

Fostering Musical Creativity with Digital Audio Workstations: An Action Research

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ABSTRACT

The development of digital technology, especially artificial intelligence (AI), has had a significant impact on education, including music learning. Digital Audio Workstations (DAWs) equipped with AI features offer opportunities to create more interactive and innovative learning. This study aims to explore the role of AI features in DAW as a creative learning medium in the extracurricular music of SMAN 8 Bandung, as well as provide new information on its impact on enhancing students' creativity. This study used a qualitative approach based on action research involving students participating in extracurricular music as research subjects. Data were collected through participatory observation, semi-structured interviews, and document analysis in the form of students' musical works. The data were analyzed using triangulation techniques to ensure the validity and reliability of the findings. The results showed that the use of AI features, such as automatic composition, sound processing, and harmony analysis, made it easier for students to understand musical concepts and encouraged them to create innovative works. In addition, the AI features helped students overcome technical obstacles, allowing them to focus more on the creative process. This results in increased student motivation and engagement in music learning. This study concludes that the integration of AI in DAW provides a great opportunity for educators to develop creative and relevant technology-based learning methods. As a recommendation, the implementation of this technology needs to be expanded and integrated with the curriculum to support learning in the digital era.

KEYWORDS

Artificial Intelligence
DAW
Creative Learning
Extracurricular Music
Educational
Technology

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INTRODUCTION

Advances in digital technology have had a significant impact on various fields of life, including education, which continues to adapt to meet the demands of the industrial era 4.0 (Yani, 2023). In music education, Digital Audio Workstation (DAW) has become one of the technologies that support the technology-based learning process (Andriyanto, 2020). DAW is software that can be used to record, edit, and produce music digitally, thus accelerating technological transformation in music learning (Nugroho, 2024). The presence of artificial intelligence (AI) in DAW opens up opportunities to create more innovative and interactive learning (Raharjo, 2023).

Various studies have discussed the utilization of technology in music learning. Andriyanto (2020) revealed that DAW technology can increase effectiveness and efficiency in the music learning process. Azis (2022) suggests that the AI feature in DAW can be utilized to facilitate the music production process. Meanwhile, Chrisanto et al., (2021) highlighted how DAW can improve students' skills and performance in music. However, although relevant, these studies have not specifically examined the impact of AI features in

DAWs on student creativity in formal education contexts, especially extracurricular music, which is a research gap to be explored further.

Creativity is an important element in music education (Yohanes Kristiawan, 2019). Musical creativity is a person's ability to create new songs, instruments or musical arrangements that have not been created before (Habsari, 2005: 85). Thus, creative learning in music requires an approach that can encourage students to think critically and produce original works (Hidayatullah, 2020). In this context, AI features in DAWs, such as automatic composition, sound processing, and harmony analysis, can serve as pedagogical tools that support technology-based learning (Pratiwi, 2020). The conceptual framework of this study is based on constructivist learning theory, where technology is used to facilitate students in constructing knowledge through exploration (Casfian et al. 2024). By utilizing AI features, students are not only facilitated in understanding complex musical concepts but also given space to develop innovative creative skills (Birtchnell, 2018).

The adoption of technology in education, especially in extracurricular music learning in schools, is still not optimal (Rumapea, 2019). At SMAN 8 Bandung, extracurricular band music has utilized DAW as a learning medium, but the specific impact of AI features in enhancing student creativity has not been explored in depth. This suggests a need to examine the role of AI features in DAW to help students overcome technical obstacles while encouraging their creativity in creating musical works. At SMAN 8 Bandung, members of extracurricular band music show great potential, but they still face challenges in accessing modern music production tools and understanding more complex production techniques. The use of a DAW equipped with AI features is appealing because it can bridge the gap between students' abilities and technological needs. In addition to providing technical convenience, this technology also provides opportunities for students to experience creative processes that are more relevant to the world of modern creative industries.

In this research, the focus is directed at exploring the role of AI features in DAW as a creative learning medium, especially in the context of extracurricular music at SMAN 8 Bandung. In addition, this research is expected to provide new insights into the impact of AI-based technology on student creativity as well as offer practical recommendations for educators to integrate technology in music learning.

METHOD

This research uses a qualitative approach with action research (AR) method to explore problems and find solutions (Creswell, 2014). This is in line with this research, which is to explore the role of artificial intelligence (AI) features in Digital Audio Workstation (DAW) as a creative learning medium in extracurricular band at SMAN 8 Bandung. The AR method was chosen because of its ability to bring innovations that fit specific conditions and needs (Darwis, 2017). The research site was located at SMAN 8 Bandung, involving 13 students in grades XI and XII who were active in extracurricular band, experienced using DAW, and had an interest in digital music technology, consisting of 10 male students and 3 female students. This research was conducted in stages starting with pre action, action and post action (Sugiyono, 2021). The stages followed the Kemmis and McTaggart model, which consists of four cyclical stages: planning, implementation, observation, and reflection (McNiff, 2013). Data were collected through participatory observation, semi-structured interviews, and document analysis of students' musical works (Pratchett, 1999). Data analysis was conducted by triangulation to ensure the validity and reliability of the findings, through data reduction, descriptive presentation, and conclusion drawing based on the main patterns (Engle, 2015).

RESULT AND DISCUSSION

Pre-Action: Initial Conditions and Data Before Intervention

This research began with a pre-action stage to map students' abilities or initial conditions in understanding and using Digital Audio Workstation (DAW) and assess their creativity in creating musical works. The software used in this study is Cubase 10.5, which was chosen because its features are easy to learn and adequate to support students' creative process (Silvia et al. 2022). In addition, this software is well known and has been partly used by students before, making the adaptation process easier. Pre-action data were collected through initial observations, semi-structured interviews, and document analysis of musical works before the intervention involving the use of Artificial Intelligence (AI) features in DAW.

The research participants consisted of 13 active extracurricular band students at SMAN 8 Bandung who were purposively selected based on their active involvement in extracurricular activities, interest in music technology, and initial experience in using a DAW. To assess the initial conditions related to students' ability to understand and use DAW, students were assigned to create a simple music arrangement using Cubase 10.5. This initial observation process was conducted over two meeting sessions to evaluate students' basic skills as well as the level of musical creativity before the intervention with AI features.

The results of the initial observation showed that most students faced obstacles in operating the basic DAW features. Out of 13 students, only 4 students had previous experience and were only able to access basic features such as recording audio, setting tempo, and trimming sound clips. Meanwhile, the other 9 students seemed to have difficulty in adjusting the tempo, harmony, and dynamics of the sound. Their digital music production process was still very limited and tended to rely on conventional instruments without utilizing more complex technology.

The results of document analysis show that students' musical works have repetitive melodic patterns, minimal exploration of harmony, and do not utilize sound effects. The resulting song structures also seem monotonous, with little variation in rhythm and harmony. Semi-structured interviews revealed that although students were interested in using digital music technology, they felt confused and not confident in operating a DAW. One student stated, "I am curious and want to learn to make music using DAW, but I am often confused by the many features in it." The extracurricular mentor also acknowledged that time constraints and lack of music technology training were the main obstacles in developing students' skills. The initial evaluation is presented in the following table.

Table 1. Pre-action Initial Observation Results

| Aspects Observed | Observation Findings | Score (1-5) |
|--------------------------------|--|-------------|
| Knowledge of DAW | 4 out of 13 students have used DAW, but only basic features. | 2 |
| Technical Skills in DAW | Majority of students Struggled with using advanced features of the DAW. | 2 |
| Musical Creativity | The works are still simple, repetitive, and lack harmonic variety. | 2 |
| Response to AI Features | Students were enthusiastic but felt less confident in exploring the AI features. | 3 |

Based on the table above, it can be seen that their technical skills in using DAW and their musical creativity are still in the low category. This result indicates that the students'

creativity level requires reinforcement with more innovative approaches for further development. These pre-action findings indicate that students have an interest in digital music technology, but their skills in operating the software and exploring the creative features are still very limited. Therefore, intervention through the utilization of AI features in DAW is expected to provide a solution to improve technical skills and expand students' creative exploration in arranging music.

Implementation of Action (Cycle 1): Introduction to DAW Features

The first cycle of this action research emphasized the introduction of Digital Audio Workstation (DAW) fundamentals and an initial exploration of its Artificial Intelligence (AI) features as creative tools in students' music-making processes. This phase was crucial in laying the foundation for digital music literacy and in fostering students' confidence to engage with music technology—particularly in applying AI to generate and arrange musical ideas.

The core objective of this stage was to build students' basic understanding of how to operate DAW software and, more importantly, to stimulate their creative thinking through digital experimentation. The pedagogical strategy was designed to be incremental, beginning with accessible technical skills and gradually progressing to more advanced explorations involving AI-powered tools. The intention was not merely to familiarize students with digital music software, but to encourage them to embrace technology as a partner in the creative process.

In the planning stage, the researcher developed a structured learning program grounded in prior diagnostic assessments of students' needs and abilities (Slam, 2021). The instructional materials included DAW menu navigation, introductory-level operations (e.g., audio input/output, basic editing), and an orientation to AI features such as Chord Track, Arranger Track, and VariAudio. These features were selected because of their potential to simplify complex musical concepts and allow students to focus more on creativity than technical hurdles. Supporting instruments such as observation sheets, semi-structured interview guides, and field notes were also prepared to document progress throughout the learning cycle.

Implementation was carried out over three interactive sessions. The first session introduced students to the user interface and fundamental tools within Cubase 10.5. With live demonstrations, students were guided through the processes of navigating menus, recording simple audio tracks, and performing basic sound editing. The goal was to remove any initial barriers to engagement with the software.

In the second session, the focus shifted to the AI components of Cubase. The researcher presented a theoretical overview followed by guided practice in using Chord Track (for automatic harmonic progression), Arranger Track (for structuring song components), and VariAudio (for pitch and melody manipulation). These tools enabled students to begin crafting more refined compositions without requiring extensive traditional music theory knowledge.

Finally, the third session was dedicated to creative application. Students were tasked with creating short musical arrangements using the AI tools they had learned. They explored rhythm, melody, harmony, and digital effects, thus engaging deeply in the creative process. This stage marked a critical shift from passive learning to active experimentation, encouraging students to take ownership of their musical expression through technology.



Figure 1. Introduction to DAWs and their features

Following the implementation of the first cycle, the observational data revealed notable progress in students' engagement and skill development in using Cubase 10.5, particularly with its integrated AI features. Students began to grasp and demonstrate basic technical competencies, including navigating the software interface, recording audio tracks, and executing simple editing tasks. These improvements indicated that the structured instructional approach had successfully laid a foundational understanding of DAW operation. However, despite these advancements, many students still encountered challenges when interacting with the more complex, AI-driven features of the software. Functions such as automatic harmonization, VariAudio manipulation, and the application of layered sound effects often required additional guidance. This highlighted the steep learning curve associated with translating abstract musical ideas into digital compositions using advanced tools.

Insights from semi-structured interviews further illuminated students' perceptions. A majority expressed excitement and increased motivation in exploring music production with the aid of AI. They recognized that these tools reduced reliance on manual instrumentation and allowed them to prototype musical ideas more efficiently. Several students also reported feeling more confident to experiment creatively after learning how the AI features could assist in structuring harmonies and melodic lines. Nonetheless, it was also evident that some students struggled to align their creative intentions with the AI functionalities. A few admitted that limited prior exposure to digital music production contributed to hesitation and slower adaptation. Additionally, the resulting musical outputs, while improved, remained relatively simple—suggesting that students were still in the early stages of mastering the creative integration of technology.

These findings emphasized the need for continued practice and structured scaffolding in subsequent learning cycles to deepen students' proficiency and musical expressiveness through AI-enhanced digital tools.

Table 2. Observation Notes of Action Implementation (Cycle 1)

| Aspect Observed | Observation Result | Caption | Score (1-5) |
|----------------------------------|--|--|-------------|
| Knowledge of DAW | 10 out of 13 students understood basic features such as navigation, recording, and simple editing. | Improvement compared to pre-action, still requires guidance on advanced features. | 3 |
| AI Feature Exploration | 7 out of 13 students were able to use the AI features for harmonization and sound effect settings. | Some students still have difficulty integrating AI with their creative ideas. | 3 |
| Creativity in Arrangement | The majority of the works feature a greater variety of rhythms and harmonies, but are basic in nature. | Musical exploration has increased although song structures tend to be simple and not fully original. | 3 |
| Student Self-Confidence | Most students feel more confident after trying out the AI features to support music arrangement. | Further practice is needed to improve adaptation and more complex explorations. | 4 |
| Response to DAW | Students show high interest and enthusiasm in exploring AI technology in DAWs.. | Motivation is increasing, but assistance is needed in using more complex features. | 4 |

Reflection of Action Implementation (Cycle 1)

Based on the results of the qualitative data analysis, the findings in cycle 1 showed gradual progress in the extracurricular band students both in terms of technical skills and musical creativity. Observations showed that students' skills in operating the DAW improved significantly, especially in basic aspects such as recording and editing. Interviews highlighted students' positive responses to the use of AI features which they found helpful, although some of them still found it difficult to maximize the features. The findings of Cycle 1 indicate that the implementation of AI technology in DAW successfully provided a new approach to creative music learning. However, the improvement of students' skills and creativity has not been maximized, especially in utilizing AI features to develop more complex and innovative compositions. Therefore, these findings became the basis for designing Cycle 2, which focused on strengthening technical skills, increasing creativity exploration, and intensive mentoring to help students utilize AI features more effectively in the music creation process.

Implementation of Action (Cycle 2): Application of AI DAW Features

The second cycle of the research focused on deepening the exploration of artificial intelligence (AI) features in Cubase 10.5 Digital Audio Workstation (DAW) to enhance students' creativity and technical skills in creating music. The main focus of this cycle was to help students master advanced features, such as automatic harmonization and sound effect settings that had been challenging in the first cycle. The process was designed to encourage

students to explore more complex and original musical ideas by utilizing AI technology as a creative tool.

The planning phase included the development of more structured learning materials with an emphasis on applying AI features for more complex audio arrangements and processing. Practice guides were developed to make it easier for students to integrate creative ideas with the automated features available in the DAW. In addition, practice sessions are designed to be more intensive with a combination of hands-on and independent practice. This material includes using the chord track feature to create automatic harmonies and audio variants to compose melodies and vocals with precision. With this approach, students are expected to master technical skills while enriching their creativity.

The implementation process began with a structured learning session that included a hands-on demonstration on how to use the AI features in the music arrangement process. Students were given a group assignment to arrange a song by utilizing AI features to add more complex variations of harmony, rhythm, and sound effects. Through this project students are encouraged to explore technology independently while developing more expressive and dynamic musical ideas. The teacher acts as a facilitator providing guidance and feedback throughout the process. Here is a picture of the implementation process.



Figure 2. Students' exploration process using AI DAW and music editing features

After the implementation process, the researcher recorded the observation results. Some aspects showed significant improvement in students' skills and creativity. Below is a table of observation results from the second cycle implementation.

Table 3. Observation Notes of Action Implementation (Cycle 2)

| Aspect Observed | Observation Result | Caption | Score (1-5) |
|---|--|---|-------------|
| Understanding Advanced DAW Features. | 11 out of 13 students were able to use advanced features such as automatic harmonization, sound effects, and audio vari. | Significant improvement in technical skills after additional guidance and training. | 4 |
| Exploration of Musical Creativity. | 9 out of 13 students began to experiment with a richer variety of harmonies, complex rhythms and sound effects. | The works are more varied and original compared to the first cycle. | 4 |
| AI Integration in Arrangement. | 8 out of 13 students were able to integrate AI features with creative ideas in a more structured and dynamic way. | Students' ability to utilize AI to develop compositions is improving. | 4 |
| Self-confidence and Independence. | The majority of students showed increased confidence and were able to work more independently in music exploration. | Less teacher support or assistance, showing progress in understanding and independent skills. | 4 |
| Motivation and Active Participation. | All students showed high enthusiasm in following the learning process and exploration of DAW features. | Active participation increased, showing consistent interest in music technology. | 5 |

From the table above, students began to master advanced features, such as chord track, audio vari, and sound effect settings, which enriched their musical arrangements. Observations also noted students' active engagement in exploring music technology and applying techniques independently. Interviews with students revealed that they felt more confident and motivated to create musical pieces. However, some students still faced challenges in aligning creative ideas with AI features. Analysis of the works showed increased complexity and more dynamic and varied musical structures. Students' works also showed stronger and more planned elements of creativity. In addition, some students began to work more independently with less assistance from the teacher, indicating improved technical skills and adaptation to AI features. Students' active participation and motivation remained high throughout the process, indicating that this technology-based approach is effective in encouraging students' musical exploration and creativity development. With intensive mentoring support and continuous practice, students are expected to continue developing their potential in creating innovative and quality musical works.

Reflection of Action Implementation (Cycle 2)

Based on the above observations, the reflection on this study showed an increase in students' technical skills and creativity compared to the first cycle. Students were able to operate advanced features, such as automatic harmonization, VariAudio, and sound effects, to enrich their musical arrangements. In addition, students' confidence and motivation in exploring new ideas increased, as seen from more complex and varied musical works. However, the reflection also revealed that some students still faced technical obstacles and

needed additional assistance, but generally succeeded in utilizing AI features to develop more varied and complex musical works. Reflection on this cycle confirmed that the use of AI-based technology does not only act as a technical tool, but also as a medium that can stimulate students' creativity and musical exploration. Thus, this reflection becomes the basis for designing more effective follow-up actions in developing students' creativity and skills in the future.

Post Action: Evaluation After Implementation and Reflection Cycle 1 and 2

After the implementation of actions and reflections in cycle 1 and cycle 2, there was a significant increase in students' technical skills and musical creativity in using Cubase 10.5 Digital Audio Workstation (DAW) with artificial intelligence (AI) features. From several stages of learning that have taken place, the evaluation results show an increase in skills in operating advanced features such as chord tracks, variaudio, and sound effects. In addition, students were also able to integrate AI technology in their music compositions better than the pre-action stage. These developments reflect that a technology-based approach can have a positive impact on students' mastery of skills.

In terms of creativity, students showed significant improvement in exploring harmony, rhythm patterns, and sound effect variations. The resulting compositions became more dynamic and structured compared to the initial results in the pre-action stage and the first cycle. This improvement can also be seen from the students' courage to experiment with various musical elements more independently. However, some students still had difficulty in maximizing the AI features for the exploration of new ideas, requiring additional practice to facilitate their understanding and skills. Nevertheless, students' enthusiasm and motivation remained high throughout the learning process.

Students' confidence and independence also improved after two cycles of action. most students were able to complete the arrangement task with less teacher assistance. This shows that students have started to understand the concept and technical operation of DAW better. The level of student engagement in discussions and exploration of DAW features also showed positive results. This indicates that the integration of AI technology in music learning has a strong impact on student engagement and motivation. Although the results are satisfactory, a follow-up training program is recommended to continue developing skills and strengthening understanding of AI technology in improving the quality of music compositions produced by students.

From the two cycles of actions that have been carried out, the researcher made a tabular record to determine the comparison before and after the implementation of the action.

Table 4. Comparison before and after action implementation

| Aspects Observed | Pre-Action | Post-Action | Changes | Score (1-5) |
|---|---|--|------------------------|-------------|
| DAW Feature Mastery | The majority of students did not understand the basic features of the DAW and required full guidance. | 11 out of 13 students were able to use advanced features such as VariAudio, chord tracks and sound effects independently. | Increased drastically. | 4 |
| Exploration of Creativity in Composition | Student compositions are still simple with little variation in harmony and rhythm. | 9 out of 13 students were able to create more complex and dynamic compositions with a variety of harmonies and rhythms. | Significant increase. | 4 |
| AI Integration in Music Arrangement | There was no utilization of AI features in the music arrangement. | 8 out of 13 students successfully integrated AI features to support the development of more structured musical compositions. | Increased sharply. | 4 |
| Self-confidence in Independence | Students tend to hesitate and depend on the teacher's direction in exploring DAW. | Most students are more confident and independent in exploring DAW features without intensive help from the teacher. | Steady increase. | 4 |
| Motivation and Participation | Interest in learning music using technology is still low. | All students showed high enthusiasm and consistent motivation throughout the exploration and practice process. | Significant increase. | 5 |

The table above illustrates students' development before and after the action. Through the comparison of pre-action and post-action results, it is evident that the use of AI features in Cubase 10.5 DAW is effective in significantly improving students' technical skills and creativity. This finding indicates that the integration of AI-based technology can be a relevant strategy to encourage students to generate creative and innovative ideas. With the research results obtained, it is expected that students can continue to develop their skills and produce innovative and high-quality musical works. Therefore, AI technology-based curriculum development should be considered as a sustainable approach in the future.

CONCLUSIONS

The application of artificial intelligence (AI) features in Cubase 10.5's Digital Audio Workstation (DAW) is effective and able to improve students' musical skills and creativity in creating musical works. Through two cycles of action, extracurricular band students at SMAN 8 Bandung showed progress in understanding DAW features, exploring creative ideas, and producing more complex and varied musical works. Students showed increased confidence, independence and high motivation in exploring musical ideas. The results of this study contribute to the development of technology-based music learning methods that are

relevant to the needs of 21st century education. This study recommends further training for teachers in music technology integration and encourages further research to explore the application of AI in various aspects of arts education and creativity.

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