Humanities and Social Sciences Letters
2025 Vol. 13, No. 3, pp. 891-903
ISSN(e): 2312-4318
ISSN(p): 2312-5659
DOI: 10.18488/73.v13i3.4316

The effect of improvisation and performance on engagement and creativity among music performance students: A quasi-experimental study

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Article History
Received: 22 January 2025
Revised: 1 July 2025
Accepted: 14 July 2025
Published: 23 July 2025

Keywords
Creativity
Engagement
Improvisation and performance.

ABSTRACT

This study investigates the role of improvisation and performance on the engagement and creativity of college students majoring in music performance. A quasi-experimental design involved 110 music performance students from Huaihua University in Hunan Province. The participants were divided into an experimental group which engaged in improvisation and performance-based interventions and a control group that followed traditional music training methods. Data were collected using an adapted version of the engagement and creativity scales. SPSS 28 was utilized for statistical analysis. The results revealed that the experimental group showed significantly higher levels of engagement (behavioral, emotional, and cognitive engagement) and creativity (fluency, originality, and flexibility) after the intervention with post-test scores higher than pre-test scores in the control group. These findings underscore the effectiveness of improvisation and performance in enhancing student engagement and creativity. The study supports the practical applicability of constructivist learning theory and multiple intelligences theory in creative pedagogy. This research provides empirical evidence for incorporating creative pedagogical approaches in music education and offers valuable insights for future educational reforms.

Contribution/Originality: This study enriches the empirical research literature on the impact of improvisation and performance on engagement and creativity in music performance education. It also provides theoretical support and a practical basis for innovative teaching methods in music education. The study is of great interest to policymakers and for further research.

1. INTRODUCTION

The traditional teacher-centered teaching model has gradually given way to a student-centered teaching method with the continuous development of educational concepts. In music education, especially music performance, students' engagement and creativity are essential to improving learning outcomes (Yu, Gao, & Wang, 2021). In recent years, scholars have paid attention to the engagement and creativity of music students. For example, McNealy (2013) pointed out that the integration of interdisciplinary subjects, especially the integration of music, art, and science significantly improved students' creativity and learning interests. Burnard and Dragovic

(2015) believe collaborative creation can promote students' active engagement in music creation and enhance their mental health and well-being. Game co-creation can greatly enhance young music students' engagement and creativity (Jimenez, 2018). Flipped classrooms shift traditional classroom teaching to self-study and interactive learning. This approach allows students to explore innovative elements of music during independent learning, enhancing their creative expression and learning motivation (Ng, Ng, & Chu, 2022). Jimenez and Dubé (2022) verified the role of teaching interaction in promoting students' learning engagement and creativity by exploring the co-creation of music-learning games. Chen (2025) further pointed out that AI tools can enhance students' creativity, enthusiasm and motivation in learning, especially in music creation and self-learning. However, the influence of performance and improvisation on college students' creativity and involvement, particularly in music performance, has not received much attention.

Improvisation and performance have gradually attracted the attention of scholars and teachers in recent years. as a creative and interactive teaching method in music education. It can break the fixed framework compared with traditional skill training and theoretical learning. Meanwhile, it allows students to express their creativity in practice and receive instant feedback, stimulating their motivation to participate and enthusiasm for learning. This approach improves students' musical expression and enhances their confidence in their learning ability. However, there is still a lack of systematic empirical research on its specific impact on students' engagement and creativity, especially among music performance students although many music teachers recognize the potential of improvisation and performance.

Therefore, this study investigates the effect of improvisation and performance methods on the engagement and creativity of students majoring in music performance based on constructivist learning theory and multiple intelligence theory. Through a quasi-experimental design, this study compares the differences in engagement and creativity between the experimental group (improvisation and performance) and the control group (traditional teaching group), thereby providing a practical basis for innovation in music education. The following research questions are answered:

1. What are the levels of engagement and creativity among music performance students?
2. Is there a significant difference in the engagement and creativity of the two groups of students?
3. Is there a significant difference in the engagement and creativity of students in the experimental group before and after the experiment?

This study enriches the empirical research literature on the impact of improvisation and performance on engagement and creativity in music performance education. It also provides theoretical support and a practical basis for innovative teaching methods in music education. Through this research, we hope to provide valuable theoretical and practical references for enhancing students' engagement and creativity in music performance.

2. LITERATURE REVIEW

Engagement and creativity profoundly impact students (Derakhshan, Greenier, & Fathi, 2023). Engagement refers to the degree of students' enthusiasm and involvement in learning activities. It can improve academic performance, enhance learning motivation, and improve problem-solving skills (Benjamin, 2024; Huang, Silitonga, & Wu, 2022). Creativity helps students develop novel solutions to problems, enhance self-confidence, and improve adaptability (Schiavio, Biasutti, & Antonini Philippe, 2021). Previous scholars have explored enhancing students' engagement and creativity in music learning through different teaching methods and strategies. For example, Chen (2025) found that AI tools can improve students' creativity and promote their learning engagement and motivation. Jimenez and Dubé (2022) proposed that teachers can effectively promote students' learning engagement by co-creating music learning games. Beirnes (2022) studied the impact of student-centered teaching methods on students' engagement in virtual wind instrument courses. Edward, Asirvatham, and Johar (2019) found that blended learning methods significantly enhanced classroom participation of high school students. Symmetrical peer-

assisted learning structures can significantly improve students' learning participation and music achievement in the context of peer-assisted learning (Johnson, 2017).

In the context of creativity, Cuadrado (2019) explored the impact of different music curriculum designs on elementary school students' creativity through quasi-experimental action research. The study found that more interactive curriculum designs can significantly improve students' creative expression and music achievement. The integration of music education promotes the creativity of junior high school students and improves their innovative performance in mathematics learning (Dang, Thi Bui, & Nhan, 2023). McNealy (2013) further proposed that interdisciplinary integration has significantly improved students' creativity and learning interests, especially music, art, and science integration.

Furthermore, Felsman, Gunawardena, and Seifert (2020) stated that improvisation stimulates higher levels of creativity by triggering co-creation and collision of ideas. The application of improvisation in primary school art education can effectively promote divergent thinking and creativity showing the great potential of art education in improving students' innovative ability (Sowden, Clements, Redlich, & Lewis, 2015). Besides, interactive and collaborative improvisation helps to enhance participants' creative performance and thinking expansion (Leach & Stevens, 2020).

The study found that most existing studies focus on primary and secondary school students, especially the application of music education in basic education. However, college students majoring in music face different challenges and needs in improving engagement and creativity. For example, college students often have a specific musical foundation and in-depth research is still lacking in further stimulating engagement and creativity. In addition, current research focuses on project-based, blended, and peer-assisted learning which have shown positive effects in improving students' creativity and engagement. However, improvisation and performance have not received enough attention in music education as highly creative and interactive.

3. RESEARCH METHODOLOGY

3.1. Research Design

A quasi-experimental design was used to explore the effect of improvisation and performance on the engagement and creativity of students majoring in music performance. A quasi-experimental design is a non-randomized experimental design usually used when a completely random assignment cannot be performed. It can be implemented in a real teaching environment while ensuring high internal validity (Shadish, Clark, & Steiner, 2008). This study selected two groups for comparative analysis to verify whether the intervention of improvisation and performance can effectively improve students' engagement and creativity considering that the research subjects are students majoring in music performance.

In this study, improvisation and performance are designed based on constructivist learning theory and multiple intelligence theory. Under the guidance of constructivist theory, the course emphasizes that students actively construct knowledge in actual creation and performance and improve engagement through practice and interaction. The theory of multiple intelligences helps the course design to fully mobilize students' musical intelligence, body movement intelligence, and interpersonal intelligence as well as promote their ability development in many aspects.

3.2. Research Population and Sample

The research population comprises college students majoring in music performance at Huaihua University and Xiangnan University in Hunan Province. The purposeful sampling method selected sophomores majoring in music performance from school of music at Huaihua University and Xiangnan University as the research sample. According to the calculation of G*Power software (Peng, Long, & Abaci, 2012), the minimum sample size required for the study is 102 people to ensure the statistical power of data analysis. A random sampling method guarantees sample variety while mitigating potential bias factors, enhancing the research findings' external validity and

generalizability (Ferguson, 2004). All students in the chosen classes possess a one-year foundation in music performance. Table 1 presents information regarding the students involved in the experiment.

Table 1. Demographic information of respondents (n=110).

Characteristics	N		%	
Group	Experimental	Control	Experimental	Control
Gender				
Male	15	18	27.3%	32.7%
Female	40	37	72.7%	67.3%
Total	55	55	100.0%	100.0%
Age				
≤18	1	0	1.8%	0.0%
18-20	50	51	90.9%	92.7%
≥21	4	4	7.3%	7.3%
Total	55	55	100.0%	100.0%

Table 1 shows that there were 27.3% males (n=15) and 72.7% females (n=40) in the experimental group and 32.7% males (n=18) and 67.3% females (n=37) in the control group. 90.9% (n=50) of the experimental group and 92.7% (n=51) of the control group were between the ages of 18 and 20, making up the majority of participants in both groups. In the experimental group, 1.8% of respondents were under 18 while none were in the control group. Similarly, 7.3% (n=4) of participants in both groups were older than 21. These demographic traits guarantee comparability for additional statistical analysis by showing a balanced representation of individuals in both groups.

3.3. Research Instruments

The engagement scale derived from the frameworks of Hasanov, Antoniou, Suleymanov, and Garayev (2021) and Min and Foon (2019) was utilized to evaluate students' engagement in the learning process. The scale consists of the following three dimensions: behavioral engagement, emotional engagement, and cognitive engagement with each component including six items. Behavioral engagement was evaluated based on the degree to which students actively participate in learning activities and meet academic obligations. An example of item is "I engage actively in classroom discussions." Emotional engagement encompasses students' affective reactions to the learning experience, including curiosity, enjoyment, and a sense of belonging. Examples include: "I enjoy engaging with my peers and teacher during the lessons." Cognitive engagement assesses the extent of mental effort and deliberation students apply to their learning, including problem-solving and self-directed learning activities. For instance, "I pursue supplementary resources to enhance my comprehension of the course content."

The creativity scale measures students' creativity in learning activities. The adaptation is based on the works of Cotter, Ivcevic, and Moeller (2020) and Handayani, Rahayu, and Agustini (2021) with items suitably modified to align with the context of this study. The scale comprises the following three dimensions: fluency, originality, and flexibility, each containing five items. Fluency assesses students' capacity to produce a substantial volume of ideas or solutions within a limited timeframe, highlighting the importance of quantity in output. Example item is as follows: "I can quickly come up with multiple solutions to a problem." Originality indicates students' capacity to produce novel and distinct ideas, emphasizing the innovation of solutions. For instance, "I can generate original ideas that others have not previously considered." Flexibility evaluates students' capacity to approach problems from various perspectives and modify strategies accordingly, demonstrating the diversity and adaptability of thought processes. Example item include "I effectively employ diverse strategies to attain my objectives."

The scale uses a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The pilot-tested results show that Cronbach's alpha values for the engagement and creativity scale were above 0.80, indicating good reliability and stability (Mohamad, Sulaiman, Sern, & Salleh, 2015).

3.4. Data Collection and Analysis

The pre-test assessed students' engagement and creativity before the intervention while the post-test assessed their engagement and creativity afterwards. Data was collected using adapted engagement and creativity scales. All participants completed online questionnaires (through Questionnaire Star) before and after the experiment.

Data was analyzed using SPSS 28. First, descriptive statistical analysis was performed on engagement and creativity, including the level and change trend of students in the two groups before and after the intervention. An independent sample t-test determined whether the intervention effect was significant (Yong & Soon, 2017). This analysis method helps verify the intervention's effects by comparing the mean differences between two independent groups. The experimental group's pre- and post-test changes were compared using a paired sample t-test (Yusop et al., 2015).

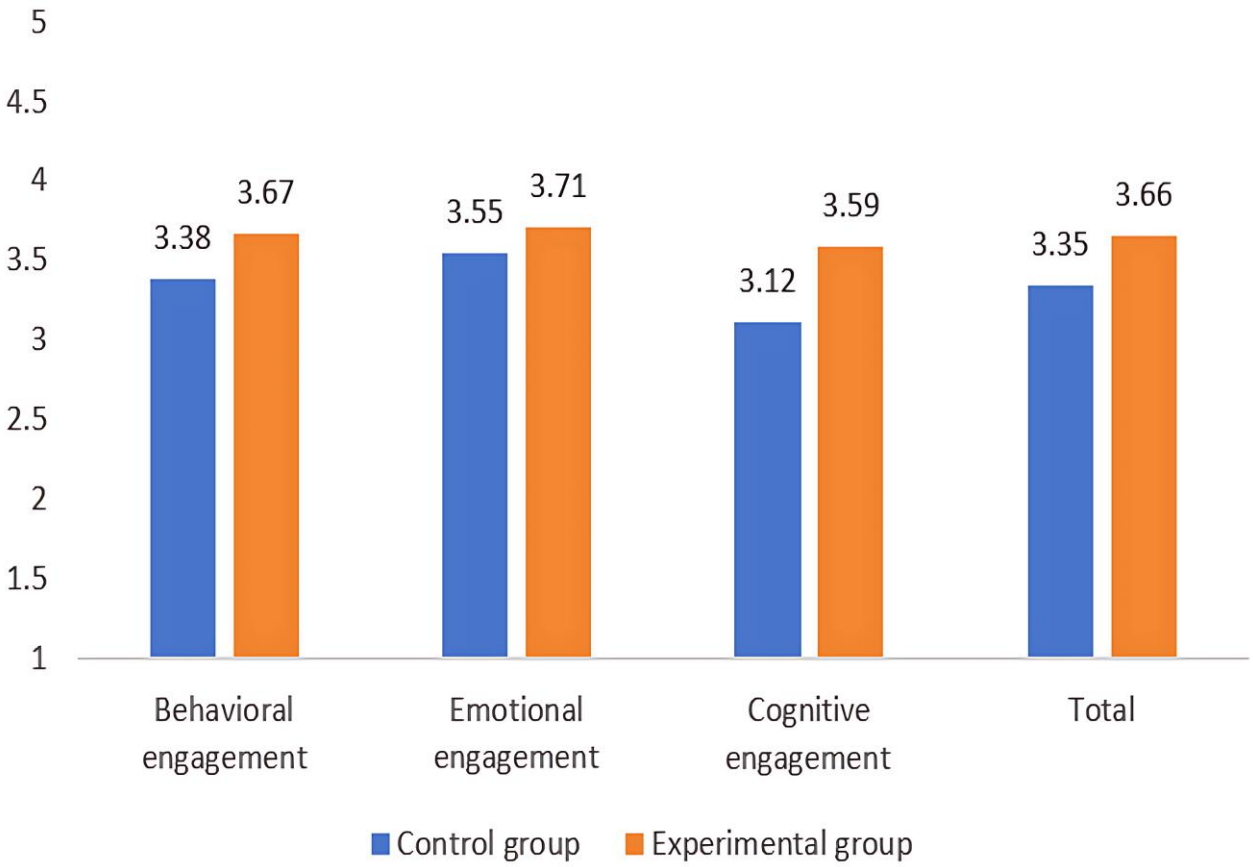

Figure 1. Engagement scores of the two groups after the experiment

4. RESULTS OF RESEARCH

The experimental group scored higher in behavioral engagement (3.67 vs. 3.38 for the control group) (see Figure 1). This group scored 3.71 for emotional engagement while the control group got 3.55. Cognitive engagement was higher in the experimental group (3.59 vs. 3.12). Experimental scores were higher than control scores of 3.35. The above figures show that experimental students outperformed control students in every measure.

The experimental group outperformed the control group in creativity fluency, originality, and flexibility (see Figure 2). The experimental group scored 3.85 on fluency. One group scored 3.73 for originality while the other scored 3.27. The experimental group scored 3.76 on flexibility while the control group scored 3.50. The experimental group scored 3.78 on creativity while the control group scored 3.46.

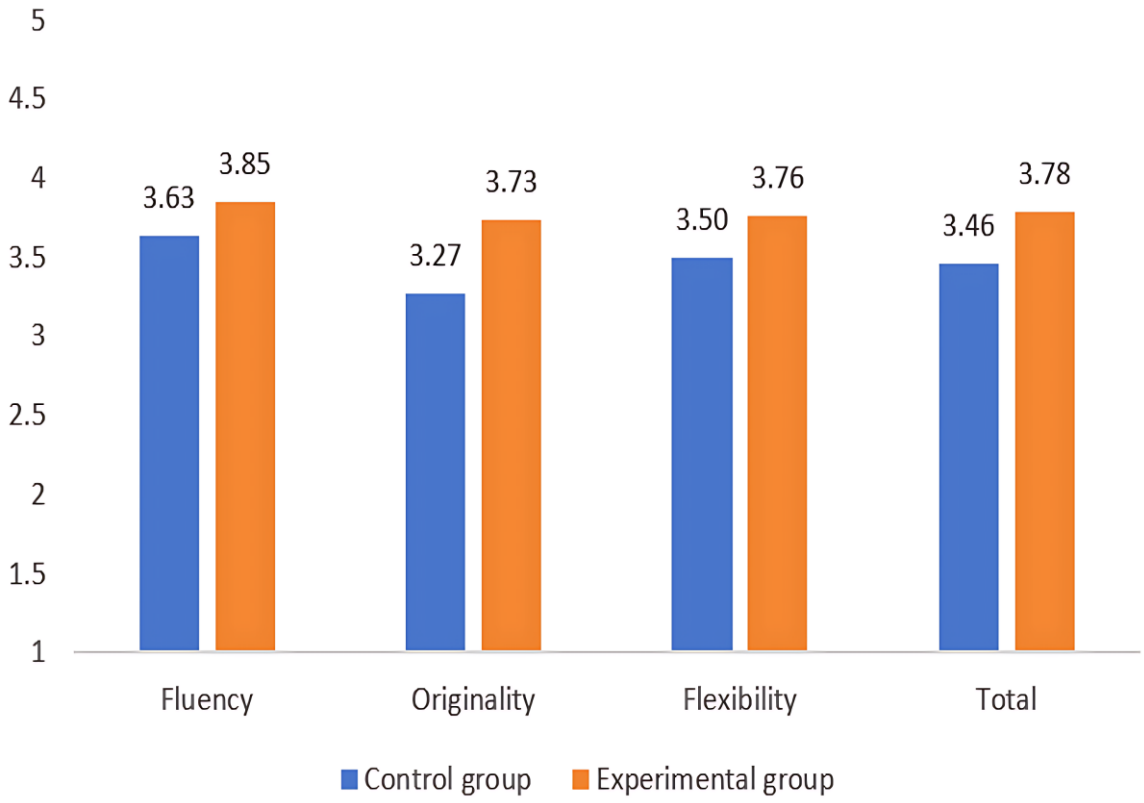

Figure 2. Creativity scores of the two groups after the experiment

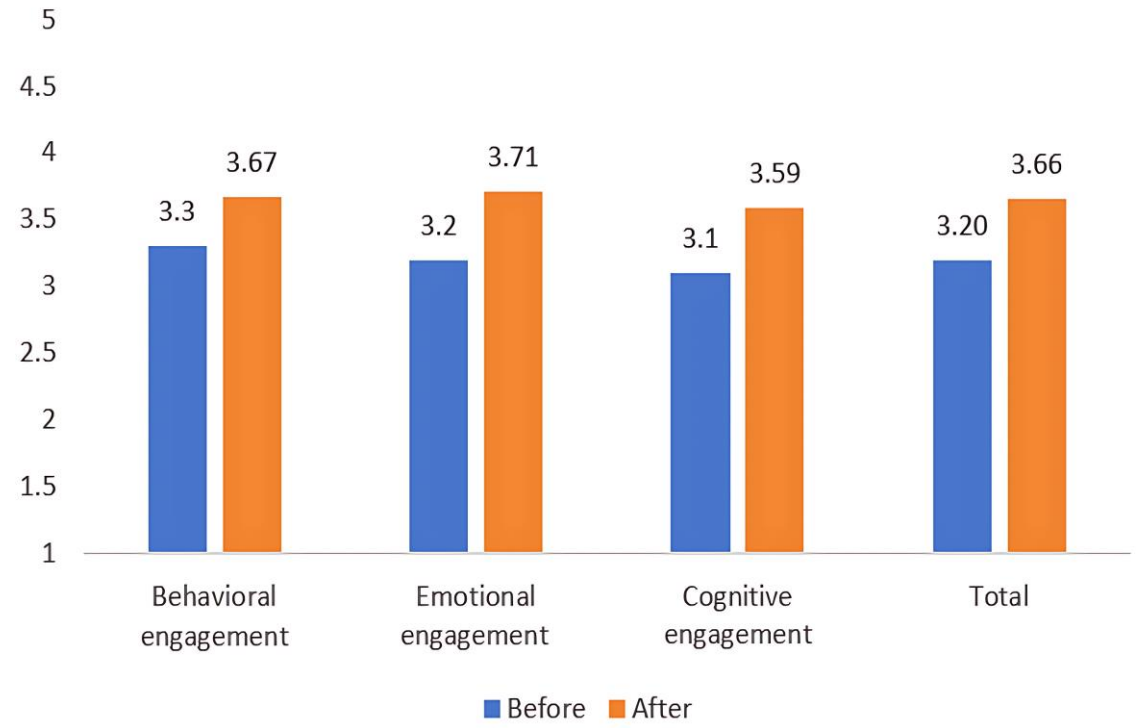

Figure 3. Engagement scores of the experimental group before and after the experiment

Figure 3 shows students' engagement in the experimental group has improved. The greatest improvement was in emotional engagement with the score increasing from 3.2 to 3.71 followed by cognitive engagement with the score rising from 3.1 to 3.59 and behavioral engagement with the score increasing from 3.3 to 3.67. Overall, it increased from 3.20 to 3.66.

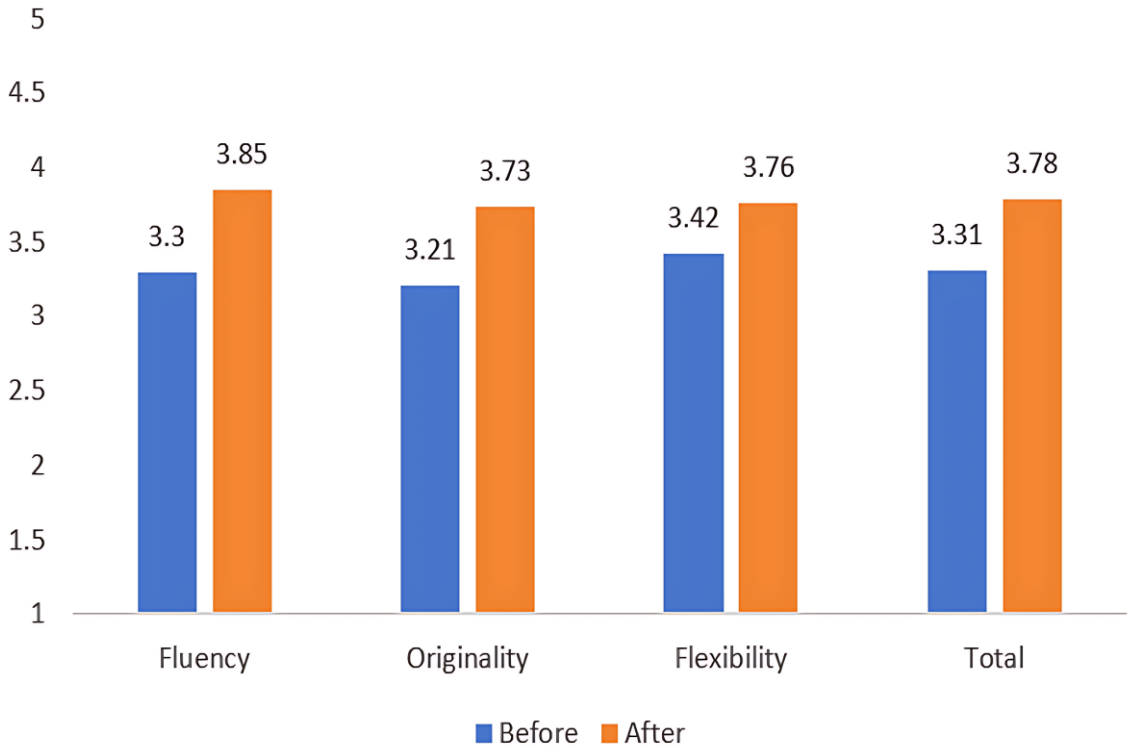

Figure 4. Creativity scores of the experimental group before and after the experiment

In the context of creativity (see Figure 4), fluency scores increased the most from 3.3 to 3.85 followed by originality scores from 3.21 to 3.73. Flexibility scores increased from 3.42 to 3.76 and the total score increased from 3.31 to 3.78 indicating that students' creativity levels improved significantly after the experiment.

Table 2. Independent t-test statistics of engagement differences between two groups

Dimensions	Control		Experimental		t	p
	Mean	SD	Mean	SD		
Engagement	3.35	0.69	3.66	0.54	-3.876	0.000***
Behavioral engagement	3.38	0.63	3.67	0.59	-2.372	0.019*
Emotional engagement	3.55	0.77	3.71	0.60	-1.335	0.184
Cognitive engagement	3.12	0.52	3.59	0.62	-3.617	0.000***

Note: *=0.1; ***=0.001.

Table 2 shows a significant difference in engagement between the two groups. A significant difference exists between the two groups in behaviour engagement (p=0.019). In the same way, a significant difference exists between the two groups in how engaged they were in thinking. However, the difference was insignificant regarding emotional engagement. Therefore, the experimental strategy did not significantly impact people's emotional engagement.

Table 3. Independent t-test statistics of creativity differences between two groups.

Dimensions	Control		Experimental		t	p
	Mean	SD	Mean	SD		
Creativity	3.46	0.54	3.78	0.50	-3.596	0.000***
Fluency	3.63	0.57	3.85	0.53	-2.336	0.021*
Originality	3.27	0.61	3.73	0.57	-4.594	0.000***
Flexibility	3.50	0.52	3.76	0.66	-2.336	0.021*

Note: *=0.1; ***=0.001.

As presented in Table 3, the difference was statistically significant in creativity. The two groups also significantly differed in fluency, originality, and flexibility. This shows that the experimental intervention made students much more creative.

Table 4. Paired t-test statistics of engagement differences of the experimental group

Dimensions	Before		After		t	p
	Mean	SD	Mean	SD		
Engagement	3.20	0.57	3.66	0.54	-5.303	0.000***
Behavioral engagement	3.30	0.78	3.67	0.59	-2.886	0.005**
Emotional engagement	3.20	0.63	3.71	0.6	-4.203	0.000***
Cognitive engagement	3.10	0.75	3.59	0.62	-4.113	0.000***

Note: **=0.05; ***=0.001.

The experimental intervention significantly improved students' performance in engagement by comparing the experimental group before and after each dimension of engagement (see Table 4). The differences in all dimensions were significant. These results show that the experimental intervention significantly enhanced students' engagement , especially in terms of emotional and cognitive engagement.

Table 5. Paired t-test statistics of creativity differences of the experimental group

Dimensions	Before		Experimental		t	p
	Mean	SD	Mean	SD		
Creativity	3.30	0.52	3.78	0.50	-5.512	0.000***
Fluency	3.30	0.78	3.85	0.53	-4.885	0.021**
Originality	3.21	0.72	3.73	0.57	-4.68	0.000***
Flexibility	3.42	0.76	3.76	0.66	-2.816	0.006**

Note: **=0.05; ***=0.001.

Based on Table 5, after the experiment, the creativity, fluency, originality, and flexibility scores were significantly higher than before, and the differences in all dimensions were statistically significant. In particular, the improvement effect was particularly significant in the dimensions of creativity and originality. These results show that the experimental intervention significantly promotes students' creativity and can effectively improve students' performance in creativity.

5. DISCUSSION

The experimental results show that after the experiment, the engagement of the experimental group was significantly higher than that of the control group and higher than before the experiment. This conclusion shows that the teaching method of improvisation and performance significantly improves students' engagement. Prior scholars state that improvisation and performance can improve people's engagement. For example, West, Hoff, and Carlsson (2017) found that improvisational theater can enhance team creativity and engagement in professional environments. Improvisers show higher personal engagement and better group engagement (Schwenke et al., 2024). Walton et al. (2018) pointed out that musical improvisation strengthens social relationships between participants and improves overall engagement. In this study, the experimental group participated in the learning process through improvisation and performance activities, applied knowledge and skills in practice, increased the sense of context and engagement in learning, and thus improved their engagement.

Constructivism supports that learning is an active process and students construct their knowledge through interaction with others and reflection (Saleem, Kausar, & Deeba, 2021; Suhendi, Purwarno, & Chairani, 2021). In improvisation and performance activities, students can construct their understanding of music through practical operations and enhance their sense of involvement in learning through interaction and feedback with others. Instant feedback from teachers and classmates also prompts students to reflect and continuously improve their

performance, further enhancing their sense of engagement in learning. Additionally, the theory of multiple intelligences emphasizes that students have cognitive intelligence and other intelligences such as musical intelligence, physical movement intelligence, and interpersonal intelligence (Alhamuddin et al., 2023; Zhang & Gang, 2024). Improvisation and performance can stimulate students' multi-dimensional intelligence, especially musical and physical movement intelligence. Through this diversified learning method, students also get better engagement and performance at the emotional and behavioral levels, thereby improving learning engagement.

The experimental group demonstrated significantly higher creativity scores compared to the control group. Additionally, the creativity scores of the experimental group, encompassing the dimensions of fluency, originality, and flexibility showed significant improvement post-experiment relative to pre-experiment scores. The instruction of improvisation and performance enhances students' creativity. Research indicates that creative teaching activities, particularly those necessitating independent creation and student performance can effectively improve student creativity (Leach & Stevens, 2020). Felsman et al. (2020) asserted that improvisation enhances creativity by facilitating co-creation and the collision of ideas. Creative tasks of a similar nature can improve divergent thinking and creativity in elementary school students, promoting the generation of more novel and unique ideas (Sowden et al., 2015). West et al. (2017) demonstrated that creating improvisational drama significantly enhances team creativity and engagement, particularly within task-oriented creative processes, fostering interaction and innovation among team members. This study's improvisation and performance activities offer students a challenging and creative learning environment that stimulates innovative thinking in music creation and performance.

Improvisation and performance offer students authentic learning experiences, prompting them to actively develop new knowledge and solutions in response to open-ended tasks. Students can enhance their creativity by engaging in continuous reflection and experimentation facilitated by peer interaction and teacher guidance. Constructivism highlights the importance of autonomy and collaboration in learning (Mishra, 2023) which are essential for fostering creativity as they allow students greater freedom to explore and express their creative abilities in their work. Improvisation and performance enhance students' capabilities across various intelligences, particularly in musical and bodily-kinesthetic domains. In the creative process, students must employ their musical abilities alongside bodily-kinesthetic and interpersonal intelligence to effectively collaborate with peers. This comprehensive intelligent engagement fosters students' innovative thinking and distinct performance (Akgün & Keskin, 2021; Frith et al., 2021). Students explore various modes of expression and cultivate a unique artistic style during the creative process, thus fostering creativity.

6. CONCLUSION

This study explored the effects of improvisation and performance on the engagement and creativity of college students majoring in music performance. The results showed that experimental group students were significantly higher than those in the control group and higher than before the intervention. All differences were statistically significant. The results support that improvisation and performance can significantly improve students' engagement and creativity as an effective teaching intervention. In addition, this study enriches the literature on how improvisation and performance can improve students' engagement and creativity in music performance.

6.1. Theoretical Implications

This study offers empirical evidence for implementing improvisation and performance in music education, particularly enhancing student engagement and creativity. The study demonstrates that improvisation and performance can boost students' behavioral engagement while simultaneously stimulating their emotional and cognitive engagement, therefore improving total engagement. The analysis indicates the potential of improvisation

and performance in fostering students' inventive thinking and adaptability, thus enhancing the comprehension of creativity development in education.

6.2. Practical Implication

The following teaching practice inspirations are obtained based on the above research results:

6.2.1. Incorporate Improvisational and Performance-Based Activities

Teachers can develop a sequence of improvisational activities pertinent to the curriculum, including improvisation and performance in classroom instruction. For instance, teachers may encourage students to improvise alongside traditional repertoire study in music performance education. In every class, educators can foster innovation and self-expression among students by directing them to improvise based on particular topics or feelings. Establishing collaborative tasks enables students to create collectively and improves classroom interaction.

6.2.2. Customized Instructional Design for Diverse Intelligences

According to the theory of multiple intelligences, teachers can create tailored learning activities that align with students' interests and strengths. Students exhibiting exceptional musical intelligence may be encouraged to develop more intricate improvisations. In contrast, those with pronounced physical movement intelligence can be guided to enhance the emotional conveyance of music through bodily expression. Teachers can develop varied creative and performance assignments tailored to the distinct intelligence types of pupils, enabling each individual to optimize their potential in their respective domains.

6.2.3. Motivate Students to Engage in Individual Creation and Practice Beyond the Classroom

Teachers can motivate students to engage in independent creation and practice outside the classroom to enhance their autonomous learning capabilities. Teachers may designate specific creative or performance assignments, necessitating students rehearse outside class and exhibit their creative outcomes during class sessions. To enhance students' self-efficacy, teachers can offer consistent, individualized advice to assist students in identifying issues and implementing improvements throughout the creative process. Furthermore, a feedback system that integrates both in-class and external evaluations should be implemented to motivate students to assess and discuss one another's work, thus enhancing their inspiration and facilitating development in autonomous learning.

6.2.4. Facilitate Collaborative Design Group Activities and Collective Exhibitions

Teachers can foster engagement and collaboration among students via cooperative group activities. Collaborative efforts among students can boost their social intelligence and foster teamwork skills. For instance, teachers can organize students to improvise and perform collaboratively, presenting their work to peers in the classroom. Teachers can offer targeted feedback to assist students in reflecting on and enhancing their work during collaborative discussions. Furthermore, arranging minor extracurricular music performances or artistic exhibitions can boost students' stage presence while fostering their creative thinking and cooperative attitude.

7. LIMITATIONS AND SUGGESTIONS

Limited to samples from a single region, future research can expand the sample range to cover students from different areas and professional backgrounds. The intervention period of this study was 10 weeks, which may not be enough to observe the effects of improvisation and performance on students' long-term engagement and creativity. Future research can extend the intervention time and conduct long-term follow-ups to evaluate the long-term impact of the intervention on students' creativity and engagement. This study mainly relies on self-rating scales to

measure students' engagement and creativity, which may have self-report bias. In the future, researchers can use more than one way to collect data, like interviews, observations, or behavioral data analysis, to make up for the flaws in self-rating scales and get more accurate and complete results.

Funding: This study received no specific financial support.
Institutional Review Board Statement: The Ethical Committee of the Universiti Sains Malaysia, Malaysia approved his study on 12 July 2023 (Ref. No. USM/JEPeM/PP/23020189).
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

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