





International Journal of Learning, Teaching and Educational Research
Vol. 24, No. 8, pp. 813-841, August 2025
<https://doi.org/10.26803/ijlter.24.8.36>
Received May 27, 2025; Revised Jul 20, 2025; Accepted Aug 4, 2025

Curriculum Innovation in History Education: Reflective Integration of Technology and Historical Reasoning in a Contextually Adaptive Model for Indonesian Senior High Schools

Muhammad Iqbal Birsyada* , Bayu Ananto Wibowo ,
Rika Novita Kusumaningrum  and Fahrudin 
Universitas PGRI Yogyakarta
Yogyakarta, Indonesia

Abstract. This study focused on designing and evaluating a digitally integrated history curriculum tailored for Indonesian senior high schools, addressing the misalignment between traditional teaching methods and 21st-century educational requirements. Employing a research and development (R&D) model guided by the ADDIE framework, the research involved five curriculum and pedagogy experts, ten history teachers, and over 200 students from six public high schools representing varying levels of technological preparedness. The development process encompassed a comprehensive needs assessment, validation by experts and practitioners, structured implementation in classrooms, and a mixed-methods evaluation including interviews, observations, assessments, and online questionnaires. The curriculum received strong validation scores from experts ($M = 4.80$) and teachers ($M = 4.60$), indicating its robust structure, contextual fit, and practical viability. Trial implementations yielded consistent effectiveness ($M = 4.60$), with ANOVA results showing no significant differences across diverse school types ($p > 0.05$). Qualitative data pointed to enhanced student participation, deeper understanding of historical content, and improved contextual analysis. The study presents a forward-thinking curriculum model that integrates digital tools into core instructional practices, providing a flexible and scalable approach for digital history education, especially in settings with limited resources.

Keywords: Digital history education; historical thinking; secondary school curriculum; educational technology; curriculum design innovation

*Corresponding author: Muhammad Iqbal Birsyada; iqbal@upy.ac.id

1. Introduction

History education plays a vital role in fostering national identity, civic values, and critical thinking about historical developments shaping the present (Domenici, 2023; Wasino et al., 2020). In Indonesia, although the curriculum has undergone several reforms to reflect evolving societal and educational demands (Fahrudin & Saefudin, 2025b), its implementation in schools remains largely traditional, centred on rote learning and teacher-dominated instruction (Widawski & Oleśniewicz, 2023). This static approach is increasingly incompatible with today's digital environment where students expect visual and interactive learning experiences, creating a mismatch between the curriculum and the 21st-century skill requirements (Alatas, 2018; Saldanha et al., 2021).

Despite growing initiatives to introduce digital tools in history instruction, most efforts remain confined to classroom-level practices without transforming the curriculum structure itself (Sousa et al., 2022; Utami et al., 2023). Comprehensive frameworks that embed digital technology into the foundational components of national history curricula, namely learning objectives, content, and pedagogy, are still rare (Fairless Nicholson, 2023). As a result, instructional practices vary widely and depend heavily on teacher discretion. This underscores the need for a technology-integrated history curriculum model that offers pedagogical coherence and policy alignment with Indonesian education standards (Birsyada et al., 2024; Kurt, 2023).

Despite the growing body of research advocating the use of digital technology in history education, most studies have primarily concentrated on specific media applications at the classroom level. For instance, Yulifar and Aman (2023) recommended the adoption of a blended learning history curriculum that combines historical content with digital resources such as documentary videos, interactive simulations, and location-based technologies to increase student engagement and offer greater instructional flexibility (Darsono et al., 2024).

Similarly, the study by Jwai'ed et al. (2024) introduced an augmented reality (AR) model to enhance students' spatial understanding of historical settings. However, these investigations largely focused on micro-level technological applications within instructional practice and did not extend their implications to curriculum-level development that could serve as a formal guideline for policymakers and curriculum designers (Fahrudin et al., 2024).

In addition to media-focused innovations, many studies underscore the role of inquiry-based and exploratory strategies in digital history learning. Ghazali et al. (2022) argue that integrating technology effectively requires pedagogies that empower students to access and construct historical narratives using digital sources independently. However, such approaches have rarely been formalized into curriculum documents aligned with Indonesia's education policy (Assumpção & Castral, 2024). Addressing this gap, the present study proposes a structured curriculum framework that embeds digital technology within core components, namely objectives, content, and instructional strategies, while maintaining historical disciplinary principles (Pranata et al., 2020; Ritzen, 2023).

Prior research has predominantly emphasized classroom-level practices without progressing toward curriculum-level integration. For instance, Adli and Fatimah (2019) showed that videos and animations support historical understanding, while Widiana et al. (2021) explored AR use in primary education. Yet neither developed a scalable curriculum for secondary schools. Although inquiry-based learning is often recommended, its integration into a nationally compliant curriculum remains limited (Jalil et al., 2024). This study bridges that gap by offering a curriculum model for senior secondary schools that integrates digital tools into core elements in line with national guidelines (Asad et al., 2023; Mulyana & Kurniawati, 2020), distinguishing itself from media-effectiveness studies by emphasizing curricular scalability validated through classroom trials (Borrero, 2023).

The primary aim of this study was to design a curriculum framework for history education at the senior secondary level in Indonesia that systematically integrates digital technology within its formal structure (Johnston et al., 2024). This framework is intended to make history learning more engaging, contextual, and relevant to the needs of 21st-century learners while maintaining alignment with national curriculum standards (Putra et al., 2020). The curriculum includes core competencies, content themes, and sample learning activities that incorporate digital tools as an integral part of instruction.

Unlike previous studies that focus on creating individual teaching media, this research emphasizes a curriculum-level innovation that provides a practical and adaptable design for the structured integration of technology (Samuelsson, 2019). By offering a ready-to-implement framework, this study contributes a scalable solution for enhancing digital history education, particularly in contexts where infrastructure and resources may vary.

This study offers a distinct contribution by shifting the focus from classroom-level media applications to the structural integration of existing digital tools within a formal history curriculum. Rather than developing new technologies, it systematizes current digital resources to promote scalable and policy-aligned innovation, an approach particularly relevant for developing countries with limited infrastructure (Hutahaeen et al., 2024). The curriculum model was designed through an integrative process that combined analysis of national curriculum standards, synthesis of academic literature, and needs identified in school contexts. This distinguishes the study from prior research that typically concentrated on media effectiveness or instructional strategies, by addressing the broader curricular architecture instead. A limited field trial in Indonesian senior high schools was also conducted to assess the model's feasibility, contextual fit, and implementation potential.

2. Literature Review

2.1 Emerging Challenges in History Curriculum Design in the Digital Age

The history curriculum plays a vital role in conveying historical knowledge while fostering critical thinking, historical awareness, and contextual comprehension of present-day issues. In the context of 21st-century education, one of the core

challenges is adapting curriculum content and delivery to suit the evolving characteristics of digital-native learners navigating rapid information flows (Hassan et al., 2024). As emphasized by Ofianto et al. (2022), developing historical understanding involves not merely memorizing facts, but engaging students in interpretive, evidence-based reasoning to reconstruct historical narratives. Nonetheless, in Indonesia, the curriculum design for history education still predominantly reflects conventional approaches focused on rote memorization, rather than encouraging inquiry-driven and reflective learning (Pratama et al., 2024). This situation reveals a persistent disconnect between curriculum content and the core competencies expected in modern education.

The problem is further compounded by the absence of explicit and structured digital integration within official history curriculum frameworks. As identified by Uyun et al. (2024), although both the 2013 Curriculum and the Merdeka Curriculum contain general statements promoting technology use, they fail to provide concrete, subject-specific implementation guidelines. Consequently, history teachers often bear the responsibility of independently incorporating technology without centralized curriculum support.

This has led to fragmented practices and limited long-term adoption of digital tools in history teaching (Sahertian, 2024). This situation has further intensified the misalignment between national digital education goals and their implementation within specific subject areas. Consequently, Indonesia's current history curriculum remained insufficiently structured to embed technological integration across essential components such as instructional objectives, core content, and pedagogical approaches (Zulkarnain et al., 2025).

A persistent limitation in history curriculum design has been the inadequate integration of digital literacy and technology-driven pedagogical methods (Darmawan et al., 2025). According to the framework of 21st-century skills, students were required not only to understand historical content but also to evaluate digital materials critically, recognize biases, and reconstruct historical interpretations using digital platforms (Widawski & Oleśniewicz, 2023).

Addressing these expectations demanded a transformation from static, textbook-centred materials to curriculum structures that offered explicit guidance for implementing digital tools in historical inquiry. In the absence of such conceptual and instructional integration, the history curriculum remained detached from the digital demands of contemporary education (Jwai'ed et al., 2024). Bridging this gap is not a matter of technical enhancement alone but represents a foundational need for curriculum reform that is responsive to the evolving nature of historical learning in digital contexts.

The persistence of this curricular disconnect was exacerbated by the prevailing reliance on transmissive teaching approaches, which failed to evolve into transformative, learner-centred paradigms (Idacavage & McAndrews, 2024; Zulkarnain et al., 2025). Structural rigidity and disjointed curricular elements restricted innovation, largely owing to the lack of an integrated conceptual

framework that could accommodate flexible pedagogy and the use of digital learning technologies (Almutairi et al., 2020). In the Indonesian context, this problem was intensified by curriculum guidelines that emphasized chronological coverage and dense content delivery, limiting teachers' capacity to explore technology-supported instructional alternatives (G. Wang, 2024). These challenges extended beyond practical constraints, touching on deeper epistemological concerns about history education's role—not as passive content delivery but as an interactive and collaborative process of constructing meaning through digital and contextual engagement (Fahrudin & Saefudin, 2025b; E. A. Stevens et al., 2022).

Furthermore, national curriculum frameworks often lacked detailed guidance on how digital tools should be integrated systematically into history instruction, creating major obstacles for policy implementation. Many history teachers reported feeling unsupported, citing a lack of institutional infrastructure and systemic alignment for developing digitally enriched pedagogy (Remiswal et al., 2023). This absence of coordinated support suppressed innovation at the classroom level and widened educational inequities, particularly in schools with limited access to technology and professional learning (A. Stevens & McDonald, 2024). As such, embedding digital tools into the history curriculum should be viewed not as a supplementary option but as a strategic policy imperative aimed at advancing equity, improving instructional relevance, and ensuring Indonesian students attain critical 21st-century historical competencies (Sousa et al., 2022).

2.2 Technology Integration in History Education

The integration of technology in history education has become increasingly critical in addressing the pedagogical demands of the digital era. Digital tools offer opportunities to reconstruct students' understanding of historical events through interactive, participatory, and multimodal learning approaches (Setyowati et al., 2023). Technology not only serves as a complementary instructional medium but also enhances cognitive engagement and supports the development of essential historical thinking skills (Corrales et al., 2024). Through the use of digital archives, interactive maps, simulations, and documentary videos, students are able to access primary sources and explore multiple perspectives, thereby fostering independent inquiry and evidence-based analysis (Domenici, 2023; Temerbayeva et al., 2023). This approach shifts the focus from rote memorization to meaningful exploration of history in classroom contexts (Laine et al., 2023).

Despite the pedagogical potential of technology, its integration into Indonesian history education has largely remained at the micro-level, typically limited to supplementary tools such as videos, online quizzes, and slide presentations (Hay, 2023). These efforts are often driven by individual teachers without systemic support from curriculum design (Idacavage & McAndrews, 2024). As a result, technological application in classrooms frequently lacks sustainability and remains dependent on school infrastructure and teacher initiative (Fahrudin & Saefudin, 2025a; X. Wang et al., 2024). Without explicit guidance within national curriculum documents, the incorporation of digital tools tends to be superficial

and inconsistent across schools (Brohinsky, 2023; Sahani & Prakasha, 2024). This situation reinforces the need for a structured curriculum framework that integrates technology meaningfully, positioning it as a core instructional element rather than a peripheral addition.

Recent research emphasizes that effective technology integration in history education requires a pedagogically grounded curriculum that systematically links digital tools to learning objectives, instructional strategies, and assessment processes (Li & Ding, 2022; Neuhaus & Vogt, 2022). This study also positions its curriculum model within the broader framework of international curriculum theories. Specifically, it aligns with Tyler's objective-based curriculum model, which emphasizes the clear formulation of learning goals and the systematic alignment of content, instruction, and assessment (Ibagón Martín & Miralles Martínez, 2022).

Furthermore, the model operationalizes elements of Taba's grassroots curriculum development process by incorporating iterative teacher input, contextual relevance, and empirical feedback into the design process (Portillo et al., 2020). It also resonates with recent propositions for curriculum design in the digital age, which stress the integration of technology not merely as content but as an organizing principle that structures learning progression (Jaramillo & Chiappe, 2024).

Such alignment is critical for ensuring that technology serves as a meaningful component rather than a superficial addition (Li & Ding, 2022; Neuhaus & Vogt, 2022). Inquiry-based and problem-based learning models are particularly compatible with digital technologies, as they promote student collaboration, independent source analysis, and reflective thinking (Widawski & Oleśniewicz, 2023). However, scholars caution that introducing technology without a strong curricular foundation may exacerbate educational disparities, especially in contexts with unequal access or insufficient teacher preparation (Engeness & Gamlem, 2025; Nygren et al., 2019).

While previous studies have emphasized the value of digital tools in enhancing engagement, they often fall short in offering a structured curriculum model that systematically integrates technology with clear pedagogical goals, content scaffolding, and assessment strategies. To address this gap, the curriculum model proposed in this study was designed as a cohesive instructional framework, anchored in curriculum theory and informed by contextual needs, that operationalizes technology integration across all instructional components (Dong et al., 2022).

In addition, technology integration in history education must be viewed as part of a broader epistemological transformation concerning how students construct historical knowledge (Mathew & Burgess, 2023). Rather than functioning solely as delivery tools, digital media should facilitate the development of critical historical understanding by enabling students to analyse, interpret, and question diverse digital representations of the past (Birsyada & Utami, 2024; Gillate et al.,

2023). Studies by Utomo and Wasino (2020) and Mars (2022) emphasize that 21st-century historical literacy requires active student engagement in evaluating digital sources and constructing historical narratives within contextually relevant, evidence-based learning environments. This also opens up opportunities for integrating reflective historical learning enriched by traditional texts, such as *Serat Tajussalatin*, which conveys leadership values and moral reasoning through historical narratives, into digital formats that support cultural relevance and ethical reasoning (Afandi, 2023; Suhaimy et al., 2018). For technology to serve as a meaningful pedagogical agent, it must be embedded within a curriculum that is conceptually coherent, operationally structured, and capable of guiding teachers in implementing source-driven and exploratory learning activities (Rajab et al., 2024).

Building on these perspectives, this study aligns with the strategies for digital curriculum design that emphasize the systematic integration of technology to enhance learning outcomes and adaptability (Jaramillo & Chiappe, 2024). This approach is also supported by Taba's inductive curriculum model, which values teacher-driven design, and Pinar's reconceptualist view of curriculum as a dynamic and reflective process shaped by context (Toma et al., 2024). The absence of such integration risks generating fragmented and unsustainable practices that are difficult to evaluate consistently (Al Maani & Shanti, 2023).

Therefore, the proposed curriculum incorporates digital literacy skills, such as assessing online sources, utilizing data visualization tools, and constructing multimedia historical projects, as key learning outcomes (Ibagón Martín & Miralles Martínez, 2022). This curriculum model is designed not only to be technically adaptive but also to cultivate reflective, critical, and meaningful historical understanding in the digital era (Vestøl, 2024). By embedding technology into the very architecture of curriculum design, this study offers a pedagogically transformative approach that advances history education toward a more equitable, relevant, and sustainable practice.

3. Methodology

3.1 Research Design

This study employed the ADDIE instructional design model to guide the curriculum development process. The five stages of ADDIE, namely Analysis, Design, Development, Implementation, and Evaluation, were followed sequentially while allowing recursive feedback for iterative improvement. The ADDIE model was selected as it aligns well with curriculum development processes that require iterative refinement, stakeholder involvement, and empirical validation. ADDIE's systematic and recursive structure supports the alignment between instructional objectives, learning activities, and assessment—key components for a technology-integrated curriculum.

This is particularly relevant for curriculum innovation efforts where contextual adaptation and continuous feedback are essential for successful implementation (Serevina et al., 2024). Each stage of the model was customized to ensure relevance

to the Indonesian secondary education context and integration of technology as a structural component of history learning.

3.2 Participants

The study involved three participant groups:

- 3.2.1 Five experts with relevant backgrounds were engaged in the validation phase of the curriculum. This group comprised two experts in curriculum design, two specialists in educational technology, and one senior academic in the field of history education. Selection was based on their professional qualifications and prior experience in digital curriculum design, ensuring informed judgment on both pedagogical and technological aspects.
- 3.2.2 Ten history teachers from six state high schools located in Yogyakarta participated in both the feasibility assessment and the practical implementation of the instructional programme. Schools were selected using purposive sampling based on three criteria: (a) variation in technological infrastructure (e.g., devices and connectivity), (b) willingness to participate in curriculum trials, and (c) availability of administrative support for integration into lesson schedules. These criteria ensured diverse implementation contexts and practical feasibility.
- 3.2.3 Around 240 students from Grades XI and XII took part in the digital history instruction sessions and were involved in formative evaluation activities. Students were drawn from the existing classrooms of the selected teachers to maintain ecological validity and reflect natural instructional settings.

3.3 Instruments

A range of instruments was utilized to obtain quantitative and qualitative information:

- 3.3.1 Validation rubrics: Experts and teachers used an eight-item rubric (five-point Likert scale) to evaluate aspects such as content accuracy, digital integration, and instructional alignment. This provided structured expert input for model validation.
- 3.3.2 Observation checklists: These were used during lessons to record teacher implementation and student engagement with AR content. This ensured fidelity and allowed consistent monitoring across schools.
- 3.3.3 Formative assessment sheets: These were embedded in each module to measure students' understanding, critical thinking, and concept mastery. This offered academic performance data linked directly to lesson objectives.
- 3.3.4 Student questionnaires: These included closed and open-ended items capturing student feedback on engagement, usability, and learning experience. This added learner-centred qualitative insights.

- 3.3.5 Teacher reflection forms: These included closed and open-ended items capturing student feedback on engagement, usability, and learning experience. This added learner-centred qualitative insights.

3.4 Data Collection and Data Analysis

Data collection followed the ADDIE framework, starting from the analysis phase where curriculum documents were reviewed and semi-structured interviews with history teachers were conducted to identify gaps in instructional content and digital integration. These findings informed the curriculum design.

In the design and development phases, a structured digital curriculum draft was created, encompassing competencies, strategies, and digital resources (AR content, videos, assessments). Experts and teachers validated this draft using rubric-based evaluations and feedback sessions, forming the core of the feasibility analysis. The implementation phase was conducted over six weeks across six schools, during which teachers implemented two instructional units. Researchers gathered data through classroom observations, student questionnaires, teacher reflections, and formative assessments to capture instructional effectiveness and student engagement.

The evaluation phase included both quantitative and qualitative analysis. Quantitative data from Likert-scaled rubrics and assessment scores were analysed using descriptive statistics (mean and standard deviation [SD]). A one-way ANOVA was also applied to determine differences in implementation effectiveness across schools. No significant differences were found ($p > 0.05$), suggesting broad adaptability of the curriculum model. Qualitative data from teacher reflections, observations, and student feedback were analysed thematically, identifying patterns in engagement, instructional challenges, and perceived value of the curriculum. This dual approach enabled a comprehensive understanding of both usability and educational impact across diverse school settings.

4. Result

4.1. Analysis Stage

The analysis stage laid the empirical foundation for developing a history curriculum with embedded digital components, specifically designed for Indonesian senior high school contexts. This phase focused on identifying the gap between existing classroom practices in history instruction and the pedagogical requirements of a digitally enriched learning environment. To ensure the depth and accuracy of the data, the research employed a triangulated approach, which included semi-structured interviews with 15 history teachers from six different schools, classroom observations in 12 sessions, and an in-depth literature review of national and international sources related to digital pedagogy and history education.

This mixed-methods approach enhanced the validity and credibility of the results, while also offering detailed insights into current limitations and opportunities for integrating digital tools into history teaching in Indonesia (Gläser-Zikuda et al.,

2020). A summary of the key findings from this needs assessment is presented in Table 1:

Table 1: Key findings from the needs assessment for a digitally integrated history curriculum in senior high schools

Assessment Aspect	Key Findings and Implications
Dominant Teaching Approach	Instruction remained largely lecture-based, with 86.7% of teachers adhering to conventional, low-interactivity methods, emphasizing the urgency of shifting toward learner-centred pedagogy.
Use of Technology in Instruction	Digital tools were minimally utilized, confined to PowerPoint and basic video playback, without being embedded into curricular goals or student-centred learning activities.
Student Participation in Digital Learning Activities	Students exhibited low engagement, particularly in tasks involving analytical or critical thinking, revealing a lack of higher-order cognitive involvement in classroom learning.
Access to Technological Infrastructure and Connectivity	Between 40% and 60% of students had access to personal devices; 50% of schools lacked proper computer labs, underscoring the need for adaptable curricular models suited to varied conditions.
Teachers' Perceptions of Technology Integration	A significant 93% of teachers indicated readiness to adopt technology in instruction, contingent upon structured curriculum support and access to professional development.
Consistency between Curriculum Goals and Technological Tools	There was no systematic linkage between digital tools and learning objectives; national curriculum documents remained abstract, hindering coherent implementation in schools.
Contextual Appropriateness of Historical Subject Matter	Curriculum content was often disconnected from students' contemporary contexts and did not adequately bridge local histories with broader global narratives.
Provision and Accessibility of Digital Educational Resources	Most schools lacked access to structured digital resources—such as AR content, infographics, and formative quizzes—limiting opportunities for contextual, independent learning.

The analysis indicated that instructional practices were still dominated by conventional, teacher-led methods focused on memorizing historical facts and delivering content in a sequential narrative format. Roughly 86.7% of participating teachers acknowledged relying on lectures, occasionally supplemented with basic media such as PowerPoint presentations or historical documentaries, yet lacking systematic integration of digital tools into instructional objectives or inquiry-driven approaches.

The observational results aligned with teacher reports, showing that student engagement in history lessons remained low, with few tasks requiring advanced cognitive skills such as interpreting original historical documents, evaluating digital content, or formulating critical historical arguments. As a result, many students continued to view history as a repetitive subject centred on factual recall, rather than as a space for critical exploration of social and historical contexts.

These findings confirmed that, when effectively incorporated into instructional practice, digital tools have the capacity to redefine history education as a more reflective and inquiry-driven learning process (Temerbayeva et al., 2023).

Beyond instructional practice, structural barriers related to digital access and institutional support were also identified. Approximately 50% of the participating schools did not have adequate computer facilities, and only 40% to 60% of students were able to use personal digital devices within school premises. Despite these limitations, 93% of history teachers expressed a willingness to integrate technology into their teaching, provided that they received sufficient curriculum guidance and access to relevant professional development.

These findings emphasized the need for a curriculum that not only accounts for infrastructural inequality but also empowers teachers through a clear and applicable pedagogical framework. In response, the curriculum developed in this study was designed to address three key priorities: promoting a shift toward participatory and inquiry-based teaching methods; embedding digital content that aligns with local educational contexts; and maintaining structural adaptability to minimize digital access disparities among schools.

4.2. Design Stage

Based on the findings from the needs analysis, the curriculum development stage focused on building an integrated structure that meaningfully embeds digital technology into senior high school history instruction. Instead of merely revising learning goals or updating content, this phase involved reorganizing essential curriculum elements, such as key competencies, achievement indicators, content domains, instructional strategies, and assessment tools, within the framework of 21st-century learning principles.

The design process was informed by the Technological Pedagogical Content Knowledge (TPACK) model, which emphasizes the interconnectedness of historical knowledge, inquiry-based teaching, and the purposeful use of digital tools to enhance student participation (S. W. Lim et al., 2023). The resulting framework was intentionally designed to align with the cognitive profiles of students in the digital era, who respond more effectively to contextual, interactive, and visually rich learning environments.

The curriculum design integrated various types of interactive digital content, such as historical narratives presented through video, augmented reality (AR) simulations, topic-based visual infographics, and reflective assessments delivered via online platforms. These digital elements were organized into modular instructional units, each equipped with comprehensive teaching manuals, automated assessment rubrics, and learner-centred activities rooted in problem-solving and historical source analysis.

Structurally, the curriculum adopted a thematic and spiral progression approach, enabling students to link local historical contexts with broader global narratives. In addition, it intentionally aimed to develop essential historical thinking abilities,

such as understanding chronological sequences, analysing sources critically, and formulating coherent historical interpretations, by engaging students in immersive, digitally supported, inquiry-based learning tasks.

To accommodate diverse school environments, the curriculum was delivered using two differentiated modes: an individual learning approach for schools equipped with sufficient digital facilities, and a collaborative format tailored for institutions with limited technological access. Each unit was intentionally designed with flexible features to allow customization in accordance with available resources and student learning profiles. A key element of the curriculum was the integration of digital formative assessments, which allowed educators to track student learning trajectories in real time and provide immediate, automated feedback via the platform.

By adopting a modular and flexible structure, the curriculum sought not only to modernize history instruction but also to present a replicable and policy-aligned instructional solution. This design was consistent with the principles of the Merdeka Curriculum, which advocates for responsive, student-centred, and digitally integrated learning experiences.

4.3 Development Stage

4.3.1 Expert Validation

The expert validation process involved five professionals specializing in curriculum development, history pedagogy, and educational technology. The validation was conducted using a standardized rubric consisting of eight assessment indicators measured on a five-point Likert scale. The results indicated a very high level of curriculum feasibility and quality, with an overall mean score of 4.80 out of 5.00. The most outstanding scores were achieved in Technology Integration within the Curriculum and Potential for Wide-Scale Implementation, both receiving perfect scores of 5.00, demonstrating the experts' strong confidence in the curriculum's structural adaptability and technological coherence. The detailed expert validation results are presented in Table 2 below:

Table 2: Results of expert review on the design of a technology-integrated history curriculum

Criteria	Expert					Mean Score
	1	2	3	4	5	
Consistency with national curriculum regulations	5	4	5	5	5	4.80
Incorporation of digital tools into curriculum components	5	5	5	5	5	5.00
Validity and contextual relevance of historical subject matter	5	4	5	5	5	4.80
Impact of digital teaching strategies on learning effectiveness	5	5	4	5	5	4.80
Appropriateness of instructional content for learners' profiles	5	4	5	5	5	4.80
Practicality of digital tool usage in classroom settings	4	4	5	4	5	4.40

Criteria	Expert					Mean Score
	1	2	3	4	5	
Functionality of digital evaluation methods in measuring learning	4	5	5	4	5	4.60
Feasibility of large-scale adoption in various school environments	5	5	5	5	5	5.00
Overall Average						4.80

The expert validation confirmed that the curriculum was highly relevant and feasible for broad application in senior high schools. The perfect scores in Technology Integration and Implementation Potential underscored the curriculum's flexibility and suitability for diverse educational contexts. However, the aspect of Ease of Technology Use received a slightly lower mean score of 4.40, indicating that some experts anticipated possible challenges in the practical use of digital tools by teachers. This feedback was essential for improving the clarity of technical instructions and enhancing teacher training modules to ensure smooth implementation.

4.3.2 Teacher Validation

This phase of validation was carried out by ten history teachers representing six senior high schools involved in the study. Using the same assessment rubric, teachers reviewed the curriculum based on its practicality, ease of implementation, and appropriateness for classroom use. A summary of the teacher evaluation findings is presented in Table 3 below:

Table 3: Results of teacher review for the technology-integrated history curriculum

Evaluation Aspect	Mean Score
Compatibility with classroom environment	4.60
Practicality of digital teaching methods	4.60
Suitability of content for student needs	4.50
Impact of digital tools on boosting student participation	4.60
User-friendliness of technology from the students' perspective	4.60
Student confidence and familiarity with the digital platform	4.60
Efficiency of digital assessments in evaluating learning progress	4.50
Potential for large-scale implementation	5.00
Overall Mean Score	4.60

The outcomes of the teacher validation process reflected a high level of approval regarding the curriculum's practicality, evidenced by an average score of 4.60. Notably, the criterion Potential for Large-Scale Implementation received the top rating (5.00), highlighting teachers' confidence in the curriculum's adaptability for use in schools with varying degrees of digital infrastructure.

Although the scores for Content Relevance and Digital-Based Assessment Effectiveness were slightly lower (4.50), teachers still rated these aspects positively, with suggestions to further adapt learning materials to local contexts

and ensure that assessment instruments accommodate varying levels of student digital proficiency. Teachers emphasized in their feedback that while the curriculum's digital media (AR and video narratives) were engaging and effective, successful implementation would require sufficient teacher training and ongoing technical support.

4.3.3 Curriculum Implementation Simulation

Building on the validation stage, particularly the favourable responses regarding the simplicity of integrating technology (experts: $M = 4.40$; teachers: $M = 4.60$), the researcher recognized that successful application depended not only on a well-established conceptual framework but also on the availability of user-friendly, practical resources tailored for both teachers and students. As a result, during development, a set of classroom-based simulation resources was produced to illustrate the practical use of the curriculum within real teaching contexts.

These simulations were built around selected themes, such as Anti-Colonial Movements, the Asian-African Conference, and National Unification, to demonstrate full lesson sequences from introduction to assessment. Each simulation outlined key teaching stages, including digital engagement, collaborative inquiry, and formative assessment using interactive digital quizzes. To accommodate diverse school settings, the materials were offered in three flexible formats: instructional video content, visual infographics, and modular narrative-based lesson plans. These delivery options were intentionally varied to support infrastructure differences and teaching styles. Table 4 presents the design and instructional aims of each simulation module:

Table 4: Simulation types and their instructional purposes

Simulation Type	Media Format	Example Topic	Instructional Goal
Guided exploration of digital module	Video & narrative guide	Anti-Colonial Movements	To illustrate the sequence of learning activities using digital resources and modules
AR-Enhanced Historical Simulation	Demonstrative video	The Asian African Conference	To illustrate AR use for visualizing historical events and boosting student engagement
Digital Quiz Assessment Tutorial	Infographic & video tutorial	Dynamics of the New Order Era	To guide teachers in conducting online assessments using automated digital tools
Scenario Adaptation for Low-Tech Environments	Narrative text & technical guide	Indonesian National Awakening	To provide collaborative models for schools with limited digital infrastructure

These instructional simulations were developed not only to enhance teachers' understanding of the curriculum but also to act as flexible strategies for implementing it across schools with varying digital capacities. Teachers were given the flexibility to select simulation formats that aligned best with their institutional resources and learner characteristics. Each simulation set was accompanied by diagnostic tools and teacher reflection templates to assess instructional impact and uncover any difficulties encountered during classroom application.

In alignment with digital pedagogy frameworks, the simulation design drew upon the Universal Design for Learning (UDL) principles, which advocate for offering multiple pathways for information access, learner engagement, and demonstration of understanding. Accordingly, these curriculum simulations fulfilled a dual function: they acted as professional development instruments for educators while simultaneously serving as practical validation tools to assess the curriculum's real-world applicability. This ensured that the proposed curriculum was not only theoretically coherent and pedagogically robust, but also implementable across varied educational contexts.

4.4 Implementation Stage

The implementation stage served as a structured field trial designed to evaluate the efficacy and practicality of the newly developed digital-based history curriculum. It was carried out in six public senior high schools within the Yogyakarta Special Region, purposefully chosen to represent variations in digital infrastructure, educator readiness, and student demographics. The main goal was to observe the autonomous application of the curriculum by teachers in authentic classroom environments without researcher facilitation and to examine students' engagement with and reactions to the integrated digital media. The implementation spanned six weeks, during which each school executed a minimum of two digital-based instructional units. The specific historical topics covered were determined by the teachers, based on schedule availability and alignment with the national syllabus.

Prior to classroom deployment, participating teachers underwent a focused technical training consisting of two 90-minute sessions. These sessions covered curriculum organization, utilization of digital components (such as videos, AR features, and online quizzes), and adaptation strategies for diverse instructional settings. During the implementation, teachers delivered the lessons independently using the provided modules, with only limited monitoring from the research team. The success of this phase was assessed through multiple data sources, including classroom observations, teacher reflection notes, student formative evaluations, and structured student surveys. Table 5 below outlines the consolidated results from the six participating schools:

Table 5: Teacher evaluation of curriculum implementation in six public senior high schools

School	Effectiveness Score (1-5)	Implementation Notes
SMAN 1 Yogyakarta	4.78	Full digital integration: students were engaged and reflective
SMAN 2 Bantul	4.75	AR tools used effectively; digital assessments worked well
SMAN 8 Yogyakarta	4.60	Strong infrastructure; limited student interaction patterns
SMAN 1 Kulon Progo	4.53	Active participation: device access was restricted
SMAN 1 Gunungkidul	4.50	Projector-based group media use
SMAN 2 Ngaglik	4.47	Low tech access: collaborative methods applied
Overall Mean Score	4.60	Implementation adapted well to varied school conditions

The average score reflecting the effectiveness of curriculum implementation reached 4.60, with top ratings observed in schools possessing moderate to advanced digital infrastructure, such as SMAN 1 Yogyakarta and SMAN 2 Bantul. However, institutions with limited technological resources also managed to implement the curriculum successfully by adopting collaborative teaching methods. A case in point is SMAN 2 Ngaglik, where limited access to personal devices was addressed by using shared projectors and conducting reflective discussions based on historical video materials. These outcomes illustrate the curriculum's flexibility and its viability in schools with constrained digital environments.

To assess whether implementation outcomes differed significantly across school settings, a one-way ANOVA was employed using teacher-reported evaluation data. The analysis revealed no meaningful statistical variation among schools ($p > 0.05$), implying that the curriculum's effectiveness was not solely determined by the availability of digital infrastructure. Rather, elements such as pedagogical approach, teacher engagement, and the adaptable nature of the curriculum played a more pivotal role. A summary of these ANOVA results can be seen in Table 6:

Table 6: Summary of one-way ANOVA on effectiveness of curriculum implementation across schools

Source of Variation	SS	df	MS	F	p-value
Between schools	0.067	5	0.013	1.142	0.395
Within schools	0.410	36	0.011		
Total	0.477	41			

The outcomes affirmed that the digitally integrated history curriculum developed in this study possessed both strong pedagogical value and adaptable structural design. In schools with constrained technological infrastructure, teachers were still able to modify their instructional delivery in ways that maintained essential learning targets. This demonstrated the curriculum's potential as a scalable and

inclusive instructional model suitable for widespread adoption in Indonesian secondary education.

In addition to the statistical data, qualitative feedback from educators and students revealed notable improvements in classroom engagement. Teachers observed increased participation, greater levels of critical questioning, and a shift toward more interactive, learner-driven environments. Students shared that digital tools, particularly AR and historical video narratives, helped them connect more meaningfully with historical content, linking it to current global issues such as colonial legacies and international relations. These reflections indicated that the curriculum not only functioned effectively in practice but also enhanced students' historical insight and contextual awareness. The successful implementation trial confirmed the curriculum's readiness for broader integration into Indonesia's educational system.

In sum, the implementation phase confirmed the curriculum's practical viability and educational impact, underscoring its capacity for replication and policy-level integration. These findings support recommendations for phased dissemination to other schools and alignment with national efforts to promote digital innovation and competency-based history learning. Figure 1 illustrates the pattern of effectiveness scores across the participating institutions:

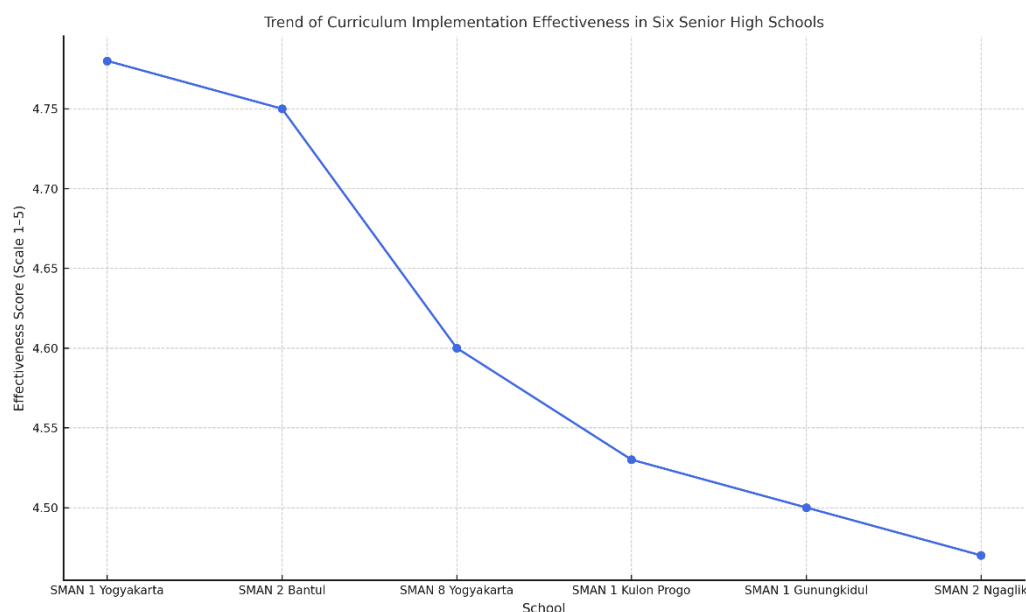


Figure 1: Effectiveness score trends across participating schools

The graphical trend revealed a relatively consistent pattern of implementation effectiveness, with a slight downward shift observed in schools that had limited digital infrastructure. SMAN 1 Yogyakarta and SMAN 2 Bantul recorded the highest scores, indicating a positive association between digital readiness and the seamless application of instructional components such as augmented reality media and automated formative assessments. Nonetheless, the variations among

school scores were minimal, as all institutions remained within the high-performance range (scores above 4.40).

This outcome emphasized that instructional adaptability and teacher agency were more decisive factors in curriculum success than technological resources alone. Overall, the chart reinforced the inference that the developed digital history curriculum was both resilient and scalable, supporting its potential for widespread implementation across diverse secondary school environments in Indonesia.

4.5 Evaluation Stage

The evaluation stage functioned as a comprehensive review of how effectively the technology-enhanced history curriculum was applied across six senior high schools. Its purpose extended beyond assessing technical implementation to include measuring the curriculum's impact on teaching quality, student participation, and learning outcomes. To gather comprehensive insights, the researcher employed data triangulation from four main sources: formative assessment results, classroom observation records, teacher reflection notes, and student questionnaire responses. This phase primarily focused on capturing shifts in students' learning behaviours and the development of history-related competencies, guided by principles of digital literacy (X. Wang et al., 2024).

Regarding instructional dynamics, educators reported notable improvements in student involvement, particularly during sessions that utilized digital elements such as historical videos and augmented reality experiences. Approximately 83% of participating teachers observed heightened student activity and increased reflectiveness during classroom discussions. These perceptions were supported by field observations, which recorded a qualitative shift in student questioning and a transition from teacher-dominated to more dialogic classroom interactions.

Concerning learning performance, 71% of students surpassed the established minimum competency benchmark (KKM), with an average improvement of 12.4% in formative assessment scores compared to those in prior cohorts taught with conventional methods. These results indicated not only enhanced historical understanding but also the development of deeper analytical thinking. A concise summary of these impacts on both educators and learners is presented in Table 7:

Table 7: Summary of teachers' and students' responses to curriculum implementation

Evaluation Aspect	Finding	Data Source
Student Engagement	83% of educators observed higher levels of active involvement	Teacher Reflections
Conceptual Understanding	76% of teachers noted improved comprehension through digital tools	Teacher Reflections
Score Improvement	Average increase in scores: 12.4% over the previous class	Formative Assessment
Students Surpassing KKM	71% of students scored above the minimum competency threshold	Daily Test Results
Classroom Atmosphere	More interactive, an increase in open discussions	Researcher Observations
"The lessons felt more interesting and immersive."	Average rating: 4.70 (scale 1-5)	Student Questionnaire
"Digital tools supported my understanding."	Average rating: 4.65	Student Questionnaire
"I was more involved during the learning process."	Average rating: 4.60	Student Questionnaire

The data presented in Table 7 indicated that the curriculum's impact went beyond surface-level improvements, contributing to meaningful changes in fundamental teaching practices. Educators observed marked improvements in student attentiveness and cognitive curiosity. The integration of digital media functioned not only as a means to facilitate content delivery but also as an effective tool for cultivating students' abilities in historical reasoning. Moreover, the consistently strong ratings in student surveys, especially regarding engagement and clarity, indicated that the use of multimedia tools, notably videos and augmented reality, fostered a learning experience that was more immersive, contextualized, and meaningful.

The findings from this evaluation carried strategic significance. The technology-integrated history curriculum developed in this study effectively tackled the pedagogical limitations of conventional instruction by transforming history education from a linear, text-dominated model into one focused on discovery, visualization, and meaningful knowledge construction. The results also affirmed the curriculum's potential for broader implementation at the national level, contingent on comprehensive teacher training, inclusive digital infrastructure, and alignment with local educational contexts. Overall, the evaluation confirmed that the curriculum was not only pedagogically sound and adaptable but also well-positioned for systemic adoption.

5. Discussion

The results of this research demonstrated that embedding technology systematically within the history curriculum substantially improved both teaching practices and student achievement. The curriculum's deployment across six schools—each with distinct technological capacities—highlighted its strong adaptability, affirming that instructional effectiveness did not solely hinge on access to digital devices. Instead, it relied on a curriculum framework that

supported pedagogical flexibility and differentiated instruction.

Consistent with the findings of Li and Ding (2022), technology holds transformative potential when integrated into a curriculum that encourages student engagement, meaningful knowledge construction, and context-based inquiry in history learning. Evaluation outcomes indicated notable gains in student involvement, enhanced classroom dialogue, and strengthened historical reasoning, signifying a shift from traditional didactic teaching to a more interactive and reflective pedagogical model (Birsyada, 2020; Candel et al., 2024; Fahrudin et al., 2025).

The novelty of this study lies in its approach to integrating technology not merely as a learning medium but as a fundamental component embedded within the curriculum structure. Unlike most previous research that concentrated on developing digital content such as videos, augmented reality, or mobile applications for classroom use (Nii Akai Netey et al., 2024), this study introduces a systemic curriculum design where technology is positioned at the core of instructional planning.

This innovation ensures that technological integration is aligned with learning objectives, content organization, pedagogical strategies, and assessment processes, making it a comprehensive framework rather than an isolated teaching aid. The curriculum developed in this study represents a shift from conventional, tool-based technology adoption toward a curriculum-driven model that can sustainably guide teachers in implementing technology-enhanced history learning (Birsyada & Permana, 2020; Bures et al., 2022).

This study presents a modular curriculum model that can be directly applied in classroom practice without requiring additional adjustments by teachers. Unlike many previous studies that focused on TPACK-based training, which often demands that teachers independently develop technology-integrated lesson plans (Bourekache & Kazar, 2020), this curriculum offers pre-structured learning scenarios, practical use-case examples, and integrated digital assessments that can be implemented as provided. These features help minimize the gap between curriculum design and practical classroom application, making the proposed model highly accessible and efficient for secondary school teachers (Fahrudin & Saefudin, 2025b; S. W. Lim et al., 2023).

Feedback from teachers highlighted that the modular format facilitated instructional planning and supported differentiated learning, while students appreciated the interactive and contextualized nature of AR-based tasks. Several students reported that the visual and exploratory activities helped them understand historical events more deeply and engage more actively in classroom discussions. Importantly, the structure of this curriculum aligns with the principles of the Kurikulum Merdeka, particularly in promoting flexible learning pathways, contextualized assessments, and inquiry-driven tasks, thereby strengthening its relevance for national policy implementation.

Within the Southeast Asian region, particularly in Malaysia, the incorporation of digital tools into history teaching has been primarily guided by national frameworks such as the Dokumen Standard Kurikulum dan Pentaksiran (DSKP Sejarah) and the Malaysia Education Blueprint 2013–2025 (Darmawan et al., 2025). However, prior investigations have shown that Malaysia's digital history initiatives have largely operated under an additive paradigm, treating technological tools as enhancements rather than core curricular elements (Inayatillah et al., 2022; Zulkarnain et al., 2025).

Implementation frequently depended on individual teacher efforts and lacked a consistent strategy to drive pedagogical innovation. Although ICT-related professional development programs were available, a weak linkage between technology use, historical content, and instructional aims often resulted in fragmented and uneven execution of digital history practices (Gyularso et al., 2023; Corrales et al., 2024; Martin et al., 2024).

By contrast, this study introduced a curriculum framework that prioritized the systematic integration of digital elements and ensured pedagogical alignment. Unlike Malaysia's supplementary approach, this Indonesian curriculum embedded digital competencies from the outset, featured interactive historical simulations, and included automated assessments as integral components (Ghazali et al., 2020; D. Lim et al., 2024; Vinco et al., 2019). Here, digital technologies served as the backbone of instructional design rather than supporting elements (Muangchan & Yanhua, 2025). The modular structure of the curriculum enabled direct classroom implementation, reducing the need for major adaptation by educators. Consequently, the Indonesian model presents a coherent and replicable example for other Southeast Asian contexts, aligning national policy, curriculum formulation, and pedagogical application to meet the educational challenges of the digital era (Stracqualursi & Agati, 2024; Zulkarnain et al., 2025).

This study also contributed to the broader international discourse on digital curriculum transformation in history education by illustrating that impactful change can be achieved without relying on sophisticated or high-cost technologies. Instead, the findings emphasized the value of modular, adaptable instructional models that align with diverse classroom realities. The curriculum framework developed through this research presented a structured method for incorporating digital resources, potentially serving as a benchmark for countries grappling with similar barriers such as limited infrastructure, uneven teacher preparedness, and varying levels of digital competency.

In contrast to many curriculum designs from developed nations, which often depend on robust technological ecosystems and significant investment, this study prioritized accessibility and long-term pedagogical sustainability, thereby enhancing its relevance and applicability across global educational settings (Granado-Peinado & Huertas, 2023; Setiawan et al., 2020; Takenaka & Soga, 2019). Consequently, the research outcomes addressed not only Indonesia's educational priorities but also contributed to the wider advancement of digital history

instruction through collaborative, inquiry-driven, and source-based pedagogical strategies.

6. Conclusion

The findings of this study validated that the purposeful incorporation of digital tools into the history curriculum had a notable positive impact on instructional quality and student learning outcomes at the senior high school level. Developed using the ADDIE framework, the curriculum received strong endorsement—reflected in expert evaluations ($M = 4.80$), teacher feedback ($M = 4.60$), and implementation scores from six different schools ($M = 4.60$)—demonstrating its conceptual robustness, pedagogical suitability, and functional effectiveness. The one-way ANOVA test ($p = 0.395$) indicated no statistically meaningful differences in implementation outcomes among schools with diverse technological capacities, suggesting that instructional strategies and the curriculum's built-in flexibility were more influential than infrastructure levels in shaping successful adoption.

Furthermore, qualitative data demonstrated increased student participation, deeper critical thinking, and improved ability to link historical topics to present-day global challenges. Student satisfaction ratings ($M = 4.65$ – 4.70) underscored the contribution of digital media, especially augmented reality and narrative-based videos, in enhancing understanding, historical thinking, and digital literacy. These findings confirmed the curriculum's strong educational value and its readiness for expansion within education systems undergoing digital transformation.

7. Suggestions

Drawing on the outcomes and scope of this research, several forward-looking recommendations are proposed. Firstly, broader piloting of the curriculum is advised across schools situated in varied geographical and socioeconomic contexts, especially in underserved and rural regions, to assess its potential for large-scale and culturally responsive application. Secondly, there is a need to establish a specialized digital training platform incorporating microlearning and interactive content to enhance teacher proficiency incrementally, moving beyond conventional training formats. Thirdly, incorporating this curriculum into national education agendas, such as the Kurikulum Merdeka, is vital for transitioning from small-scale innovation to institutionalized educational policy.

Fourthly, long-term research should be conducted to assess how effectively the curriculum fosters 21st-century skills such as digital literacy in history, analytical thinking, and participatory citizenship over time. Lastly, the curriculum model introduced in this study offers a replicable and adaptable approach that can support digital education transformation efforts in other developing nations with similar resource and capacity constraints.

8. Limitations

Although the findings of the study were promising, several methodological and contextual constraints were encountered. To begin with, the implementation phase was confined to six senior high schools located within a single province.

While these schools offered variations in terms of infrastructure, they did not adequately capture the broader spectrum of Indonesia's geographic, cultural, and institutional diversity. Second, the effectiveness evaluation was conducted over a short six-week duration, restricting the ability to assess long-term impacts on students' historical understanding, value development, or digital citizenship.

Third, tools used to gather data, such as teacher reflection logs and student feedback forms, were collected immediately after implementation, potentially influenced by early excitement or social desirability bias. Fourth, the application of digital elements such as augmented reality and automated assessments was still dependent on factors such as device availability, stable Internet connectivity, and students' foundational digital literacy – conditions that differed significantly among the involved schools. Moreover, the teacher development component was conducted in a basic offline format and has yet to be evaluated through alternative or prolonged delivery methods. As such, the outcomes presented should be regarded as preliminary insights from a pilot implementation, not as definitive proof of the curriculum's overall impact.

9. Acknowledgement

We sincerely acknowledge the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia for its generous financial support, granted through the Direktorat Penelitian dan Pengabdian kepada Masyarakat Scheme for the 2025 fiscal year. This funding was instrumental in ensuring the successful execution of this research project.

10. References

- Adli, A., & Fatimah, S. (2019). Implementation of strengthening values of nationalism in character education through history learning in public senior high school 1 Sungai Penuh. *International Journal of Educational Dynamics*, 1(2), 116-124. <https://doi.org/10.24036/ijeds.v1i2.138>
- Afandi, H. R. (2023). Reception comparison on physiognomy science pirasat towards Pirasat chapters of Serat Tajussalatin and Firasat chapter of Taj As Salatin. *International Review of Humanities Studies*, 8(1). <https://doi.org/10.7454/irhs.v8i1.1003>
- Alatas, S. F. (2018). Anti-feudal elements in classical Malay political theory: The Taj al-Salatin. *Journal of the Malaysian Branch of the Royal Asiatic Society*, 91(314), 29-39. <https://doi.org/10.1353/ras.2018.0002>
- Al Maani, D., & Shanti, Z. (2023). Technology-enhanced learning in light of Bloom's taxonomy: A student-experience study of the history of architecture course. *Sustainability (Switzerland)*, 15(3). <https://doi.org/10.3390/su15032624>
- Almutairi, A., Gegov, A., Adda, M., & Arabikhan, F. (2020). Conceptual artificial intelligence framework to improving English as second language. *Advances in Engineering Education*, 17, 87-91. <https://doi.org/10.37394/232010.2020.17.11>
- Asad, R., Altaf, S., Ahmad, S., Mahmoud, H., Huda, S., & Iqbal, S. (2023). Machine learning-based hybrid ensemble model achieving precision education for online education amid the lockdown period of COVID-19 pandemic in Pakistan. *Sustainability (Switzerland)*, 15(6). <https://doi.org/10.3390/su15065431>
- Assumpção, A. L., & Castral, P. C. (2024). A critical history of formal pedagogical strategies for the valorization of cultural heritage in Brazil. *Heritage*, 7(1), 259-271. <https://doi.org/10.3390/heritage7010013>
- Birsyada, M. I. (2020). Sufism ethics in Javanese aristocracy: A historical perspective.

- International Journal of Innovation, Creativity and Change*, 11(10), 267-286.
- Birsyada, M. I., & Permana, S. A. (2020). The business ethics of Kotagede's silver entrepreneurs from the kingdom to the modern era. *Paramita: Historical Studies Journal*, 30(2), 145-156. <https://doi.org/10.15294/paramita.v30i2.20691>
- Birsyada, M. I., Saefudin, A., Wibowo, B. A., & Dzulkurnain, M. I. (2024). Fostering historical thinking and reasoning through hybrid dialogue: Integrating Javanese philosophy into history education. *International Journal of Learning, Teaching and Educational Research*, 23(12), 192-215. <https://doi.org/10.26803/ijlter.23.12.11>
- Birsyada, M. I., & Utami, N. W. (2024). Social construction of kentongan for disaster risk reduction in highland Java and its potential for educational tool. *Heliyon*, 10(9), 1-12. <https://doi.org/10.1016/j.heliyon.2024.e30081>
- Borrero, N. (2023). Embracing the collective: Challenges and opportunities in teaching and teacher education in the wake of COVID-19. *Social Sciences*, 12(3). <https://doi.org/10.3390/socsci12030194>
- Bourekache, S., & Kazar, O. (2020). Mobile and adaptive learning application for English language learning. *International Journal of Information and Communication Technology Education*, 16(2), 36-46. <https://doi.org/10.4018/IJICTE.2020040103>
- Brohinsky, J. (2023). When the light goes out: Ignorance and multiplicity in teaching and learning. *ECNU Review of Education*, 1-19. <https://doi.org/10.1177/20965311231167190>
- Bures, M., Ripka, V., Buresova, K., Frajtak, K., Maha, J., & Cinatl, K. (2022). An innovative e-learning support for modern history distance learning and the experience during the COVID-19 lockdown. *Sustainability (Switzerland)*, 14(6), 1-19. <https://doi.org/10.3390/su14063631>
- Candel, E. C., De-la-Peña, C., & Yuste, B. C. (2024). Pre-service teachers' perception of active learning methodologies in history: Flipped classroom and gamification in an e-learning environment. *Education and Information Technologies*, 29(3), 3365-3387. <https://doi.org/10.1007/s10639-023-11924-0>
- Corrales, M., Rodríguez, F., Merchán, M. J., Merchán, P., & Pérez, E. (2024). Comparative analysis between virtual visits and pedagogical outings to heritage sites: An application in the teaching of history. *Heritage*, 7(1), 366-379. <https://doi.org/10.3390/heritage7010018>
- Darmawan, W., Kusmarni, Y., Pangestu, D. A., & Logayah, D. S. (2025). Developing living history model assisted by digital history textbooks in history learning to improve students' historical empathy. *Journal of Social Studies Education Research*, 16(2), 343-376.
- Darsono, Fahrudin, Birsyada, M. I., Judijanto, L., Muslim, A., Saefudin, A., & Saddhono, K. (2024). Environmental exploitation in the colonial period: An ecocritical analysis of Pramoedya Ananta Toer's *Buru Quartet*. *Theory and Practice in Language Studies*, 14(8), 2455-2464. <https://doi.org/10.17507/tpls.1408.18>
- Domenici, V. (2023). Training of future chemistry teachers by a historical/ STEAM approach starting from the visit to an historical science museum. *Substantia*, 7(1), 23-34. <https://doi.org/10.36253/SUBSTANTIA-1755>
- Dong, Y., Yu, X., Alharbi, A., & Ahmad, S. (2022). AI-based production and application of English multimode online reading using multi-criteria decision support system. *Soft Computing*, 26(20), 10927-10937. <https://doi.org/10.1007/s00500-022-07209-2>
- Portillo, E., Look, K., Mott, D., Breslow, R., Kieser, M., & Gallimore, C. (2020). Intentional application of the Taba curriculum model to develop a rural pharmacy practice course. *Innovations in Pharmacy*, 11(1), 1-7. <https://doi.org/https://doi.org/10.24926/iip.v11i1.2089>
- Kurt, Ö. E. (2023). Learning with smartphones: The acceptance of m-learning in higher education. *Online Information Review*, 47(5), 862-879. <https://doi.org/10.1108/OIR-10-2021-0516>

- Engeness, I., & Gamlem, S. M. (2025). Exploring AI-driven feedback as a cultural tool: A cultural-historical perspective on design of AI environments to support students' writing process. *Integrative Psychological and Behavioral Science*, 59(1), 1-23. <https://doi.org/10.1007/s12124-025-09894-8>
- Fahrudin, F., Kurniawanti, M. R., Nurgiansah, T. H., & Gularso, D. (2025). Development of teaching materials for evaluating history learning to improve students' critical thinking skills. *Journal of Education and Learning (EduLearn)*, 19(1), 530-541. <https://doi.org/10.11591/edulearn.v19i1.20882>
- Fahrudin, F., Nurgiansah, T. H., Setiawan, V., Saefudin, A., & Yogyakarta, U. P. (2024). Quantitative measures of engagement in history classes: Analyzing the efficacy of interactive pedagogies. *SAR Journal*, 7(3), 241-248. <https://doi.org/10.18421/SAR73>
- Fahrudin, F., & Saefudin, A. (2025a). A gamified assessment tool to enhance learning motivation in history. *Journal of Educational Research and Evaluation*, 9(1), 54-64. <https://doi.org/https://doi.org/10.23887/jere.v9i1.83981>
- Fahrudin, F., & Saefudin, A. (2025b). Primary sources in online history learning: Enhancing engagement and retention. *Cogent Education*, 12(1), 1-16. <https://doi.org/10.1080/2331186X.2025.2452087>
- Fairless Nicholson, J. (2023). Historical geographies of alternative, and non-formal education: Learning from the histories of Black education. *Geography Compass*, 17(11), 12724. <https://doi.org/10.1111/gec3.12724>
- Ghazali, N. H. C. M., Hamzah, M., Zaini, S. H., & Abdullah, N. (2020). Student teachers' conception of feedback within an assessment for learning environment: Link to pupil aspiration. *Cakrawala Pendidikan*, 39(1), 54-64. <https://doi.org/10.21831/cp.v39i1.25483>
- Ghazali, N. H. C. M., Suppian, Z., & Zaini, S. H. (2022). Factors influencing students' motivation towards learning. *Cakrawala Pendidikan*, 41(1), 259-270. <https://doi.org/10.21831/cp.v41i1.42211>
- Gillate, I., Castrillo, J., Luna, U., & Ibáñez-Etxeberria, A. (2023). Memoria histórica y apps para el desarrollo de la competencia social y cívica: Efectos del Proyecto 1936 en el profesorado en formación inicial. *Revista Complutense de Educación*, 34(1), 203-215. <https://doi.org/10.5209/rced.77252>
- Granado-Peinado, M., & Huertas, J. A. (2023). A teaching innovation project on writing critical essays in a history of psychology course. *Teaching of Psychology*, 50(3), 284-290. <https://doi.org/10.1177/00986283211030909>
- Gyularso, D. G., Fairuzabadi, M., & Birsyada, M. I. (2023). *Proceedings of the 1st UPY International Conference on Education and Social Science (UPINCESS 2022)*, Vol. 1. Atlantis Press SARL. <https://doi.org/10.2991/978-2-494069-39-8>
- Hassan, N. A., Salleh, A. M., Mustafa, Z., Mahfood, S. Z., Jambol, D. J. A., & Abdullah, M. (2024). A pedagogical paradigm for enhancing motivation and mastery in history education: Exploring the efficacy of Ehsond intervention. *Multidisciplinary Science Journal*, 6(9). <https://doi.org/10.31893/multiscience.2024160>
- Hay, B. (2023). Reflections on the future visions of UK tourism outlined in Burkart and Medlik's 1974 book: Tourism: past, present, and future. *Journal of Tourism Futures*, 9(2), 285-299. <https://doi.org/10.1108/JTF-11-2020-0217>
- Hutahaean, B., Telaumbanua, S., Tamba, L., & Hutabarat, R. G. N. (2024). Analysis of innovative and adaptive higher education curriculum development to Education 5.0-based challenges in Indonesia. *International Journal of Learning, Teaching and Educational Research*, 23(4), 76-98. <https://doi.org/10.26803/ijlter.23.4.5>
- Ibagón Martín, N. J., & Miralles Martínez, P. (2022). Conciencia histórica e interés en la historia de los estudiantes colombianos y españoles de educación secundaria. *Revista Electrónica de Investigación Educativa*, 24, 1-14. <https://doi.org/10.24320/redie.2022.24.e18.3938>

- Idacavage, S., & McAndrews, L. (2024). Letting go of fear and biases: New perspectives on historic clothing for design education in the post-pandemic age of digitisation. *International Journal of Fashion Design, Technology and Education*, 17543266. <https://doi.org/10.1080/17543266.2024.2332782>
- Inayatillah, Kamaruddin, & Anzaikhan, M. (2022). The history of moderate Islam in Indonesia and its influence on the content of national education. *Journal of Al-Tamaddun*, 17(2), 213-226. <https://doi.org/https://doi.org/10.22452/JAT.vol17no2.17>
- Jalil, M. Z. A., Razali, N., Rahman, K. A. A., Rahim, M. B., Samad, N. A., & Hussin, A. (2024). Development and evaluation of an augmented reality chiller system simulator for TVET teaching. *Journal of Technical Education and Training*, 16(1), 40-55. <https://doi.org/10.30880/jtet.2024.16.01.004>
- Jaramillo, J. J., & Chiappe, A. (2024). The AI-driven classroom: A review of 21st century curriculum trends. *Prospects*, 54(3), 645-660. <https://doi.org/10.1007/s11125-024-09704-w>
- Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., & Parsons, B. N. (2024). Student perspectives on the use of generative artificial intelligence technologies in higher education. *International Journal for Educational Integrity*, 20(1), 1-21. <https://doi.org/10.1007/s40979-024-00149-4>
- Jwai'ed, A. M., Masri, A. Al, Hijazi, D., & Smadi, M. (2024). Utilizing virtual reality (VR) and augmented reality (AR) technologies in EFL classrooms: A novel approach to improve vocabulary learning and retention. *Journal of Ecohumanism*, 3(6), 109-120. <https://doi.org/10.62754/joe.v3i6.3982>
- Laine, J., Korhonen, T., & Hakkarainen, K. (2023). Primary school students' experiences of immersive virtual reality use in the classroom. *Cogent Education*, 10(1). <https://doi.org/10.1080/2331186X.2023.2196896>
- Li, X., & Ding, S. (2022). Interpersonal interface system of multimedia intelligent English translation based on deep learning. *Scientific Programming*, 2022. <https://doi.org/10.1155/2022/8027003>
- Lim, D., Sanmugam, M., Yahaya, W. A. J. W., & Al Breiki, M. S. (2024). Redesigning Malaysian university students' player traits from the perspective of game theory: A qualitative study. *International Journal of Information and Education Technology*, 14(4), 552-558. <https://doi.org/10.18178/ijiet.2024.14.4.2076>
- Lim, S. W., Jawawi, R., Jaidin, J. H., & Roslan, R. (2023). Learning history through project-based learning. *Journal of Education and Learning (EduLearn)*, 17(1), 67-75. <https://doi.org/10.11591/edulearn.v17i1.20398>
- Mars, M. M. (2022). Community and cultural entrepreneurship and value co-creation in the local food marketscape. *Sustainability (Switzerland)*, 14(24). <https://doi.org/10.3390/su142416744>
- Martin, A., DiGiovanni, M., Acquaye, A., Ponticiello, M., Chou, D. T., Neto, E. A., Michel, A., Sibeoni, J., Piot, M. A., Spodenkiewicz, M., & Benoit, L. (2024). Pathways and identity: Toward qualitative research careers in child and adolescent psychiatry. *Child and Adolescent Psychiatry and Mental Health*, 18(1), 1-18. <https://doi.org/10.1186/s13034-024-00738-8>
- Mathew, S., & Burgess, J. (2023). Two decades of industrial disputation at an Indian auto plant: Lean production versus local cultural values. *Economic and Labour Relations Review*, 34(2), 263-278. <https://doi.org/10.1017/elr.2023.17>
- Muangchan, P., & Yanhua, Z. (2025). Augmented reality technology in a basic Chinese vocabulary course: A study in a Thai university. *Cogent Education*, 12(1). <https://doi.org/10.1080/2331186X.2024.2446088>
- Mulyana, A., & Kurniawati, Y. (2020). Phenomenography analysis of students' historical thinking ability in studying social history. *Cakrawala Pendidikan*, 39(3), 666-678. <https://doi.org/10.21831/cp.v39i3.28982>

- Neuhaus, T., & Vogt, M. (2022). The concept of German Bildung as a realization of the hero archetype. *Historia Scholastica*, 8(2), 11-30. <https://doi.org/10.15240/tul/006/2022-2-001>
- Nii Akai Nettey, J., Osei Mensah, R., Asafo-Adjei, R., & Adiza Babah, P. (2024). Analyzing the challenges basic school teachers face in integrating information and communication technology into teaching and learning activities in a developing country. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2024.2364544>
- Nygren, T., Haglund, J., Samuelsson, C. R., Af Geijerstam, Å., & Prytz, J. (2019). Critical thinking in national tests across four subjects in Swedish compulsory school. *Education Inquiry*, 10(1), 56-75. <https://doi.org/10.1080/20004508.2018.1475200>
- Ofianto, Aman, Ningsih, T. Z., & Abidin, N.F. (2022). The development of historical thinking assessment to examine students' skills in analyzing the causality of historical events. *European Journal of Educational Research*, 11(2), 609-619. <https://doi.org/https://doi.org/10.12973/eu-jer.11.2.609>
- Pranata, R. H., Aman, & Setiawan, J. (2020). *Implementation of multicultural values in Indonesian history learning to build tolerance and nationalism attitudes of students of Ngaglik 1 Senior High School, Sleman*. 398, 131-136. <https://doi.org/10.2991/assehr.k.200130.028>
- Pratama, R. A., Saputra, M. A., & Hikmawaty, L. (2024). Enhancing historical consciousness in history education through integrating STEM approach and historical thinking skill. *Journal of Education and Learning*, 18(1), 236-243. <https://doi.org/10.11591/edulearn.v18i1.20890>
- Putra, I. D. G. R. D., Saukah, A., Basthomi, Y., & Irawati, E. (2020). The acceptance of the english language learning mobile application Hello English across gender and experience differences. *International Journal of Emerging Technologies in Learning*, 15(15), 219-228. <https://doi.org/10.3991/ijet.v15i15.11077>
- Rajab, L., Almarabeh, T., Mohammad, H., & Majdalawi, Y. K. (2024). Strategic evaluation of e-learning: A case study of the University of Jordan during crisis. *International Journal of Data and Network Science*, 8(1), 109-116. <https://doi.org/10.5267/j.ijdns.2023.10.012>
- Remiswal, Ahmad, A., Firman, A. J., Asvio, N., & Kristiawan, M. (2023). Teacher creativity counteracts radicalism in the world of education based on local cultural values. *International Journal of Instruction*, 16(2), 1003-1016. <https://doi.org/10.29333/iji.2023.16253a>
- Ritzen, J. (2023). A personal history of the political economy of education. *International Journal of Educational Development*, 103, 1-7. <https://doi.org/10.1016/j.ijedudev.2023.102916>
- Sahani, C., & Prakasha, G. S. (2024). Effectiveness of museum visits: Attitude and learning of history. *International Journal of Evaluation and Research in Education*, 13(4), 2163-2169. <https://doi.org/10.11591/ijere.v13i4.28734>
- Sahertian, P. (2024). Integration of local cultural values into leadership skill development to enhance leadership excellence in Indonesian organizations. *Quality - Access to Success*, 25(200), 212-221. <https://doi.org/10.47750/QAS/25.200.22>
- Saldanha, K., Currin-McCulloch, J., Muskat, B., Simon, S. R., Bergart, A. M., Mesbur, E. S., Guy, D., Chilwalo, N. B., Seck, M. M., Tully, G., Lind, K., Lee, C. D., Hall, N., & Kelly, D. (2021). Turning boxes into supportive circles: Enhancing online group work teaching during the COVID-19 pandemic. *Social Work with Groups*, 44(4), 310-327. <https://doi.org/10.1080/01609513.2021.1910110>
- Samuelsson, J. (2019). History as performance: Pupil perspectives on history in the age of 'pressure to perform.' *Education 3-13*, 47(3), 333-347. <https://doi.org/10.1080/03004279.2018.1446996>
- Serevina, V., Hamidah, I., Jatmiko, A., Armita, N., Irwandani, Saputro, T., & Aridan, M. (2024). Science, technology, engineering, and math (STEM)- based geothermal

- energy source digital module assisted by Canva Application. *E3S Web of Conferences*, 2377(1). <https://doi.org/10.1088/1742-6596/2377/1/012063>
- Setiawan, R., Mardapi, D., Aman, & Karyanto, U. B. (2020). Multiple intelligences-based creative curriculum: The best practice. *European Journal of Educational Research*, 9(2), 611-627. <https://doi.org/10.12973/eu-jer.9.2.611>
- Setyowati, R. R., Rochmat, S., Aman, & Nugroho, A. N. P. (2023). Virtual reality on contextual learning during COVID-19 to improve students' learning outcomes and participation. *International Journal of Instruction*, 16(1), 173-190. <https://doi.org/10.29333/iji.2023.16110a>
- Sousa, M. J., Marôco, A. L., Gonçalves, S. P., & Machado, A. de B. (2022). Digital learning is an educational format towards sustainable education. *Sustainability (Switzerland)*, 14(3), 1140. <https://doi.org/10.3390/su14031140>
- Stevens, A., & McDonald, J. (2024). Local – National – Global: Defining indigenous values of Murujuga's cultural landscape in the frame of international patrimony. *Interdisciplinary Contributions to Archaeology, Part F2858*, 219-231. https://doi.org/10.1007/978-3-031-54638-9_15
- Stevens, E. A., Murray, C. S., Scammacca, N., Haager, D., & Vaughn, S. (2022). Middle school matters: Examining the effects of a schoolwide professional development model to improve reading comprehension. *Reading and Writing*, 35(8), 1839-1864. <https://doi.org/10.1007/s11145-022-10271-9>
- Stracqualursi, L., & Agati, P. (2024). Twitter users perceptions of AI-based e-learning technologies. *Scientific Reports*, 14(1), 1-14. <https://doi.org/10.1038/s41598-024-56284-y>
- Suhaimy, K. A., Nordin, S. R. A., Othman, H., Jaes, L., Kamri, K. A., Damin, Z. A., Halim, H., Rahim, M. H. A., Borham, A. S., Mu-barak, M. Z., Ismail, M., Othman, M. F., Aziz, H. S., & Ramlan, N. (2018). The concept of leadership and constitution from the Islamic and Malay Archipelago perspectives according to Taj Al-Salatin manuscript. *International Journal of Engineering and Technology(UAE)*, 7(4), 158-162. <https://doi.org/10.14419/ijet.v7i4.9.20642>
- Takenaka, H., & Soga, M. (2019). Development of a support system for reviewing and learning historical events by active simulation using AR markers. *Procedia Computer Science*, 159, 2355-2363. <https://doi.org/10.1016/j.procs.2019.09.410>
- Temerbayeva, A., Kabbasova, A., Zharkumbaeva, M., & Raimbekova, Z. (2023). Influence of historical education on the formation of civic identity of university students in the learning process. *European Journal of Contemporary Education*, 12(4), 1438-1446. <https://doi.org/10.13187/ejced.2023.4.1438>
- Toma, R. B., Yáñez-Pérez, I., & Meneses-Villagrà, J. Á. (2024). Towards a socio-constructivist didactic model for integrated STEM education. *Interchange*, 55(1), 75-91. <https://doi.org/10.1007/s10780-024-09513-2>
- Utami, N. W., Birsyada, M. I., & Setiani, E. D. (2023). How can we get the surface area on the Kentongan artifact? *AIP Conference Proceedings*. <https://doi.org/https://doi.org/10.1063/5.0106035>
- Utomo, C. B., & Wasino. (2020). An integrated teaching tolerance in learning history of Indonesian national movement at higher education. *Journal of Social Studies Education Research*, 11(3), 65-108. <https://jsser.org/index.php/jsser/article/view/2471/461>
- Uyun, M., Fahmi, I., Fitriani, Alimron, & Pratama, I. P. (2024). The role of local wisdom, cultural values, and religious values on cultivating social awareness and enhancing integrity in students. *Humanities and Social Sciences Letters*, 12(4), 1224-1238. <https://doi.org/10.18488/61.v12i4.3906>
- Vestøl, J. M. (2024). The 'Gospel' according to Vygotsky? Reflections on the role of symbolic mediation in religious education. *Journal of Religious Education*, 72(1), 73-89. <https://doi.org/10.1007/s40839-023-00220-1>

- Vinco, M., Supriatna, N., & Mulyana, A. (2019). The development of 21st century cultural intelligence through discovery learning and first-person historical presentation. *Paramita: Historical Studies Journal*, 29(2), 167-177. <https://doi.org/http://dx.doi.org/10.15294/paramita.v29i1.16216>
- Wang, G. (2024). Teaching and demonstrating guzheng using augmented reality (AR) technology. *SSRG International Journal of Electrical and Electronics Engineering*, 11(10), 83-92. <https://doi.org/10.14445/23488379/IJEEE-V11I10P109>
- Wang, X., Abdul Rahman, M. N. Bin, & Nizam Shaharom, M. S. (2024). The impacts of augmented reality technology integrated STEM preschooler module for teaching and learning activity on children in China. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2024.2343527>
- Wasino, Hartatik, E. S., Witasari, N., Birsyada, M. I., Singh, B., & Shintasiwi, F. A. (2020). A historical perspective of sufism networking in Asia : From India to Indonesian archipelago. *PalArch's Journal of Archaeology of Egypt / Egyptology*, 17(3), 761-774.
- Widawski, K., & Oleśniewicz, P. (2023). Education in tourism – Digital information as a source of memory on the examples of places related to the Holocaust in Poland during World War II. *Sustainability (Switzerland)*, 15(14). <https://doi.org/10.3390/su151410903>
- Widiana, I. W., Tegeh, I. M., & Artanayasa, I. W. (2021). The project-based assessment learning model that impacts learning achievement and nationalism attitudes. *Cakrawala Pendidikan*, 40(2), 389-401. <https://doi.org/10.21831/cp.v40i2.38427>
- Yulifar, L., & Aman. (2023). Resources of history learning in conventional and modern continuum lines. *Cakrawala Pendidikan*, 42(3), 586-600. <https://doi.org/https://doi.org/10.21831/cp.v42i3.63713>
- Zulkarnain, Salamah, Judijanto, L., Fahrudin, & Darsono. (2025). Curriculum-level innovation in history education: Developing a technology-integrated and contextually adaptive model for senior high schools in Indonesia. *Journal of Curriculum and Teaching*, 14(3), 191-212. <https://doi.org/10.5430/jct.v14n3p191>