mirrors. This allowed them to observe the quality of their dancing—including dynamics, design, and specific movements—in real time. Our findings show that mirrors provide direct feedback, enabling students to reflect on their performance and improve their ability to absorb information. This supports the work of Dearborn and Ross [33], whose comparative study found that using mirrors helps students sense misalignment and adjust their movements more effectively. Besides, the use of mirrors provides immediate visual feedback, significantly enhancing students' self-awareness and technical development [34].

By observing themselves in real time, students can identify areas for improvement in their movement dynamics, choreographic flow, and gestural precision. This direct observation allows for instant adjustments, fostering an environment where students can autonomously refine their technique [35]. Our research confirms that this reflective process is crucial for improving performance. Furthermore, the ability to self-correct builds essential body awareness, alignment, and control, which underpin both technical proficiency and creative expression. Therefore, mirrors not only aid in refining physical movements but also help students develop a deeper understanding of their bodily performance in relation to choreography.

The SRV method, in this study, significantly enhances the dance learning experience by enabling detailed self-observation from multiple perspectives. Using cameras or mobile devices, SRV allows students to review recordings of their performances, fostering self-regulation and motivation [20]. This multi-angled review helps identify technical strengths and weaknesses that are often missed in live practice. The process of self-evaluation cultivates greater self-awareness, enabling students to track their progress and refine their choreography. In this study, the strategic placement of cameras on the right, left, and back provided a holistic view of body movements, offering detailed feedback essential for improving dance quality. This technology-driven approach not only advances technical proficiency but also encourages students to take ownership of their learning, resulting in a more personalized and effective educational experience. In other words, the integration of mirror media with SRV also effectively enhances student creativity in choreographing, exploring, and refining dance movements. Our findings confirm the utility of technology in orchestrating movement sequences [36, 37], as the SRV-mirror combination led to measurable improvements in

both performance and creativity.

Regarding student perception, participants agreed that the method aided in selecting body movements, calibrating the amplitude of leg, head, and hand motions, and controlling eye contact with the audience. These results support Admiraal *et al.*'s [38] assertion that video recording increases students' awareness of their own practice. Furthermore, the combined use of mirrors and SRV positively assisted students in elaborating their dance movements.

The integration of mirrors and Self-Recorded Video (SRV) creates a dual visual feedback system for the students' dance performances and creations. Mirrors provide immediate feedback for correcting forms and movements, while SRV offers a structured method for detailed post-performance analysis [39]. This process of visual reflection promotes autonomy in movement assessment, thereby enhancing bodily awareness and choreographic creativity [40]. These findings confirm that visual reflection technologies serve a dual purpose: they refine technical execution and stimulate compositional innovation [41].

Regarding student perceptions, participants reported that the combined use of mirrors and SRV sharpened their focus on movement quality, including limb alignment, precision, and subtle eye contact. This visual medium provides instant feedback, directing attention to fine details that create a performance's overall harmony [42]. Consequently, both tools enhance performance quality by cultivating greater self-awareness and control over bodily expression and audience engagement [43]. The reflective process inherent in SRV also allows students to explore their movement more deeply, empowering them to infuse performances with greater emotional resonance [44].

## V. Conclusion

This study concludes that the integration of mirror media with the Self-Recording Video (SRV) method effectively enhances students' dance performance and creativity. The combined approach provides dual feedback mechanisms: real-time visual correction through mirrors and delayed self-reflection via recorded videos; resulting in improved technical accuracy, movement control, and confidence among learners. The findings indicate that technology-assisted reflective tools can significantly support skill acquisition in dance education.

However, the study is limited in several aspects. The intervention was tested only within a single dance genre, which restricts its generalizability to other dance forms. Musical components were not included although they play a critical role in rhythm and synchronization. Additionally, instructor perspectives were not examined, which may provide important insights into pedagogical challenges and implementation feasibility.

Future research should explore multiple dance genres, incorporate musical elements, and include teacher feedback to obtain a more comprehensive understanding of this instructional approach. Longitudinal studies are also recommended to assess the long-term effectiveness of mirror–SRV integration in developing students' technical and creative competencies. Overall, this study contributes practical evidence supporting the use of reflective technologies to enhance learning outcomes in dance education.

## Conflict of Interest

The authors declare no conflict of interest.

## Author Contributions

F.A. and D. designed and conducted the research; F.A., N.H.S., and A.T. wrote the paper; F.A. and A.T. analyzed the data; all authors had approved the final version.

## Funding

We would like to thank Lembaga Penelitian dan Pengabdian Masyarakat Universitas Negeri Padang for funding this work with contract number 492/UN.35/LT/2023.

## References

[1] F. Astuti, "Exploring local wisdom from youtube: An investigation on the indonesian higher education students' dance performance across gender," *Cakrawala Pendidikan*, vol. 40, no. 1, pp. 230–241, 2021. https://doi.org/10.21831/cp.v40i1.32426

[2] M. Joshi and S. Chakrabarty, "An extensive review of computational dance automation techniques and applications," in *Proc. the Royal Society A: Mathematical, Physical and Engineering Sciences*, vol. 477, no. 2251, 2021. https://doi.org/10.1098/rspa.2021.0071

[3] B. Xie, H. Liu, R. Alghofaili, Y. Zhang, Y. Jiang, F. D. Lobo, C. Li, W. Li, H. Huang, M. Akdere, C. Mousas, and L. F. Yu, "A review on virtual reality skill training applications," *Frontiers in Virtual Reality*, vol. 2, pp. 1–19, 2021. https://doi.org/10.3389/frvir.2021.645153

[4] Y. Zou, F. Kuek, W. Feng, and X. Cheng, "Digital learning in the 21st century: trends, challenges, and innovations in technology integration," *Frontiers in Education*, vol. 10, p. 10, 2025. https://doi.org/10.3389/feduc.2025.1562391

[5] A. Leavy, L. Dick, M. Meletiou-Mavrotheris, E. Paparistodemou, and E. Stylianou. "The prevalence and use of emerging technologies in STEAM education: A systematic review of the literature," *Journal of Computer Assisted Learning*, vol. 39, no. 4, pp. 1061–1082, 2023. https://doi.org/10.1111/jcal.12806

[6] N. Mazhud, "Basic traditional dance movement training to improve the dancing skills of class X students of LPP UMI high school," *Madaniya*, vol. 1, no. 40, 56–67, 2020. (in Indonesian)

[7] W. Li, "On the role of creativity in the application-oriented university students' engagement and success," *Heliyon*, vol. 9, no. 6, pp. 1–7, 2023. https://doi.org/10.1016/j.heliyon.2023.e17374

[8] A. Alam and A. Mohanty, "Educational technology: Exploring the convergence of technology and pedagogy through mobility, interactivity, AI, and learning tools," *Cogent Engineering*, vol. 10, no. 2, pp. 1–37, 2023. https://doi.org/10.1080/23311916.2023.2283282

[9] K. Seo, M. Yoo, S. Dodson, and S. H. Jin, "Augmented teachers: K–12 teachers' needs for artificial intelligence's complementary role in personalized learning," *Journal of Research on Technology in Education*, vol. 57, no. 4, pp. 876–893, 2024. https://doi.org/10.1080/15391523.2024.2330525

[10] H. Abubakar, and H. B. Muhammed, "A systematic literature review on teaching teachers pedagogy through YouTube video technology," *Journal of Digital Educational Technology*, vol 3, no. 1, pp. 1–11, 2023. https://doi.org/10.30935/jdet/12839

[11] S. Connor, K. Edvardsson, C. Fisher, and E. Spelten. "Perceptions and interpretation of contemporary masculinities in western culture: A systematic review," *American Journal of Men's Health*, vol. 15, no. 6, 2021. https://doi.org/10.1177/15579883211061009

[12] J-C. Hong, M-L. Chen, and J-H. Ye. "Acceptance of YouTube applied to dance learning," *International Journal of Information and Education Technology*, vol. 10, no. 1, pp. 7–13, 2020. https://doi.org/10.18178/ijiet.2020.10.1.1331

[13] S. Maghaydah, M. Al-Emran, P. Maheshwari, and M. A. Al-Sharafi, "Factors affecting metaverse adoption in education: A systematic review, adoption framework, and future research agenda," *Heliyon*, vol. 10, no. 7, pp. 1–17, 2023. https://doi.org/10.1016/j.heliyon.2024.e28602

[14] J. Douglah, "Use the mirror now"—Demonstrating through a mirror in show dance classes," *Multimodal Communication*, vol. 9, no. 2, pp. 1–32, 2020. https://doi.org/10.1515/mc-2020-0002

[15] H. Miko, R. Frizen, and C. Steinberg, "Using AI-based feedback in dance education—A literature review," *Research in Dance Education*, pp. 1–25, 2025. https://doi.org/10.1080/14647893.2025.2524160

[16] A. Zardi, E. G. Carlotti, A. Pontremoli, and R. Morese, "Dancing in your head: An interdisciplinary review," *Frontiers in Psychology*, vol. 12, pp. 1–14, 2021. https://doi.org/10.3389/fpsyg.2021.649121

[17] N. Jane Patel, "Exploring the implications of the metaverse: opportunities and challenges for dance movement therapy," *Body, Movement and Dance in Psychotherapy*, vol 19, no. 4, pp. 340–351, 2024. https://doi.org/10.1080/17432979.2024.2306581

[18] W. Liu, H. Xue, and Z. Y. Wang, "A systematic comparison of intercultural and indigenous cultural dance education from a global perspective (2010–2024)," *Frontiers in Psychology*, no. 15, pp. 1–18, 2024. https://doi.org/10.3389/fpsyg.2024.1493457

[19] A. Dania, D. Hatziharistos, M. Koutsouba, and V. Tyrovola, "The use of technology in movement and dance education: Recent practices and future perspectives," *Procedia-Social and Behavioral Sciences*, vol. 15, pp. 3355–3361, 2011. https://doi.org/10.1016/j.sbspro.2011.04.299

[20] M. A. R. Encalada and S. M. A. Sarmiento, "Perceptions about self-recording videos to develop EFL speaking skills in two Ecuadorian universities," *Journal of Language Teaching and Research*, vol. 10, no. 1, pp. 60–67, 2019. https://doi.org/10.17507/jltr.1001.07

[21] L. Yang. "The Evolution of ballet pedagogy : A study of traditional and contemporary approaches," *Journal of Literature and Arts Research*, vol. 2, no. 2, pp. 1–10, 2025. https://doi.org/10.71222/2nw5qw82

[22] Y. Qu, "Innovative research on the application of digital dance imaging technology in dance presentation," *Frontiers in Art Research*, vol. 5, no. 15, pp. 26–33, 2023. https://doi.org/10.25236/far.2023.051505

[23] H. Rui, L. Zhang, and Y. Li, "Transforming dance education in China: enhancing sustainable development and cultural preservation," *Research in Dance Education*, pp. 1–29. 2025. https://doi.org/10.1080/14647893.2025.2524151

[24] R. Piitulainen, P. Hämäläinen, and E. D. Mekler, "Vibing together: Dance experiences in social virtual reality," in *Proc. Conference on Human Factors in Computing Systems*, 2022. https://doi.org/10.1145/3491102.3501828

[25] M. Trajkova, D. Long, M. Desphande, A. Knowlton, and B. Magerko, "Exploring collaborative movement improvisation towards the design of LuminAI—A co-creative AI dance partner," in *Proc. Conference on Human Factors in Computing Systems*, 2024. https://doi.org/10.1145/3613904.3642677

[26] Y. Xiu, X. Liu, Y. Yuan, H. Zhao, and C. Zhang, "A new method of dance rhythm training based on an immersive cave automatic virtual environment," *IEEE Access*, vol. 11, pp. 109422–109434, 2023. https://doi.org/10.1109/ACCESS.2023.3317886

[27] S. Al Syaifullah, S. Arifin, and N. Muthohirin, "The role of surau godang in improving religious literacy: Study at the minangkabau community in west sumatra," *Progresiva: Jurnal Pemikiran Dan Pendidikan Islam*, vol. 13, no. 2, pp. 231–242, 2024. https://doi.org/10.22219/progresiva.v13i02.33783

[28] F. Astuti, "The essence of siganjua lalai values in dance movements of minangkabau women," *Harmonia: Journal of Arts Research and Education*, vol. 19, no. 1, pp. 37–47. 2019. https://doi.org/10.15294/harmonia.v19i1.23622

[29] K. Humphreys and S. Kimbrell, "Best instructional practices for developing student choreographers," *Journal of Dance Education*, vol. 13, no. 3, pp. 84–91, 2013. https://doi.org/10.1080/15290824.2013.812790

[30] F. Astuti, "The transformation of sumbang duo baleh values for minangkabau women dancers (based on local culture)," International in *Proc. Conference on Art and Design Education (ICADE)*, 2018, pp. 114–118. https://doi.org/10.2991/icade-18.2019.26

[31] J. C. P. Chan, H. Leung, J. K. T. Tang, and T. Komura, "A virtual reality dance training system using motion capture technology," *IEEE Transactions on Learning Technologies*, vol. 4, no. 2, pp. 187–195, 2011. https://doi.org/10.1109/TLT.2010.27

[32] C. L. C. Simon, J. T. Pinlac, W. A. Regala, R. D. Dela Peña, J. C. G. Tolentino, and L. P. Soriano, "Enhancing filipino senior high school students' conceptual understanding of Philippine folk dance using the iSAYAW web application," *International Journal of Multidisciplinary: Applied Business and Education Research*, vol. 5, no. 8, pp. 3247–3271, 2024. https://doi.org/10.11594/ijmaber.05.08.25

[33] K. Dearbon and R. Ross, "Dance learning and the mirror: Comparison study of dance phrase learning with and without mirrors," *Journal of Dance Education*, vol. 6, no. 4, pp. 109–115, 2006. https://doi.org/10.1080/15290824.2006.10387323

[34] H. Flavian, "Towards teaching and beyond: Strengthening education by understanding students' self-awareness development." *Power and Education*, vol. 8, no. 1, pp. 88–100, 2016. https://doi.org/10.1177/1757743815624118

[35] S. Y. S. Baagbah and M. Ganapathy, "The effect of mirroring approach with visual feedback on pronunciation improvement perception: Mediating role of intrinsic motivation and cognitive engagement," *Cogent Education*, vol. 12, no. 1, pp. 1–20, 2025. https://doi.org/10.1080/2331186X.2025.2530784

[36] B. A. Capristo, "Dance and the use of technology," Master thesis, The University of Akron, 2012.

[37] E. J. Jung and S. Lee, "The combined effects of relationship conflict and the relational self on creativity," *Organizational Behavior and Human Decision Processes*, vol. 130, pp. 44–57, 2015. https://doi.org/10.1016/j.obhdp.2015.06.006

[38] A. Leijen, I. Lam, L. Wildschut, P. R-J. Simons, and W Admiraal, "Streaming video to enhance students' reflection in dance education," *Computers & Education*, vol. 52, no. 1, pp. 169–176, 2009. https://doi.org/10.1016/j.compedu.2008.07.010

[39] Z. C. Özkan, "Examining the relationships between media literacy, technology integration skills and STEM applications self-efficacy perception via structural equation model: A study on visual arts teacher candidates," *International Journal of Modern Education Studies*, vol. 8, no. 1, pp. 72–90, 2024. https://doi.org/10.51383/ijonmes.2024.364

[40] A. T. Carceller, "The ARTificial revolution: Challenges for redefining art education," *Digital Education Review*, vol. 45, pp. 84–90, 2024. https://doi.org/10.1344/der.2024.45.84-90

[41] M. Verbitskaya, A. Kourova, and I. Pidberejna, "Developing cross-cultural competence and media literacy through multi-modal instruction and projects," *Journal of Educational Research and Practice*, vol. 15, no. 1, pp. 1–12, 2025. https://doi.org/10.5590/jerap.2025.15.2024

[42] R. K. Hansen, E. Jochum, D. Egholm, M. Villumsen, and R. P. Hirata, "Moving together-benefits of an online dance program on physical and mental health for older women: An exploratory mixed-method study," *BMC Geriatrics*, vol. 24, no. 1, pp. 1–17, 2024. https://doi.org/10.1186/s12877-024-04983-6

[43] Z. Simopoulou, A. Willis, and L. Georgiadou, "'Things on your doorstep you don't even think about': Thinking intercultural engagement with psychodynamic theory," *Frontiers: The Interdisciplinary Journal of Study Abroad*, vol. 34, no. 2, pp. 302–322, 2022. https://doi.org/10.36366/frontiers.v34i2.742

[44] M. Li, "Breaking boundaries: Enhancing dance learning through virtual reality innovation," *Education and Information Technologies*, vol. 30, no. 2, pp. 1607–1634, 2025. https://doi.org/10.1007/s10639-024-12834-5


Copyright © 2026 by the authors. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (CC BY 4.0).