



Cardboard Media as an Innovation in Solfeggio Learning: a Creative Solution Amidst the Limitations of Dayak Musical Instrument

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Abstract: Limited access to the Dayak traditional musical instrument, the Dau', is driving innovation in music education in the digital age. This research explores students' perceptions of using cardboard media as a creative alternative in learning the fundamentals of instruments. Through a qualitative approach, this study found that students responded positively to cardboard media. Data was collected through participant observation, documentation, and interviews with 2023 Performing Arts Education students at Tanjungpura University. Open-ended questions are used to understand how students perceive the cardboard media used in the learning process. Data analysis used triangulation to understand students' opinions on learning media. The research findings indicate that students have a positive view of using cardboard media in basic Dayak music learning. They assess that this media is not only effective in facilitating understanding of Dayak music concepts but also stimulates creativity and fine motor skills. This finding suggests that cardboard media can be an innovative and flexible solution in traditional music education, especially in resource-limited environments. The implications of this research open up opportunities for further development, such as integrating augmented reality technology, to create a more immersive and engaging learning experience for millennials.

Keywords: cardboard media; dayak music; solfeggio

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INTRODUCTION

Amidst the increasingly massive pressures of modernity, efforts to preserve ancestral heritage now face complex dynamics. Traditional art, particularly Dayak music, contains deep philosophies that remain crucial to preserve for future generations. This research analyzes students' responses to the use of cardboard as an innovative alternative medium for understanding the fundamentals of musicality (Solfeggio). The use of these simple materials addresses the accessibility constraints of the original instruments, which are often difficult to find in learning environments. Functionally, traditional music has broad significance for human well-being, ranging from its effectiveness in overcoming sleep disorders (Amiri et al., 2019) to its role as a relaxation instrument for pregnant women to reduce anxiety (Satriami & Sumiati, 2022). This multifaceted value confirms that traditional music is a manifestation of ancestral intellectual intelligence that ensures life's harmony (Hapidzin et al., 2022) and also serves as a fundamental basis for the music education curriculum (Vitale, 2011).

Traditional arts, particularly Dayak music, possess an essence that extends far beyond mere recreation; they serve as a medium for fostering social harmony and communication between individuals (Razak & Ferdinand, 2019). As a heritage passed down through generations, this music carries a deep load of values and life principles that shape cultural identity (Sagala, 2024). In the context of modern education, these noble values are dynamic and adaptable to changing times (Čaleta, 2023), providing a strong philosophical basis for integrating traditional music into the formal curriculum. The urgency of learning this art form is a major driver of students' technical skills, including in solfeggio lessons. Integrating Dayak instruments or melodies into solfeggio exercises is not merely a preservation effort, but a strategy to bring students closer to learning materials that have emotional and sociological relevance. By studying pitch accuracy and rhythm through musical structures deeply rooted in society (Carretero-Martínez et al., 2014), students not only sharpen their auditory sensitivity but also internalize cultural identities that are integral to their lives (Kapoyos et al., 2022). Thus, Solfeggio is no longer seen as rigid Western music theory, but rather as a tool for dissecting and understanding the intellectual wealth of our ancestors.

As an authentic heritage of West Kalimantan, Dayak music plays a crucial role in strengthening national identity among the younger generation (Efriani et al., 2024; Hartanto et al., 2021; Kuncoro, 2018). Nevertheless, the transmission of cultural values often faces obstacles due to limited resources and conventional teaching methods. The perceptual gap between teacher effectiveness and student reception poses a unique challenge (Scoot, 2016), necessitating a breakthrough in learning media that aligns with the dynamic characteristics of Generation Z (Permana et al., 2024). Innovation through an active approach is expected to transform monotonous methods into motivating and meaningful learning experiences. This issue is evident in the limited physical infrastructure on campus, where the ratio of available Dayak instruments is not proportional to the

number of students in a single classroom. With only one set of instruments for 51 students, the learning process becomes inefficient, leading students to lose focus while waiting for their turn (long queues). As a creative solution to these constraints, this research explores the use of engineered cardboard media resembling the *Dau'* instrument as a solfeggio learning aid. This media imitation allows all students to practice rhythmic patterns and fingering simultaneously without waiting. Thus, cardboard media is not merely a physical substitute but a technical bridge that ensures that every individual is actively involved in mastering the fundamentals of Dayak musicality, despite the limitations of music laboratory facilities.

The main focus of this investigation rests on two essential pillars: musicality (Solfeggio) and learning effectiveness. Solfeggio is considered a primary stimulus that builds musicality, including rhythmic sensitivity (Zhang, 2022), and its manifestation is pitch sensitivity (Yalçın & İDe, 2019). In an effort to achieve instructional effectiveness, the integration of visual aids is crucial so that solfeggio material is not only cognitively absorbed but also becomes a permanent learning experience (Sunardi, 2023). The implementation of cardboard media in this context offers a duality of benefits. First, this media stimulates students' creativity through independent assembly activities. Second, this study examines the extent to which these imitation instruments improve students' Solfeggio (rhythmic sensitivity) and their theoretical understanding of the structure of traditional Dayak music. This is crucial in preparing them to meet the graduate profile of being competent in disseminating traditional music. Academically, this study is expected to make a significant contribution to Dayak music pedagogy by mapping student perceptions and optimizing the potential of cardboard material as an educational and economical solfeggio learning instrument. This finding can serve as a reference for education practitioners in designing more attractive teaching modules for Generation Z. Furthermore, the generated data has the potential to be developed into a more advanced prototype of an electric *Dau* instrument, while still considering organological aspects, materiality, and authentic cultural identity representation.

METHODS

This study adopts a descriptive qualitative approach to observe and describe the behavioral patterns or actions of an object (Christy & Rachman, 2023). This research will examine how cardboard media, as a teaching aid for Dayak traditional music, can improve musical sensitivity/Solfeggio. The data obtained were analyzed using triangulation techniques to ensure the validity of the findings. This research uses a qualitative approach with a case study design. The research subjects are 51 students enrolled in the Dayak Musical Instruments Fundamentals course at Tanjungpura University. This course studies Dayak musical instruments, including their types, playing positions, techniques, and patterns for each instrument. The limited availability of musical instruments in the study program necessitates alternative approaches to learning to ensure students are well-supported. The concrete step taken was to create rice cardboard media resembling the blades of the *Dau'*. It is hoped that, through this medium, students can acquire skills in playing Dayak musical rhythmic patterns, particularly the *Dau'* instrument.

Data were collected through participant observation during the learning process, interviews conducted by distributing questionnaires, and the analysis of related documents on student learning outcomes. Data analysis adopted the Miles and Huberman model for data collection, data reduction, data presentation, and conclusion drawing (Miles & Huberman, 1994). Meanwhile, data validity was ensured through triangulation across observation, interviews, and documentation.

Students learn Dayak traditional music through textual and contextual instruction in every class meeting. They must bring imitation musical instruments made of rice cardboard that resemble the *Dau'* instrument, including its drumsticks. Students are trained to imitate the musical patterns demonstrated by the lecturer using this simple medium. This interactive learning process not only helps students understand the basic motor skills of Dayak music but also builds rhythmic sensitivity. To assess the learning experience, a questionnaire was sent, divided into eight statements in Table 1.

Table 1. List of Statements in the Questionnaire Distribution

No	Statement
1	Full Name
2	NIM
3	Cultural Background
4	I had never known how to play Dayak music before, including the <i>Dau'</i> instrument
5	Using cardboard media allows me to play Dayak music (specifically the <i>Dau'</i>) accurately.
6	Cardboard media becomes a learning innovation amidst the limitations of musical instruments.
7	I am very enthusiastic about learning the basics of Dayak musical instruments using cardboard because I can practice directly.
8	The cardboard media in this course helps me improve my Solfeggio skills.

RESULT AND DISCUSSION

Basic Dayak musical instrument learning was conducted by 51 second-semester students from the Performing Arts Education Study Program at FKIP Tanjungpura University. This course is a required course and a distinguishing feature of the study program. The learning objective of this lesson is to introduce Dayak Kanayatn traditional music, specifically Jubata. This music is played with their *Dau We'* instruments, *Dau Nak'* instruments, *Ketubung* (membranophone), and *Agukng* (Gong). This ensemble can be played by 4 players. Learning the basics of Dayak musical instruments in this class is not only textual but also contextual, meaning direct experience with Dayak culture through performing the rhythm of Jubata music. The word "*Jubata*" itself has a deep meaning: Creator or God (Katarina & Diana, 2020). Therefore, this drumming pattern is not only played for entertainment but is also an important part of the Dayak community's religious rituals. This ritual serves as a medium for the Dayak community to convey their requests or expressions of gratitude to the Almighty God (Callista et al., 2022; Prasetyo et al., 2023).

The class began learning the Jubata musical motif with a demonstration of the *Dau* pattern by the lecturer. Previously, students were required to create cardboard media that imitated the shape of *Dau* blades. A circle with a diameter of approximately 20 cm is cut into eight blades. Additionally, they are required to have a stick to hit the *Dau'* that will be played. The class was randomly divided into 10 groups, and each group selected a leader to coordinate the training process outside class hours. Each individual in the group takes turns playing a Dayak musical instrument until all the instruments are mastered. After demonstrating the rhythmic pattern of the *dau'* on the *Jubata* motif, students were asked to imitate the sound produced by that rhythmic pattern.

Imitation begins with a process of sound exploration and sound sensitivity, culminating in the ability to sing it verbally (Hemming & Kvarnhall, 2015). Then, the students sat in a row and imitated the rhythmic patterns by hitting cardboard, as if they were playing the *Dau'*. This exercise was repeated until they reached the rhythmic patterns of the *dau nak'nya* and *dau wek'nya*. When the students were considered capable of playing these patterns, the class was divided into two groups. The first group played the rhythmic pattern of the *dau wek'nya*, while the other group played the rhythmic pattern of the *dau nak'nya*. After both groups were able to play their rhythmic patterns well, they were combined and played the Jubata music rhythm together. One group took turns playing the actual *Dau'* instrument until each had direct experience with it.

To determine the use of cardboard media in teaching basic Dayak music to improve solfeggio skills, students were asked to complete a questionnaire through Google Forms. The 51 students answered questions 1-3, which were related to their personal identities. Question number three about their tribal background yielded the following data. 47.1% each have a Dayak or Malay ethnic background, while the rest are of Chinese ethnicity. Other data shows that most of them have never played traditional Dayak music before.



Figure 1. Result of Statements 3 and 4

A person's limited experience in playing music naturally affects their proficiency and musical mastery. Through this learning, they automatically gain direct experience in playing traditional Dayak music. The *Dau* instrument, which serves as the main melody in *Jubata* Music, provides their understanding of the drum motifs, both their *Dau We'* and *Dau Nak'*. Through classroom observation, repeating patterns is not a difficulty for them. The challenge is the interlocking pattern found in the *Jubata* music. Therefore, one student needs another to play those drum patterns. If one of *Dau's* motifs is played incorrectly, it cannot be called a *Jubata* musical motif. One of the steps taken is the imitation and drill method, which can shape a person's personality (Hidayat et al., 2022; Sari et al., 2022). Students have a responsibility to play the *Dau* as the main melody because it will affect the other musical instruments.

Using cardboard media allows me to play Dayak music (specifically the *Dau'*) accurately

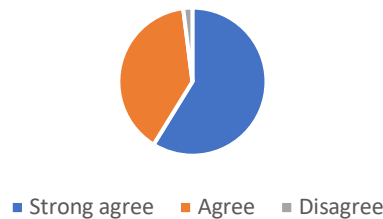


Figure 2. Result of Statement 5

Besides making it easier for them to play *Dau*, 54.9% of students believe that using cardboard can address the challenge of limited musical instruments (Figure 2). If you have to wait for your turn, it will certainly take a long time. Cardboard media helps them get used to the movements when hitting the *Dau* according to the pattern. This motor skill is of significant importance, as the accuracy and precision of the drumming technique affect the timbre of the sound (Patteson, 2016). If the position is slightly off, the *Dau* that is struck might not be in the center, thus not creating the correct resonance. Plus, the correct use of the right and left hands is essential. According to Sarbadhikary (2023), this activity requires students' motor skills to be precisely coordinated. Although cardboard media does not produce a sound similar to *Dau*, at least repeated practice can train them to use the correct hitting technique.

Cardboard media becomes a learning innovation amidst the limitations of musical instruments.

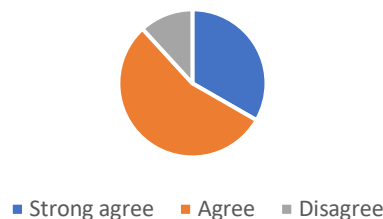


Figure 3. Result of Statement 6

The image displays a cardboard medium created by a student, where the *Dau'* is made in a three-dimensional shape. Not just a circular cardboard sheet, but more like a cylindrical shape, albeit not too tall. Here is where the students' creativity process takes shape, stemming from their experience in observing the *Dau'* instrument organologically. How the shape of the *dau'* is represented by students using cardboard with volume, not just flat sheets. Similarly, the shape of the stick used to strike the *Dau'* is also represented.

I am very enthusiastic about learning the basics of Dayak musical instruments using cardboard because I can practice directly.

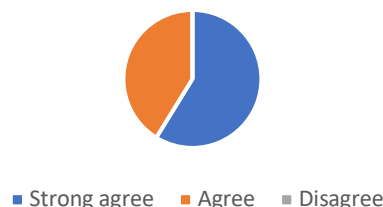


Figure 4. Result of Statement 7

The strong student interest in learning *Dau* rhythm patterns through cardboard media is clearly reflected in the survey data, where 100% of respondents gave a positive response—58.8% "Strongly Agree" and 41.2% "Agree"—to the effectiveness of hands-on practice using this media. This aligns with the views of Febriyani and Sukmayadi (2023), who stated that post-COVID-19 pandemic, the spirit of independence in the Merdeka Curriculum has become a main pillar in arts and culture learning.

The cardboard media in this course helps me improve my Solfeggio skills.

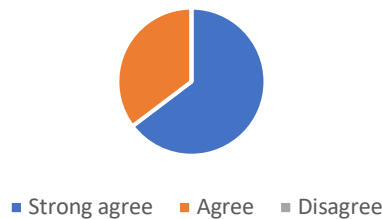


Figure 5. Result of Statement 8

The value of collaboration built during the media creation process had a significant impact on their academic achievements. This is evidenced by the data in Figure 5, where 64.7% of students stated they 'Strongly Agree' and 35.3% stated they 'Agree' that using cardboard media is effective in helping them improve their Solfeggio skills. This aligns with the opinion that Solfeggio helps students create desired music in groups (Eroglu, 2021; Teixeira Dos Santos & Del-Ben, 2010). Thus, cooperation in preparing materials not only strengthens relationships among students but also provides a concrete support system for collectively mastering musicality skills. Integrating traditional Dayak instruments into the world of education is not just about transferring knowledge but also serves as a means for students to delve into cultural diversity. The use of alternative media such as cardboard has proven effective in stimulating learning enthusiasm, allowing students from diverse ethnic backgrounds to interact directly with different musical traditions. This aligns with Váradi (2022), who emphasizes the importance of educational platforms as spaces for embracing cultural diversity.

Innovation in mastering Solfeggio skills can be achieved through alternative media, such as cardboard, which serves as a creative solution to overcome the limitations of native Dayak musical instruments. Transforming these simple materials into musical instrument replicas is not just a technical activity; it is a process that stimulates creativity, helping students build confidence in self-expression while also understanding basic acoustic principles. Through this exploration, students are encouraged not only to reproduce sounds but also to embark on a journey of self-discovery that can spark the creation of new and original musical compositions. The use of this medium also has a social dimension; as stated by Fukamizu et al. (2009), playing music with high self-confidence can strengthen interpersonal relationships, making the cardboard a unifying bridge between the players and the audience. Furthermore, in line with Kaschub (2024), optimizing the potential of cardboard in music education directly contributes to the conservation of cultural heritage while also nurturing a generation of young composers who are visionary and capable of adapting to any resource limitations.

The previously outlined advantages serve as a strong foundation for revolutionizing this learning medium into the digital realm to overcome the limitations of the original instrument. Amid barriers to accessing physical musical instruments, the integration of technologies such as Augmented Reality (AR) offers a creative solution to help students visualize the structure of the Dau instrument more precisely. This aligns with Firdaus et al. (2022), who stated that digital platforms are highly effective in helping learners accurately represent complex objects. As demonstrated by Guclu et al. (2021), digital applications can realistically present visualizations of musical instruments, while Permadi and Budiwati (2016) show that cardboard media is highly suitable for experimenting with digital audio, similar to gamelan instruments. This synergy between physical cardboard media and audio-visual development not only creates an effective learning tool for students to master Solfeggio skills but also prepares them to take on the role of innovative cultural arts educators in the future.

CONCLUSION

This research shows that cardboard media can be an effective tool for learning the basics of Dayak music. The use of cardboard media can help students better understand the concepts of Dayak music, improve their fine motor skills, and make them more creative, cooperative, and collaborative with their peers. The results of this study can serve as a basis for evaluating the learning of traditional Dayak music using cardboard media. These reference results can also serve as a basis for reconstructing the curriculum, enabling more structured lectures and achieving the learning outcomes.

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