Vol. 15, No. 04, pp. 2621-2651, 2025 DOI: 10.23960/jpp.v15i4.pp2621-2651

Jurnal Pendidikan Progresif

e-ISSN: 2550-1313 | p-ISSN: 2087-9849

http://jpp.fkip.unila.ac.id/index.php/jpp/

Critical Thinking and Historical Understanding in History Learning: A Systematic Literature Review and Bibliometric Analysis

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Received: 14 October 2025 *Accepted: 11 December 2025* *Published: 24 December 2025*

Abstract: Critical Thinking and Historical Understanding in History Learning: A Systematic Literature Review and Bibliometric Analysis. **Objective**: This study systematically reviews global research on critical thinking and historical understanding in history education from January 2021 to November 2025. **Method:** The study employed a Systematic Literature Review (SLR) approach with the PRISMA protocol to answer three research questions. Data were searched in the Scopus database using keywords related to history education and critical thinking. Article selection was carried out using inclusion and exclusion criteria assisted by Covidence, resulting in 21 articles for analysis. The analysis was conducted using bibliometrics (VOSviewer), limited meta-analysis, N-Gain analysis, and narrative synthesis. **Result:** The study shows an increasing trend toward quantitative methods, quasi-experiments, and Research and Development (R&D), with the largest contribution coming from Indonesia. VOSviewer visualization revealed three main clusters, namely history learning, historical thinking, and critical thinking. The learning strategies used included textbook analysis, the STEM approach, Problem-Based Learning, Project-Based Learning, Peter Seixas' historical thinking framework, and History Work Camp integrated with technology such as Padlet, digital comics, virtual field trips, cloud-based learning, and interactive digital media. A limited meta-analysis showed positive but statistically unstable effects. In contrast, N-Gain analysis showed an increase in historical understanding in the moderate to high categories, especially in authentic experience-based learning and digital technology. **Conclusion:** This review comprehensively maps the conceptual relationship between history learning, historical thinking, and critical thinking. The main gaps lie in the limited number of stable experimental studies, the lack of instrument standardization, and the dominance of short-term, outcome-oriented designs. Therefore, further research should focus on more rigorous experimental designs, performance-based assessments, longitudinal studies, and the development of integrated learning models grounded in inquiry, reflection, and authentic experience.

Keywords: critical thinking, historical understanding, learning strategies, history education, systematic review.

To cite this article:

Jufri, M. J., Darini, R., Budiman, M., Kinanti, A. N., Aolafasila, I. Z., & Darmawan, T. H. (2025). Critical Thinking and Historical Understanding in History Learning: A Systematic Literature Review and Bibliometric Analysis. *Jurnal Pendidikan Progresif*, *15*(4), 2621-2651. doi: 10.23960/jpp.v15i4.pp2621-2651.

INTRODUCTION

The learning process in the modern era emphasizes critical thinking skills. As a compulsory subject in the national curriculum, history offers an alternative for developing critical thinking skills through historical understanding. Discussions in education, especially in history, teach students to think critically in evaluating and

analyzing historical events and relating them to current conditions. This is a mutually beneficial relationship that enhances students' critical thinking skills (Reyes-Parra et al., 2024). To improve critical thinking skills and raise awareness in history learning, history education plays an important role. All teachers in history learning must be able to understand historical events and encourage students to think critically about them and their implications (Baird, 2015).

Developing students' critical thinking skills and providing them with a deep understanding of historical explanations are pedagogical goals in history education. When students think critically, they can better interpret and analyze historical events to reflect on the present and future. Understanding basic historical concepts is also an application of critical thinking, as is students' historical experience based on their overall knowledge. According to Peter Seixas, historical thinking encompasses six key concepts, namely historical significance, analysis of primary sources, continuity and change, cause and effect, historical perspective, and ethical dimensions (Seixas, 2017). These six concepts form a critical framework for understanding past events in a contextual, analytical, and reflective manner. Meanwhile, Sam Wineburg argues that historical thinking involves recognizing the fundamental difference between the past and the present, a concept known as "historical alterity" (Levisohn, 2017). Contemporary studies tend to combine these two frameworks by incorporating digital literacy, local context, and performance-based assessment in response to the demands of 21st-century learning. By combining critical thinking and historical understanding in its implementation, students are encouraged to understand the differences between the past and the present. They also foster historical awareness through critical questions about the relationship between past life and technological developments in the present in society (Campbell, 2021).

In the current rapid flow of modernity, information technology is highly dynamic, giving rise to diverse historical narratives and complex problems worldwide. Mastering critical thinking skills is essential for rejecting information with ambiguous accuracy and for cultivating individuals who possess extensive insights, can engage in reflection, and actively contribute to society (Wang & Seepho, 2017). Conversely, historical understanding serves a practical function as cognitive knowledge, sustaining historical narratives that evolve within society and safeguarding against historical bias. The connection between critical thinking and historical comprehension profoundly influences students' cognitive growth. This critical thinking skill helps students process information more logically. Then, knowing history can help you understand past events in a deeper way (Vendrell-Morancho & Moya, 2025).

Education must now be able to adapt its teaching to meet society's changing needs. This includes teaching history, which often raises questions about politics and the different social and cultural conditions in countries around the world. We need to be able to find ways to make history fun for our students as teachers (Thompson, 2016). Controversial and sensitive issues in history also require teachers to be adaptive, not create subjective narratives about students' interests, and to select appropriate concepts and content to include in the learning process (Davies, 2017). The integration of multicultural education into history education also presents complex challenges. Teaching about controversial historical events requires careful consideration to encourage understanding and appreciation of cultural diversity (Bermudez & Stoskopf, 2020).

History Education faces complex problems because the learning process emphasizes memorization and lacks skill development and analysis. Traditional learning approaches have led

to classic problems in history learning, where learning still emphasizes memorization and lacks interpretation. This conventional learning approach is still widely applied across educational levels, emphasizing memorization of facts rather than analytical and critical thinking skills for interpreting historical events. This approach has been widely adopted in education systems, as history learning emphasizes content over deep thinking (Hanh et al., 2025).

In various countries, the challenges in fostering critical thinking skills in history education show relatively similar patterns. In the United States, for example, the use of linear and repetitive textbooks has been shown to limit student interest and participation, prompting a shift toward more reflective and interactive learning approaches (Berman, 2025). On the other hand, contexts such as Vietnam show that when the curriculum begins to demand more critical and analytical history learning, many teachers find it difficult to adapt these methods to develop students' historical thinking skills (Hanh et al., 2025). This situation aligns with global findings showing that teachers generally still face obstacles in designing history lessons that effectively integrate critical analysis, source interpretation, and historical reasoning.

Teachers' abilities are paramount because developing students' critical thinking skills must begin with critical teachers. Many teachers cannot stimulate students' critical thinking skills because they have not yet applied deep thinking in their teaching (Saefudin, 2025). Assessment issues cannot be separated from the fact that historical and critical thinking skills have not yet been successfully applied in students' learning at each level of education. Most history assessments focus on fragmented information, rather than evaluating students' ability to reason and think historically (Ercikan & Seixas, 2015).

Previous systematic literature reviews (SLRs) have examined critical thinking skills in educational contexts. Yasmin, et al. (2025) and Casmini & Redhana (2025) focused on the impact of AI on critical thinking skills and the use of challenge-based learning models. The results of these two studies show that both integrating AI into learning and using challenge-based learning models improve critical thinking. On the other hand, Samaniego López et al. (2025), reported that the limitations of technology-based interventions in fostering critical thinking include high implementation costs, insufficient teacher training, digital inequality, and ethical constraints.

Previous SLR research has not only discussed critical thinking skills in terms of process, but also examined them from an assessment perspective. Rothinam et al. (2025), examined assessment techniques that emphasize critical thinking skills. Their findings revealed that reliance on standard assessments can hinder deep engagement. Furthermore, a systematic literature review by Nascimento & Reis (2025)analyzed critical thinking competencies in responding to social and environmental challenges, and developed a model to prepare teachers with the competencies to address social and environmental changes.

Based on previous research, it can be observed that studies on critical thinking skills in education remain at a generic level and have not been explicitly directed at the characteristics of specific disciplines. The majority of previous SLRs treat critical thinking as a universal competency that can be developed through technology, innovative learning models, or other pedagogical interventions. However, this interpretation often overlooks epistemological differences across disciplines. This overly broad approach leaves the literature unable to explain how critical thinking works in scientific contexts that require specialized analytical practices, such as history.

Furthermore, these studies have not examined how the structure of historical knowledge, which relies on source interpretation,

evidence analysis, event reconstruction, and multiperspective understanding, shapes a form of critical thinking distinct from that in other subjects. The lack of focus on disciplinary context has created a gap in the literature: there is no comprehensive mapping of the relationship between critical thinking skills and historical understanding, whether in the learning process, the use of technology, or the development of authentic historical assessments. In addition, previous SLR approaches tend to assess the effectiveness of learning strategies in general rather than examining how these strategies support the construction of evidential and interpretive historical understanding.

The limitations of previous studies have created a research gap: critical thinking skills have been studied in a general, interdisciplinary manner, without examining how these competencies are formed within the epistemological context of history learning. This common approach ignores the distinctive characteristics of history, such as evidence analysis, source assessment, multiperspectivity, and temporal reasoning, which actually require a different form of critical thinking from other disciplines. In addition, previous studies have focused more on the effectiveness of certain technologies or learning models without mapping the direct relationship between critical thinking pedagogical strategies and historical understanding. The absence of this disciplinary analysis indicates a need to examine more specifically how critical thinking interacts with historical understanding as a single competency.

In response to this gap, this study offers a new perspective by presenting a systematic literature review that specifically examines the relationship between critical thinking skills and historical understanding in recent academic publications. This study not only maps learning strategies, technology use, and relevant forms of assessment, but also identifies conceptual patterns that link critical thinking indicators with historical understanding (Gómez-Carrasco et al., 2022). Using a systematic literature review approach, this study provides a more precise synthesis framework to strengthen the development of historical education theory and practice, as well as opening up new methodological directions for further research in the field of history teaching and 21st-century competencies. Based on the description above, the research questions posed in this study are:

RQ1: How do developments in research methods and focus reflect changes in approaches to critical thinking and historical understanding in history education?

RQ2: How are the mechanisms of the relationship between critical thinking and historical understanding explained in history education research?

RQ3: How is the effectiveness of history education strategies analyzed in fostering students' critical thinking?

METHOD

Research Design

This study employed a systematic approach to identify and synthesize prior research findings. Literature Review (SLR) to assess critical thinking abilities and historical comprehension. This approach can yield a comprehensive map and summary of prior research on the subject under investigation by the researcher, assist in pinpointing deficiencies, and offer guidance for subsequent research (Fundoni et al., 2023).

The SLR research process commences with precise and targeted research inquiries (Lefaivre & Slobogean, 2013). Next, a detailed research design was made that lists the criteria for including and excluding people, the search strategies, and the ways to get and analyze the

data (Višiæ, 2022). The SLR process follows a set of steps that make things clearer and more productive, which makes the results more trustworthy (García-Peñalvo, 2022).

Data extraction was performed using a structured protocol designed based on three research questions. For RQ1, the variables collected included the number of publications within the year range specified by the inclusion criteria, research methods, and research trends in each country. For RQ2, in addition to extracting indicators of critical thinking and historical understanding, bibliometric data, including co-occurrence keywords, authorship, and thematic clustering, were collected for analysis using *VOSviewer* to visualize conceptual relationships as a network. For RQ3, the variables extracted included the form of history learning strategies, intervention descriptions, implementation duration, supporting technology, evaluation instruments, and findings on their effectiveness. Basic metadata and methodological characteristics were also recorded to ensure consistency and transparency of the analysis. The complete data extraction protocol is presented in Appendix Table 1 below.

Table 1. Protocol data variable

Category	Variables Extracted
RQ1	Number of publications per year (January 2021–November 2025); research methods; country of origin of publication
RQ2	Relationship between critical thinking indicators and historical understanding indicators; reported mechanisms linking both constructs; bibliometric data such as co-occurrence keywords, authorship patterns, and thematic clustering analyzed through VOSviewer
RQ3	Types of strategies or instructional interventions; supporting technologies or media; assessment instruments; effectiveness findings

Search Strategy

The search strategy employed in this study aimed to identify literature on the research themes of critical thinking and comprehension of historical analysis in historical education. The literature search strategy was formulated as an integral component of a protocol aimed at reducing research bias (Frandsen & Eriksen,2020). We used the Scopus database for the literature search because it has articles from a wide range of international academic journals and is a reliable source of research. The use of Scopus as the sole database in this study was based on considerations of quality and methodological consistency. Scopus has extensive journal coverage, is rigorously curated, and is highly reputable, ensuring that the literature analyzed meets high academic standards and is relevant to the research topic. In addition, Scopus provides consistent, structured metadata, enabling searches, extractions, and analyses to be carried out more accurately and free from technical bias. Because the fields of education, humanities, and historical studies are comprehensively covered in Scopus, a single database can still provide an adequate representation of the literature. This approach also avoids the heterogeneity of article quality that often arises when combining multiple databases with different curation standards.

The search strategy for the Scopus database was TITLE-ABS-KEY, which searched for terms in the title, abstract, and keywords. The keywords were selected to cover the study's main topics: history education, critical thinking, and understanding history in the context of education. The Boolean search string used in Scopus was as follows: (TITLE-ABS-KEY), ("HISTORY EDUCATION" OR "HISTORY

LEARNING" OR "TEACHING HISTORY") AND ("CRITICAL THINKING" OR "HISTORICAL THINKING" OR "HISTORICAL UNDERSTANDING").

The publication range from January 2021 to November 2025 was selected to ensure that all data analyzed reflects the latest developments in research on the relationship between critical thinking and historical understanding in the context of modern education. This period captures an important post-pandemic phase, when pedagogical innovation, technology integration, and new learning approaches are rapidly evolving. In addition, the use of English-language articles is necessary to maintain consistency in quality, comparability of methodologies, and access to a wider range of international literature, as English is the global standard for scientific communication and enables more valid bibliometric analysis. The search results from the Scopus database were then exported to *Covidence* software for screening through title–abstract screening, full-text review, and data extraction.

Inclusion and Exclusion Criteria

Selecting appropriate and inappropriate articles is important during the research planning phase (Torsello et al., 2012). The author established predetermined criteria. Then, articles were selected for further review in selecting articles suitable for this study (Spolarich, 2023). Exclusion criteria were created to sort out sources that were not eligible or not allowed to participate in the study (Finnegan & O'Donoghue, 2019).

The criteria established in this study serve to filter the literature sources, ensuring that those included in the requirements meet academic standards and are relevant to the topic used in the analysis. These criteria make the study's focus more targeted and consistent with the focus of this Research. By consistently applying inclusion and exclusion criteria standards, the credibility and transparency of this Research can be strengthened, and the review process can be replicated more easily. A summary of these criteria is presented in Table 2.

Table 2. Inclusion and exclusion criteria

Criteria Type	Inclusion Criteria	Exclusion Criteria
Document Type	*Peer-reviewed* scientific journal articles.	Books, book chapters, project reports, dissertations, editorials, or *grey literature*.
Method	All types of empirical methods: qualitative, quantitative, *mixed Methods, Research, and Development,*	Conceptual/theoretical articles without empirical data.
Topic Focus	Focus on discussing critical thinking and/or historical understanding In the context of history learning.	Does not discuss critical thinking or historical understanding.
Year of Publication	Published between January 2021 and November 2025.	Published before 2021.
Language	Written in English	Written in a language other than English
Level Education	Level of formal education (elementary school, junior high school, high school, or college).	Non-formal education or general training.
Accessibility of sources	The article is available in full text.	Not accessible in full text

This study's systematic literature review followed the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines. We used the PRISMA guidelines to find and choose articles for analysis. Choosing the right articles in the PRISMA guidelines stresses strict methods for extracting and combining data, such as clear research questions, the right inclusion criteria, and thorough search strategies (Soni, 2025). Covidence software is used to get data for the Systematic Literature Review (SLR) process. Document screening includes points that help identify a document, like its title, abstract, introduction, methods, results, and discussion. Every part makes sure that all parts of the review are reported clearly and thoroughly (Page & Moher, 2017).

The search results from the Scopus database produced 225 articles pertinent to the search keywords: ("history education" OR "history learning" OR "teaching history") AND ("critical thinking" OR "historical thinking" OR "historical understanding"). In the first step, all 225 articles from the Scopus database were looked at. After getting the data from the Scopus database, it was sent to Covidence for screening of the title and abstract. Based on the title and abstract, 122 articles were excluded because they did not fit the topic. Furthermore, 103 articles were retained for further evaluation (studies sought for retrieval), and all were successfully accessed (n = 0 could not be retrieved).

At the eligibility assessment stage, 103 articles were analyzed through a full-text review based on inclusion and exclusion criteria. Based on the screening process based on the full-text review, 82 articles were excluded because they did not meet the eligibility criteria. The articles that were excluded because they did not meet the inclusion criteria were as follows: 1 article in the form of a book, project reports, or editorials, 27 articles did not use methods that included empirical data, 24 articles after review did not discuss critical thinking or historical understanding, 11 articles were written in languages other than English, 14 articles did not focus on the education level population, and 5 articles were not accessible in full text. Ultimately, 21 articles were obtained after a rigorous selection process that met all the inclusion criteria and were declared eligible for further analysis in this systematic review to map research publications that discuss critical thinking and historical understanding in history learning

Data Analysis

The data analysis stage was conducted on articles that had passed the article screening process. From this process, 21 articles were obtained and systematically analyzed. The articles were classified into thematic categories using a deductive approach (based on a theoretical framework of critical thinking and historical understanding) and an inductive approach (based on patterns emerging from the data). The open coding process was carried out independently by two researchers to minimize subjectivity, and the coding results' consistency was assessed using inter-rater reliability via a coefficient of agreement. Any differences were resolved through discussion until a consensus was reached.

Bibliometric analysis was used to map trends in the number of publications per year, country distribution, and research method patterns, to identify the geographical distribution of research, methodological trends, and the dynamics of research growth in the field of critical thinking and historical understanding.

Furthermore, VOSviewer was used to analyze relationships among keywords through co-occurrence mapping, thematic clustering, overlay, and density, revealing dominant themes, shifts in research focus, and the intensity of studies in this field. The learning strategies reported in the articles were analyzed using quantitative and qualitative approaches. Studies with quasi-

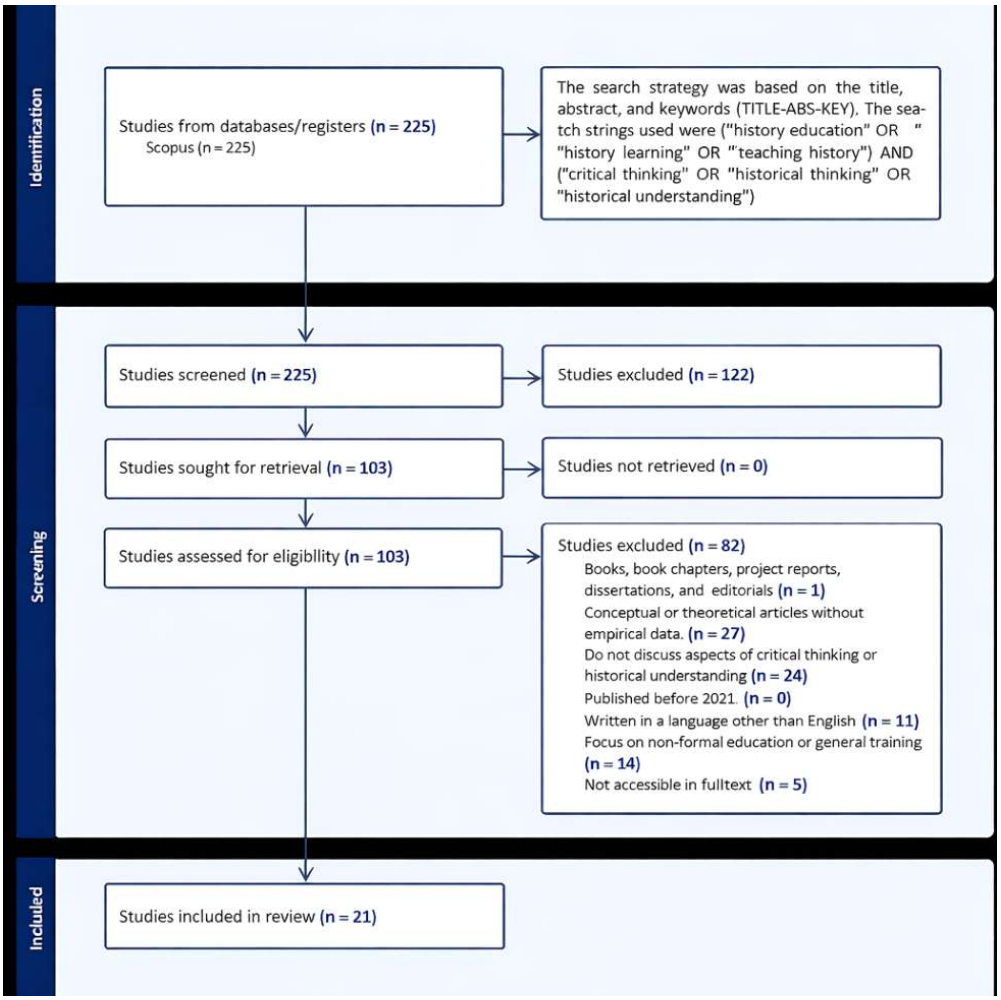

Figure 1. PRISMA flow diagram from Covidence

experimental designs were analyzed through limited meta-analysis to obtain a summary effect on the improvement of critical thinking and historical understanding skills. In addition, findings from development studies were compared using N-Gain analysis to assess the relative effectiveness of learning models and media. Meanwhile, articles that did not present quantitative data were analyzed qualitatively through narrative synthesis to identify patterns of pedagogical approaches, learning models, media, learning technologies, and reflective practices that contributed to strengthening critical thinking and historical understanding in history learning.

■ RESULT AND DISCUSSION

The results extracted from 21 studies on critical thinking and historical understanding in the context of history learning included in the systematic literature review are as follows:

RQ1: What are the trends and methods in Research related to critical thinking and historical understanding in the context of history learning?

History education is not only oriented toward the mastery of facts and the chronology of events, but also emphasizes students' ability to analyze, assess, and interpret historical sources

reflectively. The study systematically reviewed research on critical thinking and historical understanding in history education and identified 21 articles summarized in Table 2.

Table 3. Article data extraction results

Writer	Title	Year	Method	Country
(Álvarez Martínez-Iglesias et al., 2021)	The development of historical competencies in secondary education: A study based on the analysis of sources in Spanish and Italian history textbooks	2021	Quantitative	Spain
(Suntiah, 2021)	Students' Critical Thinking Skills in the Reflective Class of Islamic Cultural History	2021	Qualitative	Indonesia
(Bae et al., 2021)	Developing Historical Thinking in Large Lecture Classrooms Through PBL Inquiry Supported with Synergistic Scaffolding	2021	Case Study	USA
(Pratama et al., 2022)	Integration of STEM education in history learning	2022	Qualitative	Indonesia
(n. Ofianto et al., 2022)	The Development of a Historical Thinking Assessment to Examine Students' Skills in Analyzing the Causality of Historical Events	2022	Research and Development	Indonesia
(O. Ofianto et al., 2022)	Media Timeline Development with the Focusky Application to Improve Chronological Thinking Skills	2022	Research and Development	Indonesia
(Fadli et al., 2022)	Flipped classroom in history learning to improve students' critical thinking	2022	Quasi-experimental	Indonesia
(Bunari et al., 2023)	Understanding history, historical thinking, and historical consciousness in history learning: An ex post facto correlation	2023	Ex-Post Facto	Indonesia
(n. Ofianto et al., 2023)	Development of Online Local History Learning Media Based on Virtual Field Trips to Enhance the Use of Primary Source Evidence	2023	Research and Development	Indonesia
(Setyowati et al., 2023)	The Effect of Digital Learning of Historical Comics on Students' Critical Thinking Skills	2023	Quasi-Experimental	Indonesia
(Hongphanut, 2023)	A development of a history instructional model on cloud technology to enhance critical thinking abilities and information literacy of undergraduate students	2023	Quantitative	Thailand
(Chimbunde et al., 2023)	A Model for Developing Critical Thinking Skills in Teaching History: Lessons from Zimbabwe	2023	Case Study	South Africa
(Pratama et al., 2024)	Enhancing historical consciousness in history education through integrating a STEM approach and historical thinking skills	2024	Quantitative	Indonesia
(Tirado-	Enhancing historical thinking through	2024	Quasi-	Spain

Olivares et al., 2024)	learning analytics in Primary Education: A bridge to formative assessment		Experimental	
(O. Ofianto et al., 2024)	Assessing historical thinking skills in high school history education: a Padlet-based approach	2024	Quasi-Experiment	Indonesia
(Burgos-Videla et al., 2025)	Critical thinking in the classroom: the historical method and historical discourse as tools for teaching social studies	2025	Qualitative	Chile
(Nurhasanah et al., 2025)	Bridging cognition and ethics: Socio-emotional skills and digital history literacy in fostering critical thinking	2025	Quantitative	Indonesia
(Hanif & Maruti, 2025)	History Work Camp (HWC): A Fun History Learning Framework to Enhance Creative Thinking Skills	2025	Research and Development	Indonesia
(Hanh et al., 2025c)	Historical thinking skills from the perspective of high school students in Vietnam	2025	Quantitative	Vietnam
(Fahruddin et al., 2025)	Development of teaching materials for evaluating history learning to improve students' critical thinking skills	2025	Research and Development	Indonesia
(Miralles-Sánchez et al., 2025)	Historical Thinking and Teacher Discourse in Secondary Education: An Exploratory Observational Study	2025	Case Study	Spain

Research trends related to the central theme are shown in Figure 2 below. The results of the literature mapping show that Research on critical thinking and historical understanding in history learning has increased significantly in the last five years (2021–2025).

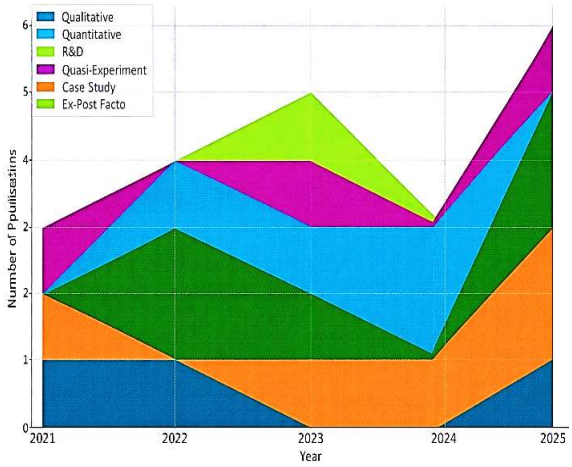

Figure 2. Publication trends by year

Based on Figure 2, the trend in research publications for the period 2021–2025 shows fluctuating but progressive dynamics. In 2021, three publications used quantitative, qualitative, and case study methods, marking the initial exploration phase of history learning and the development of critical thinking. In 2022, the number of publications increased to 4 articles, with Research and Development (R&D) methods dominant in 2 studies, alongside one qualitative study and one quasi-experiment. This pattern shows a shift in research orientation from mapping phenomena to developing more applicable learning innovations.

The year 2023 had the greatest diversity of methods, with five publications covering quantitative, quasi-experimental, R&D, case studies, and ex post facto designs. This condition reflects the integration phase between development, effectiveness testing, and causality analysis in historical learning research. Furthermore, in 2024, the number of publications decreased to three articles, all of which focused on quantitative and quasi-experimental methods, indicating a stronger focus on testing the impact

of learning. In 2025, there was a significant surge of six publications, dominated by quantitative methods (two publications) and R&D (two publications), complemented by one qualitative study and one case study, signaling a phase of increasingly mature, contextually grounded research expansion.

Overall, the publication trend from three articles in 2021, increasing to four articles in 2022, reaching five articles in 2023, decreasing to three articles in 2024, and surging again to six articles in 2025, shows that historical learning research is moving through stages of exploration, innovation, validation, and impact reinforcement. The dominance of quantitative, quasi-experimental, and R&D methods reflects a strong orientation toward learning effectiveness. In contrast, the reemergence of qualitative methods and case studies in the final phase confirms that strengthening critical and historical thinking also requires a deep understanding of the learning process and context.

Methods

The distribution of research methods used in studies on critical thinking and historical understanding in history learning shows that researchers employ various methodological approaches, with different proportions depending on the objectives and characteristics of the research. Research trends related to the main themes are shown in Figure 3 below.

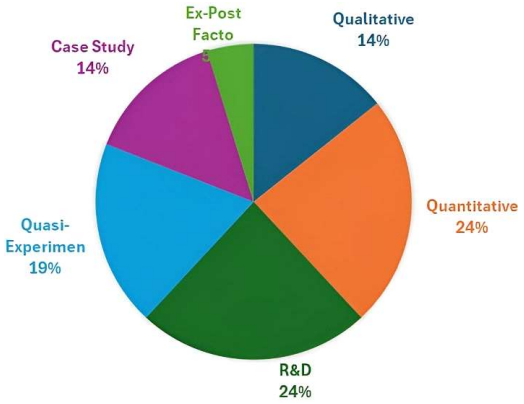

Figure 3. Publication trends by research method

Figure 3, Based on the pie chart, quantitative methods and Research and Development (R&D) occupy a dominant position with five publications each (24%), followed by quasi-experiments with four publications (19%), qualitative and case studies with three publications each (14%), and ex-post facto with only one publication (5%). The dominance of quantitative methods, R&D, and quasi-experiments suggests that historical learning research aimed at strengthening critical thinking is primarily focused on measuring learning impact, testing the effectiveness of models, and developing innovative teaching media and tools. This indicates that critical thinking and historical understanding are positioned as learning outcomes that can be objectively tested, rather than merely as reflective and hermeneutic processes.

The high number of R&D-based and quasi-experimental studies indicates that strengthening critical thinking in history learning is primarily achieved through model interventions, digital media, and STEM- and technology-based approaches. This approach is effective in showing a statistically significant increase in critical thinking scores and historical skills. However, their limitation lies in the lack of exploration of historical meaning, historical awareness, and the dynamics of students' interpretation of past events, which are more appropriately studied through qualitative methods and case studies. The low number of ex post facto studies (1 publication) also indicates that research on the long-term impact of history learning on students' attitudes, values, and historical awareness remains very limited.

The tendency for quantitative methods and experiments to dominate is also influenced by the academic world's demand for indexed publications, the need for measurable outcomes, and the ease of statistical data processing. Many reputable journals prioritize articles that present significant results, hypothesis testing, and proven models, encouraging researchers to choose approaches that produce numerical outputs more

quickly. Conversely, qualitative research and case studies that require extensive time, in-depth observation, and reflective analysis are often considered less efficient for meeting publication targets. As a result, studies on understanding history as a complex interpretive process tend to be marginalized.

From an educational policy perspective, the dominance of quantitative methods, R&D, and quasi-experiments in national education cannot be separated from policy directions such as the Merdeka Curriculum, Merdeka Learning, competency-based assessment, and the digitization of learning, which emphasize the measurement of learning outcomes, media innovation, and the effectiveness of learning models. This policy encourages researchers to prove that critical thinking can be standardized, measured, and improved through specific learning designs. However, this policy has not been fully balanced with a strong push to research the reflective, ethical, and historical awareness dimensions as the foundation for shaping national character, which is precisely the normative goal of history education itself.

In the future, trends in historical learning publications are expected to remain dominated by quantitative research, quasi-experiments, and R&D as the demand for digital innovation, artificial intelligence, and data-based learning grows stronger. However, to ensure that strengthening critical thinking and historical understanding is not reduced to mere score achievement, a more balanced methodological reorientation is needed, one that expands on qualitative research, case studies, and longitudinal studies. Thus, historical research will not only produce cognitively critical learners but also individuals with historical awareness, ethical sensitivity, and a strong national identity.

Research Trends by country of origin

The analysis of research trends in the Systematic Literature Review also shows the geographical location of the Research. The results of the Systematic Literature Review (SLR) analysis of the distribution of Research by country of conduct show considerable geographical variation, albeit with varying degrees of contribution.

Based on Figure 4, the distribution of Research by the countries where it was conducted shows that Indonesia ranks first, with the highest number of studies, namely 13 publications. This dominance shows that the issues of critical thinking and historical understanding in history learning have received considerable attention from academics and education practitioners in Indonesia. In second place, research trends in Spain, with three publications, indicate a fairly consistent interest in the development of learning in history education, emphasizing critical thinking skills in the context of European education. Several other countries, namely the United States, Thailand, South Africa, Chile, and Vietnam, published one publication.

Based on Figure 4, Indonesia occupies the most dominant position in terms of the number of publications with a total of 13 articles, spread across almost all methods, including qualitative (2), quantitative (2), R&D (5), quasi-experimental (3), and ex-post facto (1). This dominance shows that Indonesia is the center of research on critical thinking-based history learning in Southeast Asia. Other countries have far fewer publications: Spain (3 publications), spread across quantitative, quasi-experimental, and case studies; Thailand, Vietnam, Chile, the USA, and South Africa each contributed only one publication, with a tendency toward a single method. This pattern shows that research output remains highly concentrated geographically, with a sharp disparity in contributions across countries.

In terms of methodology, Indonesia is dominated by quasi-experiments and case studies, which are strongly oriented towards testing the effectiveness of learning models in real classrooms and exploring local contextual

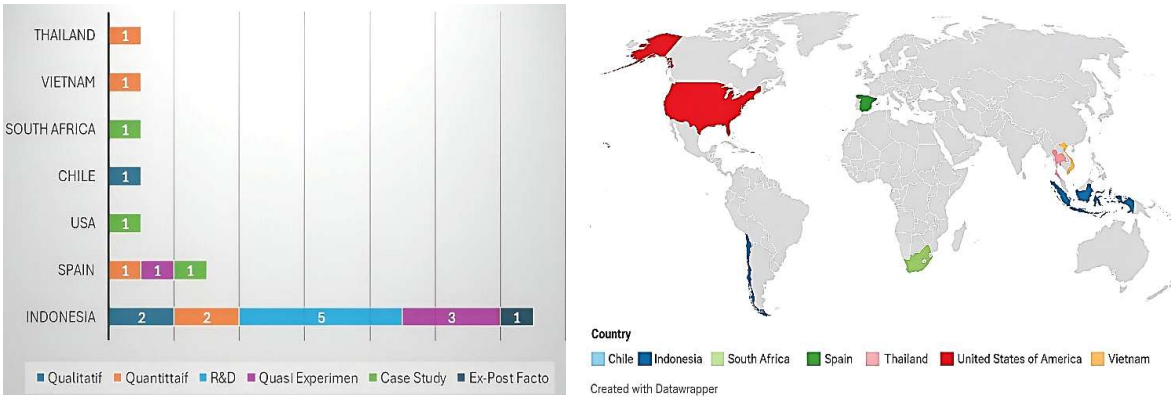

Figure 4. Geographical distribution of research locations by country

practices. Spain tends to use experimental approaches and discourse analysis, reflecting the European research tradition of examining discourse-based historical thinking and formative assessment. Meanwhile, countries such as Thailand, Vietnam, the USA, Chile, and South Africa each have only one methodological approach, indicating that critical thinking studies in history education in these countries remain specific and thematic and have not developed systematically.

Indonesia's dominance can be interpreted as the result of the expansion of educational research following curriculum reform, increased demands for faculty publications, and the development of graduate programs in history education. However, critically, this dominance also shows that the mainstream of scholarship in critical historical thinking is still heavily influenced by specific national contexts, posing a risk of contextual bias in the generalization of SLR findings. Western and African countries, which contribute few publications, often present conceptual depth (e.g., historical discourse, higher-order thinking methodologies) but are less developed quantitatively. This indicates an imbalance between research productivity and theoretical strength.

Indonesia's strong contribution is closely related to national policy directions such as the Merdeka Curriculum, the strengthening of HOTS, project-based learning, and the digitization of education, which directly encourage experimental and R&D-based research. Conversely, countries with more stable education systems, such as Spain and the USA, tend to be more selective and conceptual in producing research, resulting in a small number of publications but a focus on the assimilation of historical thinking theory and critical pedagogy. Other developing countries, such as Vietnam, Chile, and South Africa, tend to place critical historical research as a limited thematic issue, not yet becoming a national agenda for educational research.

More broadly, this distribution map reflects the geopolitics of knowledge production, where Global South countries such as Indonesia show high productivity but still often focus on the technical implementation of learning. In contrast, Global North countries are more dominant in the formulation of theory and historical thinking paradigms. This creates an imbalance between producers of empirical data and producers of conceptual frameworks. As a result, much of Indonesia's research still relies on models adapted from Western theory, rather than being constructed independently from local wisdom and national historiography.

Overall, publication trends by country show that Indonesia is the epicenter of research on critical thinking-based history learning, particularly

through experimental approaches and case studies. However, the imbalance in contributions across countries indicates that the global discourse on critical thinking and historical understanding remains epistemologically uneven. For future research development, cross-country collaboration, strengthening international comparative studies, and the development of historical thinking theories grounded in the contexts of Asia, Africa, and Latin America are needed so that research is not only strong in terms of quantity but also mature in concept and globally competitive.

RQ2: How is critical thinking related to historical understanding in the context of history education?

This study analyzes bibliometric data from filtered articles, which are then visualized using VOSviewer software. VOSviewer visualization displays three complementary perspectives in reading knowledge maps. Network visualization shows how keywords are interconnected in clusters, revealing the main conceptual structures and thematic groups that have emerged in the research. Meanwhile, overlay visualization provides a temporal dimension, highlighting how the research focus shifts over time, especially with the emergence of new keywords that indicate the direction of research development. Density visualization shows the areas most "densely" used by researchers, allowing us to identify the themes that appear most frequently and are the focus of attention in the literature. Overall, these three visualizations not only provide an overview of the relationships between concepts but also the dynamics of development and the intensity of topics in the analyzed research corpus.

Figure 5 shows the results of Posviewer's network visualization, which shows three main clusters: historical, Red, green, and yellow nodes represent thinking, learning about history, and critical thinking, respectively. The keyword network map in the image shows thematic relationships that are not only fragmented into three major clusters of critical thinking, historical thinking, and history learning, but also interconnected through several broker keywords that play a strategic role in circulating ideas between clusters. These relationships are not random; rather, they form intellectual patterns that show how research in the field of history education develops and interacts across themes.

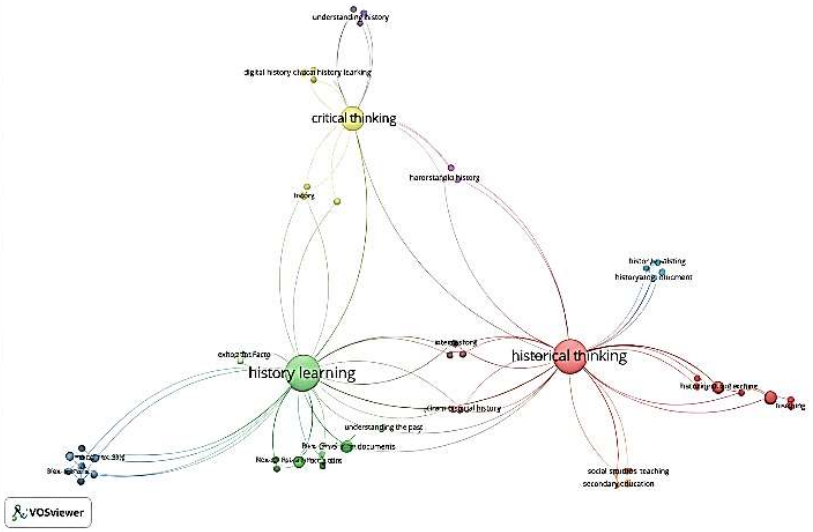

Figure 5. Network visualization from vosviewer

One of the most important bridges is seen between the critical thinking and historical thinking clusters. Keywords such as historical discourse, assessment, and digital literacy-based history serve as connectors because they contain elements of higher-order thinking (argument analysis, source evaluation, interpretation) as well as epistemic characteristics of history (discourse, evidence, narrative). Historical discourse, for example, is strategically positioned because it presupposes critical thinking skills for assessing the quality of historical arguments and, at the same time, serves as core material in historical thinking instruction. Thus, these keywords serve as conceptual mediators, enabling the two clusters to interact continuously. Similarly, assessment appears on the map at the intersection of historical learning and critical thinking skills. This keyword indicates that the assessment not only measures the outcome but also evaluates the argumentative process and understanding of historical thinking structures. This integration is increasingly prominent in recent literature.

Another connection is seen through digital literacy-based history, which links modern digital literacy needs with the demands of critical and historical thinking. The digitization of historical sources encourages students to verify, interpret, and critique information, core competencies of both clusters. The position of this keyword indicates that digital transformation is driving the integration of new pedagogical approaches, while also affirming the role of technology as a catalyst for thematic integration.

Meanwhile, the bridge between the history learning and historical thinking clusters is seen through keywords such as historical consciousness, chronological thinking, and causality. These three are not only central concepts in the cognitive development of history learning but also form a broader structure of historical thinking. These keywords indicate that the improvement of historical thinking skills is rooted in a systematic history-learning process, leading these two clusters to form a closer relationship than other clusters. This relationship reflects the fact that most of the literature attempts to construct learning progressions, trajectories of historical concept mastery that guide students toward advanced historical thinking.

Overall, this network map shows that integration is not comprehensive but rather occurs through specific broker nodes that facilitate the flow of ideas. Critical thinking and historical thinking are not directly connected; rather, they are connected through conceptual bridges such as historical discourse and assessment. Meanwhile, history learning is the cluster with the widest reach, serving as a foundation that connects the pedagogical process with historical thinking skills.

In overlay visualization, the focus shifts from the structural relationships between keywords to an understanding of their temporal dynamics. While network visualization emphasizes how keywords are connected and form thematic clusters, overlay visualization adds a temporal dimension, showing when a theme began to develop or became dominant.

Figure 6 shows an overlay visualization on the VOSviewer map, revealing a clear temporal shift in research themes between 2022 and 2025. In the early phase (around 2022, marked in blue-purple), the prominent themes centered on history learning, historical consciousness, chronological thinking, and historical education. This indicates that research during this period was still focused on the conceptual foundations of history learning, particularly students' understanding of historical consciousness, chronological order, and the fundamental structure of historical knowledge.

Entering 2023 (blue-green), there was a shift towards more applied themes, with the emergence of topics such as critical thinking, assessment, and the use of comics as learning media. In this phase, research not only highlights

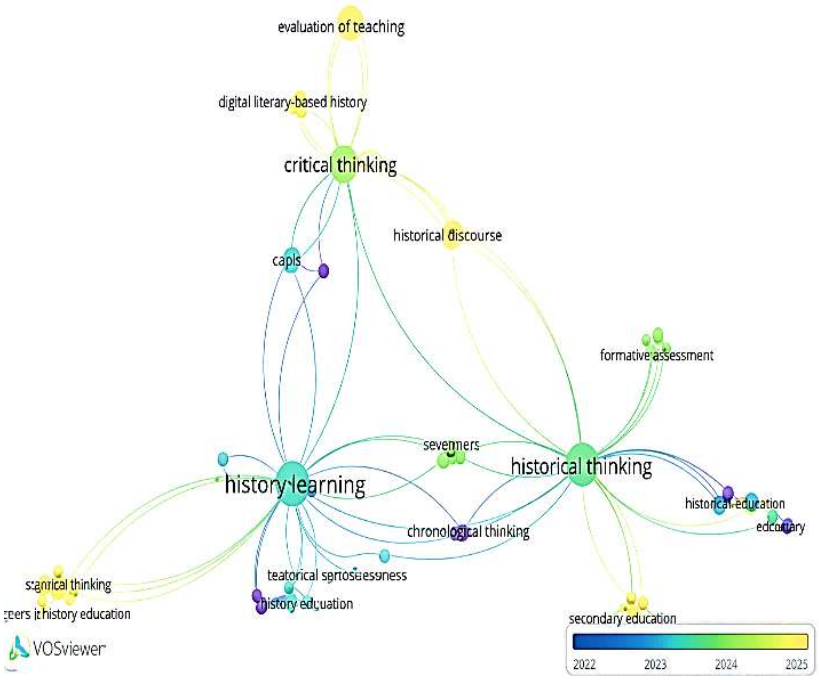

Figure 6. Overlay visualization from vosviewer

conceptual aspects but also begins to explore interventions in history learning, including how to develop critical thinking skills and how to apply alternative media in the classroom.

In the 2024 period (green-yellow), the overlay visualization shows an increasingly pronounced shift towards historical discourse, digital literacy-based history, and the evaluation of teaching. This change indicates that the focus of research is shifting towards digital literacy, historical discourse, and the evaluation of teaching practices. These themes reflect a response to the demands of the digital age and the need to improve the quality of evidence-based learning.

Finally, in 2025 (yellow), research moved towards more contemporary topics such as formative assessment, secondary education, and creative thinking, indicating an increased focus on continuous evaluation, the context of secondary education, and the development of creativity in history learning. Overall, the color shift in the overlay visualization illustrates the evolution of research from a conceptual focus to a more progressive pedagogical and evaluative approach, in line with trends in history learning innovation over the past four years.

Density visualization on the VOSviewer map shows areas with the highest research density, marked in bright yellow, and areas with lower intensity, marked in green to dark blue. In this visualization, it appears that "history learning" and "historical thinking" form two main centers of density. This indicates that across the entire research corpus, these two topics not only frequently appear as keywords but also serve as the dominant epistemic focus, acting as the gravitational point that guides the direction of historical education research.

Figure 7 shows the results of density visualization using Vosviewer, which reinforces the findings from the previous network visualization. The high density around these two topics reflects the fact that most studies do not stand alone but move within an "intellectual ecosystem" that provides a conceptual foundation for history learning and historical reasoning. In other words, these studies have a relatively uniform orientation: strengthening students' competence in

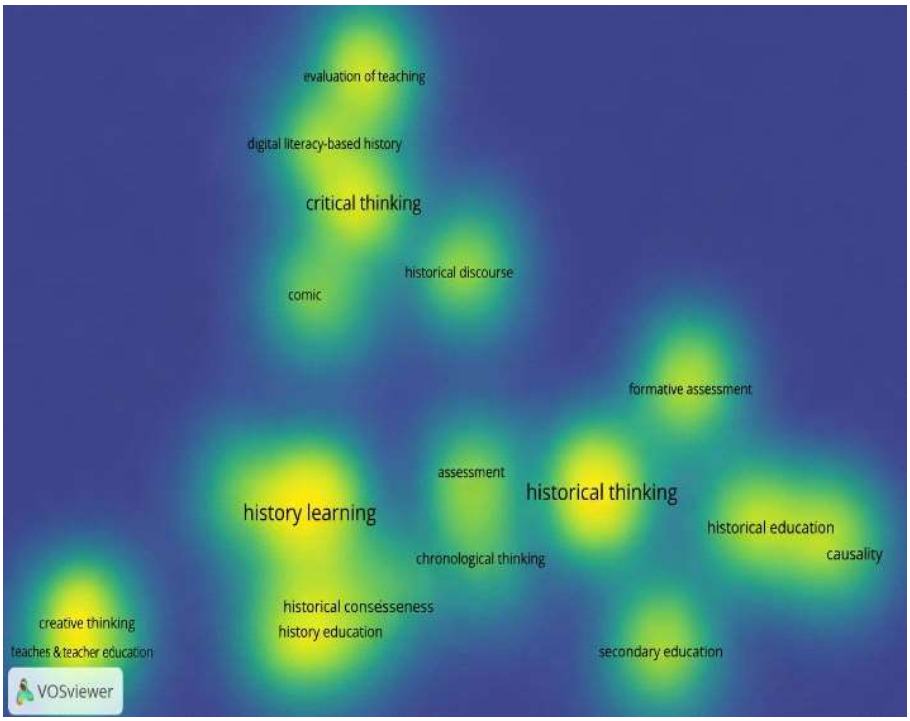

Figure 7. Density visualization from vosviewer

understanding the past through historical thinking processes, both procedurally (e.g., chronology, evidence, causality) and substantively.

On the other hand, the moderate density seen in areas such as assessment, historical education, and historical consciousness indicates that these topics play a supporting role. They do not dominate the discourse, but they reinforce the core discussion. This moderate density suggests that there are consistent efforts to link the history learning process with evaluation and historical awareness, and to integrate history pedagogy into the curriculum.

Meanwhile, areas that appear less prominent, such as comics, digital literacy-based history, and creative thinking, indicate peripheral yet emerging topics, fields that are not yet mainstream but offer space for methodological and pedagogical innovation. Despite their low density, the presence of these topics indicates the exploration of new research approaches, especially media-based, creativity, and digital literacy approaches aligned with the needs of 21st-century education.

Density analysis also shows a pattern of layered knowledge structures. The core layer is dominated by main pedagogical constructs (history learning and historical thinking), the second layer by supporting dimensions (assessment, historical consciousness), and the peripheral layer by developing innovations. This layered structure shows that research in the field of history education is hierarchical, with a stable center of orientation but still open to the development of experimental themes.

A bibliometric analysis using three VOSviewer visualization approaches shows that research on the relationship between critical thinking and historical understanding in history education exhibits an organized, interconnected knowledge structure. Network visualization confirms that the three main clusters, historical thinking, history learning, and critical thinking, do not develop separately, but are interconnected

through several connecting keywords that function as brokers, such as historical discourse, assessment, and digital literacy-based history. The presence of these keywords indicates that the integration of critical thinking and historical thinking occurs primarily through concepts that require source evaluation, argumentation, and interpretation, essential components of both.

Meanwhile, overlay visualization shows temporal dynamics that enrich the understanding of developments in this field. The color shift on the map shows the evolution of the research focus from basic concepts of history learning (2022) to applied pedagogical approaches, such as the development of critical thinking and the use of learning media (2023), then developing into more current issues, such as digital literacy, historical discourse, and teaching evaluation (2024). In the latest phase (2025), research began to emphasize formative assessment, secondary education, and student creativity, signaling a shift in orientation from conceptual foundations to learning innovation and continuous assessment. This pattern shows that research is increasingly oriented toward integrating modern pedagogy with 21st-century needs.

In line with this, density visualization shows that history learning and historical thinking are the center of gravity of the discourse, indicating that both are the most dominant epistemic bases in the literature. Themes such as assessment, historical consciousness, and historical education emerge as supporting layers, while innovative topics such as comics, digital literacy-based history, and creative thinking areon the peripheral layer. These findings reveal a layered structure of knowledge: a stable center, a consistent supporting circle, and an innovative periphery that continues to evolve. However, this study has limitations, particularly because the analysis relies solely on keywords and publication metadata, thus not fully capturing the depth of the articles' content or the epistemological context of each concept. Furthermore, the limited sample size and publication period may limit the generalizability of the findings to the dynamics of global history education research.

RQ3: How are history learning strategies developed to foster students' critical thinking?

History learning in the 21st century aims to develop critical thinking skills through innovative strategies that emphasize reflective, collaborative, and technology-based activities. A rigorous data review yielded 21 articles on critical thinking and historical understanding in history learning, which were then extracted using Covidence. Various approaches or learning strategies were found that can enhance critical thinking and historical knowledge in history learning.

Of the 21 articles analyzed, several strategies were used in history learning to foster critical thinking skills, and their effectiveness was assessed through a limited meta-analysis using both qualitative and quantitative approaches. A meta-analysis was used to examine the effect sizes of four quasi-experimental studies. Effect size is used in meta-analysis to combine the results of several studies, providing a more comprehensive understanding (Hedges & Kuyper, 2015). The use of effect size in the analysis of four quasi-experimental studies made an important contribution to assessing the actual impact of history learning strategies on improving students' critical thinking skills and historical understanding. In general, effect sizes are interpreted according to Cohen's criteria: values around 0.20 are considered small, 0.50 medium, and 0.80 or more large (Valladares-Neto, 2018). To see the effect size of these four quasi-experimental publications, refer to Table 4 below.

The effect size values in the table show that the Digital Comic strategy (Setyowati et al., 2023) has the greatest influence, with a value of 1.172, which falls into the large effect category.

Table 4. Effect size from four quasi-experimental publications

Author, Year	Strategy/Media	Effect Size	Std. Error
(Fadli et al., 2022)	Flipped Classroom	0.823	0.212
(Setyowati et al., 2023)	Digital Comic	1.172	0.159
(Tirado-Olivares et al., 2024)	Learning Analytics	0.798	0.237
(Ofianto et al., 2024)	Padlet	-0.072	0.169

The Flipped Classroom strategy (Fadli et al., 2022) and Learning Analytics (Tirado-Olivares et al., 2024) also show large effects with values of 0.823 and 0.798, respectively, indicating that both strategies have a strong impact on improving student abilities. In contrast, the Padlet strategy (Ofianto et al., 2024) showed a very small effect size, close to zero (-0.072), indicating that, empirically, its influence on the measured learning outcomes was very weak or insignificant. The difference in standard errors across studies also shows variations in the accuracy of effect estimates, with Digital Comic yielding the most precise estimates compared to other strategies.

Based on the variation in effect sizes, a summary effect (pooled effect) was calculated using *JASP* software via a simple meta-analysis approach. This analysis aimed to provide an overview of the combined influence of all learning strategies tested quasi-experimentally and to assess the consistency of results across studies using a heterogeneity test. The summary effect results from the four publications are as follows

Meta-Analytic Tests		
	Test	p
Heterogeneity	$Q_e(3) = 30.06$	< .001
Pooled effect	$t(3) = 2.51$	.087

Meta-Analytic Estimates					
		95% CI		**95% PI**	
	Estimate	**Lower**	**Upper**	**Lower**	**Upper**
Pooled effect	677.1	-180.0	1534	-1163	2518
τ	511.8	248.5	1618		
τ^2	261938.0	61766.3	$2.619\times10^{+6}$		

Source: Data analysis results from JASP Software (2025)

The results of a meta-analysis of the development of history learning strategies to foster students' critical thinking skills show significant heterogeneity across studies (Q‘ (3) = 30.06; $p < 0.001$). These findings indicate that the historical learning strategies developed, such as the flipped classroom, digital comics, learning analytics, and *Padlet*, were applied in very diverse contexts, learning designs, and student characteristics. In other words, the development of historical learning strategies to foster critical thinking is contextual, greatly influenced by pedagogical approaches, technology integration, and the cognitive goals to be achieved in each study.

Furthermore, the pooled effect results show a $t(3) = 2.51$, $p = 0.087$, indicating that, overall, the combined effect of historical learning strategies on students' critical thinking is not statistically significant at the 0.05 level but shows a positive trend. These findings suggest that the development of history learning strategies does strengthen

critical thinking. However, the effect's strength is not yet stable in general due to the limited number of comparable quasi-experimental studies and the high variation in intervention designs.

In contrast to meta-analytic findings showing a positive but statistically unstable effect, N-Gain value-based analysis provides a more operational picture of the improvement in students' historical understanding after learning interventions. In general, N-Gain values are in the moderate to high category, indicating that various media innovations and learning models can promote meaningful improvements in conceptual understanding of history. N-Gain values in this range indicate that students not only experience an increase in numerical learning scores, but also an improvement in the quality of their understanding of concepts, chronology, and causal relationships in historical events. Generally, N-Gain levels are presented in the table below.

Table 5. N-Gain range

N-Gain Range	Category
$g \geq 0.70$	High
$0.30 \leq g < 0.70$	Medium
$g < 0.30$	Low

Table 6. Data result using n-gain

Author, Year	Learning Media/Model	N-Gain Value	Category
(Ofianto et al., 2022)	Timeline Media	0.68	Medium
(Hanif & Maruti, 2025)	History Work Camp	0.77	High
(Ofianto et al., 2023)	Virtual Field Trips	0.72	High

Based on Table 6, three publications that used media and learning models as strategies were found to be effective in improving historical understanding. The use of digital timeline media in the publication by Ofianto et al. (2022) yielded an N-Gain value of 0.68, which falls in the moderate category, close to the high category threshold. This finding confirms that chronological visualization through digital timelines effectively helps students understand the systematic sequence of historical events. Through structured visual representations, students can more easily connect one event to another in a logical timeline. This media also helps reduce students' cognitive load when studying abstract and complex material. Although the increase has not reached the high category, these results show that digital timelines are quite effective as a medium for reinforcing basic historical understanding, especially in terms of chronology and continuity of events.

Research by Hanif & Maruti (2025) using the History Work Camp (HWC) Model yielded the highest N-Gain value of 0.77 in the high category, indicating that the history learning model, delivered outside the classroom, improved creative thinking skills in a fun learning atmosphere. The physical, emotional, and social involvement of students during field activities fosters a deeper, more meaningful understanding. Students not only learn historical facts but also directly experience the context of space, time, and values attached to historical events. This type of learning strengthens the construction of historical meaning through authentic experiences, making the understanding formed more durable and contextual.

Meanwhile, Virtual Field Trips (VFTs) used in the research by Ofianto et al. (2023) as a medium for learning about the local history of the Pagaruyung Kingdom showed an N-Gain value of 0.72, which is also in the high category. This

shows that primary source-based virtual experiences can provide historical learning that is almost equivalent to direct field experiences. Through virtual exploration of the historical environment, students can observe historical evidence, analyze artifacts, and relate events to the local context more concretely. The advantages of VFT lie in its flexible access and cost efficiency, while still having a significant impact on historical understanding.

Based on a comparison of N-Gain scores, History Work Camp and Virtual Field Trips (VFT) were more effective than digital Timeline media in improving students' historical understanding. History Work Camp obtained the highest N-Gain (0.77), followed by VFT (0.72), both of which were in the high category, while digital Timeline was in the medium category (0.68). This difference shows that history learning based on direct experience or authentic experience simulations has a stronger impact on deepening historical understanding than learning that focuses solely on representational visualization. Work Camp allows students to construct historical meaning through direct physical, emotional, and social engagement, while VFT provides a similar contextual experience virtually. On the other hand, the digital Timeline plays a greater role in reinforcing chronological thinking structures but does not yet fully accommodate the aspects of a complete historical experience. Thus, the higher the authenticity of the learning experience provided by a medium, the greater the potential to improve students' historical understanding, as indicated by the N-Gain score.

Similar to the meta-analysis findings that show a positive but statistically unstable effect, as well as the N-Gain analysis results that show an increase in historical understanding in the moderate to high categories, the synthesis of other articles provides a more in-depth explanation of pedagogical mechanisms, implementation contexts, and factors that support and hinder the effectiveness of history learning. Several articles describe the process of history learning through reflective, socio-critical, historical debate, and transformative-interactive approaches to build students' critical thinking skills and historical awareness.

Suntiah (2021) examined students' critical thinking skills in Islamic Cultural History, which was developed through reflective teaching. This research involved 16-17-year-old Grade XI students at MAN 1 and MAN 2 Bandung, West Java, Indonesia. The learning process was carried out with students actively involved through initial reading activities, heterogeneous group discussions assisted by video media, presentation of discussion results, and reflective journal writing. Teachers acted as facilitators through provocative questions that encouraged student reflection and argumentation. The study's results show that reflective classes support students' learning and critical thinking. This is supported by increased critical thinking, as evidenced by comparisons of pre-test and post-test results, and reinforced by daily tests and students' reflective journals.

The findings of this study align with foreign research from Chile by Burgos-Videla et al. (2025), which examined pedagogical approaches oriented towards the development of critical and reflective thinking through the application of historical methods and the construction of historical discourse as the main pillars of the educational process. The study adopted a hermeneutic and critical-reflective approach by identifying various pedagogical strategies that implement the proposed approach, including structured historical debates, school-based research projects, collaborative analysis of primary and secondary sources, and the integrated use of digital technology. These strategies are linked to the main categories of historical thinking, contextualization, causality, multicausality, continuity, and change. The findings

show that adopting a socio-critical approach in history teaching can transform the classroom into a space for active reflection.

The alignment between national and international research indicates that the reflective approach to history learning has cross-context validity. Both national and international contexts affirm that the reflective and socio-critical approaches are important foundations for the development of critical thinking and meaningful historical understanding. The reflective approach is not only effective in one particular education system but is a universally relevant pedagogical strategy for improving critical thinking and historical understanding.

Despite their similarities, John Flavell's metacognitive theory perspective, which refers to students' knowledge of their own cognitive processes, points to differences in the implementation of reflection in both contexts and shows differences in the level of depth of students' thinking awareness (Flavell, 1979). The reflective journal in Suntiah's (2021) study placed students at the stage of monitoring and self-evaluating their understanding, which was shown to directly increase critical thinking scores. In contrast, the socio-critical approach of Burgos-Videla et al. encourages metacognition at a higher level, namely, collective regulation of thinking, in which students not only reflect on what they understand but also on how history is constructed, debated, and socially interpreted. This explains why reflection in an international context is more strongly related to the formation of awareness of causality, continuity, and historical change.

An analysis of Problem-Based Learning (PBL) strategies and the integration of STEM approaches was conducted based on one foreign publication by Bae et al. (2021) and two publications by Pratama et al. in 2022 and 2024. The research conducted by Bae et al. (2021) on the application of Problem-Based Learning (PBL) in the form of PBL-LHC (Problem-Based Learning–Learning History Cycle) to develop historical thinking in large lecture classes, leveraging the synergy of the Scaffolding Approach. The results of this study confirm that the PBL-LHC model is effective when applied to large-scale history classes. Another finding is the role of synergistic scaffolding, as visualized in the PBL-LHC quadrant, which enables diagnostic and contingent interactions to continue even in large classes.

On the other hand, the STEM approach in history learning has a strong correlation with students' historical thinking skills and historical awareness. The STEM approach not only strengthens science and technology literacy but also develops historical reasoning through data analysis, causal logic, and evidence-based decision-making. Conversely, historical thinking skills deepen the quality of STEM learning by providing a social, cultural, and historical context for the development of science and technology. However, there are challenges to the STEM approach that act as obstacles, namely, curriculum requirements and evaluation systems that still emphasize low-level objective tests. These findings reveal a disconnect between the goals of developing 21st-century skills such as critical thinking, historical awareness, and problem solving, and assessment practices in schools.

A synthesis of findings from foreign publications by Bae et al. (2021) and national publications by Pratama et al. (2024) shows that both PBL and the integration of the STEM approach have the same direction in improving students' historical thinking skills, even though they are applied in different educational contexts. The study by Bae et al. (2021) confirms that the PBL-LHC model is effective in developing historical thinking, even in large lecture classes, through synergistic scaffolding that supports visual representations that enable reflection, diagnosis, and the optimal continuation of inquiry. Meanwhile, the findings of Pratama et al. show

that the STEM approach in history learning is strongly correlated with students' historical thinking skills and historical awareness, as it encourages data analysis, causal reasoning, and evidence-based decision-making in understanding historical events.

Conceptually, PBL and STEM/STEAM converge on the paradigm of inquiry-based learning and authentic problem-solving, thereby complementing each other in developing causal reasoning, chronological understanding, and historical reflection. However, unlike the overseas context, which is relatively more prepared in terms of the learning system, the implementation of STEM in the national context still faces structural challenges in the form of curriculum and evaluation system requirements that are oriented towards LOTS, resulting in a lack of synchronization with the objectives of developing 21st-century skills.

The effectiveness of this learning strategy cannot be separated from the role of assessment as an instrument that guides the learning process. Research conducted by Ofianto et al. (2023) developed a historical thinking assessment instrument to measure students' ability to analyze the causality of historical events. The resulting essay contained six indicators of cause-and-effect analysis. The results of this study show that the developed instrument consists of valid and reliable items. This was demonstrated in a study by Fahrudin et al. (2021), who developed teaching materials to evaluate history learning and improve critical thinking skills. The resulting product was teaching material consisting of learning objectives, indicators, theories, techniques, summaries, and exercises. The effectiveness of this teaching material development product was measured through effectiveness tests in experimental and control classes. The results showed that this product improved critical thinking in the experimental class compared to the control class, indicating that the developed teaching materials are well-suited as instruments for evaluating history lectures.

Both findings suggest that developing teaching materials and evaluation instruments grounded in critical thinking is a key factor in improving the quality of history learning. Valid, systematic teaching materials based on critical thinking indicators have been proven to not only improve students' cognitive achievement but also shift the orientation of evaluation from merely measuring memorization to assessing analytical, reflective, and historical decision-making abilities. These findings support the argument that reformulating assessment strategies plays a strategic role in fostering historical thinking and critical thinking skills as 21st-century competencies in history learning.

Historical sources are still widely used in modern education, especially in history instruction, as learning resources. Although many learning resources are available in other media, classroom history instruction still relies on textbooks as a primary source of information. Research conducted by Álvarez Martínez-Iglesias et al. (2021) analyzed the sources contained in history textbooks used in Spain and Italy, as well as how these sources were designed for teachers to use in history lessons. The textbooks analyzed were published by several leading publishers in Spain and Italy. The analysis shows that the activities in the textbooks, presented as student assignments, are at a low cognitive level, making it difficult to develop critical and reflective historical thinking. Instead, textbooks are used only to reinforce memorization of dates, facts, and relevant historical figures.

These findings reinforce the results of previous learning strategy syntheses, namely that improving historical thinking requires more than just static learning resources; it also requires integration with active approaches such as PBL, STEM, and the use of digital media and primary sources. In this context, textbooks are no longer positioned as the final source of information but rather as a starting point for historical inquiry, reflection, and argumentation.

Further research using a correlational approach by Bunari et al. (2023) shows that historical understanding, historical thinking skills, and historical awareness are mutually reinforcing. These findings confirm that improving critical and historical thinking cannot be separated from how students construct meaningful conceptual understanding of historical events. In practical terms, teachers can always consider teaching the three components in this study, so that the history learning process will be much more meaningful in terms of educational values and character building. Meanwhile, Nurhasanah et al. (2025) expanded the scope of critical thinking by linking it to the socio-emotional, ethical, and digital history literacy dimensions. The findings of this study indicate that digital literacy in history learning has a direct positive impact on cognitive abilities in modern educational environments. However, this study also found that socio-emotional skills do not directly affect critical thinking, challenging previous assumptions.

Simultaneously, these two findings confirm that strengthening critical thinking in history learning is more determined by the integration of conceptual understanding, historical reasoning, and digital literacy than by affective factors alone. The implication is that the main challenge for 21st-century curricula and assessments lies in shifting learning and assessment practices from mere objective, memorization-based tests to performance-based assessments, historical inquiry, and reflective activities that can authentically measure higher-order thinking skills.

Teachers' limitations in developing students' critical thinking skills are not a problem confined to national education but a global phenomenon found in education across various developing countries. A study by Chimbunde et al. (2023) in Zimbabwe shows that traditional teaching practices still dominate history learning focused on the transmission of knowledge and memorization of facts, leaving very little space for developing students' critical thinking. This study proposes a transformative-interactive 2P-2C framework (Context-oriented learning environment (COLE), process-oriented learning environment (POLE1), participative-oriented learning environment (POLE2), and continuous improvement-oriented learning environment (CIOLE)) as an alternative to overcome these problems by learning from the current practices of history teachers that hinder opportunities to develop critical thinking skills in history education. This model results from combining principles from constructivism, critical pedagogy, and critical theory.

Meanwhile, research in Europe, particularly in Spain, by Miralles-Sánchez et al. (2025), analyzed the discourse of teaching in history learning and its relationship to the development of historical thinking skills through observational studies conducted in a total of 28 classes, in history subjects taught by 14 teachers enrolled in a master's program in Teacher Education, with two classes per teacher. The findings of this study indicate that the dominance of historical contextualization discourse has the potential to weaken the development of historical critical thinking. Critical thinking grows more effectively through source interpretation and real case study analysis, rather than simply presenting context. The mutually inhibiting relationship between the exploration of prior knowledge and historical thinking skills further confirms that activating prior knowledge does not automatically foster critical thinking without a focused learning design. Conversely, the mutually reinforcing relationship between source interpretation and evaluation confirms that the core of historical thinking lies in the ability to critically interpret and evaluate evidence.

Both studies emphasize that teachers' limitations in developing students' critical thinking skills are a global issue that occurs in both developing countries and Europe. Comparatively,

both studies emphasize that the main problem is not solely in the method, but in the pedagogical orientation of teachers, which is still centered on the delivery of information rather than on the development of students' analytical skills. The difference is that Chimbunde et al. (2023) emphasize solutions at the systemic level of transformative learning through the 2P–2C model, while Miralles-Sánchez et al. (2025) highlight issues at the level of classroom discourse practices, particularly the relationship between teacher discourse types and students' historical thinking activities. Thus, these two studies complement each other: one offers a macro-conceptual model for reforming history learning, while the other provides micro-evidence that, without changes in the practices of interpretation, source evaluation, and case analysis, achieving the goal of developing critical thinking will be difficult.

History education in Southeast Asia shows a dynamic transformation in response to demands to strengthen critical and historical thinking in the digital age. A study in Thailand conducted by Hongphanut et al. (2023) developed the History Instructional Model on Cloud Technology (HIMCT Model) for history teaching to improve students' critical thinking and information literacy skills. Meanwhile, in Vietnam, history education, which was initially a "secondary" subject focused on mechanical memorization, has shifted towards the development of historical thinking, representing a significant shift in Vietnam's national history curriculum implemented in 2022. In line with this, Hanh et al. (2025) explore the application of Peter Seixas' historical thinking model, integrated with visualization techniques, to improve high school students' historical thinking skills.

The transformation of history learning in Southeast Asia, as demonstrated by studies in Thailand (Hongphanut et al., 2023) and Vietnam (Hanh et al., 2025), reflects a global paradigm shift from rote-based history learning toward strengthening critical thinking and technology- and visualization-based historical thinking. The development of the History Instructional Model on Cloud Technology (HIMCT) in Thailand confirms that the integration of digital technology and information literacy is an important prerequisite for the growth of students' critical thinking, in line with Facione's view that places evidence-based analysis, evaluation, and decision-making at the core of critical thinking. Meanwhile, Vietnam's history curriculum reform, which adopts Peter Seixas' historical thinking model, emphasizes that historical thinking requires not only mastery of facts but also the ability to analyse evidence, assess interpretations, and synthesize historical meaning in a contemporary context. The synthesis of these two studies shows that in Southeast Asia, the strengthening of historical and critical thinking moves along two main paths, namely digital technology-based innovation and curriculum reform based on a conceptual framework of historical thinking.

Based on the analysis of RQ 3, this study has several limitations that need to be considered. First, the number of quasi-experimental studies that can be analyzed meta-analytically is still limited, so the generalizability of the findings is not yet optimal. Second, the high level of heterogeneity between studies shows that history learning strategies are applied in very diverse contexts, both in terms of learning design, student characteristics, and technology integration, so that their effectiveness is highly dependent on the context of application. Third, there is still overlap between the constructs of critical thinking, historical thinking, and historical understanding, which has an impact on the differences in indicators and measurement instruments. In addition, the use of N-Gain in some studies represents an increase in conceptual understanding rather than higher-order critical thinking skills, so that the measurement of the

impact of critical thinking is not yet fully comprehensive.

Given these limitations, future research should involve a larger, more homogeneous set of experimental studies, particularly regarding the constructs and measurement instruments for critical thinking, to obtain a more stable estimate of the impact. The direction of research development also needs to focus on formulating an integrated history learning model that combines reflective approaches, Problem-Based Learning, STEM, and authentic experience-based learning. In addition, strengthening performance-based assessment is an important agenda to measure critical thinking skills through source analysis, historical argumentation, and evidence-based decision-making activities. Studies on teacher readiness, curriculum flexibility, and educational policy support also need to be expanded to ensure the sustainability of learning innovation implementation.

Overall, RQ3 confirms that the development of history learning strategies to foster critical thinking skills is a systemic process, covering pedagogical, technological, assessment, teacher competency, and education policy aspects. Although empirical findings show a positive influence, its effectiveness is not yet fully stable and is greatly influenced by the context of implementation. Therefore, the future development of critical thinking-based history learning needs to be guided in a more structured, integrated, and sustainable manner within the national education ecosystem.

■ CONCLUSION

Based on a systematic synthesis of all analyzed articles, this study confirms that the development of critical thinking skills in history learning has undergone significant shifts in approach, media, and pedagogical orientation. RQ1 shows that research on history learning is dominated by quantitative and quasi-experimental approaches with a tendency to utilize innovative learning models, digital media, and contextual approaches. RQ2 shows that critical thinking has a strong epistemic connection to historical thinking and understanding, mediated by concepts such as historical discourse, assessment, and digital literacy. Meanwhile, RQ3 confirms that various learning strategies, whether problem-based, project-based, experience-based, or technology-integration-based, tend to positively influence students' critical thinking skills. However, effectiveness varies depending on the application context.

However, this study has several limitations that need careful consideration. First, the number of experimental studies that meet the meta-analysis criteria remains limited, so the generalizability of the findings is not yet optimal. Second, the high heterogeneity across studies indicates that variations in learning design, student characteristics, and institutional context significantly affect the effectiveness of the strategies used. Third, there is still conceptual overlap among critical thinking, historical thinking, and historical understanding, as well as differences in the measurement instruments used. In addition, some studies still rely on general cognitive learning outcome indicators, so that the measurement of higher-order critical thinking skills is not yet fully comprehensive.

Based on these limitations, there are enormous opportunities for further research. Future research needs to focus on strengthening more homogeneous experimental designs, using critical thinking instruments specifically validated for the context of history learning, and developing integrated learning models that simultaneously accommodate critical thinking, historical thinking, digital literacy, and creativity. In addition, it is necessary to expand longitudinal studies to examine the sustainability of learning strategies' impacts over the long term, as well as cross-country comparative studies to enrich our

understanding of how social, cultural, and educational policy contexts shape the strengthening of critical thinking in history learning.

The practical implications of these findings provide recommendations for various education stakeholders. For teachers, the results of this study emphasize the importance of designing history learning that emphasizes source analysis activities, argumentative discussions, critical reflection, and the meaningful use of digital media. For students, history learning should be positioned as a vehicle for developing critical reasoning, not merely for mastering facts about the past. Meanwhile, for education policymakers, these findings emphasize the urgency of aligning the curriculum, assessment system, and teacher professional development programs to truly support the strengthening of critical thinking skills as a key 21st-century competency. Thus, history learning is expected to contribute strategically to shaping a generation that is reflective, analytical, and intellectually responsible.

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