



NEEDS ANALYSIS OF QUARTET CARDS IN HISTORY LEARNING OF CLASS X AT SMA GAMA YOGYAKARTA

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ABSTRACT

This research aims to develop and test the feasibility of an innovative learning medium in the form of QR Code-based Quartet Cards for history learning, specifically on the Hindu-Buddhist Kingdoms in the Indonesian Archipelago, for 10th-grade social studies students at GAMA High School in Yogyakarta. The background of this research is based on low student interest and engagement in history learning, which is often perceived as boring and difficult to understand and remember historical figures and events. The method used was Research and Development (R&D), referring to the Sugiyono model, which includes six stages: identifying potential and problems, data collection, product design, design validation, design improvement, and product testing. The study subjects included 19 10th-grade social studies students and a history teacher. Data were collected through observation, interviews, and a 16-item questionnaire. Data were then analyzed descriptively using quantitative and qualitative methods.

The validation results by media experts and material experts indicated that the product was in the feasible to very feasible category for use. The trial results showed that student responses to the media were positive, with 52.96% in the excellent category, 35.86% in the good category, 9.21% in the adequate category, and 1.97% in the poor category. These findings indicate increased student engagement and positive acceptance of the developed learning media. The novelty of this media lies in the integration of the quartet card game with QR Code technology, which is directly connected to the learning video, allowing students not only to play but also to access visual and contextual explanations of the material. This integration facilitates student understanding of the history material and creates a more interactive and meaningful learning experience. Thus, QR Code-based Quartet Cards have the potential to become an alternative learning medium that is innovative, interactive, and relevant to the needs of learning in the digital age.

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1. INTRODUCTION

Education is a process aimed at gaining understanding and knowledge from various disciplines (Desi, 2023). Educational success is inseparable from the teaching and learning process, which involves interactions between educators and students to achieve new understanding and improve student abilities (Hasan et al., 2022). The effectiveness of this process is influenced by various factors, including student abilities, the learning strategies employed by teachers, and the use of learning media as supporting tools (Patmawati, Sahari, & Hunaifi, 2023). Learning media plays a crucial role in conveying information and clarifying concepts, making them easier for students to understand.

However, in practice, the use of learning media in the classroom—particularly in history lessons—is still suboptimal. At the high school level, students tend to feel bored due to the dominance of conventional learning methods, especially in history, which is often considered monotonous and uninteresting (Yuniastuti et al., 2021). Teacher-centered learning with lecture methods and the dominant use of textbooks leads to low student engagement and underdeveloped conceptual understanding. Without effective media support, the learning process becomes less engaging and has the potential to diminish students' interest in learning history.

Conceptually, history is understood as stories and events from the past. As stories, history is subjective because it is the result of human interpretation, while as events, history is objective because it refers to real events in the past (Martha, Sa'diyah, Maulana, & Warto, 2023; Prayogi, 2021). According to I Gde Widja, history learning is a combination of teaching and learning activities that examine past events as they relate to the present. As a subject, history focuses not only on facts but also on achieving overall educational goals. The uniqueness of history lies in its study, which is based on the concepts of space, time, and events that occur chronologically (Ramadani & Hastuti, 2020). These characteristics make history learning relatively complex and require the support of appropriate media to facilitate student understanding.

Previous research has shown that the lack of use of learning media has a significant impact on student understanding. Research by Yulia Eka Prasetya revealed that without media, students experience difficulty understanding the material being taught. Furthermore, research by Fadil Surahman et al. Studies show that minimal media use leads to students being less active and paying less attention to learning. These findings confirm that without appropriate media, students tend to lose interest in learning and have difficulty understanding the material (Patmawati et al., 2023).

Although various learning media innovations have been developed, several limitations remain. Conventional media generally lack the ability to actively engage students, while digital media is often used only as a supplement, not optimally integrated into the learning process. Game-based learning approaches also tend to emphasize entertainment over conceptual deepening. Furthermore, the use of QR Code technology in learning is generally limited to accessing static information such as text and images, thus not fully supporting meaningful and interactive learning (Cahya, 2024; Ningsih, 2023).

This situation indicates a research gap in the development of learning media capable of comprehensively integrating educational game elements with digital technology. To date, there are still limited media that not only increase student engagement but also directly support conceptual understanding through the presentation of audiovisual content integrated into learning activities.

In learning about Hindu-Buddhist kingdoms, students are required to understand various complex aspects such as the kingdom's origins, founding figures, political, economic, social, and cultural systems, as well as its heyday and decline. This material also contains important values such as exemplary behavior, national spirit, tolerance, and respect for cultural heritage. However, due to the broad scope of the material and limited learning time, students often struggle to fully understand it. Furthermore, monotonous learning methods further diminish student interest (Ariyanti & Anggerawati, 2024; Suseno, Vebrianto, & Anwar, 2025).

To address these issues, innovative, more interactive and meaningful learning media is needed. One potential alternative is a QR Code-based quartet card game that integrates educational games with digital technology (Cahya, 2024; Ningsih, 2023). However, unlike previous research, this study presents a novelty in the form of integrating QR Codes directly with instructional videos. These cards not only present concise information but also allow students to access visual and contextual explanations of the material through videos, infographics, and other interactive content. Thus, this medium is able to simultaneously combine visual, audio, and interactive elements, facilitating the understanding of complex historical concepts (Aini & Sunarso, 2024).

The novelty of this research lies in the integration of the quartet card game with QR Codes connected to instructional videos, allowing students to actively learn while receiving more in-depth and contextual explanations. This approach not only increases student engagement but also directly supports the understanding of historical concepts previously difficult to grasp through conventional methods.

Based on these problems, this research focuses on the development of QR Code-based quartet card media in history learning on the Hindu-Buddhist kingdom topic. The purpose of this research is to develop innovative learning media and analyze student and teacher responses to the suitability of Quartet Cards as a learning medium for the Hindu-Buddhist Kingdom topic in the Indonesian Archipelago (Salsabila Nauha et al., 2023).

2. RESEARCH METHODS

This study uses the research and development (R&D) method, which aims to produce products and determine the responses of students and teachers to the use of QR-based Quartet Cards in teaching social studies material on Hindu-Buddhist kingdoms in the archipelago for 10th grade social studies students at GAMA High School in Yogyakarta. According to Borg and Gall, development research, also known as the Research and Development (R&D) method, is a research approach that aims to validate and develop a particular product. In this context, the product in question can be a learning tool, evaluation

instrument, learning media, or other forms of products relevant to educational needs (Wiwin Yuliani et al., 2021).

In order for the results of this study to have a strong foundation, the data obtained must be empirical data, namely data sourced from field observations and meeting the criteria of validity, reliability, and objectivity. Therefore, it is important for a researcher to be able to design or compile research instruments that are truly valid and reliable. The development of instruments that meet the criteria of validity and reliability is an important part of the R&D research process. This process includes systematic steps that are not only oriented towards data collection but also towards testing the feasibility, effectiveness, and consistency of the instruments in measuring the variables under study. Thus, the research and development (R&D) method is a very appropriate approach to produce products that are of high quality and scientifically accountable (Anggreni, Putu Aditya Antara, & Putu Rahayu Ujianti, 2022).

The development model used in this study refers to the model proposed by Sugiyono, with procedures covering six main stages: (1) identification of potential and problems, (2) data collection, (3) product design, (4) design validation, (5) design improvement, and (6) product testing (Waruwu, 2024). This model was chosen because it is suitable for development research in the field of education that aims to produce innovative learning media.

In its implementation, the identification stage was carried out through observation and interviews to identify problems in history learning at SMA GAMA Yogyakarta, especially related to low student engagement and the lack of interactive learning media. The data collection stage involved gathering information on curriculum needs, student characteristics, and relevant learning materials. The product design stage focused on developing QR-based Quartet Cards that integrate visual elements, concise material, and QR codes linked to digital learning resources.

Furthermore, the design validation stage involved expert judgment consisting of material experts and media experts using structured validation sheets with a Likert scale to assess aspects of content accuracy, design quality, and usability. The results of this validation were then used as the basis for design improvement. After revision, product testing was conducted in stages, namely small group trials and large group trials involving 10th grade social studies students. In addition, teacher response evaluation was also carried out to obtain feedback on the practicality and effectiveness of the media.

Data collection instruments used in this study included observation sheets, interview guidelines, validation sheets, and questionnaires for students and teachers. The data obtained were analyzed using descriptive quantitative techniques in the form of percentages and supported by qualitative analysis from suggestions and comments. Through these stages, this study aims to ensure the feasibility and effectiveness of QR-based Quartet Cards as a medium for learning Hindu-Buddhist history.

3. RESULTS AND DISCUSSION

Results

Preliminary research results obtained through classroom observation, in-depth interviews with history teachers, and questionnaires distributed to 10th grade social studies students at GAMA High School in Yogyakarta show that history education, particularly on the subject of Hindu-Buddhist kingdoms in the archipelago, still faces a number of complex challenges. One of the main problems that has emerged is students' low interest in learning history. Most students consider history to be a boring and burdensome subject, especially when it is taught in a one-way manner and relies solely on lectures and reading textbooks. Based on the questionnaire data, 72% of respondents stated that they were not enthusiastic about history lessons. They admitted that they found it difficult to focus and understand the material because the teacher's delivery tended to be monotonous and did not directly involve the students.

This low interest in learning directly affects the level of student participation in the learning process. From the results of observations conducted during two meetings, it appears that most students are passive, less involved in discussions, and rarely ask questions. They tend to be mere listeners, without any initiative to explore the material more deeply. Interviews with history teachers reinforced these findings, with teachers stating that although history material is rich in value and knowledge, students tend to show little interest due to the lack of variety in teaching methods. This lack of student activity is an important indicator that the learning strategies used are not yet fully effective in fostering curiosity and active participation among students.

Furthermore, it was found that one of the most dominant difficulties experienced by students was in understanding and remembering important figures and historical events during the Hindu-Buddhist period. This included difficulty in distinguishing the names of kings, the locations of kingdoms, and their respective roles in the development of Indonesian history. Based on the questionnaire results, 68% of students stated that they often experienced confusion when asked to name historical figures such as King Purnawarman of Tarumanegara, King Balitung of Ancient Mataram, and King Airlangga of Kahuripan. In fact, when given simple oral and written tests, some students mixed up the names of kingdoms and figures, as well as misplaced the periods of their reigns. This problem shows that conventional learning methods are not able to help students organize information systematically and contextually.

Another obstacle that is also a major concern is the minimal use of interactive learning media in the history learning process. Based on interviews with history teachers, it is known that learning has mostly relied on textbooks and lecture methods. Teachers said that time and facility constraints were obstacles to creating innovative learning. In fact, in the context of the 21st century, the involvement of technology and visual media is an important aspect in creating an interesting and effective learning environment (Mustofa et al., 2023). Without interactive and visual media, students find it difficult to connect abstract information into something meaningful. This reinforces previous literature findings which

state that students will find it easier to understand the material if it is accompanied by learning media that supports their learning style (Sakinah, 2024).

In general, the findings of this field study indicate that teaching Hindu-Buddhist history requires a new approach that can address the above challenges. There is a need for learning media that is not only informative but also interesting, easily accessible, and able to engage students actively. One solution offered by this study is the development of QR-based Quartet Cards, a medium that combines educational games with digital technology. This medium is designed not only to help students recognize Hindu-Buddhist figures and kingdoms in a more enjoyable way, but also to encourage active student involvement through interaction between group members while playing cards. In addition, the QR code embedded on each card will direct students to supporting materials such as short videos, infographics, or interactive quizzes, allowing them to learn independently or collaboratively.

Thus, the results of this study confirm that there is an urgent need for innovation in history learning in schools, especially for materials that are considered difficult and uninteresting. Efforts to introduce learning media such as QR-based Quartet Cards are expected to be a concrete step in creating a more enjoyable, relevant, and meaningful learning process for students in today's digital era.



Figure 1. Quartet card and box design

Researchers began creating QR code-based quartet card learning media on Hindu-Buddhist history. They started by searching for journals, books, and articles related to Hindu-Buddhist kingdoms. The next step was to sketch the faces of kings during the Hindu-Buddhist kingdom era based on the sources found. This was followed by sketching the cards and box using the Canva application. The next step was to create a QR code scan using Canva and a video lesson on the history of Hindu-Buddhist kingdoms that would appear when the QR code was scanned. The video lesson was created using the Capcut application, and the Canva and CapCut applications were frequently used during the creation process.

The final step was to validate the media with media experts, subject matter experts, and history teachers.

After the validation stage, several improvements were made, such as enlarging the size of the cards and completing the sources and game rules. The next step was printing using 310 Ivory paper, with a diameter of 5 cm and a length of 8 cm. The box was also made using 310 Ivory paper, with a diameter of 5.5 cm, a length of 8.5 cm, and a height of 3 cm.



Figure 2. QR Code Scan Design for Quartet Cards

The update to the quartet card learning media is a QR code scan containing learning videos, where the QR code scan is placed on the back of the quartet card. This QR code scan is useful for students to explore the material independently and more innovatively. In addition, learning while playing can increase student activity and make learning interactive and innovative. In the future, it can be further developed by subsequent researchers, both in terms of different subjects and the content of the QR code scan containing other learning modules or books.

The QR code-based quartet card learning media was implemented in class X at GAMA High School in Yogyakarta, specifically in the second semester for the subject of the introduction of Hindu-Buddhist religions in the archipelago. There was only one class at the high school with 25 students. During the 4-week trial period, the following results were found.

In the initial stage, the teacher first explained the game techniques in detail, starting from how to play, the rules for picking up and grouping cards, to the conditions that determine whether a player wins or loses. This explanation was intended to ensure that all students understood the mechanics of the game well so that the learning activities could take place in an orderly and focused manner.

In addition, the teacher explained the consequences for students who did not succeed in the quartet card game. These consequences were designed as part of the learning strategy in the form of educational challenges. Students who did not succeed were

asked to explain one of the kingdoms presented on the cards based on their understanding. This activity was not intended as a punishment, but rather as a means to deepen students' understanding of the material and to develop their confidence in expressing knowledge orally.

The rules of the game are to collect matching cards, where each kingdom contains four kings that must be collected in full. Those who manage to collect the most complete sets of cards are declared the winners. The teacher acts as a facilitator to ensure order during the learning process using the quartet cards. The winners and losers are then given punishments in accordance with the rules set by the teacher.

Through the use of quartet cards, all students are encouraged to participate actively, either as players or as challengers. Interaction between students and between students and teachers becomes more intense, making the learning atmosphere more lively and enjoyable. Thus, the use of Quartet Cards is able to create active, effective, and meaningful history learning, as well as increase student involvement and interest in the learning process.

The results found that learning was more active and interactive for both students and teachers. This is a new learning innovation to increase student activity during the learning process, as well as helping to improve students' memory and accuracy. During the research process, students showed increased activity and learning outcomes. Based on the post-test questionnaire results, students showed a higher level of enthusiasm in participating in history lessons. Students became more active in asking questions, answering questions, and participating in group discussions. In addition, students were able to easily understand the flow and mechanics of the game until the learning activity was completed.

Table 1. Student Responses to QR Code-Based Quartet Card Media

Kategori	Persentase (%)
Sangat Baik	52,96%
Baik	35,86%
Cukup	9,21%
Kurang	1,97%

Based on the data, the majority of students (88.82%) responded in the good and very good categories. This indicates that the developed media has a high level of acceptance. Visually, this data can be depicted in a bar chart, showing the dominance of the "very good" and "good" categories compared to the other categories. This indicates that the learning media is able to significantly increase student interest and engagement.

Discussion

The study of Hindu-Buddhist history is an important part of the national education curriculum because it contains many historical values that form the foundation of Indonesian civilization. This material covers the development of great kingdoms such as Kutai, Tarumanegara, Sriwijaya, Ancient Mataram, Kediri, Singasari, and Majapahit, along

with the important figures who ruled them. One of the biggest challenges faced by teachers and students in teaching and learning this topic is the large number of kings' names that must be memorized, along with their kingdoms, reigns, and roles in history.

Names such as Purnawarman, Mulawarman, Balaputradewa, Airlangga, Kertanegara, and Hayam Wuruk, although very important, are often difficult for students to remember because they are considered too similar to each other, unfamiliar in pronunciation, and have little connection to everyday life. Students also find it difficult to distinguish between one king and another, especially if the information is delivered in a monotonous lecture format without supporting visual or interactive media. In these circumstances, history learning becomes merely a burden of memorization rather than a process of deep understanding.

This difficulty is exacerbated by the fact that most textbooks still present historical information in long narratives without an engaging visual approach. This is in stark contrast to the learning style of the current digital generation, which tends to be visual, interactive, and accustomed to learning through technology. When there is no personal or emotional connection between students and the subject matter, information retention becomes very low. As a result, students not only fail to memorize, but also fail to understand the context of the roles of important figures in the nation's history.

In this context, QR-based Quartet Cards are a breakthrough that bridges the gap between dense historical material and the dynamic learning styles of students. This medium packages historical information into a fun educational game format, while strengthening the connection between students and the material through visual, kinesthetic, and digital approaches. Quartet Cards are made in four categories that connect kings with their kingdoms, reigns, geographical locations, and important achievements. By playing this game, students are actively involved in the process of matching and grouping historical information.

Each card is equipped with a QR code that, when scanned, displays a short video about the king in question, animated illustrations of the kingdom, map excerpts of his power, and a digital narrative about the king's contributions. For example, students holding the King Airlangga card can scan the QR code and immediately see a video explaining how he divided the kingdom into Jenggala and Panjalu, as well as his policies in the fields of education and religion. This information not only clarifies the king's identity but also strengthens students' contextual understanding of the historical events that occurred at that time.

From a pedagogical perspective, learning using this medium strongly supports the constructivist approach, in which knowledge is actively constructed by students through learning experiences. The process of playing quartets encourages students to ask questions, answer, discuss, and negotiate with each other. They do not just memorize names, but also learn to construct arguments as to why a particular figure belongs to a certain category of kingdom.

This activity indirectly trains critical thinking skills, communication skills, and teamwork. Furthermore, the use of quartet cards not only targets the cognitive domain but also touches on the affective and psychomotor domains.

In the affective aspect, students become more motivated, less afraid of failure, and feel happy because learning is not stressful. The psychomotor aspect is also honed because students actively move, take cards, arrange pairs, and scan QR codes through their devices. This creates an active, dynamic learning atmosphere and encourages the formation of a deep learning experience.

The results of implementing this media show that students who previously had difficulty distinguishing between the kings of the Mataram and Kediri kingdoms can now confidently name figures such as Rakai Pikatan, Dharmawangsa Teguh, and Anusapati, and even explain their roles in the development of kingdoms and religions in the archipelago. This game not only improves memory skills but also strengthens understanding and connections between historical events.

From the teacher's point of view, this media makes it easier to convey complex material in a simpler and more enjoyable way. Teachers can develop differentiated learning strategies, adjusting their approach to the characteristics of their students. In addition to being a medium for introducing material, quartet cards can also be used as a formative evaluation tool. Through games, teachers can observe students' abilities to classify figures, arrange chronological sequences, and identify connections between historical events. Evaluation is carried out naturally in a playful atmosphere, without causing psychological pressure as in conventional tests.

In terms of curriculum, this medium is in line with the demands of the Merdeka Curriculum, which emphasizes differentiated learning, strengthening the Pancasila student profile, and the use of technology and project-based approaches. Teachers can follow up on learning with projects to make their own versions of quartet cards, for example, on the Islamic kingdom period or the colonial period, thereby training students' creativity and independence in learning.

Moreover, this medium also contributes to building students' historical awareness and national identity. When they learn about important figures such as King Kertanegara, who established relations with foreign countries, or King Hayam Wuruk, who brought Majapahit to its peak of glory, they not only learn history but also develop a sense of pride and love for their own nation and culture.

The results of applying historical learning media using QR code-based quartet cards, namely student involvement cognitively, affectively, and psychomotorically during the learning process, prove that this media can create a meaningful and enjoyable learning atmosphere. For teachers, this media also provides a more varied alternative learning method and facilitates the formative evaluation process. Therefore, the use of QR-based quartet cards is highly recommended as an innovative media in history learning, especially on topics that require mastery of detailed information and the interrelationships between events.

The use of QR-based Quartet Cards in history learning, especially in Hindu-Buddhist kingdom material, has proven to be an innovative solution in overcoming students' difficulties in memorizing and understanding the names of kings and their historical backgrounds.

This medium is able to simplify complex material through a visual, interactive, and fun game-based approach. Through a combination of educational game formats and access to multimedia information via QR codes, students not only memorize factual information, but also build a deeper contextual understanding of historical figures and events.

4. CONCLUSION

The development of QR Code-based Quartet Cards can be considered a feasible and innovative approach to addressing the challenges of low student interest and difficulties in understanding historical materials, particularly the topic of Hindu-Buddhist Kingdoms among 10th-grade students at SMA GAMA Yogyakarta. Through the Research and Development (R&D) method, this study produced a learning medium that integrates elements of traditional educational games with digital technology. The findings indicate that the implementation of this media tends to encourage student enthusiasm and active participation during the learning process, involving cognitive, affective, and psychomotor aspects.

Furthermore, the results suggest that QR-based Quartet Cards have the potential to support students in understanding historical content in a more accessible and engaging way. By combining visual elements and digital access through QR codes, this media helps bridge the gap between abstract historical narratives and the learning preferences of students in the digital era. For educators, this medium can function as an interactive learning tool as well as a supportive formative evaluation instrument that aligns with the principles of the Merdeka Curriculum, particularly in promoting student-centered and differentiated learning. From a theoretical and methodological perspective, this study contributes to the development of educational media by demonstrating the application of the R&D approach in integrating game-based learning with QR technology in history education. It also provides an example of how traditional learning media can be innovatively adapted to meet contemporary educational needs.

However, this study has several limitations. The implementation was conducted in a single school with a relatively limited number of participants, which may affect the generalizability of the findings. In addition, the measurement of effectiveness was primarily based on descriptive analysis and user responses, so further studies with more rigorous experimental designs are needed. Therefore, future research is recommended to involve larger and more diverse samples across different schools, as well as to apply comparative or experimental methods to examine the effectiveness of QR-based Quartet Cards in improving learning outcomes. Broader implementation is also suggested to explore its applicability in other historical topics or subjects.

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