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Integrating the Sibelius App into Learning Traditional Dayak Music Rhythmic Patterns to Enhance Musical Creativity

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ABSTRACT

This study examines the integration of Sibelius, a digital music notation software, as an innovative pedagogical medium in teaching Dayak traditional rhythm patterns to enhance students' musical creativity. Traditional music instruction, which predominantly relies on oral and imitative approaches, often lacks systematic structure and limits students' conceptual understanding and creative development. Addressing this gap, this research employs a descriptive qualitative design conducted at Sanggar Panatau Kameluh Bulan involving 26 students. Data were collected through observation, interviews, performance tests, and documentation of students' musical works. The findings indicate that the use of Sibelius significantly improves students' cognitive understanding of rhythmic structures through visual notation, enhances psychomotor skills in performing rhythm patterns, and increases affective engagement toward traditional music learning. Moreover, students demonstrate notable development in musical creativity, as reflected in their ability to explore, modify, and create new rhythmic variations based on traditional patterns. The study also reveals that digital notation serves as an effective bridge between oral tradition and modern pedagogical practices, supporting both learning innovation and cultural preservation. Despite challenges related to technological access and varying levels of digital literacy, the integration of Sibelius offers a relevant and adaptable model for technology-based music education. This research contributes to the development of culturally responsive and innovative music pedagogy in the digital era.

KEYWORDS

Sibelius App
Digital Music
Dayak Music
Traditional
Creative Development

INTRODUCTION

Music education plays a strategic role in developing students' musical creativity and cultural awareness. Beyond acquiring technical skills, music learning serves as a medium for fostering creative thinking, problem-solving abilities, and artistic self-expression (Saefurrohman et al., n.d.). In contemporary music education, creativity is regarded as one of the primary competencies that students should develop through active engagement with musical experiences. Selecting the right music education method plays a crucial role in supporting the holistic development of children during their early development (Muqri et al., 2025). Webster explains that musical creativity is a dynamic process involving divergent and convergent thinking in exploring, organizing, and transforming musical ideas into meaningful artistic expressions. Thus, music learning should not merely focus on reproducing existing musical materials but also provide opportunities for students to experiment, explore, and create new musical possibilities.

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The concept of creativity itself has been widely discussed in educational and psychological studies. Guilford identifies creativity through divergent thinking abilities, including fluency, flexibility, originality, and elaboration. These dimensions enable learners to generate multiple ideas, adapt existing concepts, and develop innovative solutions to problems. Similarly, Torrance emphasizes that creativity can be observed through an individual's ability to produce original responses, modify existing knowledge, and elaborate ideas into more complex forms. In the context of music education, these dimensions are reflected in students' abilities to explore rhythmic variations, modify musical structures, improvise, and create new compositions based on prior musical experiences. Consequently, musical creativity is not limited to composing entirely new works but also encompasses the transformation and reinterpretation of existing musical materials into innovative forms.

From a sociocultural perspective, Burnard introduces the concept of "musical creativities," arguing that creativity in music is plural and context-dependent rather than a singular universal ability. Musical creativity emerges through interactions among individuals, cultural traditions, learning environments, and available resources. This perspective is particularly relevant in traditional music education because students' creative development often occurs through engagement with inherited cultural materials. In learning traditional Dayak music, creativity can therefore be understood as the ability to reinterpret, adapt, and develop traditional rhythmic patterns while maintaining their cultural characteristics and values. Such an approach positions creativity not as a departure from tradition but as a process of cultural continuity and innovation

Digital music notation software, such as Sibelius, is a technology that can be used in music education. This application allows users to write, visualize, and play back musical compositions in real time, thus supporting a more systematic understanding of musical concepts (Novianti et al., n.d.). In the context of learning, the use of music notation software not only helps students read and write notation but also encourages the exploration of musical ideas and the development of creativity. Sibelius software helps improve students' abilities and knowledge in understanding music theory (Rahmi & Azrul, 2019). Thus, the relevance of using Sibelius in music learning has great potential as an innovative medium in improving the quality of learning.

However, traditional music instruction at Sanggar Panatau Kameluh Bulan, particularly in learning Dayak rhythmic patterns, continues to rely predominantly on oral and demonstrative approaches. Although this method remains effective for cultural transmission, it often limits opportunities for systematic analysis, documentation, and creative development. Students frequently learn through imitation without sufficient access to visual representations of rhythmic structures, making it difficult to understand the conceptual organization of rhythms or develop original rhythmic variations. Similar challenges are found in the teaching of traditional Dayak music more broadly, where many rhythmic patterns remain undocumented in formal notation systems. As a result, learning activities often emphasize preservation through repetition rather than creative engagement with musical materials.

Traditional Dayak music represents an important component of Indonesia's cultural heritage, characterized by distinctive rhythmic structures and rich sociocultural meanings. Beyond its aesthetic value, Dayak music functions as a medium of social communication, cultural expression, and ritual practice. Dayak music has distinctive rhythmic characteristics and serves as a medium for cultural expression, social communication, and part of traditional rituals (Maulana et al., 2024). Nevertheless, the influence of globalization, the dominance of popular culture, and the limited integration of technology in traditional music education have

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contributed to declining interest among younger generations. Consequently, innovative pedagogical approaches are needed to ensure that traditional music remains relevant while preserving its cultural authenticity.

In this context, the integration of Sibelius into the learning of traditional Dayak rhythmic patterns offers a promising pedagogical innovation. By transforming oral rhythmic traditions into digital notation, Sibelius enables students to visualize, analyze, and manipulate rhythmic structures more systematically. Digitizing traditional musical rhythmic patterns through musical notation allows for a more structured, easily understood, and widely accessible presentation of material (Samosir et al., 2023). This process not only supports conceptual understanding but also creates opportunities for creative exploration through the modification and development of rhythmic patterns. The use of digital notation therefore functions as a bridge between traditional musical knowledge and contemporary educational practices. Through this approach, students are expected not only to understand traditional Dayak rhythms more effectively but also to develop musical creativity by exploring, adapting, and generating new rhythmic expressions rooted in local cultural traditions.

Based on this background, the present study aims to examine the integration of the Sibelius application in learning traditional Dayak music rhythmic patterns and its contribution to the development of students' musical creativity at Sanggar Panatau Kameluh Bulan. This research is expected to contribute both theoretically and practically to the development of culturally responsive, technology-based music education that promotes creativity while supporting the preservation of local cultural heritage.

METHOD

This study employed a mixed-methods approach using an embedded design, integrating quantitative and qualitative data to comprehensively examine the effectiveness of the Sibelius application in learning traditional Dayak music rhythm patterns and its contribution to students' musical creativity. The quantitative component was used to identify changes in students' understanding of rhythmic structures and musical creativity before and after the learning intervention, while the qualitative component was conducted to explore students' learning experiences, creative processes, and perceptions regarding the integration of digital technology in traditional music learning.

The research was conducted at Sanggar Panatau Kameluh Bulan, Palangka Raya, involving 26 students selected through purposive sampling. Participants were chosen based on their active involvement in traditional music learning activities and their willingness to participate throughout the research process. The study was implemented through four stages: needs analysis, learning design, implementation, and evaluation.

During the needs analysis stage, observations and preliminary interviews were conducted to identify existing problems in learning traditional Dayak rhythmic patterns. The learning design stage involved the digitization of traditional rhythmic materials into Sibelius notation, preparation of instructional materials, and development of creative exploration activities. The implementation stage consisted of a series of learning sessions in which students learned, practiced, and developed traditional Dayak rhythm patterns using the Sibelius application. The evaluation stage was carried out to assess changes in students' understanding and creativity as well as to reflect upon the effectiveness of the learning model.

Data were collected through observations, semi-structured interviews, performance tests, and documentation. Observation was used to record student participation, engagement, and creative behavior during learning activities. Semi-structured interviews were conducted

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with students and instructors to obtain in-depth information regarding learning experiences, perceived benefits, and challenges in using Sibelius. Documentation included students' digital notation files, rhythmic compositions, photographs, and learning records generated throughout the intervention. The quantitative data were obtained through performance-based assessments administered before and after the implementation of Sibelius-based learning.

Qualitative data analysis followed the interactive model of Miles, Huberman, and Saldaña (2014), consisting of data condensation, data display, and conclusion drawing. Interview transcripts, observation notes, and documentation records were first organized and reduced to identify relevant information related to creativity development and technology integration. The data were then coded through an open-coding process to generate categories and themes. Emerging themes were subsequently grouped into broader conceptual categories, including cognitive development, creative exploration, technological engagement, and cultural learning experiences.

Through this mixed-methods framework, the study provides a comprehensive understanding of how the integration of Sibelius supports the learning of traditional Dayak music rhythm patterns and facilitates the development of students' musical creativity within a culturally responsive digital learning environment.

RESULT AND DISCUSSION

Collaborative Education from a pedagogical perspective has been proven to be an effective strategy for students in arts learning to increase creativity (Puri, 2025). Learning is a process of interaction between students, educators, and learning resources within a learning environment. Traditional music instruction at the Panatau Kameluh Bulan studio is conducted verbally, directly imitating the instructor's performance. This approach to teaching has drawbacks that can have long-term consequences, reducing the originality of the rhythmic patterns created. Music lessons are inherently active, dynamic, and based on practical skills, placing students at the center of the learning process (Kusnadi et al., 2023).

Observations conducted during the implementation of Sibelius-based learning revealed substantial changes in students' understanding of rhythmic concepts. Prior to the intervention, most participants experienced difficulties identifying note values, rhythmic groupings, and metric structures when learning was delivered through demonstration and imitation. Students tended to memorize rhythmic patterns without understanding their structural relationships.

Performance test results demonstrated an increase in students' ability to read and analyze rhythmic notation. The average score improved from 40% in the pre-test, to 85% in the post-test. The most significant improvement occurred in identifying rhythmic subdivisions and translating oral rhythmic patterns into notation form. Jesti Say "Before using Sibelius, I only followed the instructor's example. After seeing the notation and listening to the playback, I could understand where the strong beats and rhythmic accents were located. Kevin, another student explained "The visual notation helped me remember the rhythm pattern more easily because I could see and hear it simultaneously."

Digital notation enables the documentation, analysis, and dissemination of traditional rhythmic patterns in a structured format. Recent studies highlight that digitalization plays a crucial role in preserving and revitalizing traditional music in the digital era (Kallio & Vakeva, 2017). By transforming oral traditions into digital formats, educators can create more accessible and sustainable learning resources while maintaining cultural authenticity.

The application of Sibelius application-based learning in the material of traditional Dayak music rhythm patterns provides significant improvements in both cognitive,

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psychomotor, and affective aspects of students (Billah et al., 2024). Music art learning as a type of art education that can develop children from various aspects of development that function as a builder of aesthetic qualities of self in cognitive, affective and psychomotor forms (Madina et al., 2021). Cognitively, students experienced improvements in understanding the structure of rhythmic patterns that were previously difficult to grasp using conventional methods. Visualizing notation in Sibelius helped students recognize note values, beat patterns, and the relationships between rhythmic elements more systematically. This was evident in the improved learning evaluation results, where students were able to identify, read, and write rhythmic patterns more accurately than before the intervention (Kamtini & Sitompul, 2019).

From a psychomotor perspective, students' ability to practice rhythmic patterns has significantly improved. Students have become more skilled at executing rhythmic patterns precisely and consistently, whether through clapping, playing instruments, or vocalization. The playback feature in Sibelius allows students to replay their notation, allowing them to independently evaluate the appropriateness of the rhythm. This process encourages reflective learning, where students not only receive material but also actively correct errors and continuously improve their musical performance. Art, as a form of expression, is an activity that can help children develop and achieve broader goals (Kusnanto & Frima, 2022).

Meanwhile, from an affective perspective, there was an increase in students' interest and motivation in learning traditional music. Learning, previously considered monotonous, became more engaging thanks to the use of interactive digital technology. Students demonstrated greater enthusiasm for learning, especially when given the opportunity to create and develop their own rhythmic patterns using the Sibelius app. This demonstrates that technology integration can create learning experiences relevant to the characteristics of the digital generation, while strengthening students' attachment to traditional music as part of their cultural identity.

This study also showed a significant increase in students' musical creativity. Students were not only able to reproduce traditional rhythmic patterns but also began to explore and develop new rhythmic variations. The digitalization process through Sibelius provided space for students to experiment with various rhythmic possibilities flexibly. In this context, creativity is understood not only as the ability to create but also as the ability to adapt and transform traditional rhythmic patterns into more innovative forms. This finding aligns with the concept of modern music pedagogy, which emphasizes the importance of exploration and creation as part of the learning process.

Further discussion indicates that the integration of Sibelius into learning serves as a bridge between traditional and modern approaches. Until now, learning traditional Dayak musical rhythmic patterns has tended to be oral and imitation-based, making them difficult to document and develop systematically. With digital notation, rhythmic patterns can be visually represented and well-documented, facilitating the learning process, analysis, and further development. Furthermore, the use of this technology also supports the process of cultural preservation in digital form, which is more adaptive to current developments.

However, the implementation of this learning process is not without several obstacles. Limited technological facilities are a major obstacle, particularly in terms of device availability and access to the Sibelius application. Furthermore, differences in students' digital literacy levels also affect the speed of adaptation to technology use. In the initial stages, some students experienced difficulties operating the application, necessitating intensive guidance and the development of structured learning modules. However, these obstacles can be gradually overcome through ongoing practice and guidance.

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Quantitatively, there was an increase in student learning outcomes, as demonstrated by a comparison of pre-test and post-test scores. The average student score increased significantly, particularly in indicators of rhythmic pattern understanding and rhythmic translation ability. Furthermore, the assessment of musical creativity showed developments in exploration, improvisation, and the creation of rhythmic variations. Students were not only able to imitate the traditional rhythmic patterns provided, but also began to develop new patterns by combining elements of traditional rhythms with modern musical approaches.

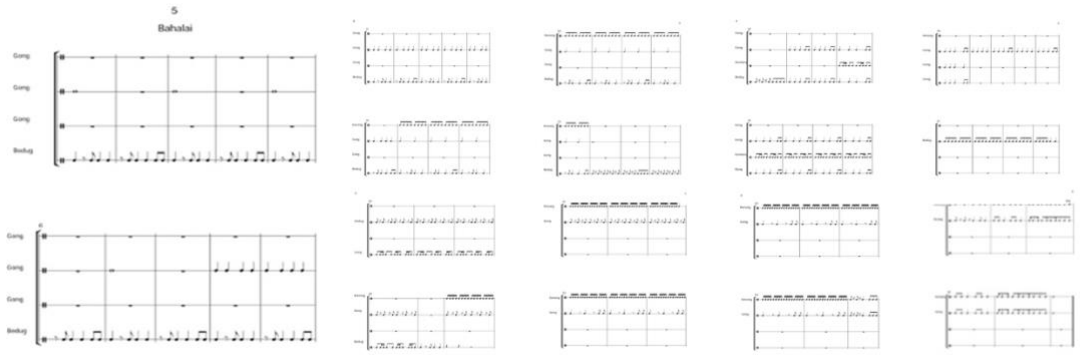

Figure 1. One of the works of the children of the Panatau Kameluh Bulan Studio.

From a process perspective, using Sibelius provides a more interactive and contextual learning experience. The digital notation feature allows students to see visual representations of rhythmic patterns previously learned only orally. Furthermore, the playback feature helps students independently correct errors and improve musical accuracy. This aligns with findings that digital media in music learning can simultaneously enhance conceptual understanding and practical skills. Thus, Sibelius serves not only as a tool but also as a medium for creative exploration in music learning.

Further discussion shows that the use of technology in traditional music learning can bridge the gap between conventional methods and the learning needs of the digital generation. Learning, which was previously one-way and dependent on instructor instruction, has become more participatory and exploration-based. Students have the opportunity to experiment with various rhythmic possibilities, making the learning process more meaningful (Li, 2024). Furthermore, the digitization of traditional Dayak musical rhythmic patterns through Sibelius also contributes to cultural preservation efforts in a more adaptive and documented form.

However, this study also identified several challenges, such as limited technological resources, differences in students' digital literacy levels, and the time required to adapt to using the Sibelius application. Some students initially experienced difficulty operating the application's basic features. Therefore, intensive mentoring and the development of systematic learning modules are necessary to ensure optimal use of technology.

This study confirms that pedagogical innovation through the integration of Sibelius into learning traditional Dayak music rhythm patterns is effective in enhancing students' musical creativity. This approach not only strengthens musical understanding but also opens up space for the development of creative ideas based on local wisdom. Thus, traditional music learning can continue to develop and remain relevant in the digital age without losing its cultural identity.

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Cognitive Enhancement through Visualized Rhythm Structures

The integration of Sibelius provided a structured visual representation of rhythmic patterns that were previously transmitted orally. This shift from an aural–imitative approach to a visual–analytical framework significantly enhanced students' conceptual understanding. Students were able to identify note values, rhythmic groupings, and temporal structures more accurately. This finding is consistent with recent studies emphasizing that digital and multimodal learning environments improve conceptual understanding by integrating visual and auditory processing (R. Mayer, 2020; Schaffernak et al., 2022). In music education, the use of notation software has been shown to support analytical thinking and facilitate deeper comprehension of musical structures through interactive visualization (King & Himonides, 2017). Compared to traditional methods, which rely on memorization and imitation, digital tools enable a more systematic and cognitively engaging learning process.

Despite its benefits, several challenges were identified in implementing Sibelius-based learning. Limited access to technological resources remains a primary constraint, particularly regarding hardware and software availability. Additionally, differences in students' digital literacy levels affected the pace of adaptation. Research indicates that successful integration of technology in education depends on infrastructure readiness and teacher competence in digital pedagogy (Tondeur et al., 2017). Therefore, continuous training and the development of structured instructional models are essential to ensure effective implementation.

Use of Learning Media

The use of the Sibelius application as a learning medium in music education shows a paradigm shift from a conventional approach to more systematic and interactive technology-based learning (Saputra D, 2020). Sibelius as a digital music notation software not only functions as a sheet music writing tool, but also as a visual and audio representation medium that can help students understand musical concepts more deeply. In the context of learning rhythmic patterns, the presence of notation and playback features allows students to see and hear rhythmic structures simultaneously, thus strengthening the connection between theoretical understanding and musical practice.

In the study of modern musical rhythm patterns, Sibelius has long been used as a tool to develop the skills of reading, writing, and arranging complex rhythms (Nurjanah et al., 2024). Modern music generally has a standard notation system, so this application can be used optimally to explore various rhythmic variations, including polyrhythms. Meanwhile, in traditional Dayak music, learning rhythmic patterns has been done more through oral methods (listening and imitating) that are passed down from generation to generation. Although this teaching method has high authentic value, it is often less effective in the context of formal education because it does not provide a systematic visual representation. This is where the role of learning media becomes significant, namely as a tool to digitize traditional rhythmic patterns into musical notation so that they can be archived as files.

Field observations indicated notable improvements in students' performance accuracy. During the initial learning sessions, many students struggled to maintain tempo consistency and execute rhythmic variations correctly. Following six weeks of Sibelius-assisted instruction, students demonstrated greater precision in performing rhythmic patterns both individually and in groups. Documentation of performance assessments showed that students became more capable of maintaining rhythmic stability and correcting errors independently. The playback feature allowed participants to compare their performances

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with the intended notation and make revisions without constant instructor intervention. Ringgo, instructor interviewed during the study noted: "Students became more independent. Previously, they waited for corrections from the teacher, but after using Sibelius they could immediately identify mistakes by listening to the playback."

Figure 2. Rhythm pattern learning process

Students can learn traditional rhythmic patterns as a foundation, then develop them using modern rhythmic principles such as tempo variation, accentuation, and dynamic processing. This process not only enriches students' musical understanding but also opens up creative space for creating new compositions that remain rooted in local cultural values. Thus, learning doesn't stop at reproduction but progresses to musical transformation and innovation.

Furthermore, the use of Sibelius also contributes to building students' digital music literacy, a crucial competency in 21st-century education. Students learn not only about music as a cultural product but also about a creative process that can be supported by technology. This aligns with the concept of pedagogical innovation, which emphasizes the integration of technology, creativity, and cultural context in learning (Andriani et al., 2023). With this approach, traditional music is no longer positioned as a static legacy, but rather as a dynamic source of inspiration that is relevant to current developments.

The integration of Sibelius provided a structured visual representation of rhythmic patterns that were previously transmitted orally. This transformation from an aural–imitative approach to a more analytical and visual-based framework significantly enhanced students' conceptual understanding. Students were able to identify note values, rhythmic groupings, and temporal structures more accurately than before the intervention.

This finding supports the theory of multimedia learning, which emphasizes that combining visual and auditory representations can strengthen cognitive processing and knowledge retention (R. E. Mayer, 2009). In music education, technology-based tools such as notation software play a crucial role in facilitating deeper conceptual understanding by enabling learners to engage with musical elements in multiple modes (Davis, 2012). Compared to conventional approaches, which rely heavily on memorization, the use of Sibelius encourages analytical thinking and structured comprehension of rhythmic patterns.

Creativity Development: From Reproduction to Transformation

One of the most significant findings of this study is the enhancement of students' musical creativity. Initially, students tended to replicate traditional rhythmic patterns without modification. However, after the implementation of Sibelius-based learning, they began to explore variations, including changes in tempo, dynamics, and rhythmic structure. This shift indicates a transition from reproductive learning to creative and transformative musical thinking. Creativity in music education involves not only producing new ideas but also

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reinterpreting existing cultural materials in innovative ways (Burnard, 2012).

Moreover, providing space for exploration is a key factor in fostering creativity, as students develop their ability to compose and modify musical ideas independently (Hickey, 2012). In this context, Sibelius acts as a mediating tool that bridges traditional rhythmic knowledge with contemporary creative practices, enabling students to generate new musical expressions rooted in local culture.

CONCLUSIONS

Overall, the results and discussion of this study indicate that pedagogical innovation through the integration of the Sibelius application in learning traditional Dayak music rhythmic patterns significantly contributes to improving the quality of learning. This approach not only enhances students' musical understanding and skills but also encourages the development of creativity and strengthens cultural awareness. Thus, traditional music learning can continue to develop innovatively and relevantly in the digital era, without losing the essence of the local wisdom values contained within.

Thus, it can be concluded that the Sibelius application plays a strategic role as a learning medium capable of bridging the learning of modern and traditional musical rhythmic patterns. Through this integration, students not only gain a more comprehensive musical understanding but also develop creativity in processing and transforming traditional rhythmic patterns into broader and more innovative musical contexts.

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