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Digitalizing Gamelan Degung: An Android-Based Application to Enhance Musicianship in Higher Education

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Abstract

Using the Gamelan Degung Sunda application as an alternative instructional medium has proven effective in addressing the challenges posed by the limited availability of gamelan instruments in higher education settings. The demand for flexible and efficient solutions in developing performance skills for Gamelan Degung has driven the integration of digital technology into arts education. This study adopts a qualitative approach using a case study method, employing direct observation and in-depth interviews with students who engaged with the application as part of their learning process. The findings indicate that the Gamelan Degung Sunda application effectively enhances students' understanding of musical structure and fundamental techniques in playing Gamelan Degung Sunda. It also significantly improves accessibility by enabling students to practice independently outside formal classroom sessions. Moreover, the application fosters active learning, despite its limited content scope, which does not fully represent the complexity of karawitan (Sundanese classical music). These findings underscore that integrating digital technology into arts education is not merely a short-term solution to infrastructural constraints but represents an innovative approach to cultivating adaptive and participatory learning experiences. The practical implication lies in the application's role as a pedagogical aid within academic environments that lack adequate facilities. Academically, the study opens avenues for developing digitally-based arts curricula and further investigating the effectiveness of application-based instructional media within the context of arts education in the digital transformation era. Future application developments are recommended to include more complex instructional content and comprehensive integration within technology-oriented arts study programs.

Keywords: Instructional media; Music application; Sundanese Gamelan Degung; Digital Gamelan Degung application

Digitalisasi Gamelan Degung: Aplikasi Berbasis Android untuk Meningkatkan Kemampuan Musikal di Pendidikan Tinggi

Abstrak

Pemanfaatan aplikasi Gamelan Degung Sunda sebagai media pembelajaran alternatif terbukti mampu menjawab tantangan keterbatasan instrumen gamelan di lingkungan perguruan tinggi. Kebutuhan akan solusi yang fleksibel dan efisien dalam mengembangkan keterampilan memainkan Gamelan Degung mendorong integrasi teknologi digital dalam proses pendidikan seni. Studi ini menggunakan pendekatan kualitatif dengan metode studi kasus, melalui observasi langsung dan wawancara mendalam terhadap mahasiswa yang menggunakan aplikasi tersebut dalam pembelajaran. Hasil menunjukkan bahwa aplikasi Gamelan Degung Sunda efektif dalam mendukung pemahaman struktur musikal dan teknik dasar dalam bermain Gamelan Degung Sunda, sekaligus meningkatkan aksesibilitas mahasiswa untuk berlatih secara mandiri di luar kelas formal. Aplikasi ini juga memotivasi proses belajar secara aktif, meskipun masih memiliki keterbatasan dalam cakupan materi yang belum merepresentasikan keseluruhan kompleksitas karawitan Sunda. Temuan ini menunjukkan bahwa integrasi teknologi digital dalam pembelajaran seni bukan hanya solusi jangka pendek atas keterbatasan sarana, tetapi juga pendekatan inovatif dalam menciptakan pengalaman belajar yang adaptif dan partisipatif. Implikasi praktisnya terletak pada pemanfaatan aplikasi ini sebagai alat bantu pedagogis dalam lingkungan akademik yang memiliki keterbatasan fasilitas. Sementara itu, implikasi akademiknya membuka peluang untuk pengembangan kurikulum seni berbasis digital serta kajian lebih lanjut mengenai efektivitas media pembelajaran berbasis aplikasi dalam konteks pendidikan seni di era transformasi digital. Disarankan pengembangan lanjutan terhadap konten aplikasi dengan materi yang lebih kompleks, serta integrasi menyeluruh dalam program studi seni berbasis teknologi.

***Kata kunci**: media pembelajaran; aplikasi musik; gamelan degung Sunda; aplikasi digital gamelan degung.*

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INTRODUCTION

Information and communication technology (ICT) has significantly impacted various aspects of life, including education (Ray et al., 2024; Riefaldi et al., 2024). ICT has become one of the main pillars in transforming education in Indonesia due to its capacity to collect, transmit, and disseminate information effectively. In the context of the Industrial Revolution 4.0, integrating digital systems to support teaching and learning activities is inevitable (Mustika et al., 2020).

However, the successful implementation of technology in education is highly dependent on the readiness of both lecturers and students. Technological proficiency is essential for strengthening digital literacy and enhancing competitiveness and adaptability in the digital era (Burnard, 2007; Hidayatullah, 2024; Lasut et al., 2023).

In music education, advancements in ICT have given rise to various print-based, electronic, and digital learning media, enabling more interactive and flexible learning processes (Pramusinta & Ummah, 2023; Rahayu et al., 2022). One major opportunity technology brings is using mobile devices, such as smartphones, to support learning traditional music, including Sundanese *karawitan*.

One innovative implementation is the *Gamelan Degung* application. This application offers a solution for educational institutions with limited access to physical instruments by providing convenient access, learning flexibility, and cost efficiency (Januar, 2023; Maulana et al., 2024). Nevertheless, there remains a lack of academic studies evaluating the effectiveness of this application, particularly regarding the mastery of fundamental *Gamelan Degung* patterns.

In the Music Education Study Program at Universitas Pendidikan Indonesia, the Sundanese *Gamelan Degung* course is offered as an elective with only two credits (Lindsay, 2016), often resulting in students struggling to acquire basic performance skills. This indicates a lack of adequate practice access, a limitation that could be addressed through digital learning media.

This study aims to evaluate the effectiveness of the *Gamelan Degung* application in enhancing university students' fundamental *karawitan* skills, particularly in understanding and mastering basic rhythmic patterns. In addition, the study examines user experiences in utilizing the application as a technology-based learning medium.

This research is expected to guide art education institutions strategically to develop more adaptive and efficient learning approaches. Additionally, the results can serve as a valuable reference for educational technology developers, particularly when designing features for *Gamelan Degung* applications that cater to the learning needs of an academic environment.

Many previous studies have focused on using digital technology in music education. (2016) and Rizkita & Sukmayadi assert that the success of music learning is greatly influenced by the software used. Digital applications provide a more interactive and personalized learning experience. The *Gamelan Degung* application, a music-based medium, has advantages in terms of accessibility, flexibility, and efficiency.

Studies by (2005) and Uludag & Satir demonstrate that mobile applications can boost interest in learning, enhance teacher-student communication, and accelerate musical development. These advantages are particularly relevant in traditional arts education, which is often limited by time and space constraints.

In his research on WhatsApp utilization in music education, Ventura (2017) highlights the role of digital technology in creating a more inspiring and collaborative learning environment. The results showed increased

interaction and understanding of music theory. This research reinforces the idea that digital media can broaden the scope of music education.

Meanwhile, a study by Amrullah M Fahlevi on developing a web-based multimedia application for Acehnese traditional musical instruments found that students had an easier time understanding the musical structure and showed a significant increase in interest in learning. This underscores technology's great potential in conserving and transmitting traditional music.

However, most of these studies have not examined digital applications specifically in the context of *Gamelan Degung*. Therefore, this research fills a gap in the literature and opens a new space for contextualized, applicable, technology-based approaches to learning traditional music.

METHOD

This study was conducted using a qualitative case study method, selected for its capacity to uncover in-depth dynamics of *Gamelan Degung* learning through digital media within the context of higher music education. This approach enables the researcher to explore how students experience, respond to, and interpret digital applications as a medium for musical learning (A. Prastowo, 2010). This study's central research question is: *How can the Gamelan Degung digital application enhance students' musical competence regarding performative skills and conceptual understanding of gamelan's musical structure?*

The research was carried out over three months, from February to April 2025, at the Music Education Study Program, Universitas Pendidikan Indonesia, West Java. The study involved six students who were members of the "Unit Karawitan Mahasiswa" student activity unit, an ensemble actively engaged in Sundanese traditional musical practices, particularly *Gamelan Degung*. These participants were purposively selected based on their prior experience playing Gamelan Degung through conventional means and the digital application used in this study.

The limited number of participants is an important methodological note. With only six students involved, the study does not aim to yield generalizable findings to a larger population. Instead, the case study design is intended to explore the distinctive, contextual experiences of the participants. Accordingly, the external validity of this study is indeed limited. However, it contributes to contextual understanding and developing digital-based *gamelan* learning practices in higher education settings.

The researcher employed three primary techniques to collect the data: participatory observation, semi-structured interviews, and literature review. Observation was carried out intensively during class sessions and practice activities. Through this process, the researcher documented how students interacted with the application's features, adapted finger movements, recognized rhythmic patterns, and constructed an understanding of song structures using the digital tool. These activities were systematically recorded in structured field notes.

The interviews were conducted to gain deeper insight into students' perspectives, perceptions, and evaluations of the application's effectiveness as a learning medium. These interviews were carried out individually and guided by open-ended questions developed from key indicators of musical learning, such as playing techniques, mastery of rhythmic patterns, and understanding of *Gamelan Degung* structures. The information gathered allowed participants to articulate their subjective experiences freely and reflectively.

The literature review served as a form of conceptual triangulation. By engaging with relevant scholarly sources on the use of digital technology in music education (Salley et al., 2024) and theories supporting the design and implementation of digital learning media, the study built a theoretical foundation that

contextualized and strengthened the interpretation of field findings.

The research instruments included observation guides, interview questions, and field note sheets. These instruments were developed openly and flexibly to adapt to the dynamic realities of field conditions.

To ensure the validity of the data, the study implemented triangulation of both sources and methods. Interview results were compared with findings from observation and documentation, and data consistency was carefully analyzed. The researcher also conducted member checking by asking participants to review the initial interpretations to ensure the accurate representation of their experiences. This approach aligns with the view of Denzin et al. (2018), who assert that validity in qualitative research can be enhanced through multiple data sources and methodological strategies.

The data analysis followed the interactive model developed by Miles and Huberman (Thalib, 2022), which includes data reduction, data display, and conclusion drawing. The process began with thoroughly rereading the entire dataset from observations and interviews, followed by data reduction in which the most relevant and meaningful segments were selected. These data were then coded and organized into categories and themes, such as "adaptation of playing techniques through digital media," "affective responses to the application," and "enhancement of structural musical understanding."

The data were then presented as thematic narratives that interpretively illustrated relationships between categories. These narratives were designed to highlight the learning dynamics experienced by students, from the challenges of using the application to the development of their musical competence.

Finally, conclusions were drawn gradually through a comparative process between emerging patterns from the field and the conceptual framework used in the study. These conclusions were provisional and continuously refined in light of new data until strong consistency was achieved across the research findings.

Overall, the methodological approach in this study was not only intended to assess the effectiveness of a digital application in music education, but also to create a reflective space for understanding how technology may serve as an alternative tool in transforming traditional music learning processes, particularly in the context of *Gamelan Degung* within higher education institutions.

RESULTS AND DISCUSSION

In the treasures of Sundanese *karawitan*, *Gamelan Degung* is built with several kinds of musical instruments called devices. *Gamelan Degung* is recognized as an ancestral heritage, so it has existed since the ancient Sundanese people from generation to generation. Throughout history, it has changed by adding and reducing its instruments. Some of the devices in *Gamelan Degung Buhun* include *Gong, Bedug, Kendang* with *kulanter, Saron panerus, Bonang, Jengglong, Peking,* and *Suling* with a high tone because it is only for *gendingan* or instrumental. The high tone is used so that people can hear it from a distance, and is usually placed on a high stage (Entjar Tjarmedi, 1974). The current *Gamelan Degung* has several instruments, including Gong with its kempul, Kendang with its kulanter, Saron Panerus, Saron Peking, Bonang, Jengglong, and *Suling*, some of which are added with *Kecrek* (Juju Sain Martadinata, 1976). *Gamelan Degung* is widely favored in Indonesia, especially West Java. Not only is it popular domestically, but *Gamelan Degung* also attracts the international community's attention, especially those interested in Indonesian culture and *gamelan* music.

As part of Sundanese cultural wealth, Sundanese artists and technology experts have innovated by creating an application-based *Gamelan Degung*. This app lets anyone play *Gamelan Degung* digitally through an Android or iOS smartphone. Designed to be used on devices

with modest specifications, this application still pays attention to a fast response rate so that the playing experience remains comfortable and smooth. With this application, students are expected to be able to use it as an additional tool and practice tool, both at home and on campus, so that they can still take part in learning even though they cannot directly practice with real *gamelan* instruments.

The *Gamelan Degung* application is the result of collaboration between West Java artists and the development team, which in this case was developed by Dhany Irfansyah and Yulius Wibowo with the Masagi Studio-Biminasoft team. Released on October 1, 2021, this application is an innovation in the digitization of traditional regional musical instruments into mobile device platforms, which until now has been minimal. Here is the *Gamelan Degung* application used as a learning medium.

Figure 1. Gamelan Degung App Home Cover (Source: Marsel Ridky Maulana).

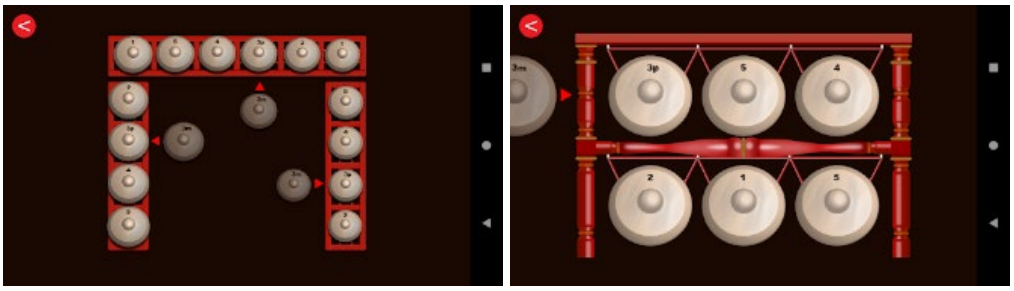

Figure 2. *Waditra*/Instrument *Bonang* (left) and *Jengglong* (right) (Source: Marsel Ridky Maulana).

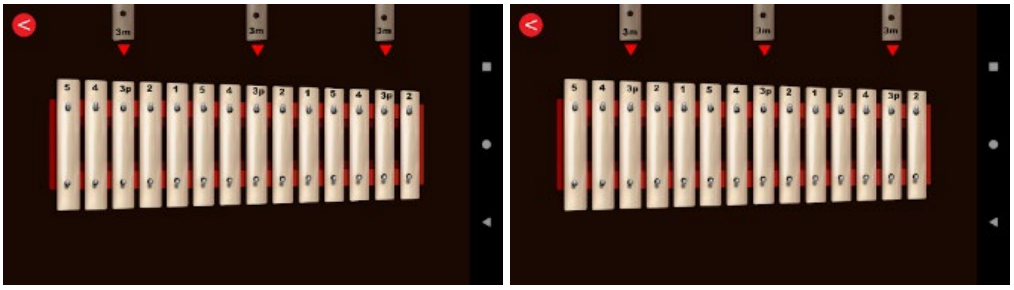

Figure 3. *Waditra*/Instrument *Saron Panerus* (left) and *Saron Peking* (right) (Source: Marsel Ridky Maulana).

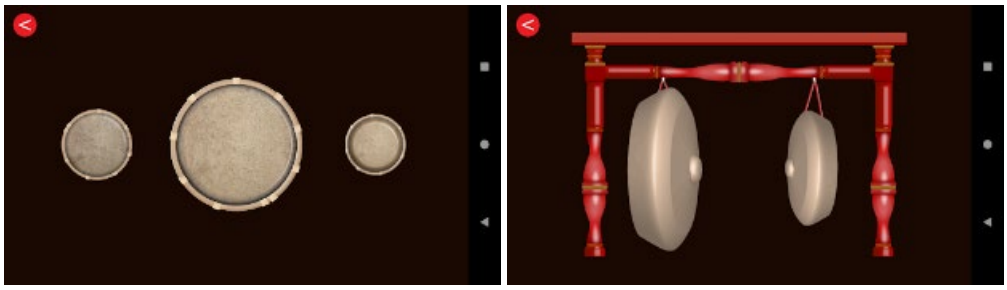

Figure 4. *Waditra*/Instrument *Kendang* (left) and *Gong* with *Kempul* (right) (Source: Marsel Ridky Maulana).

There is an interesting feature that presents six types of traditional musical instruments from *Gamelan Degung* Sundanese, namely: (1) *Saron Panerus*, (2) *Bonang*, (3) *Saron Peking*, (4) *Jenglong*, (5) *Kendang* with *Kulanter*, and (6) *Gong* with *Kempul*. All these instruments can be played interactively through touch on smartphones and tablets, both Android and iOS, provided they meet the minimum specifications.

Table 1. *Gamelan Degung* Application Information.

Application Information	iOS	Android
Version	2.0	1.5
Required OS	iOS 14.4	Android 6.0
Size	28 MB	13 MB

Based on information from the *Gamelan Degung* application, it can be seen that it is compatible with all smartphone devices, as long as they meet the minimum specifications determined. Especially at this time, most students already use smartphones with fairly sophisticated specifications, so there are no significant obstacles in operating the application. In terms of usage, the *Gamelan Degung* application offers complete features. It comes with clear usage instructions, making it easier for users to understand how to play *gamelan* through this application. Interestingly, this application allows playing *Gamelan Degung* in groups (ensemble), where each student can play a part of the *gamelan* instrument from their respective smartphone devices.

Gamelan is a traditional instrument that has been developed and passed down for centuries, and is firmly attached to local cultural identity (Fauzi, 2022). As a traditional instrument, *gamelan* is not only present as a musical instrument but also part of cultural practices rooted in local communities' social networks (Imammuddin & Rosnelly, 2021). Therefore, *Gamelan Degung* Sundanese needs to be maintained and preserved in terms of its instruments, music, drumming patterns, songs, and cultural values. In education, this preservation effort must also be accompanied by innovation so that *Gamelan Degung* remains relevant and not forgotten by the younger generation.

At least in the context of *gamelan* music and playing *Gamelan Degung* Sundanese songs, the next generation needs to understand and even master them. One of the reasons traditional arts are less popular is that they are often considered old-fashioned compared to modern arts (Anila & Adri, 2022). Other obstacles often faced, such as limited musical instruments, time, and places to practice, are now starting to be overcome with gamelan applications. Therefore, one of the efforts to attract the younger generation is modernizing traditional musical instruments through digital applications.

The existence of the "Unit Karawitan Mahasiswa" in the Universitas Pendidikan Indonesia music education study program is an important forum for students of the music education study program who want to develop their interests and talents in the field of musical arts. In formal learning in lectures, the limited time and scope of material often make mastery of Gamelan Degung's art not fully optimal. Therefore, this talent interest unit is an additional space that supports music education study program students in deepening their understanding of the theory and practicing *karawitan* more intensively. In addition, by utilizing Android/iOS-based applications, students can access additional material at any time, so that the learning process becomes more flexible, adaptive to the development of digital technology, and supports the development of their competencies more optimally.

The six student participants in this study were members of the "Unit Karawitan Mahasiswa" and had used the *Gamelan Degung* application during their learning process. Based on observations and interviews, three dominant themes emerged as the core findings of the research: (1) accessibility and learning flexibility, (2) increased interest and student engagement in *karawitan* learning, and (3) effectiveness in understanding basic rhythmic patterns.

Table 2. Observation and Interview Results on Student Use of the *Gamelan Degung* Application (Source**:** Field observation and interviews conducted by the researcher (2025).

Dominant Theme	Frequency	Example of Student Statement
Accessibility and Learning Flexibility	5 out of 6	"I can study at home or during my free time without going to campus."
Increased Interest and Engagement	5 out of 6	"Learning gamelan becomes fun because I can directly try it on my phone."
Understanding of Basic Rhythmic Patterns	4 out of 6	"Because it can be replayed and practiced repeatedly, I memorized the 'kedét', 'cindek', and 'paser barung' patterns more quickly."

In the learning process, students are first introduced to the features of the *gamelan* application and the basic theory of how to play the *gamelan*. After understanding the parts of the instrument and the music theory, students are introduced to the basic music patterns in *Gamelan Degung* Sundanese. In general, there are 17 basic beat patterns in *Gamelan Degung*, namely *randegan, kedet, seler putri, tengkep barung, parel, puyur putri, rugrug, racikan, dayung putri, rentagan, cindek, layar putri, balik layar, sendret, sampur, tenjragan,* and *paser barung*. However, the author did not use all 17 patterns in this lesson. The author only chooses three simple and easy-to-memorize patterns: *kedet*, *cindek,* and *paser barung*. The following is the notation of the basic *Gamelan Degung* patterns used in the lesson (see picture).

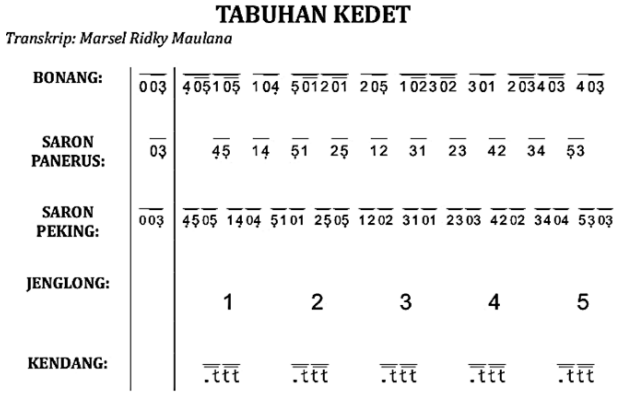

Figure 5. The Original Notation *Tabuhan Dasar*/Basic *Kedet* (Source: Marsel Ridky Maulana).

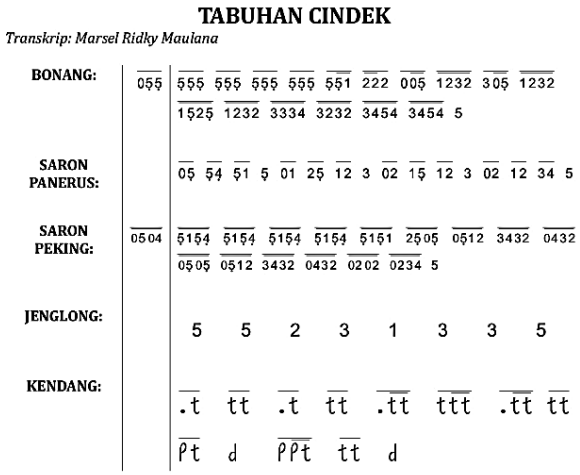

Figure 6. The Original Notation *Tabuhan Dasar*/Basic *Cindek* (Source: Marsel Ridky Maulana).

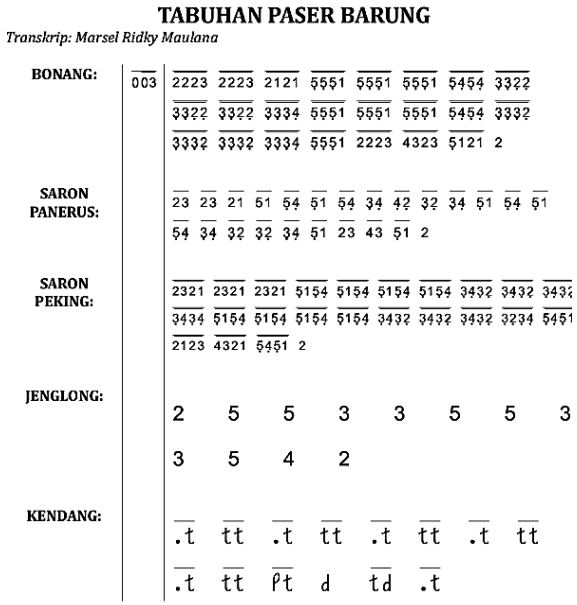

Figure 7. The Original Notation *Tabuhan Dasar*/Basic *Paser Barung* (Source: Marsel Ridky Maulana).

This basic pattern is an initial exercise for playing the *Gamelan Degung* application. Before using the application, students practice imitating Gamelan Degung's sounds by singing with their mouths. Students can choose virtual musical *waditra*/instruments using the *Gamelan Degung* application. After they were able to master the patterns orally, they practiced using the application independently based on what they had learned before. The author also provides time for students to familiarize themselves with this practice. If skilled enough, they will be asked to play the application smoothly and then allowed to perform together according to their chosen instrument. All this practice is done using a smartphone device.

Figure 8. Students choose the *waditra*/instrument in *Gamelan Degung* Application (Source: Marsel Ridky Maulana).

The Gamelan Degung application succeeded in arousing students' excitement and interest, so they were encouraged to explore the learning of *Gamelan Degung* more deeply. This was reinforced through an interview with one of the students who stated, "I like playing it, so I want to know more about the sounds of the various instruments in this *Gamelan Degung* application. Also, the app is practical and can be used anywhere." This statement shows that the simplicity of this application makes it easy for students to access it anytime and anywhere. After the learning and application of the *Gamelan Degung* application was completed, the following findings were obtained: (1) the application can be accessed easily by students without obstacles; (2) students show higher enthusiasm in learning *gamelan* through the application; and (3) students understand the learning material better because they can immediately practice it through the application, compared to receiving theory alone.

Figure 9. Students choose the *waditra*/instrument in *Gamelan Degung* Application (Source: Marsel Ridky Maulana).

As a form of evaluation, it can be seen that in terms of knowledge, students showed greater curiosity. This positively impacted their understanding of the shapes and sounds produced by each instrument in the *Gamelan Degung* application. In terms of attitude, students also showed increased activity in learning, including the enthusiasm to collaborate with fellow students in the *gamelan* ensemble format. Meanwhile, in terms of skills, students seemed to be more skillful and skilled in playing the given notation. It can be interpreted that using the *Gamelan Degung* application in the introduction and learning of basic *gamelan* is beneficial for students in understanding the material, even though they are not directly dealing with conventional *gamelan* instruments. In the future, this learning media needs to be further developed according to the teacher's creativity to deliver material more effectively. Apart from being a supporting tool, using this application also has the potential to overcome the limitations of learning facilities, especially in the Music Education study program, in terms of teaching *Gamelan Degung*.

Gamelan Degung application successfully addresses the limitations of conventional practice media, especially in the context of Sundanese *karawitan-based* music education. This aligns with **Vygotsky's** constructivist theory on the Zone of Proximal Development (ZPD), which posits that learning becomes more effective when supported by appropriate tools and social contexts.

The application is a scaffolding tool, enabling students to develop their understanding independently before transitioning to collaborative practices in a digital ensemble format. Consequently, a shift occurs from passive to active and constructive learning, enhancing a more personalized and contextual learning experience.

In terms of accessibility, this application expands learning opportunities, particularly for students facing geographic or time-related constraints. This supports the blended learning approach, which combines technological tools with traditional teaching to broaden the reach of education.

From the findings, it can be concluded that learning Gamelan Degung for students of the Music Education Study Program, especially those who are members of the "Unit Karawitan Mahasiswa," is more effective. Students look more skillful, without experiencing significant obstacles both in terms of time and practice. In addition, the flexibility of using this application in various situations also helps students deepen their basic skills in playing gamelan, so that their competence increases.

Figure 10. Students playing the *Gamelan Degung* application together (Source: Marsel Ridky Maulana).

The *Gamelan Degung* application brings several benefits to students. One of them is ease of access, because the application is available on their respective smartphones, students no longer need to take turns waiting to practice the *gamelan* directly. In addition, because it is an application on a smartphone, students can practice anytime and anywhere, without being limited by time and place. Interesting learning media like this help convey messages and information in the learning process, and are designed to make it easier for students to achieve learning goals (Nurseto, 2012).

However, like other innovations, this application is certainly not free from shortcomings in addition to its advantages. The following presents some of the advantages and disadvantages of this application when compared to conventional *Gamelan Degung*:

Table 3. Strengths and Weaknesses of *Gamelan Degung* Conventional and *Gamelan Degung* Applications.

Gamelan Application		*Gamelan* Conventional	
Strengths	Weaknesses	Strengths	Weaknesses
It can be played anywhere.	Requires certain smartphone specifications.	No need for supporting equipment such as speakers or chargers.	It cannot be played on the move.
It can be played at any time.	The sound produced depends on the quality of the speakers.	The sound produced is louder.	The number of players in the group is small (according to the number of tools).
Everyone has one.	Can only be played in a standard way (no technique).	Can practice real playing techniques.	Inflexible to play in terms of time and place.

In terms of accessibility, using the Gamelan Degung application can expand the opportunity to learn gamelan, including for those with physical limitations. For example, students who live far from campus can still learn *Gamelan Degung* easily through their smartphones at any time. In addition, compared to conventional *gamelan*, which requires high costs for purchase and maintenance, this application is much more economical. Students only need to have a smartphone and download the app, which is generally available for free.

Regarding flexibility, the *Gamelan Degung* application frees the learning process without being bound by time and place. Students can practice whenever and wherever they need. This is especially helpful when access to gamelan practice is only available at certain times and places. That way, students also have more opportunities to explore their creativity by playing *gamelan*. This application, developed for smartphones and tablets, also has other advantages such as affordable price, broad user coverage, and learning features that are continually updated (Dendy Triadi, 2013).

However, it is important to remember that the hands-on experience of playing conventional *Gamelan Degung* is still valuable

and cannot be entirely replaced by an app. Not all media fall into the category of learning media, but all learning media are part of educational media (Falahudin, 2014; Rumidjan et al., 2017).

CONCLUSION

This study explicitly addresses the core research question regarding the effectiveness of the *Gamelan Degung* application as an innovative solution to overcome the challenges of traditional music learning in the digital era. The application has been proven to address various physical and logistical barriers, such as the high cost of procurement, the heavy weight of instruments, the limited availability of *gamelan* sets, and restricted practice time within classroom settings. The application enhances flexibility in the learning process by enabling students to practice independently anytime and anywhere. It directly contributes to the efficiency of mastering the fundamental material of *Gamelan Degung*.

The primary contribution of this research lies in integrating digital technology into arts education, particularly within the context of higher education. Through a contextual and adaptive pedagogical approach, the application opens new possibilities for cultural preservation while simultaneously strengthening music learning strategies tailored to the characteristics of the digital generation. These findings also imply the need for curricular policy adjustments in higher music education by incorporating digital media into a technology-based learning strategy without neglecting the importance of hands-on practice with conventional *gamelan* instruments.

Nonetheless, it is essential to emphasize that this application is not intended to replace traditional gamelan instruments entirely. Instead, it serves as a supplementary tool within the learning process. Traditional *Gamelan Degung* performance inherently requires direct interaction with physical instruments to achieve a comprehensive musical understanding. Therefore, after mastering the material and basic techniques through the application, students are still encouraged to readapt to real instruments for practical application.

The main limitation in developing this application lies in its suboptimal representation of playing techniques, acoustic nuances, and the holistic musical experience. Hence, future research is recommended to explore integrating immersive technologies, such as augmented reality (AR), virtual reality (VR), and haptic devices, to enrich the interactive and sensory dimensions of *Gamelan Degung* learning. Interdisciplinary collaboration between technology, musicology, and education is a strategic step in developing a more representative, contextual, and impactful digital gamelan learning model, contributing significantly to the advancement of digital music education in higher education.

REFERENCE

A. Prastowo. (2010). *Menguasai Teknik-Teknik Koleksi Data Penelitian Kualitatif*. DIVAS Press.

Amrullah M Fahlevi, Z. (2024). Pengembangan Aplikasi Multimedia Berbasis Web untuk Pembelajaran Alat Musik Tradisional Aceh. *Jurnal Elektronika Dan Teknologi Informasi*, *5*(1), 7–13. https://doi.org/https://doi.org/10.5201/jet.v5i1.418

Anila, N., & Adri, M. (2022). Pengenalan Kesenian Alat Musik Tradisional Sumatera Barat Dengan Augmented Reality Berbasis Mobile Device. *Algoritma: Jurnal Ilmu Komputer Dan Informtika*, *Vol. 6 No.*(April), 35–47. https://doi.org/http://dx.doi.org/10.30829/algoritma.v6i1.11575

Burnard, P. (2007). Reframing creativity and technology: promoting pedagogic change in music education. *Journal of Music, Technology & Education*, *1*(1), 37–55. https://doi.org/10.1386/jmte.1.1.37_1

Dendy Triadi. (2013). *Bedah Tuntas Fitur Android*. Great Publisher, 2013.

Denzin, N. K., Lincoln, Y. S., Giardina, M. D., & Cannella, G. S. (2018). *The SAGE Handbook of Qualitative Research*. SAGE Publications, Inc. 2018.

Entjar Tjarmedi. (1974). *Penuntun Pengajaran Degung*. Bandung Pelita Mas , 1974.

Falahudin, I. (2014). Pemanfaatan Media dalam Pembelajaran. *Jurnal Lingkar Widyaiswara*, *1*(4), 104–117.

Fauzi, M. (2022). Pengembangan Aplikasi Media Pembelajaran Alat Musik Tradisional Aceh Berbasis Flash. *It (Informatic Technique) Journal*, *10*(1), 11. https://doi.org/10.22303/it.10.1.2022.11-20

Hidayatullah, R. (2024). Seni Tradisi Indonesia dan Tantangan Masyarakat Global. *Grenek Music Journal*, *13*(1), 107. https://doi.org/10.24114/grenek.v13i1.57012

Imammuddin, M., & Rosnelly, R. (2021). Pengembangan Aplikasi Media Pembelajaran Tanaman Herbal Berbasis Android. *IT (Informatics Technique) Journal*, *9*(2), 130. https://doi.org/10.22303/it.9.2.2021.130-141

Januar, M. C. (2023). Persepsi Siswa Terhadap Gamifikasi Quizizz Dalam Pembelajaran Ppkn Di Smkn 1 Serang. *Academy of Education Journal*, *14*(2), 348–358. https://doi.org/10.47200/aoej.v14i2.1664

Juju Sain Martadinata. (1976). *Sekar Gending Degung*. Bandung Mitra Buana , 1996.

Lasut, E. M. M., Supit, D., & Lotulung, M. S. D. (2023). Pemanfaatan TIK dalam Pembelajaran di Sekolah Dasar. *Jurnal Educatio FKIP UNMA*, *9*(3), 1401–1408. https://doi.org/10.31949/educatio.v9i3.5426

Lindsay, L. (2016). Transformation of teacher practice using mobile technology with one-to-one classes: M-learning pedagogical approaches. *British Journal of Educational Technology*, *47*(5), 883–892. https://doi.org/10.1111/bjet.12265

Maulana, M. R., Karyono, T., & Sunaryo, A. (2024). The Influence of Technology in Wayang Golek Purwa Performances : Combining Tradition and Innovation. *Virtuoso Jurnal Pengkajian Dan Penciptaan Musik*, *7 No. 2*(2), 199–212. https://doi.org/https://doi.org/10.26740/vt.v7n2.p199-212 The

Mustika, G., Fujiawati, F. S., & Permana, R. (2020). Aplikasi Mobile APPS Gamelan Untuk Pembelajaran Seni. *Jurnal Pendidikan Dan Kajian Seni*, *5*(2), 162–170. https://doi.org/http://dx.doi.org/10.30870/jpks.v5i2.9901

Nart, S. (2016). Music software is a technology integrated into music education. *Turkish Online Journal of Educational Technology*, *15*(2), 78–84.

Nurseto, T. (2012). Membuat Media Pembelajaran yang Menarik. *Jurnal Ekonomi Dan Pendidikan*, *8*(1), 19–35. https://doi.org/10.21831/jep.v8i1.706

Pramusinta, Y., & Ummah, A. N. R. (2023). Peningkatan kreativitas guru sekolah dasar melalui pelatihan pembuatan e book. *Jurnal Inovasi Hasil Pengabdian Masyarakat (JIPEMAS)*, *6*(1), 27–36. https://doi.org/10.33474/jipemas.v6i1.18757

Rahayu, R., Iskandar, S., & Abidin, Y. (2022). Inovasi Pembelajaran Abad 21 dan Penerapannya di Indonesia. *Jurnal Basicedu*, *6*(2), 2099–2104. https://doi.org/10.31004/basicedu.v6i2.2082

Ray, S., Das, J., Pande, R., & Nithya, A. (2024). Foodborne Pathogens cum Contamination, Hygiene Practices, and

Other Associated Issues in Ready-to-Eat Food. In *Recent Advances in Ready-to-Eat Food Technology* (Vol. 8, Issue 2, pp. 195–222). CRC Press. https://doi.org/10.1201/9781032622408-13

Riefaldi, M., Handoyo, S. S., & Arthur, R. (2024). Pemanfaatan Aplikasi Canva Dalam Materi Loader dan Truk Pada Mahasiswa Pendidikan Teknik Bangunan Universitas Negeri Jakarta. *Jurnal Pendidikan West Science*, *2*(01), 16–24. https://doi.org/10.58812/jpdws.v2i01.907

Rizkita, N., & Sukmayadi, Y. (2022). Application of Four-Hands Piano Virtual Learning Videos for Learning to Read Basic Level Block Notation. *Gondang: Jurnal Seni Dan Budaya*, *6*(2), 292. https://doi.org/10.24114/gondang.v6i2.37464

Rumidjan, Sumanto, Sukamti, & Sugiharti, S. (2017). Pelatihan Pembuatan Media Pembelajaran untuk Meningkatkan Kualitas Pembelajaran Bagi Guru Sekolah Dasar. *Abdimas Pedagogi*, *1*(1), 77–81. https://doi.org/https://doi.org/10.17977/um050v1i12017p77-81

Salley, R., Sumadi, A., & Triharini, M. (2024). Bentuk Fisik Angklung Sebagai Perwujudan Kosmologi dan Makna Sosial. *Tonika : Jurnal Penelitian Dan Pengkajian Seni*, *7*(2), 79–102. https://doi.org/10.37368/tonika.v7i2.767

Schiemer, G., & Havryliv, M. (2005). Pocket gamelan: A pure data interface for mobile phones. *Proceedings of the International Conference on New Interfaces for Musical Expression*, *1*, 156–159.

Thalib, M. A. (2022). Analisis Data Model Miles dan Huberman untuk Riset Akuntansi Budaya. *Madani : Jurnal Pengabdian Ilmiah Pelatihan*, *5*(1), 23–33. https://doi.org/https://doi.org/10.30603/md.v5i1.2581

Uludag, A. K., & Satir, U. K. (2023). Seeking alternatives in music education: The effects of mobile technologies on students' achievement in basic music theory. *International Journal of Music Education*, *1*, 1–17. https://doi.org/10.1177/02557614231196972

Ventura, M. Della. (2017). Creating inspiring learning environments by means of digital technologies: A case study of the effectiveness of WhatsApp in music education. *Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST*, *180*(1), 36–45. https://doi.org/10.1007/978-3-319-49625-2_5

Vygotsky, L. (2003). Vygotsky's educational theory in cultural context. In Alex Kozulin (Ed.), *Vygotsky's Educational Theory in Cultural Context* (pp. 1–478). Cambridge University Press, 2003. https://doi.org/10.1017/CBO9780511840975