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Development of Android-Based Interactive Learning Media for Teaching Makassar Traditional Drum

Ainul Yaqin Efendi; Kusnadi

Universitas Negeri Yogyakarta, Indonesia

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Abstract

The Makassar drum is one of the traditional musical instruments of South Sulawesi that has an important function in traditional ceremonies, art performances, and the socio-cultural life of the Makassar people. However, with the passage of time, students' knowledge of this traditional instrument has begun to decline. This study aims to (1) develop an Android-based Makassar Drum learning media product for high school students in Parepare City, (2) determine the feasibility of Android-based Makassar Drum learning media for high school students in Parepare City, and (3) test the effectiveness of Android-based Makassar Drum learning media for high school students in Parepare City. This study used the research and development (R&D) method with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The research subjects were 10th grade students at SMA Negeri 2 Parepare. Data collection methods encompasses observation, interviews, document anaylist, and test. Employing tools like product evaluation sheets from material and media experts, teacher and students feedback forms. Data analysis used in this study was qualitative and quantitative. Qualitative data analysis was used to describe the data resulting from needs analysis, learning analysis, and student characteristics analysis. Quantitative data analysis was used to test the feasibility of the media and its effectiveness in its implementation in learning. Three quantitative data analysis techniques were used: 1) Descriptive statistics, 2) Paired sample t-test, and 3) N-gain test. The results of the study show that (1) the product produced is an interactive multimedia application with the theme of Makassar Gendang, equipped with materials, video tutorials, sheet music, and virtual instruments as learning tools; (2) the media is deemed suitable for use, as evidenced by a material expert validation score of 86 (very good), a media expert score of 68 (good), a student response rate of 87 (very good), and a teacher response rate of 89 (very good); and (3) the media has been proven effective in improving learning outcomes. This was demonstrated through a paired sample t-test with a t-value of 14.218 and a p-value of 0.000 (<0.05), which means that there was a significant difference between the students' pretest and posttest results. Furthermore, the N-Gain calculation results show a pretest average score of 67.35, a posttest average of 85.58, and an N-Gain value of 0.54, which is in the moderate category. This means that this learning media has an effective improvement effect on student understanding, especially in the subject of Traditional Makassar Drum Music.

Keywords: *Interactive Learning Media, Makassar Drums, Traditional Music, ADDIE*

Introduction

The traditions and culture of the Makassar tribe have deep historical roots. Makkelo, (2020) research notes that the Makassar people have developed a literacy system through the Lontaraq script since the 16th century, producing monumental literary works such as Sureq Galigo, which is evidence of a highly advanced local civilization. More than just entertainment, literary and artistic works in Makassar culture reflect spiritual, moral, and social values that have been passed down from generation to generation. However, amid the rapid pace of globalization and technological development, there has been a shift in values among the younger generation towards local culture. Traditions are often considered outdated and irrelevant to the times. This has led to a decline in the interest and participation of the younger generation in preserving regional culture (Saputra et al., 2024). In addition, the lack of attractive learning facilities and media has also become an obstacle to cultural inheritance, both through formal and non-formal education. One of the traditional musical instruments of the Makassar tribe, called Ganrang or Gendang Makassar, is a percussion instrument that plays an important role in various traditional ceremonies, including weddings, welcoming important guests, and religious ceremonies. Gendang Makassar is made of wood in the shape of a tube with a hole covered with goat skin that is tightened so that it can produce sound when struck.

Reflecting on the current reality, the interest of the younger generation in preserving or even learning about their own culture seems to be waning, requiring an adaptive approach, especially in utilizing digital technology. The use of technology in education and culture is currently considered an effective solution for introducing and instilling cultural values in the younger generation. Akramunnisa et al., (2025) emphasize that the digitization of local culture through augmented reality-based mobile applications has been proven to strengthen cultural literacy among students. A study by Pardede et al., (2025) shows that 96.05% of students have personal smartphones regardless of their socioeconomic background, with an average daily usage of 4 hours and 45 minutes, mostly for social media and entertainment, but only a small portion for learning. This indicates a gap that can be exploited as an educational medium that is more relevant to the digital lifestyle of teenagers. Zahrani et al., (2025) also revealed that digital technology can be a strategic tool to support the regeneration of traditional culture in the global era, especially when combined with media that is attractive and suited to the characteristics of the younger generation. In the context of education, a digitally developed approach to arts and culture learning is considered capable of building students' local identity and protecting them from the negative influences of foreign cultures (Sabila et al., 2025)

The Phase E Music Arts Learning Outcomes (10th grade high school) based on *Keputusan Kepala Badan Standar, Kurikulum, dan Asesmen Pendidikan Kemdikbudristek Nomor 033/H/KR/2022* emphasizes the development of students' understanding, expression, and reflection on local music. This reflects the importance of learning that is not only cognitive, but also affective and psychomotor in building students' cultural awareness and local identity. Especially with the implementation of the Merdeka Curriculum, which requires contextual and locally-based learning, cultural-based learning media innovation has become very relevant. According to Moreira, learning media is an instrument used to show facts, concepts, principles, and procedures to make them more real or concrete (Moreira et al., 2018). Students can interact directly with various technologies in their learning activities in various ways. This includes working on material presented by computers or mobile devices in a structured sequence, such as exercise and practice programs (Smaldino et al., 2019).

According to Suryani et.al (2018) , the history of media use in learning based on technological development is divided into six stages of development, as follows.

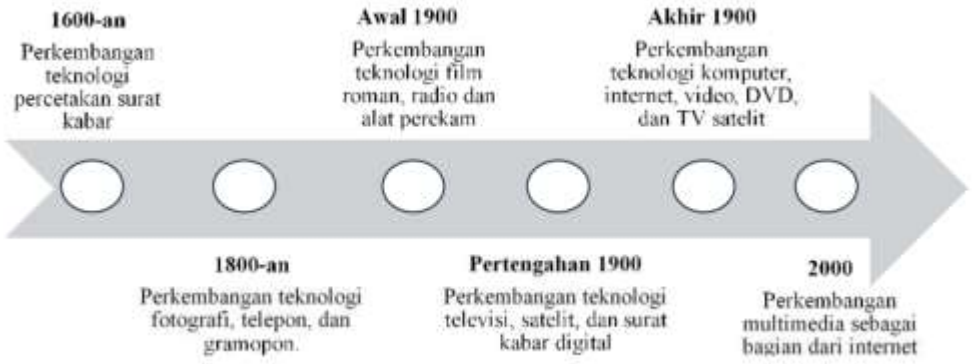

Figure 1. History of Learning Media Development
Source: (Suryani, Setiawan, and Putria, 2018)

The material can be presented in various data formats such as text, images, audio, video, simulations, and other types of media. There are several types of multimedia in the context of learning, namely presentation media, computer-based learning, television and video, 3D and animation, e-learning and learning management systems (LMS), and mobile learning (Deni Darmawan, 2012).

In the field of education, Android has become an important medium in supporting the digital learning process. Various studies show that Android-based applications can improve learning effectiveness through interactive and accessible approaches. Nurhaliza, (2022) developed an Android-based operating system learning application using App Inventor. The validation results show that the application is suitable for use in learning, with an average suitability score of 85.5%. The increasingly advanced development of the times shows significant changes in student character (Yuniarsih et al., 2023). The development of technology and information has given rise to communication devices known as smartphones. These devices have become an integral part of the lives of today's students, given that their activities and lifestyles are greatly influenced by the use of digital technology (Hakim & Yulia, 2024). Considering these characteristics, the development of learning media for high school students must be designed to be visually appealing, interactive, and relevant to the experiences of teenagers. Technology-based media such as Android applications or digital learning tools are effective strategies.

Method

This study uses the Research and Development (R&D) method with the aim of developing and testing the effectiveness of the Android-based Gendang Makassar virtual instrument learning media as an effort to preserve traditional music through the use of technology. The development model used is ADDIE, which consists of five stages, namely analysis, design, development, implementation, and evaluation. As described in the following figure.

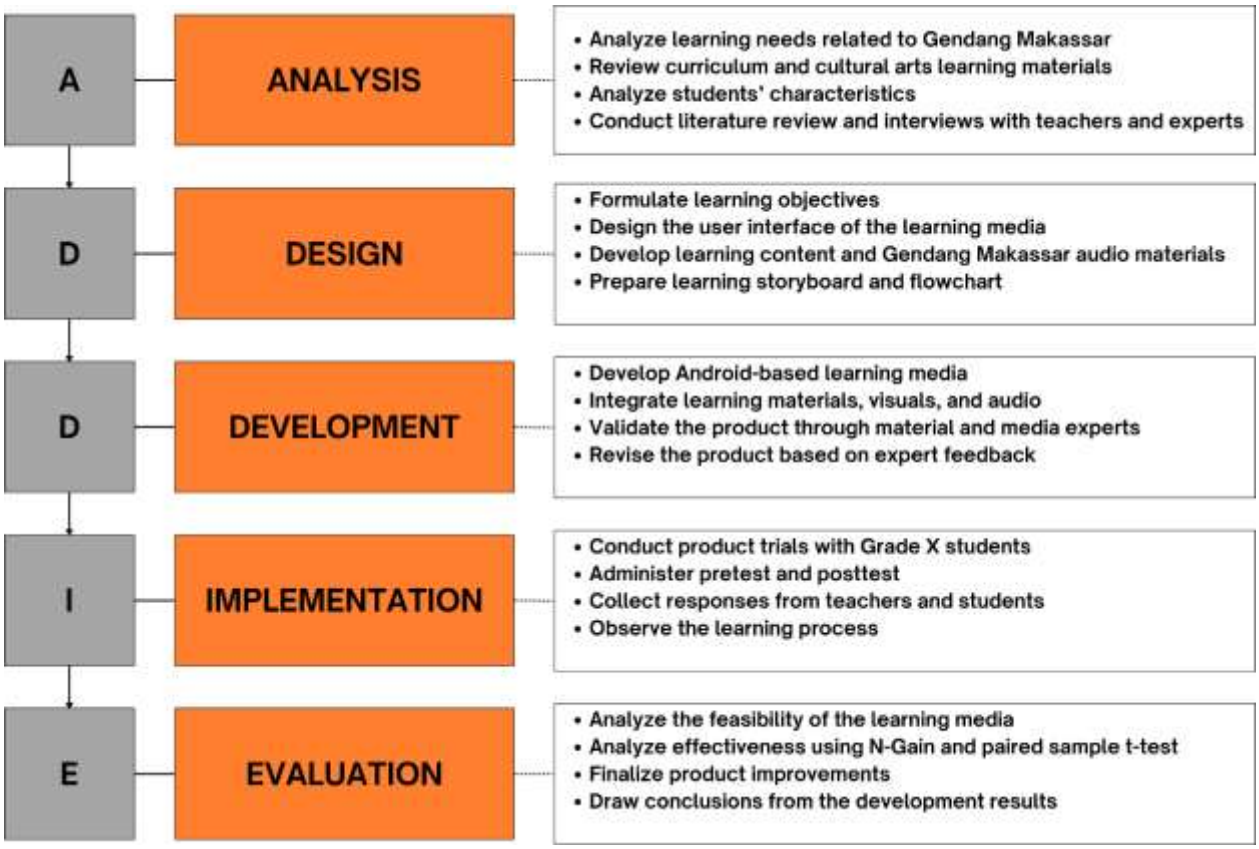

Figure 2. ADDIE Model

The analysis stage was conducted to identify learning needs through literature studies, observations, and interviews with arts and culture teachers and resource persons who understand Makassar Gendang. The analysis also included a review of the curriculum and student characteristics. The design stage included the design of learning objectives, application interface design, content material compilation, and learning flow design using flowcharts and storyboards. Next, in the development stage, the media was developed into an Android application prototype containing historical material, tutorials, notation, and the sound of Gendang Makassar, which was then validated by subject matter experts and media experts. Revisions were made based on validator input before field testing.

The implementation stage was carried out on 10th grade students at SMA Negeri 2 Kota Parepare, involving two classes with a total of 43 students. Learning was conducted using the developed media, accompanied by pre-tests and post-tests to measure learning outcome improvement. In addition, students and teachers were asked to fill out response questionnaires to assess the suitability and practicality of the media. The evaluation stage aimed to assess the effectiveness of the learning media based on student learning outcomes and user responses.

Data collection was conducted through observation, interviews, documentation, tests, and questionnaires. Data analysis used qualitative and quantitative approaches. Qualitative analysis was used to describe the results of the needs analysis and media development process, while quantitative analysis was used to test the feasibility and effectiveness of the learning media. Feasibility was analyzed descriptively using percentages, while the effectiveness of the media was analyzed using a paired sample t-test and N-Gain to determine the increase in student learning outcomes after using the learning media.

Results and Discussion

Product Development Results (Analysis–Design–Development)

The results of this study are in the form of an Android-based virtual learning medium for the Makassar drum, developed to support cultural arts learning for 10th grade high school students. The development of this medium is based on the results of an analysis of learning needs, student characteristics, and curriculum requirements that necessitate the integration of technology into the learning process. Based on the analysis stage, it was found that traditional music learning, especially Makassar Gendang, is still dominated by conventional methods and limited interactive learning media. This condition means that students have fewer opportunities to practice independently and understand the techniques of playing the drum in a concrete way. Therefore, Android-based learning media was chosen as a solution to provide a more flexible and interactive learning experience.

In the design stage, the learning media was designed with a systematic content structure that is easy for students to understand. The media contains several main components, namely an introduction to the Makassar drum, a brief history, playing techniques, basic notation, and interactive audio and visuals. In addition, the interface design was created with a simple display, clear navigation, and the use of visual and audio elements that support material comprehension, making it easier for students to operate the media independently. The development stage produced learning media products that can be operated on Android devices and allow students to interact directly with virtual instrument features. This feature allows students to tap parts of the drum on the screen to produce sounds that resemble real instruments, providing a more realistic learning experience. The integration of text, images, and audio in this media is in line with the principles of multimedia learning, which emphasizes the importance of presenting information through various sensory channels to enhance understanding.

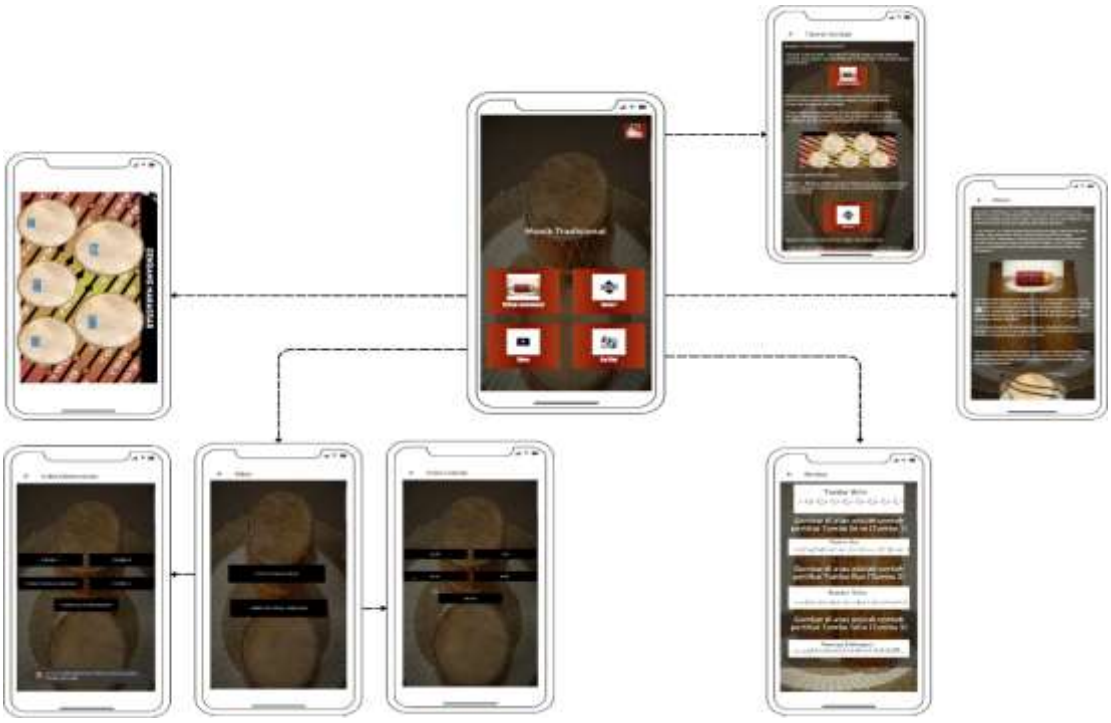

Figure 3. Design of the Learning Media for Makassar Traditional Drum

Overall, the results of the development show that the Android-based virtual learning media for the Makassar drum has been successfully developed in accordance with the learning needs and objectives that have been set. This media not only functions as a means of delivering material, but also as a training medium that allows students to learn actively and independently. Thus, the development of this media is expected to increase student engagement and strengthen their understanding of traditional regional music material.

Expert Validation Results (Development–Evaluation)

Expert validation was conducted as part of the evaluation process during the development stage of the Android-based Makassar Drum virtual learning media. This validation aimed to assess the suitability of the media before its implementation in learning and to ensure the media's alignment with the established learning objectives.

Table 1 Results of Media Product Feasibility Calculations by Material Experts

No	Aspect	Total Score Obtained	Ideal Maximum Score	Score
1.	Material Quality Aspects	21	25	84
2.	Content Quality Aspects in Materials	32	35	91
3.	Aspects of Language Use	21	25	84
Total		78	85	86
Criteria				**Very Good**

The results of validation by subject matter experts showed a feasibility score of 86%, which is classified as excellent. The subject matter experts' assessment covered aspects such as the suitability of the material to learning competencies, accuracy of content, completeness of material, and clarity of presentation. The score obtained shows that the material presented in the media is in line with the needs of arts and culture learning and can be used as a learning resource for students.

Meanwhile, the validation results by media experts scored 68% in the good category. The media experts' assessment focused on visual appearance, navigation, text readability, and ease of use. Although the media was deemed suitable for use, the media experts provided several suggestions for improvement, particularly regarding simplifying the appearance, integrating text and images, and adding instructions for use to make the media easier for students to operate.

Table 2 Results of Feasibility of Media Products by Material Experts

No	Aspect	Total Score Obtained	Ideal Maximum Score	Score
1.	Multimedia Display	32	45	71
2.	Quality of Multimedia Content	16	25	64
Total		48	70	68
Criteria				**Good**

Based on the validation results, product revisions were made in accordance with input from material experts and media experts. The revisions included the addition of a variety of drumming patterns, simplification of the Makassar Drum history material, improvement of the visual layout, and the addition of an instruction menu. This revision process shows that evaluation at the development stage plays an important role in improving the quality of learning media before it is used at the implementation stage.

User Test Results (Implementation–Evaluation)

The Android-based Makassar Drum virtual instrument learning media trial was conducted as part of the implementation stage as well as evaluating the use of media in cultural arts learning. The trial aims to determine the user's response, both in terms of students and teachers, to the feasibility and practicality of the learning media developed. The product trial was conducted with 20 students from class X-4 and 23 students from class X-7 at SMAN 2 Parepare with a total number of students in this trial of 43 students to determine the user's response to the virtual learning media for the Android-based Makassar Drum instrument in the context of real learning in the classroom.

Table 3 Feasibility of Media Products by Student Response

No	Aspect	Total Score Obtained	Ideal Maximum Score	Score
1.	Feasibility of Content/Material	22	25	88
2.	Feasibility of Language	17	20	85
3.	Presentation Feasibility	28	30	93
Total		67	75	89
Criteria				**Very Good**

The results of the analysis of student responses show the level of media feasibility with a percentage of 89%, which is included in the very good category. This achievement shows that most students consider the learning media to have an attractive appearance, navigation that is easy to understand, and material content that is clear and relevant to the needs of cultural arts learning. In addition to student responses, the assessment was also carried out by teachers as users as well as learning facilitators. The results of the teacher's response to the use of learning media show a very positive assessment in all aspects assessed. In the display aspect, the learning media obtained a percentage of 87.07%, while in the material and content aspect, the percentage was 91.77%. Both aspects are included in the excellent category, which indicates that the appearance of the media is considered attractive and easy to use, and the material presented is in accordance with learning competencies and cultural arts learning needs.

In addition, in the benefits aspect, the learning media obtained the highest percentage of 93.69%, which is also in the excellent category. These results indicate that teachers assess learning media as having high benefits in supporting the learning process, facilitating the delivery of traditional music material, and increasing student involvement in cultural arts learning in the classroom.

Overall, the results of the pilot test showed that the virtual learning media for the Android-based Makassar Drum instrument had a high level of acceptance from both students and teachers. This finding indicates that the media developed is not only technically feasible, but also practical to be used in the learning process of cultural arts at the high school level.

Table 4 Feasibility of Media Products by Teacher Response

No	Aspect	Average score obtained	Personates (%)	Category
1	Display Aspect	4,35	87,07	Very Good
2	Material/Content Aspect	4,59	91.77	Very Good
3	Benefit Aspect	4,69	93,69	Very Good

Media Effectiveness Test Results (Evaluation)

The effectiveness assessment was carried out through the analysis of students' pretest and posttest results. The data was analyzed using the paired sample t-test statistical test to determine whether or not there was a significant difference before and after the use of learning media, as well as the N-Gain test to measure the level of improvement in learning outcomes. The use of Sample T-Test requires an analysis requirement test. The normality test results show that the data is normally distributed, so the effectiveness analysis can be continued.

Table 5 Paired Sample Test

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviaion	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Nilai Post Test - Nilai Pretest	18.233	8.409	1.282	15.645	20.820	14.218	42	0.000

Based on the test results, the t value is 14.218 with a significance value (p-value) of 0.000 (<0.05), which shows that there is a significant difference between the pretest and posttest scores of students after the implementation of the Android-based Makassar Drum interactive learning media.

Table 6 N Gain Test

Statistics	Pretest	Postest	N Gain
Average	67.35	85.58	0.54
Total number of students	43		

Furthermore, the calculation results show that the average pretest score is 67.35 and the average posttest score is 85.58 from a total of 43 students, with an average N-Gain value of 0.54 which is included in the moderate category ($0.30 \leq g < 0.70$). These results indicate that there is an increase in student learning outcomes after participating in learning with the developed media. Thus, the implementation of interactive learning media Makassar Drum Learning Media based on android has the effectiveness in improving students' understanding of the material provided.

The findings of this study indicate that the Android-based interactive learning media for Makassar traditional drum developed through the ADDIE model is both feasible and effective for use in arts education. The structured development process covering analysis, design, development, implementation, and evaluation ensured that the learning media met pedagogical, technical, and contextual requirements. Recent studies emphasize that the ADDIE model remains a relevant and flexible framework for developing technology-based instructional media, particularly in supporting learner-centered and outcome-oriented learning environments (Aldoobie, 2015). Expert validation results, along with positive responses from students and teachers, confirm that the integration of multimedia elements and interactivity enhances usability, learning engagement, and instructional quality. This finding is consistent with recent research highlighting that well-designed interactive digital media can significantly improve learner motivation and engagement in arts and culture education (Koç & Kanadlı, 2025).

Furthermore, the effectiveness test results strengthen the contribution of this study by providing empirical evidence of improved learning outcomes. The significant difference between pretest and posttest scores, supported by the paired sample *t*-test and a moderate N-Gain value, indicates that the interactive features particularly the virtual instrument play a critical role in improving students' conceptual understanding and practical skills in traditional music learning. Recent studies suggest that interactive and experiential digital learning environments promote deeper learning and better knowledge retention by actively involving learners in the learning process (Bond et al., 2021). Additionally, the integration of digital media in traditional music education has been recognized as an effective approach to preserving local cultural heritage while adapting instructional practices to the needs of digital-native learners (Franceschini & Laney, 2021). Therefore, this study demonstrates that Android-based interactive learning media can serve as an innovative and effective solution for enhancing traditional music education in secondary schools.

Conclusion

The novelty of the Android-based Makassar Drum interactive learning media lies in the integration of local traditional music content with interactive virtual instrument features that allow students not only to learn material, but also to practice playing instruments digitally on one learning platform. This media integrates material, video tutorials, sheet music, and instrument simulations so as to support contextual, participatory, and student-centered learning, and is in line with the characteristics and learning needs in the Merdeka Curriculum. The implementation results show that the learning media developed is feasible and effective for use in Cultural Arts learning. This is evidenced by the results of expert validation which are in the good to very good category, positive student and teacher responses, and a significant increase in learning outcomes based on the effectiveness test. Thus, the Android-based Makassar Drum interactive learning media contributes to improving students' understanding and engagement with traditional music materials, while supporting the preservation of local culture through the use of digital technology.

References

Akramunnisa, A., Supriadi, S., & Patmaniar, P. (2025). Pengenalan Aplikasi Augmented Reality Sebagai Media Pembelajaran Berbasis Kemampuan Literasi dan Numerasi Siswa di SMA 9 Luwu. *Jurnal IPMAS*, *5*(1), 10–19. https://doi.org/10.54065/ipmas.5.1.2025.549

Aldoobie, N. (2015). ADDIE Model. *European Journal of Training and Development*, *37*(7), 615–634. https://doi.org/10.1108/EJTD-10-2012-0052

Badan Standar, Kurikulum, dan Asesmen Pendidikan. (2022). Keputusan Kepala Badan Standar, Kurikulum, dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Nomor 033/H/KR/2022 tentang Capaian Pembelajaran pada Pendidikan Anak Usia Dini, Jenjang Pendidikan Dasar, dan Jenjang Pendidikan Menengah pada Kurikulum Merdeka. Kemdikbudristek.

Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education*, *18*(1), 50. https://doi.org/10.1186/s41239-021-00282-x

Darmawan, D. (2012). Inovasi Pendidikan: Pendekatan Praktik Teknologi Multimedia dan Pembelajaran Online. PT. Remaja Rosda Karya.

Franceschini, A., & Laney, R. (2021). Sketching music together: Mixed groups exploring melodic similarity and contrast using a digital tabletop. *Journal of Music, Technology & Education*, *14*(2–3), 179–207. https://doi.org/10.1386/jmte_00040_1

Hakim, A. N., & Yulia, L. (2024). Dampak Teknologi Digital Terhadap Pendidikan Saat Ini. *Jurnal Pendidikan Sosial Dan Humaniora*, *3*(1), 145–163.

Koç, A., & Kanadlı, S. (2025). Effect of Interactive Learning Environments on Learning Outcomes in Science Education: A Network Meta-Analysis. *Journal of Science Education and Technology*, *34*(4), 681–703. https://doi.org/10.1007/s10956-025-10202-7

Makkelo, I. D. (2020). Sejarah Makassar dan Tradisi Literasi. *Lembaran Sejarah*, *15*(1), 30. https://doi.org/10.22146/lembaran-sejarah.59523

Moreira, I. X., Pereira, S., & Gusmão, H. F. (2018). The Influence Of Concrete Instructional Media On Learning Achievement. *ISCE : Journal of Innovative Studies on Character and Education*, *2*(1), 104–114.

Nurhaliza, B. (2022). *Pengembangan Media Pembelajaran Berbasis Android Menggunakan MIT App Inventor untuk Meningkatkan Hasil Belajar Peserta Didik pada Konsep Gerak Melingkar* [bachelorThesis, FITK UIN Syarif Hidayatulah Jakarta]. https://repository.uinjkt.ac.id/dspace/handle/123456789/61570

Pardede, S., Pardede, D. L., & Pardede, L. (2025). *Exploring Smartphone Use and Learning Behaviors among Senior High School Students: Insights from a Developing Region in Indonesia*.

Sabila, N., Safitri, D., & Sujarwo, S. (2025). Pelestarian Nilai Budaya Melalui Pendidikan Di Tengah Arus Globalisasi. *Jurnal Intelek Insan Cendikia*, *2*(4), 7641–7651.

Saputra, R., Hasanah, N., Kamaludin, Azis, M., Putra, M. A., & Armayadi, Y. (2024). Peran Seni Dalam Mempertahankan Identitas Budaya Lokal Di Era Modern. *Besaung : Jurnal Seni Desain Dan Budaya*, *9*(2), 183–195. https://doi.org/10.36982/jsdb.v9i2.4044

Smaldino, S. E., Lowther, D. L., Mims, C., & Russell, J. D. (2019). *Instructional technology and media for learning* (12th Edition). Pearson Education, Inc.

Suryani, N., Setiawan, A., & Putria, A. (2018). Media Pembelajaran Inovatif dan Pengembangannya. PT. Remaja Rosdakarya.

Yuniarsih, C., Anipah, A., Susanti, S., Azis, A., & Septialona, A. (2023). Menganalisis Kompentensi Pemimpin Perubahan di Era Perubahan Digital dan Implementasi di Lembaga Pendidikan. *Jurnal Syntax Admiration*, *4*(1), 17–32. https://doi.org/10.46799/jsa.v4i1.528

Zahrani, I. P., Purwanto, E., Ardiyanti, N., Lusiyanti, S., & Riani, A. E. (2025). Media sebagai Alat Penguatan Budaya Lokal di Tengah Arus Globalisasi. *Jurnal Desain Komunikasi Visual*, *2*(3), 13–13. https://doi.org/10.47134/dkv.v2i3.4281