International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Android-Based Local History Learning to Strengthen Students' Understanding of Yogyakarta Cultural Heritage

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Abstract

Advances in digital technology have driven the transformation of history education through the use of more interactive and contextual Android-based media. This study aims to explore students' experiences in using Android-based local history learning and to analyze its contribution to enhancing their understanding of Yogyakarta's cultural heritage. The study employed a qualitative approach, involving 10th-grade students and a history teacher at a high school in the Special Region of Yogyakarta, selected through purposive sampling. Data were collected via open-ended questionnaires, in-depth interviews, and observations, and were analyzed using the Miles, Huberman, and Saldaña model, which includes data reduction, data presentation, and drawing conclusions. The results indicate that Android-based local history learning enhances students' interest and motivation, facilitates their understanding of the history and philosophical values of Yogyakarta's cultural heritage, and fosters a growing awareness of the need to preserve local culture. The integration of multimedia—including text, images, videos, interactive maps, and quizzes—provides a more meaningful learning experience compared to conventional teaching methods. This study contributes an Android-based local history learning model that integrates Yogyakarta's cultural heritage as a contextual learning resource, thereby supporting the strengthening of students' cultural identity while also promoting cultural preservation in the era of digital transformation.

Keywords: local history learning; Android; Yogyakarta's cultural heritage; digital learning; cultural identity.

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E-ISSN: 2986-0733

INTRODUCTION

Advances in digital technology have transformed the way people—especially the younger generation—access information, communicate, and learn (Jamaludin et al., 2025). The use of Android-based smartphones has become an integral part of students' daily lives, opening up new opportunities to create more interactive, flexible, and contextual learning experiences (Reuschke et al., 2021). On the other hand, the rapid pace of globalization and the dominance of global digital content also pose challenges to the preservation of local culture. Young people tend to be more familiar with popular culture through social media than with their own local history and culture (Yang & Chung, 2026). This situation has the potential to diminish a sense of belonging to local cultural identity if not balanced by educational innovations relevant to the characteristics of 21st-century students.

Yogyakarta is one of Indonesia's cultural centers, boasting a rich and diverse history and culture (Bunari et al., 2023). As a Special Region, Yogyakarta possesses tangible cultural heritage sites such as the Yogyakarta Palace, Taman Sari, the Yogyakarta Monument, Vredeburg Fortress, and the Malioboro area, as well as intangible cultural heritage such as the Sekaten Ceremony, Grebeg, Yogyakarta batik, wayang, gamelan, and the philosophy of Hamemayu Hayuning Bawana (Birsyada et al., 2024). These various cultural heritages not only hold historical value but also embody educational values, character development, tolerance, mutual cooperation, and local wisdom that form the foundation of life for the people of Yogyakarta. Therefore, the existence of this cultural heritage holds great potential as a source of contextual and meaningful history learning for students.

However, history instruction in schools remains dominated by lecture-based methods, the use of textbooks, and activities focused on memorizing facts and the chronology of historical events (Kachorsky & Kessner, 2022). Such approaches often fail to establish a connection between historical content and the realities of students' lives. As a result, history is viewed as a boring subject, irrelevant, and focused solely on achieving academic grades (Bunari et al., 2023). On the other hand, students belonging to Generation Z actually possess a high level of digital literacy and are accustomed to accessing information through mobile devices, social media, short videos, and interactive digital applications. This situation highlights a gap between students' characteristics and the still-conventional strategies for teaching history (Sebbowa & Ng'ambi, 2020).

This phenomenon is also evident in local history education in Yogyakarta. Although students live in an environment rich in historical and cultural sites, their understanding of the philosophical significance and local cultural values remains relatively limited (Nugroho, 2019).

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Many students know Malioboro, the Yogyakarta Palace, or the Yogyakarta Monument only as tourist destinations, without understanding their history, cultural value, or their important role in the historical journey of the Indonesian nation (Saefudin, 2025). This situation indicates that the use of local cultural heritage as a resource for learning history has not been optimized, even though the surrounding environment serves as an authentic and contextual learning laboratory.

Digital transformation in education actually offers significant opportunities to address these issues (Patil et al., 2023). The use of Android-based learning media allows students to gain a more engaging learning experience through the integration of text, images, videos, audio, interactive maps, animations, quizzes, and geolocation technology that can link historical material to actual cultural sites (Ishar et al., 2024). This type of learning not only boosts motivation but also enables students to build their own understanding of history in line with 21st-century learning characteristics that emphasize critical thinking, creativity, communication, and collaboration (Ilham & Rahman, 2024). Furthermore, this approach aligns with the implementation of the Merdeka Curriculum, which promotes context-based, environment-centered learning and reinforces the Pancasila Student Profile—particularly the dimensions of global diversity and noble character—through exposure to local culture.

Various previous studies have shown that the use of digital technology can enhance learning motivation, student engagement, and learning outcomes across various subjects (Gershon, 2014; Tirado-Olivares et al., 2021, 2024). The use of Android apps, virtual museums, augmented reality, gamification, and digital modules has been shown to provide a more interactive learning experience compared to conventional learning (Rowe, 2020; Sari & Saefudin, 2024; Stoel et al., 2022). Similarly, several studies on digital-based history learning indicate that digital media can increase students' interest in historical material and aid in visualizing past events (Kessner & Harris, 2022; Saefudin et al., 2026; Tsai et al., 2025). However, most of these studies still focus on the effectiveness of learning media in general, the development of learning applications, or the digitization of museums and cultural heritage sites. Research that specifically integrates Yogyakarta's cultural heritage as the main content in Android-based history learning remains very limited.

Furthermore, previous studies have generally focused more on measuring improvements in students' learning outcomes or motivation, while research on how Android-based learning can strengthen students' understanding of local cultural heritage and foster cultural awareness and cultural identity remains scarce (Catalano, 2021; Park & Sohn, 2023; Tilak et al., 2023). In fact, amid the rapid pace of digital transformation, history education should not only focus on mastering subject matter but also serve as a means of preserving culture and

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strengthening the identity of the younger generation.

Given these conditions, there are three research gaps that form the basis of this study. First, there is still limited research developing Android-based local history learning that utilizes Yogyakarta's cultural heritage as the primary learning resource. Second, previous studies have primarily focused on the effectiveness of learning media on learning outcomes, while aspects of students' understanding of local cultural heritage and the formation of their cultural identity have not been extensively explored. Third, there has been little research examining students' experiences in using Android-based learning media to understand the historical values and local wisdom of Yogyakarta in a contextual manner.

Building on these gaps, this study offers a novel approach in the form of an Android-based local history learning model that integrates Yogyakarta's cultural heritage as a contextual learning medium to enhance students' understanding of local history and culture. Unlike previous studies, which were more oriented toward the use of technology as a medium for delivering content, this study positions digital technology as a means of cultural preservation, strengthening cultural identity, and developing history education that aligns with the characteristics of the digital generation.

Therefore, this study aims to explore students' experiences in using Android-based local history learning and to analyze how this medium contributes to enhancing their understanding of Yogyakarta's cultural heritage. The research findings are expected to provide a theoretical contribution to the development of digital-based history learning studies while also serving as practical recommendations for teachers, schools, and educational media developers in integrating local wisdom into history learning in the era of digital transformation.

METHOD

This study employs a qualitative approach with the aim of gaining an in-depth understanding of students' experiences in using Android-based local history learning materials to enhance their understanding of Yogyakarta's cultural heritage. The qualitative approach was chosen because this study focuses on exploring students' meanings, experiences, perceptions, and interpretations regarding the use of digital learning media, thereby enabling a comprehensive description of the phenomenon within the context of history learning based on local wisdom (Yin, 2018).

The study was conducted at a high school (SMA) in the Special Region of Yogyakarta, selected through purposive sampling based on several criteria: the school had implemented the Merdeka Curriculum, possessed facilities supporting digital learning, and its students were

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already accustomed to using Android-based smartphones in learning activities. The research focused on 10th-grade students because at this level, Indonesian history curriculum begins to integrate local history and the reinforcement of cultural identity as part of contextual learning.

The research subjects consisted of one 10th-grade class selected through purposive sampling because it was deemed capable of providing relevant information regarding learning experiences using Android applications. In addition to the students, the Indonesian History teacher was also involved as a supporting informant to obtain information regarding the implementation of instruction, student responses, and the effectiveness of using Android-based learning media in the local history learning process.

Data collection was conducted using three main techniques: open-ended questionnaires, in-depth interviews, and observation. Open-ended questionnaires were administered to all students to explore their perceptions regarding the ease of using the app, their interest in learning local history, their motivation to learn, their understanding of Yogyakarta's cultural heritage, and the benefits of Android-based media in the learning process. The questions were designed as open-ended prompts so that students could freely express their experiences and opinions based on their actual learning experiences.

Furthermore, in-depth interviews were conducted with several students selected based on the diversity of their responses to the open-ended questionnaire, thereby yielding more detailed information about their learning experiences. Interviews were also conducted with history teachers to gain perspectives on changes in students' learning activities, the effectiveness of Android-based media in learning, and the challenges faced during the implementation of digital-based history learning. All interviews were conducted in a semi-structured manner, allowing the researcher the flexibility to develop follow-up questions based on the informants' responses.

Observations were conducted during the learning process using an observation sheet that focused on students' activities while using the Android app, interactions between teachers and students, students' engagement in discussions, their ability to connect historical material with Yogyakarta's cultural heritage, and their responses to the app's features. Observations were also used to gather data on changes in students' learning behaviors during the learning process.

Data analysis was conducted interactively using the Miles, Huberman, and Saldaña model, which comprises three stages: data reduction, data presentation, and drawing conclusions. In the data reduction stage, the researcher selected, grouped, and simplified data from questionnaires, interviews, and observations in accordance with the research focus. The

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next stage involved presenting the data in the form of descriptive narratives, matrices, direct quotes from informants, and tables illustrating students' perceptions of Android-based local history learning. The final stage involves drawing conclusions by interpreting all research findings and comparing information obtained from various data sources to gain a comprehensive understanding of the phenomenon under study (Miles et al., 2014).

Data validity was ensured through source triangulation and methodological triangulation (Miles et al., 2014). Source triangulation was conducted by comparing information obtained from students and history teachers, while methodological triangulation was carried out by comparing the results of open-ended questionnaires, interviews, and observations. In addition, the researcher also conducted member checking with several informants to ensure that the interpretations were consistent with the experiences they shared during the study. This step was taken to enhance the credibility, reliability, and confirmability of the research results so that the findings would have a high level of confidence.

RESULTS AND DISCUSSION

This study aims to explore students' experiences in using Android-based local history learning to enhance their understanding of Yogyakarta's cultural heritage. Data were collected through open-ended questionnaires, in-depth interviews, and observations during the learning process. Overall, the results indicate that the use of Android applications provides a more engaging, interactive, and contextual learning experience compared to learning history through textbooks. Students not only showed increased interest in local history material but also gained a better understanding of the cultural values embodied in Yogyakarta's various cultural heritage sites.

Based on observations during the learning process, students appeared more active in exploring the material available on the Android app. They utilized features such as images, videos, location maps, and interactive quizzes to understand the history of the Yogyakarta Palace, the Yogyakarta Monument, Taman Sari, Malioboro, as well as various cultural traditions such as Sekaten and Grebeg. Group discussion activities also took place more dynamically as students exchanged information about their experiences visiting these various cultural sites.

Survey results indicate that the majority of students responded positively to the use of the Android app as a medium for learning local history.

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Table 1. Students' Perceptions of Android-Based Local History Learning

Evaluated Aspects	Strongly Agree	Agree	Netral Neutral	Disagree	Strongly Disagree
Android devices make history learning more interesting	42	44	10	4	0
The app helps students understand the history of Yogyakarta	39	47	11	3	0
It enhances students' understanding of Yogyakarta's cultural heritage	37	49	10	4	0
It increases students' motivation to study local history	40	43	13	4	0
It encourages students' commitment to cultural preservation	35	50	11	4	0

Table 1 shows that the majority of students fell into the "agree" and "strongly agree" categories for all aspects measured. These findings indicate that Android-based history learning can enhance students' learning experiences while strengthening their understanding of Yogyakarta's cultural heritage.

The interview results reinforce these findings. One student stated:

"I used to think of Malioboro as just a place to hang out, but after using this app, I've come to understand its history and why the area is important to the development of Yogyakarta." (Student A)

Another student remarked:

"The material is easier to understand because there are videos and images. I've learned more about the philosophy behind the Yogyakarta Monument and the connection between the Palace, the Monument, and the Krapyak Stage." (Student B)

Meanwhile, another student stated:

"Learning history isn't boring anymore because it's like exploring tourist sites using a smartphone. After learning this, I want to visit those places in person." (Student C)

History teachers also responded positively to the use of Android devices. According to the teachers, students became more active in asking questions, participating in discussions, and connecting historical material to their surroundings. The teachers noted that learning was no longer lecture-centered but had evolved into a more exploratory and student-centered approach.

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Observations during class also revealed changes in students' learning behaviors. At the beginning of the lessons, most students simply waited for the teacher's explanations. After the Android app was introduced, students began independently seeking additional information about the history of the Yogyakarta Palace, Vredeburg Fortress, Taman Sari, and various cultural traditions featured in the app. They also actively discussed the philosophical meaning of "Hamemayu Hayuning Bawana" and connected it to the lives of Yogyakarta's people today.

In addition to enhancing historical understanding, the Android app also helped students recognize the connections between cultural sites, historical events, and local cultural values. Most students stated that they had only just come to understand that the various historic buildings in Yogyakarta are not merely tourist attractions but are part of the historical journey and cultural identity of the people of Yogyakarta.

Nevertheless, the study also identified several challenges in implementing Android-based learning. Some students reported that unstable internet access caused videos to load more slowly. In addition, some students needed time to adapt to the interactive map feature in the app. However, these challenges did not dampen the students' enthusiasm for participating in the lessons.

Overall, the study's results indicate that Android-based local history learning provides a more meaningful learning experience compared to conventional learning. The integration of text, images, videos, interactive maps, and quizzes not only boosts students' motivation to learn but also strengthens their understanding of Yogyakarta's cultural heritage and fosters awareness of the importance of preserving local culture in the digital age.

DISCUSSION

The research findings indicate that Android-based local history learning can enhance students' understanding of Yogyakarta's cultural heritage while also increasing their motivation to learn. Students find it easier to understand local history because the material is presented through images, videos, interactive maps, and quizzes, which allow them to build a more contextual learning experience. These findings align with the research by Jonathan and Wasito (2023), which states that Android-based applications can improve learning effectiveness through more engaging and interactive presentation of material. Additionally, Puteri et al. (2025) also explain that Android-based learning media can improve learning outcomes as well as students' independence in the learning process.

The findings of this study also indicate that success in history learning is influenced not only by the use of technology but also by the ability of instructional media to present material

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that is relevant to students' lives. When cultural heritage sites such as the Yogyakarta Palace, the Yogyakarta Monument, Taman Sari, and Malioboro are presented through digital media, students are able to connect historical knowledge with their everyday experiences. This aligns with constructivist theory, which states that knowledge is constructed through active and contextual learning experiences (Darsono et al., 2025; Sari & Saefudin, 2024; Setyo et al., 2026). Thus, the use of Android applications provides students with the opportunity to construct their own understanding through the exploration of various digital learning resources.

In addition to enhancing historical understanding, this study found that Android-based learning also strengthened students' awareness of the importance of preserving local culture. Students began to understand that various cultural sites in Yogyakarta are not merely tourist attractions but are part of a cultural identity that must be preserved. This finding supports previous research stating that contextual learning based on local culture can build interpersonal skills while strengthening students' understanding of cultural values in daily life (Saefudin et al., 2026; Utomo et al., 2024). The results of this study also expand upon previous findings that explain how digital media holds great potential for supporting the preservation of cultural heritage through more engaging and meaningful learning activities (Pangestu et al., 2025; Saefudin, 2024; Saefudin et al., 2024).

This study also shows that the use of Android apps encourages students to be more active during the learning process. They not only receive information from teachers but also seek additional information, discuss with peers, and explore various features available on the apps. These findings are consistent with research indicating that Android-based learning media provide students with opportunities to learn more independently through various digital learning resources (Alonso, 2019; Komalasari et al., 2025). Similar results were also reported in previous studies, which explained that Android-based digital modules can increase students' active participation because the material is presented systematically, interactively, and is easily accessible via mobile devices (Tirado-Olivares et al., 2021; Utaminingsih et al., 2024).

Overall, the results of this study demonstrate that Android-based local history learning not only serves as an innovative learning medium but also as an effective strategy for strengthening students' understanding of Yogyakarta's cultural heritage. The integration of digital technology with local wisdom creates a more contextual learning experience, enhances learning motivation, strengthens cultural identity, and supports the preservation of cultural heritage in the era of digital transformation. These findings also expand the body of research on digital-based history learning by presenting Yogyakarta's cultural heritage as a primary learning resource relevant to 21st-century educational needs.

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CONCLUSION

The research findings indicate that Android-based local history learning makes a positive contribution to enhancing students' understanding of Yogyakarta's cultural heritage. The use of digital media has transformed the history learning process—which was previously conventional—into one that is more interactive, contextual, and student-centered. Through the integration of various multimedia features—such as images, videos, interactive maps, and quizzes—students not only gain knowledge about historical events but also come to understand the philosophical, social, and cultural values embedded in Yogyakarta's diverse cultural heritage. These findings demonstrate that digital technology can serve as both a learning tool and a medium for cultural preservation in the era of digital transformation.

From an academic perspective, this study contributes to the development of research on digital-based history learning by presenting a learning model that integrates Yogyakarta's cultural heritage as a contextual learning resource. Unlike previous studies, which have largely focused on the effectiveness of learning media on motivation or learning outcomes, this study demonstrates that Android-based learning also plays a role in strengthening students' understanding of local culture, fostering cultural awareness, and supporting the formation of cultural identity. Thus, this study expands the use of digital technology not only as a learning medium but also as a strategy for preserving cultural heritage through education.

Nevertheless, this study still has several limitations. The study was conducted at only one school with a limited number of informants; therefore, the results cannot yet be generalized to all students in the Special Region of Yogyakarta or other regions in Indonesia. Furthermore, this study focused primarily on students' learning experiences and thus did not quantitatively measure improvements in learning outcomes or long-term behavioral changes. Other factors, such as the readiness of digital infrastructure, teachers' ability to develop learning materials, and differences in student characteristics, were also not analyzed in depth.

Therefore, future research is recommended to involve a larger number of respondents across a more diverse range of schools to obtain a more comprehensive picture of the effectiveness of Android-based local history learning. Future studies could also employ mixed-methods or experimental designs to more objectively measure the impact of learning media on learning outcomes, cultural awareness, and the formation of students' cultural identity. Furthermore, app development could be integrated with Augmented Reality (AR), Virtual Reality (VR), or Artificial Intelligence (AI) technologies to make local history learning more immersive, adaptive, and capable of supporting the sustainable preservation of Indonesia's cultural heritage.

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