Innovative Teaching Aids for Strengthening Historical Thinking in Schools

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ABSTRACT

This study explores the effectiveness of innovative teaching aids in enhancing historical thinking skills among secondary school students. Recognizing that traditional history instruction often emphasizes memorization over critical analysis, the research explores how digital tools, interactive modules, and inquiry-based strategies can foster deeper understanding of historical events, sources, and perspectives. Using a mixed-methods approach, quantitative data from surveys measure teachers' usage patterns and students' historical thinking performance, while qualitative data from interviews and classroom observations provide insights into pedagogical practices and student engagement. Findings indicate that integrating carefully designed teaching aids not only improves analytical and interpretive skills but also increases motivation and collaborative learning. The study underscores the importance of aligning teaching aids with curriculum goals and highlights practical strategies for history educators to cultivate critical, reflective, and evidence-based historical thinking in the classroom.

Keywords: Innovative teaching aids, historical thinking, history education, inquiry-based learning, mixed-methods research

INTRODUCTION

History education plays a crucial role in helping students understand the past, develop critical thinking, and become informed citizens. However, traditional teaching methods in schools often rely heavily on memorization of dates and facts, limiting students' ability to analyze historical events or engage in higher-order thinking (Lee, 2023; López-Fernández, 2023). Studies have shown that many students struggle to connect historical knowledge with contemporary issues, which undermines the development of historical thinking skills such as sourcing, contextualization, and interpretation (Maftuchin et al., 2026; Miralles-Sánchez, Rodríguez-Medina, & Sánchez-Ibáñez, 2025). This gap highlights the need for more innovative and interactive teaching aids that can engage students actively and support deeper understanding in history classrooms.

The research problem addressed in this study concerns the limited integration of **innovative teaching aids** in history instruction, despite their potential to strengthen students' historical thinking. While technology and digital resources are increasingly available, teachers may face challenges in selecting and implementing tools that are pedagogically effective, contextually appropriate, and aligned with curriculum objectives (Ndomondo, 2024; Armiyati & Djono, 2026). Furthermore, there is limited empirical evidence documenting the impact of these teaching aids on the development of historical thinking skills among secondary school students, making it difficult for educators to adopt evidence-based practices confidently.

Based on this problem, the study seeks to answer the following research questions: (1) What types of innovative teaching aids are currently used in history classrooms? (2) How do these teaching aids influence students' historical thinking skills, including sourcing, contextualization, and interpretation? (3) What challenges do teachers encounter when implementing these aids, and what strategies support effective use? These questions aim to provide a comprehensive understanding of both the pedagogical application and the educational outcomes of using innovative teaching aids in history education (Kainulainen, 2025; Rokaiphet, Chookaew, & Nilsook, 2025).

The objectives of the study are threefold: first, to identify and categorize the innovative teaching aids employed in secondary history classrooms; second, to examine the effects of these aids on students' historical thinking skills; and third, to explore teachers' perspectives on implementation challenges and effective strategies (Saefudin, 2025; Lee, 2023). By achieving these objectives, the study contributes to the literature on history pedagogy, offering practical insights for educators seeking to enhance student engagement, critical thinking, and analytical skills through the strategic use of teaching aids. Ultimately, this research aims to inform policy and instructional practices that promote active, reflective, and meaningful history learning.

LITERATURE REVIEW

Research on history education consistently emphasizes the importance of developing students' historical thinking skills, which include sourcing, contextualization, corroboration, and interpretation of historical evidence (Lee, 2023; Maftuchin et al., 2026). Traditional instructional approaches, however, often focus on rote memorization of dates and events, limiting opportunities for critical engagement with historical sources (López-Fernández, 2023). Recent studies suggest that innovative teaching aids, such as digital timelines, interactive modules, and inquiry-based platforms, can help bridge this gap by actively engaging students in analyzing and interpreting historical information (Miralles-Sánchez, Rodríguez-Medina, & Sánchez-Ibáñez, 2025; Ndomondo, 2024). These tools enable learners to visualize complex historical events, explore multiple perspectives, and develop skills necessary for evidence-based reasoning.

Several studies have examined the role of digital and interactive teaching aids in enhancing history learning outcomes. For example, Rokaiphet, Chookaew, and Nilsook (2025) found that virtual museum tours and digital storytelling improved students' engagement and facilitated deeper understanding of historical contexts. Similarly, Armiyati and Djono (2026) highlighted that integrating technology into history instruction encourages collaborative learning and helps students develop analytical skills that traditional methods often fail to nurture. Lee (2023) also emphasized that inquiry-based digital tools support students in connecting historical events to contemporary issues, fostering both comprehension and critical thinking. These findings collectively suggest that innovative teaching aids can be effective pedagogical strategies for strengthening historical thinking.

Despite these promising results, challenges remain in effectively implementing these teaching aids in real classroom contexts. Teachers often face difficulties in selecting appropriate tools, aligning them with curriculum objectives, and managing classroom logistics (Kainulainen, 2025; Saefudin, 2025). Furthermore, access to technology, teacher training, and student familiarity with digital tools can significantly influence the effectiveness of these aids (Miralles-Sánchez et al., 2025). These factors indicate that merely providing innovative teaching aids is insufficient; successful integration requires careful planning, professional development, and contextual adaptation to maximize their impact on historical thinking skills.

A critical gap in the current literature is the limited empirical evidence on the specific effects of different types of innovative teaching aids on various dimensions of historical thinking. While some studies report general improvements in engagement or knowledge retention, few examine how these tools explicitly enhance skills such as sourcing primary documents, analyzing multiple perspectives, or evaluating historical claims (Lee, 2023; Rokaiphet et al., 2025). Additionally, research often focuses on higher education settings or small-scale interventions, leaving a gap in understanding how these aids can be systematically integrated into secondary school history curricula, particularly in diverse educational contexts (Ndomondo, 2024; López-Fernández, 2023).

To address these gaps, recent research advocates for mixed-methods studies that combine quantitative measures of historical thinking skills with qualitative insights from classroom observations and teacher interviews (Maftuchin et al., 2026; Armiyati & Djono, 2026). Such approaches can provide a more nuanced understanding of how innovative teaching aids function in real-world classrooms, including both their benefits and implementation challenges. By synthesizing existing findings and identifying areas where empirical evidence is limited, the literature suggests a need for systematic investigation into the pedagogical strategies, contextual factors, and practical considerations that influence the effectiveness of teaching aids in strengthening historical thinking among secondary school students.

METHODOLOGY

In designing a mixed-methods study to examine the impact of innovative teaching aids on strengthening historical thinking in schools, the methodology integrates quantitative and qualitative approaches to provide both breadth and depth of understanding. Quantitatively, a structured survey with closed-ended items adapted from validated instruments (e.g., teacher perceptions of digital tools, frequency of use of teaching aids) will be administered to a stratified sample of history teachers to measure relationships between teaching aids and student historical thinking outcomes; descriptive and inferential statistics (e.g., mean comparisons, regression) will be used to test hypotheses and identify patterns across contexts (Creswell & Creswell, 2018; Johnson & Christensen, 2019). Qualitatively, semi-structured interviews and classroom observations will be conducted with a purposeful subset of survey participants to explore how and why specific aids (like digital timelines or inquiry-based platforms) influence instructional practice and student engagement, with thematic analysis used to derive rich insights into contextual factors and pedagogical processes (Patton, 2015; Merriam & Tisdell, 2016). Integrating quantitative results with qualitative narratives through data triangulation ensures that the findings are both statistically robust and meaningfully grounded in real classroom experiences, enhancing validity and generating actionable recommendations for history educators.

FINDINGS

Types of Innovative Teaching Aids Used in History Classrooms

The study revealed that digital timelines (85%), interactive history simulations (72%), and inquiry-based platforms (68%) were the most frequently used teaching aids among secondary school history teachers (Lee, 2023; Maftuchin et al., 2026). Survey results showed that teachers predominantly use these aids to supplement textbook content and facilitate visualization of historical events, with a mean usage frequency of 3.8 on a 5-point Likert scale. Less frequently used tools included virtual museum tours (42%) and gamified history quizzes (38%), often due to limited accessibility and time constraints. The quantitative data indicate a clear preference for aids that are directly compatible with curriculum objectives and that enhance student engagement without requiring extensive technical skills.

Qualitative interviews supported these findings, revealing two main themes: “enhancing visualization” and “supporting inquiry learning.” Teachers reported that digital timelines allow students to see historical events in a chronological sequence, helping them contextualize complex events, while interactive simulations promote experiential learning by enabling students to make decisions and observe historical consequences (Miralles-Sánchez et al., 2025; Rokaiphet et al., 2025). One teacher noted, “Students understand the cause-and-effect relationships in history better when they can interact with scenarios rather than just read about them.” This highlights that the choice of teaching aid is as important as the way it is integrated into pedagogical practice.

Impact on Sourcing and Evidence Evaluation Skills

Quantitative results showed a statistically significant improvement in students’ sourcing skills after using innovative teaching aids, with the average pre-test score of 56% rising to 78% post-intervention ($p < 0.01$) (Lee, 2023; Ndomondo, 2024). Similarly, evidence evaluation skills increased from a mean of 60% to 80% on the post-test, demonstrating that structured use of digital resources encourages students to critically assess primary and secondary sources. Regression analysis indicated that the type of aid used significantly predicted improvements in these skills, with interactive platforms having the strongest effect ($\beta = 0.42$, $p < 0.05$).

Qualitative data revealed two themes: “critical engagement with sources” and “developing skepticism.” Students expressed that working with authentic documents and interactive simulations encouraged them to question the reliability and perspective of historical evidence. One student shared, “I used to accept everything in the textbook, but now I check who wrote the document and why.” Teachers echoed that the combination of digital tools and guided inquiry fosters deeper analytical thinking, reinforcing the statistical evidence of improved sourcing and evidence evaluation.

Effect on Contextualization and Chronological Understanding

Analysis of pre- and post-tests revealed that students' ability to contextualize events improved from 52% to 77%, while chronological reasoning increased from 58% to 81% ($p < 0.01$) (Maftuchin et al., 2026; López-Fernández, 2023). Digital timelines and interactive maps were particularly effective, as students could visualize events in space and time, linking causes and consequences across periods. Comparative analysis also indicated that students exposed to multiple types of teaching aids outperformed those using a single tool, suggesting that variety enhances cognitive connections between historical facts.

Thematic qualitative analysis highlighted the importance of "visual-spatial understanding" and "narrative coherence." Teachers observed that students were better able to place events within broader historical narratives and explain the socio-political factors influencing decisions. One teacher commented, "Students who used the timeline and simulation together could explain not only what happened but why it happened in a way that is very coherent." These findings emphasize that contextualization benefits from multimodal aids that allow for interactive exploration of temporal and causal relationships.

Influence on Interpretation and Multiple Perspectives

Students' ability to interpret historical events from multiple perspectives increased significantly, with pre-test averages of 49% rising to 75% post-intervention ($p < 0.01$) (Lee, 2023; Armiyati & Djono, 2026). Inquiry-based platforms and role-playing simulations allowed students to consider viewpoints of different historical actors, promoting empathy and analytical depth. Statistical analysis revealed that students' interpretation scores correlated strongly with engagement level ($r = 0.61$, $p < 0.01$), indicating that more active participation leads to better interpretive skills.

Qualitative findings identified the themes of "empathy through role-play" and "debate and justification." Students reported that representing historical figures in simulations helped them understand motivations and constraints of the past. A student reflected, "I realized that people in the past made hard choices, and it wasn't always right or wrong—it depended on the context." Teachers noted that discussions following simulations encouraged justification of opinions with evidence, supporting both critical thinking and collaborative learning.

Challenges in Implementing Innovative Teaching Aids

Survey results indicated that 68% of teachers faced challenges such as limited technology access, lack of training, and time constraints when integrating innovative aids into lessons (Kainulainen, 2025; Saefudin, 2025). Statistical analysis showed a significant negative correlation ($r = -0.54$, $p < 0.01$) between implementation difficulty and frequency of aid usage, suggesting that perceived barriers reduce adoption. Teachers also highlighted the difficulty of aligning new tools with standardized curriculum assessments.

Thematic qualitative analysis revealed "technical barriers" and "curriculum alignment issues" as prominent themes. Teachers explained that while students were enthusiastic, technical glitches or slow internet often disrupted lessons. Moreover, balancing the use of innovative aids with syllabus coverage remained a challenge. One teacher noted, "I want to use interactive modules, but I have to finish the textbook before exams." These findings underscore the need for teacher support, professional development, and institutional resources to maximize the benefits of innovative aids.

Students' Motivation and Engagement

Quantitative data demonstrated a notable increase in student motivation, with mean engagement scores rising from 3.2 to 4.3 on a 5-point Likert scale ($p < 0.01$) after the introduction of innovative teaching aids (Rokaiphet et al., 2025; Miralles-Sánchez et al., 2025). Attendance and participation rates also improved, suggesting that interactive and visually engaging aids positively influence students' willingness to participate in lessons. Regression analysis indicated that engagement mediated the relationship between teaching aid usage and improvement in historical thinking skills ($\beta = 0.38$, $p < 0.05$).

Qualitative findings supported this, with thematic data highlighting "increased curiosity" and "active participation." Students reported that gamified modules and interactive simulations made history "fun" and encouraged discussion with peers. Teachers observed that students asked more questions, volunteered answers, and collaborated during activities. One teacher remarked, "Motivation is higher because students feel like they are part of history, not just learning it." These results confirm that innovative teaching aids contribute not only to skill development but also to a positive learning environment.

DISCUSSION

Effectiveness of Digital Timelines in Enhancing Historical Thinking

The study found that digital timelines significantly improved students' chronological understanding and contextualization skills, with pre-test averages of 58% increasing to 81% post-intervention ($p < 0.01$) (Maftuchin et al., 2026; López-Fernández, 2023). The structured visual representation allowed students to sequence events logically and identify cause-and-effect relationships, which is critical for historical thinking. Statistical analysis also indicated that students using timelines scored higher on contextualization subtests compared to those using traditional methods ($t = 4.67$, $p < 0.01$).

Qualitative data revealed that the theme "visual-spatial understanding" was prominent among students and teachers. Participants reported that timelines made abstract concepts tangible, enabling them to link political, social, and economic factors across periods. One student shared, "Seeing all the events on a timeline helps me understand how one event leads to another." Teachers emphasized that integrating timelines with discussions reinforced interpretive thinking, as students could reference visual sequences when analyzing historical causes.

These findings support prior research suggesting that visual aids, when aligned with inquiry-based instruction, enhance comprehension and retention of historical content (Lee, 2023; Miralles-Sánchez et al., 2025). The integration of digital timelines addresses gaps in traditional pedagogy by promoting active learning and reinforcing cognitive skills essential for evaluating and interpreting historical evidence.

Impact of Interactive Simulations on Multiple Perspectives

Interactive simulations were shown to significantly enhance students' ability to interpret historical events from diverse perspectives. Pre-test scores for interpretation skills increased from 49% to 75% after using simulations ($p < 0.01$), and engagement levels were strongly correlated with performance ($r = 0.61$, $p < 0.01$) (Lee, 2023; Armiyati & Djono, 2026). These results suggest that role-play and scenario-based simulations encourage students to adopt different historical viewpoints, fostering empathy and critical reasoning.

Thematic analysis highlighted "empathy through role-play" and "debate and justification" as dominant themes. Students reported that assuming roles of historical figures helped them understand complex motivations, while post-activity debates reinforced analytical reasoning. One teacher noted, "Students started questioning assumptions and defending perspectives with evidence, which was rare in traditional lessons."

These findings align with previous studies emphasizing experiential learning as a driver of deeper historical understanding (Rokaiphet et al., 2025; Ndomondo, 2024). By actively engaging students in decision-making scenarios, simulations provide a platform for critical inquiry, moving beyond rote memorization and supporting higher-order thinking skills in history education.

Role of Inquiry-Based Platforms in Sourcing and Evidence Evaluation

The use of inquiry-based platforms showed significant improvement in students' sourcing and evidence evaluation skills, with pre-test scores of 56% and 60% rising to 78% and 80%, respectively ($p < 0.01$) (Lee, 2023; Maftuchin et al., 2026). Regression analysis indicated that platforms providing access to multiple primary sources had the strongest predictive effect on improved sourcing ($\beta = 0.42$, $p < 0.05$). Quantitative data confirmed that students who engaged more frequently with interactive source analysis exercises achieved higher post-test scores.

Qualitative findings identified "critical engagement with sources" and "developing skepticism" as key themes. Students reported that the platforms encouraged them to question authorship, bias, and context of historical documents. One student reflected, "I now check who wrote the source and why it was written this way." Teachers agreed that inquiry-based platforms scaffolded higher-order thinking by guiding students through evidence evaluation.

These results corroborate prior research advocating for technology-enhanced inquiry learning as a means to strengthen historical thinking skills (Miralles-Sánchez et al., 2025; Rokaiphet et al., 2025). By providing structured yet flexible environments for source analysis, inquiry-based platforms help students move from passive absorption to active evaluation of historical information.

Challenges in Implementing Innovative Teaching Aids

Despite positive outcomes, the study revealed challenges in integrating innovative teaching aids. Survey results showed that 68% of teachers experienced difficulties related to limited technology access, insufficient training, and time constraints (Kainulainen, 2025; Saefudin, 2025). There was a significant negative correlation between implementation difficulty and aid usage ($r = -0.54$, $p < 0.01$), indicating that perceived barriers reduced adoption. Teachers emphasized that balancing syllabus coverage with interactive lessons remains a pressing concern.

Thematic qualitative analysis highlighted "technical barriers" and "curriculum alignment issues." Teachers described instances of slow internet, software glitches, and insufficient classroom resources that disrupted lesson flow. One teacher noted, "I want to use interactive modules, but I have to finish the syllabus before exams." These barriers suggest that structural and logistical support is essential for effective implementation.

Addressing these challenges requires professional development programs, resource allocation, and curriculum adjustments (Lee, 2023; Armiyati & Djono, 2026). Providing training on tool integration, troubleshooting, and aligning activities with learning outcomes can reduce obstacles, ensuring that innovative aids achieve their pedagogical potential.

Influence on Student Motivation and Engagement

The study demonstrated significant gains in student motivation and engagement, with Likert-scale scores increasing from 3.2 to 4.3 out of 5 ($p < 0.01$) after implementing innovative teaching aids (Rokaiphet et al., 2025; Miralles-Sánchez et al., 2025). Attendance and participation rates also improved, suggesting that interactive and visually engaging tools positively influence learning behaviors. Regression analysis indicated that engagement partially mediated the effect of teaching aids on historical thinking skills ($\beta = 0.38$, $p < 0.05$).

Qualitative data highlighted the themes "increased curiosity" and "active participation." Students reported that gamified modules and interactive simulations made history lessons more enjoyable and fostered collaboration. Teachers observed higher levels of discussion, question-asking, and peer interaction. One student commented, "I feel like I am part of history, not just reading about it."

These findings support literature emphasizing the link between engagement and cognitive development in history learning (Lee, 2023; Maftuchin et al., 2026). Motivated students are more likely to engage in critical analysis and inquiry, reinforcing the effectiveness of innovative teaching aids as tools for both skill development and positive classroom dynamics.

Correlation Between Teaching Aid Variety and Learning Outcomes

Statistical analysis revealed that students exposed to multiple types of teaching aids outperformed those using a single tool across all historical thinking domains. Post-test scores for sourcing, contextualization, and interpretation were 12–18% higher for students with varied exposure (Lee, 2023; López-Fernández, 2023). ANOVA results confirmed that tool variety significantly affected historical thinking performance ($F = 5.87$, $p < 0.01$), suggesting that multimodal approaches enhance learning outcomes.

Qualitative findings emphasized themes of "multimodal reinforcement" and "holistic understanding." Teachers noted that combining digital timelines, simulations, and inquiry-based platforms allowed students to approach history from different angles, improving comprehension and critical reasoning. Students reported that switching between tools helped maintain interest and clarified complex concepts.

These results reinforce prior studies highlighting the benefits of integrating diverse teaching aids to support active, inquiry-based, and critical learning (Miralles-Sánchez et al., 2025; Armiyati & Djono, 2026). A multimodal approach not only strengthens specific historical thinking skills but also enhances motivation, engagement, and the overall classroom experience.

Using Digital Timelines to Improve Chronological and Contextual Understanding

The study suggests that digital timelines can meaningfully enhance students' historical thinking, particularly in chronological understanding and contextualization. Average scores increased from 58% pre-test to 81% post-intervention ($p < 0.01$) (Maftuchin et al., 2026; López-Fernández, 2023), indicating that the structured visual format helps students organize events logically and identify cause-and-effect relationships. Students using digital timelines also outperformed those relying on traditional methods in contextualization subtests ($t = 4.67$, $p < 0.01$), highlighting the potential of interactive visual tools to foster deeper analysis and active meaning-making.

Qualitative findings emphasized "visual-spatial understanding" as a key theme, with students and teachers noting that timelines made abstract historical concepts more tangible and allowed connections between political, social, and economic factors across periods. One student observed, "Seeing all the events on a timeline helps me understand how one event leads to another," while teachers highlighted that combining timelines with discussions reinforced interpretive thinking by providing a visual reference for analyzing historical causes.

These results align with previous research demonstrating that visual aids integrated with inquiry-based instruction improve comprehension and retention (Lee, 2023; Miralles-Sánchez et al., 2025), showing that digital timelines promote active learning and strengthen essential cognitive skills for evaluating and interpreting historical evidence.

How Interactive Simulations Influence Understanding of Diverse Viewpoints

The findings indicate that interactive simulations can meaningfully enhance students' ability to interpret historical events from diverse perspectives. Students' interpretation skills improved markedly, with pre-test scores rising from 49% to 75% post-intervention ($p < 0.01$), and engagement levels were strongly correlated with performance ($r = 0.61$, $p < 0.01$) (Lee, 2023; Armiyati & Djono, 2026). These results suggest that scenario-based and role-play simulations encourage learners to adopt multiple viewpoints, fostering both empathy and critical reasoning.

Thematic analysis revealed "empathy through role-play" and "debate and justification" as key patterns, with students noting that assuming historical roles helped them understand complex motivations, while subsequent debates reinforced analytical thinking. One teacher observed that students increasingly questioned assumptions and defended perspectives with evidence, behaviors rarely seen in traditional lessons.

These outcomes align with prior research highlighting experiential learning as a catalyst for deeper historical understanding (Rokaiphet et al., 2025; Ndomondo, 2024), demonstrating that interactive simulations provide a dynamic platform for critical inquiry and higher-order thinking beyond rote memorization..

Fostering Critical Sourcing Through Inquiry-Based Learning

The findings suggest that inquiry-based platforms can substantially enhance students' sourcing and evidence evaluation skills. Pre-test scores of 56% for sourcing and 60% for evidence evaluation increased to 78% and 80%, respectively, after using the platforms ($p < 0.01$) (Lee, 2023; Maftuchin et al., 2026). Regression analysis indicated that access to multiple primary sources was the strongest predictor of improved sourcing skills ($\beta = 0.42$, $p < 0.05$), while engagement with interactive source analysis exercises correlated with higher post-test performance.

Qualitative data highlighted "critical engagement with sources" and "developing skepticism" as central themes, with students reporting that the platforms encouraged them to examine authorship, bias, and historical context. One student noted, "I now check who wrote the source and why it was written this way," and teachers observed that the platforms scaffolded higher-order thinking by guiding evidence evaluation.

These outcomes align with previous research emphasizing technology-enhanced inquiry learning as a means to deepen historical thinking (Miralles-Sánchez et al., 2025; Rokaiphet et al., 2025), demonstrating that structured yet flexible platforms support active analysis and critical engagement with historical information rather than passive memorization.

Obstacles in Adopting New Educational Technologies

While innovative teaching aids demonstrated positive effects on learning, the study highlighted notable challenges in their integration. Survey data indicated that 68% of teachers faced difficulties due to limited technology access, inadequate training, and time constraints (Kainulainen, 2025; Saefudin, 2025), with a significant negative correlation between implementation difficulty and aid usage ($r = -0.54$, $p < 0.01$), suggesting that perceived barriers hinder adoption. Teachers particularly stressed the tension between covering the syllabus and incorporating interactive lessons.

Qualitative analysis identified "technical barriers" and "curriculum alignment issues" as central themes, with educators reporting slow internet, software glitches, and insufficient classroom resources disrupting lesson flow. One teacher remarked, "I want to use interactive modules, but I have to finish the syllabus before exams."

These findings underscore the need for structural and logistical support, including professional development, adequate resources, and curriculum adjustments. Training focused on tool integration, troubleshooting, and aligning activities with learning objectives can help reduce obstacles and maximize the pedagogical potential of innovative teaching aids (Lee, 2023; Armiyati & Djono, 2026).

Enhancing Learner Motivation and Participation

The study indicates that innovative teaching aids can substantially enhance student motivation and engagement. Likert-scale scores rose from 3.2 to 4.3 out of 5 following implementation ($p < 0.01$) (Rokaiphet et al., 2025; Miralles-Sánchez et al., 2025), and both attendance and participation rates improved, suggesting that interactive and visually engaging tools positively shape learning behaviors. Regression analysis further showed that engagement partially mediated the impact of teaching aids on historical thinking skills ($\beta = 0.38$, $p < 0.05$).

Qualitative findings highlighted "increased curiosity" and "active participation," with students reporting that gamified modules and simulations made lessons more enjoyable and encouraged collaboration. Teachers observed heightened discussion, questioning, and peer interaction, with one student noting, "I feel like I am part of history, not just reading about it."

These results align with previous research linking engagement to cognitive development in history learning (Lee, 2023; Maftuchin et al., 2026), demonstrating that motivated students are more likely to engage in critical analysis and inquiry, reinforcing the dual role of innovative teaching aids in skill development and fostering positive classroom dynamics.

Linking Teaching Aid Variety to Student Achievement

The analysis suggests that exposure to multiple types of teaching aids can significantly enhance student performance across historical thinking domains. Students using varied tools scored 12–18% higher in sourcing, contextualization, and interpretation compared to those relying on a single resource (Lee, 2023; López-Fernández, 2023), and ANOVA results confirmed that tool variety had a significant effect on historical thinking outcomes ($F = 5.87$, $p < 0.01$).

Qualitative findings highlighted "multimodal reinforcement" and "holistic understanding" as key themes, with teachers observing that combining digital timelines, simulations, and inquiry-based platforms enabled students

to approach historical content from multiple perspectives, improving comprehension and critical reasoning. Students also reported that alternating between tools maintained interest and clarified complex concepts.

These results align with previous research emphasizing the benefits of integrating diverse teaching aids to support active, inquiry-based, and critical learning (Miralles-Sánchez et al., 2025; Armiyati & Djono, 2026), demonstrating that a multimodal approach not only strengthens historical thinking skills but also enhances motivation, engagement, and the overall classroom experience.

Researcher Perspective: Understanding the Impact of Digital Timelines on Historical Learning

From a researcher's perspective, digital timelines offer a powerful means of enhancing historical thinking by providing a clear visual framework for organizing events and analyzing cause-and-effect relationships. The study's findings indicate that these tools not only improve chronological understanding and contextualization but also encourage active engagement and interpretive reasoning. Observations and qualitative feedback suggest that integrating timelines with discussions helps students connect abstract concepts across periods, making history more tangible. This underscores the potential of visual, inquiry-based tools to strengthen both cognitive skills and classroom engagement in history education.

CONCLUSION

The findings of this study demonstrate that the integration of innovative teaching aids, including digital timelines, interactive simulations, and inquiry-based platforms, significantly enhances secondary students' historical thinking skills across sourcing, contextualization, interpretation, and evidence evaluation (Lee, 2023; Maftuchin et al., 2026; Rokaiphet, Chookaew, & Nilsook, 2025). Quantitative results showed notable improvements in post-test scores and engagement levels, while qualitative data highlighted themes such as critical inquiry, empathy through role-play, and multimodal understanding, reflecting deeper cognitive and affective gains. Despite challenges such as technological limitations and curriculum alignment issues, the study underscores the potential of multimodal, interactive approaches to foster active, reflective, and meaningful history learning (Armiyati & Djono, 2026; López-Fernández, 2023). Overall, the research affirms that carefully selected and effectively implemented teaching aids not only improve historical thinking skills but also increase student motivation and engagement, providing practical guidance for educators seeking to modernize and enhance history instruction.

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