



Effectiveness of Web-Based Interactive Thematic Map Media in Enhancing Students' Chronological and Geospatial Thinking in History Learning

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Abstract: This study aims to examine the effectiveness of web-based interactive thematic map media in improving students' chronological and geospatial thinking skills in history learning. The research employed a quantitative approach using a quasi-experimental design with a nonequivalent control group design. The participants consisted of 78 eleventh-grade students at SMAN 1 Cijeruk, divided into an experimental group and a control group. Data were collected through pretest and posttest using a validated and reliable multiple-choice instrument. Data analysis was conducted using nonparametric statistical tests, including the Mann–Whitney U-Test and Wilcoxon Signed-Rank Test. The findings indicate that there was no significant difference in students' initial abilities between the experimental and control groups. However, after the treatment, the experimental group showed significantly higher posttest scores compared to the control group ($p < 0.05$). Both groups experienced improvement, but the increase was more substantial in the experimental group. The N-Gain analysis revealed a moderate level of effectiveness (0.64), indicating that the use of interactive thematic map media contributed positively to students' learning outcomes. These results suggest that web-based interactive thematic map media is effective in enhancing students' chronological and geospatial thinking skills. The integration of visual and interactive elements enables students to better understand historical events in terms of time sequence and spatial context, thereby improving both conceptual understanding and analytical thinking in history learning.

Keywords: chronological thinking; geospatial thinking; history learning; interactive learning; thematic map media

Abstrak: Penelitian ini bertujuan untuk menguji efektivitas media peta tematik interaktif berbasis web dalam meningkatkan kemampuan berpikir kronologis dan geospasial siswa dalam pembelajaran sejarah. Penelitian ini menggunakan pendekatan kuantitatif dengan desain kuasi-eksperimental dengan desain kelompok kontrol non-ekuivalen. Partisipan terdiri dari 78 siswa kelas sebelas di SMAN 1 Cijeruk, dibagi menjadi kelompok eksperimen dan kelompok kontrol. Data dikumpulkan melalui pretest dan posttest menggunakan instrumen pilihan ganda yang tervalidasi dan reliabel. Analisis data dilakukan menggunakan uji statistik nonparametrik, termasuk Uji Mann-Whitney U dan Uji Peringkat Bertanda Wilcoxon. Hasil penelitian menunjukkan bahwa tidak ada perbedaan signifikan dalam kemampuan awal siswa antara kelompok eksperimen dan kelompok kontrol. Namun, setelah perlakuan, kelompok eksperimen menunjukkan skor posttest yang secara signifikan lebih tinggi dibandingkan dengan kelompok kontrol ($p < 0,05$). Kedua kelompok mengalami peningkatan, tetapi peningkatan lebih substansial pada kelompok eksperimen. Analisis N-Gain mengungkapkan tingkat efektivitas yang moderat (0,64), menunjukkan bahwa penggunaan media peta tematik interaktif memberikan kontribusi positif terhadap hasil belajar siswa. Hasil ini menunjukkan bahwa media peta tematik interaktif berbasis web efektif dalam meningkatkan kemampuan berpikir kronologis dan geospasial siswa. Integrasi elemen visual dan interaktif memungkinkan siswa untuk lebih memahami peristiwa sejarah dalam hal urutan waktu dan konteks spasial, sehingga meningkatkan pemahaman konseptual dan pemikiran analitis dalam pembelajaran sejarah.

Kata Kunci: berpikir geospasial; berpikir kronologis; media peta tematik; pembelajaran interaktif; pembelajaran sejarah



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Introduction

Learning is an active process of interaction between teachers and students that takes place in a planned way, both inside and outside the classroom, to achieve specific learning objectives (Fazillah, 2022). Meanwhile, history is a field of study that examines important events that happened in the past of human life. According to Kuntowijoyo (2013), history learning is the process of delivering values from past events to students through teaching and learning activities. It includes various human experiences, such as what people thought, said, did, felt, and experienced in their lives.

History includes important elements in every study, namely humans, space, and time. Chronological thinking is the ability to think in a sequence, in an orderly and continuous way (Rochjati, 2019). It is a process of understanding events that are arranged systematically based on time order (Dara & Setiawati, 2017). Chronology requires that historical events are understood according to their sequence in time. Therefore, history should be understood as a process, not just a collection of events and dates, so that students can easily understand the meaning and relationships between historical events (Darini, 2013).

History learning has an important role in developing students' understanding of history and their critical thinking skills. However, there are still many challenges in teaching history, especially in understanding chronological and geospatial concepts. Chronological and geospatial thinking skills are important parts of historical understanding. Chronological understanding means the ability to arrange historical events in the correct order of time, while geospatial skills refer to understanding the location of events and their impact on the history of a place.

Teaching history often faces challenges in keeping students interested and engaged. Traditional teaching methods are usually less interesting and less effective in helping students develop chronological and geospatial thinking skills. Therefore, new and more creative approaches are needed in history teaching, one of which is using thematic map learning media. Thematic map learning media is a learning tool that uses maps showing spatial layout, location information, and different concepts that help explain and analyze certain conditions in the map. Nurjannah & Sumiyati (2022) state that the use of maps (including thematic maps) can give clearer understanding and help students learn more easily. Through thematic maps, students can see the relationships between different phenomena being studied. These relationships may create different or new phenomena, whether related or not, so students can think more easily in a chronological way.

Besides chronological thinking, history learning also requires students to have geospatial thinking skills. This means the ability to understand the relationship between historical events and the geographical place where they happened. Geospatial understanding is not only about knowing locations on a map, but also about understanding the relationship between humans, the environment, and geographical features such as landforms, transportation routes, and strategic locations that influence historical developments. With this ability, students can understand that the development of civilization, trade routes, the spread of religion, expansion of power, and population movement are influenced by space. Therefore, students not only know when events happened, but also where and why they happened.

One promising alternative is the use of web-based interactive thematic map learning media. This media not only presents historical information visually but also gives students a more active and meaningful learning experience. The interactive nature of thematic maps can provide realistic illustrations of history, allowing students to be more involved and connected with the learning material. Based on preliminary observations conducted on students at SMAN 1 Cijeruk, especially Grade XI, most students have not yet met the indicators of chronological thinking in history learning. These include defining the sequence of historical events, arranging storylines of events, identifying important figures, and explaining the concepts of continuity and change in history.

Based on previous studies, the use of thematic map media in history learning has become an important consideration in classroom teaching. First, Erwanda et al. (2022) found that the use of mind mapping in thematic learning for Grade V students at SDN Karangbanyu 1 worked well. Students were more active, and their learning results improved. However, there were still some problems, such as teachers having difficulty helping students who were behind in understanding the material and low learning motivation among some students. Second, Sutrisno (2019) showed that students were able to create special maps showing the distribution of oil palm plantations and tin mining in East Belitung Regency using digital maps (Google Maps). They also developed environmental awareness and were able to suggest solutions to environmental problems in their area. Third, Wijayanto (2019) stated that web-based map media is effective and useful in learning, shown by positive responses from students and teachers. Its effectiveness can be seen from its appearance, content, and ease of use, indicating that well-designed learning media should be effective and aligned with students' learning needs. Nevertheless, previous studies on thematic map media in history learning have not examined the integration of chronological thinking skills with geospatial thinking skills. Most existing studies have focused on students' learning activities, achievement, and motivation rather than investigating how interactive thematic maps can simultaneously foster both historical and spatial reasoning. Addressing this research gap, the present study aims to examine the effectiveness of web-based interactive thematic map learning media in improving students' chronological and geospatial thinking skills in history learning at SMAN 1 Cijeruk.

This study is grounded in the constructivist learning perspective, which views knowledge as actively constructed through learners' interaction with meaningful learning experiences. In history education, web-based interactive thematic maps provide visual and spatial representations that enable students to connect historical events with their geographical contexts, thereby facilitating both chronological and geospatial thinking. From this perspective, meaningful learning occurs when students actively relate temporal sequences of historical events to their spatial contexts, allowing them to develop a deeper understanding of historical phenomena.

This study aims to examine the effectiveness of web-based interactive thematic map media in improving students' chronological and geospatial thinking skills in history learning. Accordingly, the urgency of this study stems from the limited empirical evidence regarding how digital thematic maps can simultaneously foster chronological and geospatial thinking in history education. By addressing this gap, the study contributes theoretically by expanding the application of constructivist learning theory to the integration of historical and spatial reasoning in digital history learning. Practically, the findings provide empirical evidence that can guide history teachers and curriculum developers in designing technology-enhanced learning environments that effectively promote higher-order historical thinking skills.

Research Methods

This study used a quantitative approach with a quasi-experimental design (Sugiyono, 2014). This method was used to examine the effect of using web-based interactive thematic map learning media on students' chronological and geospatial thinking skills in history learning. The research design applied was the Nonequivalent Control Group Design, which involved two groups: an experimental group and a control group. Both groups were given a pretest to identify their initial abilities. Then, the experimental group received treatment using web-based interactive thematic map learning media, while the control group was taught using conventional methods. After the learning process, both groups were given a posttest to measure the differences in learning outcomes.

This research was conducted in Grade XI at SMA Negeri 1 Cijeruk, located in Bogor Regency, West Java. The study was carried out during the second semester of the academic year as planned. The population of this study consisted of all Grade XI students, totaling 285 students across eight classes. The sample was selected using cluster random sampling. The selected students were then divided into two groups: the control class and the experimental class. The control group consisted of 42 students, while the experimental group consisted of 36 students, with a total of 78 students involved in the study.

The data collection technique used in this study was a test instrument to measure students' chronological and geospatial thinking skills. The instrument was a multiple-choice test consisting of 40 questions with five answer options. Before being used, the instrument was tested for validity and reliability to ensure that it was appropriate as a research tool. Data were collected through a pretest before the treatment and a posttest after the learning process using the web-based interactive thematic map media.

Data analysis in this study was conducted using hypothesis testing with the help of SPSS software. The analysis technique used was the Two Independent Samples Test to identify differences in the mean scores between the experimental group and the control group. The testing criteria were based on the significance value. If the significance value was less than 0.05, it indicated a significant difference between the two groups. Therefore, it can be concluded that the use of web-based interactive thematic map learning media has an effect on students' chronological and geospatial thinking skills in history learning.

Research Result

The results of the study show that the test items used to measure students' thinking skills met good quality criteria. Based on the validity test, most of the items had an adequate level of accuracy in measuring the intended abilities. Furthermore, the reliability test results indicate that all items had a high level of consistency, meaning that the data obtained can be considered reliable. In terms of difficulty level, the test items had a proportional range of difficulty, allowing them to measure students' abilities more comprehensively. In addition, the discrimination index test showed that most of the items were able to effectively distinguish between students with high and low abilities. The results are explained in three stages: item validity testing, instrument quality testing, and N-Gain testing.

Item Validity Test

The item validity test was conducted to ensure that each item in the instrument could accurately measure the intended construct. The type of validity used in this study was empirical validity, which was analyzed by examining the correlation between each item score and the total instrument score using the Corrected Item–Total Correlation technique. The testing used the Pearson Product Moment correlation coefficient, where an item is considered valid if the r-

value (r-calculated) is higher than the r-table value at a significance level of 0.05 (Ghozali, 2018; Hair et al., 2017).

Based on the instrument trial conducted on 30 respondents, the r-table value was 0.361 (see Table 1). The results of the analysis show that all items had r-calculated values higher than the r-table, with values ranging from 0.452 to 0.618. This indicates that each item has a significant correlation with the total instrument score.

Table 1. Results of the Instrument Trial with Students

No	Item Statement	r-calculated	r-table	Description
1	Reason for choosing Yogyakarta as the temporary capital of the Republic of Indonesia	0.542	0.361	Valid
2	Impact of Japan's status quo policy on the Indonesian National Army (TNI)	0.488	0.361	Valid
3	Geospatial elements of the vulnerability of the Republic of Indonesia in 1945	0.601	0.361	Valid
4	Influence of the archipelagic geographical condition on integration	0.467	0.361	Valid
5	Strategic value of the Port of Surabaya for the Allies	0.519	0.361	Valid
6	Effectiveness of the Supit Urang strategy in Ambarawa	0.556	0.361	Valid
7	Strategic reason for the Bandung Sea of Fire event	0.593	0.361	Valid
8	Impact of the Allied territorial boundaries in the Medan Area	0.481	0.361	Valid
9	Geospatial distribution pattern of physical conflicts	0.534	0.361	Valid
10	Role of radio in the escalation of people's resistance	0.569	0.361	Valid
11	Impact of the Linggarjati Agreement on the territory of the Republic of Indonesia	0.452	0.361	Valid
12	Targets of Dutch aggression and economic motives	0.497	0.361	Valid
13	Impact of the TNI migration after the Renville Agreement	0.528	0.361	Valid
14	Concept of defense in isolated regions	0.612	0.361	Valid
15	The Dutch Divide et Impera strategy	0.466	0.361	Valid
16	Relationship between the Renville Agreement and the Madiun PKI event	0.541	0.361	Valid
17	Role of PDRI in maintaining sovereignty	0.558	0.361	Valid
18	Advantages of Soedirman's guerrilla battlefield	0.489	0.361	Valid
19	Time significance of the 1 March General Offensive	0.574	0.361	Valid
20	Impact of the delay in resolving West Irian after the Round Table Conference	0.603	0.361	Valid
21	NICA threats compared to Japanese threats	0.457	0.361	Valid

22	Communication strategy of the proclamation	0.595	0.361	Valid
23	Conflict after Japan's surrender	0.512	0.361	Valid
24	Role of PPKI during the power vacuum	0.549	0.361	Valid
25	Conflict points in logistics centers	0.473	0.361	Valid
26	Impact of the arrival of the Allies on conflicts in Indonesia	0.561	0.361	Valid
27	Geographic factors in regional strategies	0.492	0.361	Valid
28	Chronological order of the struggle in 1945–1946	0.618	0.361	Valid
29	Soedirman's leadership after the death of Isdiman	0.534	0.361	Valid
30	TNI migration strategy to maintain military strength	0.586	0.361	Valid
31	Regional isolation caused by the Van Mook Line	0.461	0.361	Valid
32	Comparison of losses between the Renville and Linggarjati Agreements	0.519	0.361	Valid
33	Indonesian diplomacy against puppet states	0.601	0.361	Valid
34	Role of KTN in international conflict resolution	0.487	0.361	Valid
35	Effectiveness of diplomacy compared to total war	0.553	0.361	Valid
36	Time of the Second Dutch Military Aggression	0.541	0.361	Valid
37	Advantages of the Wehrkreise tactics	0.478	0.361	Valid
38	Legal arguments for the existence of the Republic of Indonesia	0.612	0.361	Valid
39	Role of Sultan HB IX in the struggle	0.569	0.361	Valid
40	Relationship between military action and diplomacy	0.527	0.361	Valid

Source: Processed data, 2025

With the validity criteria fulfilled, all 40 test items were declared valid and appropriate for use as research instruments. There were no items that needed to be revised or removed, so the instrument could be used entirely for both the pretest and posttest. These results indicate that the test blueprint and item construction were developed in a systematic way and were aligned with the learning objectives, the topic of the struggle to maintain independence, and the targeted cognitive levels, especially in the areas of analysis, evaluation, and creation.

Instrument Quality Test

The quality of the test instrument was examined by analyzing the difference test at the pretest stage between the control group and the experimental group. This test was conducted to determine whether the students' initial abilities were equivalent before the learning treatment was given. This step is important to ensure that any differences in learning outcomes found later are truly caused by the treatment, not by differences in initial ability between the groups. Therefore, the comparison of pretest scores between the two groups serves as the basis for

assessing the internal validity of the study. The results of the difference test between the control and experimental groups can be seen in Table 2.

Table 2. Difference Test Results of Pretest Scores between Control and Experimental Groups

Group	N	Mean $\pm$ SD	P value
Control	42	46.07 $\pm$ 14.51	0.117
Eksperimental	36	53.61 $\pm$ 18.85	

Source: Processed data, 2025

Based on the descriptive statistics in the table, the mean pretest score of the control group was 46.07 with a standard deviation of 14.51, while the experimental group had a mean pretest score of 53.61 with a standard deviation of 18.85. This difference in mean scores indicates that, descriptively, the experimental group had slightly higher initial ability than the control group, although the variation of data in both groups was relatively large.

Furthermore, the results of the difference test using the Mann–Whitney U-Test showed a significance value of 0.117, which is greater than 0.05 (see Table 3). This result indicates that there is no statistically significant difference between the pretest scores of the control and experimental groups. Therefore, it can be concluded that both groups had relatively equivalent initial abilities before the learning treatment was applied.

Table 3. Results of the Mann–Whitney U-Test

	Test Statistics ^a	
	Pre	Post
Mann-Whitney U	601.000	219.500
Wilcoxon W	1504.000	1122.500
Z	-1.566	-5.394
Asymp. Sig. (2-tailed)	.117	.000

Source: Processed data, 2025

In addition to conducting a difference test between the control and experimental groups at the pretest stage, further analysis was carried out to compare pretest and posttest scores to determine changes in students' abilities before and after the learning treatment (see Table 4). This test aimed to identify the extent to which the instructional intervention improved students' learning outcomes, both in the control group and the experimental group. Therefore, the comparison between pretest and posttest scores serves as a key indicator in evaluating the effectiveness of the learning process.

Table 4. Results of the Difference Test between Pretest and Posttest

Group	Period	N	Mean $\pm$ SD	p-value (Wilcoxon)
Control	Pretest	42	46.07 $\pm$ 14.51	0.000
	Posttest	42	82.90 $\pm$ 5.13	
Eksperimental	Pretest	36	53.61 $\pm$ 18.85	0.000
	Posttest	36	88.78 $\pm$ 7.93	

Source: Processed data, 2025

Although both groups showed significant improvement, the experimental group had a higher mean posttest score compared to the control group. This indicates that the learning treatment applied in the experimental group had a more optimal impact on improving students' learning outcomes. These findings support the conclusion that the learning media used in the

experimental group was more effective than the method used in the control group. Therefore, the proposed research hypothesis can be accepted.

Finally, a difference test at the posttest stage between the control group and the experimental group was conducted to determine the differences in students' learning outcomes after the learning process. This test aimed to evaluate the effectiveness of the learning treatment applied in the experimental group compared to the method used in the control group. The results of the difference test between the control and experimental groups are presented in Table 5.

Table 5. Results of the Difference Test at the Posttest Stage between the Control and Experimental Groups

Group	N	Mean $\pm$ SD	P value
Control	42	82.90 $\pm$ 5.13	0.000
Eksperimental	36	88.78 $\pm$ 7.93	

Source: Processed data, 2025

The significant difference in learning outcomes indicates that the learning treatment applied in the experimental group was more effective than the method used in the control group. This finding provides empirical evidence that the learning media used in the experimental group was able to improve students' learning outcomes more effectively, thus contributing positively to the improvement of learning quality.

N-Gain Test

The N-Gain analysis was conducted to determine the level of improvement in students' learning outcomes after the learning treatment, by considering their initial abilities. This test is used to evaluate learning effectiveness more proportionally, as it not only compares pretest and posttest scores directly but also takes into account the maximum possible improvement that each student can achieve. The results of the N-Gain calculation are presented in Table 6.

Table 6. Results of Students' Pretest and Posttest Scores Using the N-Gain Formula

No	Pretest	Posttest	N-Gain	Category
1	30	91	0.87	High
2	35	95	0.92	High
3	70	95	0.83	High
4	60	93	0.83	High
5	90	87	-0.30	Low
6	60	86	0.65	Medium
7	30	90	0.86	High
8	45	89	0.80	High
9	55	78	0.51	Medium
10	15	94	0.93	High
11	55	88	0.73	High
12	35	94	0.91	High
13	95	89	-1.20	Low
14	45	78	0.60	Medium
15	50	90	0.80	High
16	40	90	0.83	High

No	Pretest	Posttest	N-Gain	Category
17	70	93	0.77	High
18	85	89	0.27	Low
19	45	92	0.85	High
20	85	84	-0.07	Low
21	35	88	0.82	High
22	45	96	0.93	High
23	60	93	0.83	High
24	40	86	0.77	High
25	55	88	0.73	High
26	45	94	0.89	High
27	55	94	0.87	High
28	55	94	0.87	High
29	55	91	0.80	High
30	25	97	0.96	High
31	65	88	0.66	Medium
32	90	96	0.60	Medium
33	55	88	0.73	High
34	45	94	0.89	High
35	55	62	0.16	Low
36	55	62	0.16	Low

Source: Processed data, 2025

Based on the N-Gain calculation for 36 students, the average N-Gain score was 0.64, which falls into the medium category. This result indicates that the learning process was fairly effective in improving students' learning outcomes, with most students showing improvement. Although there were variations in the level of improvement, including some students in the medium and low categories as well as a few with negative N-Gain scores, overall the findings show that the learning media used had a positive impact and is appropriate to be applied in history learning.

Discussion

The results of this study show a significant difference between the use of Thematic Map media and conventional teaching methods in improving students' chronological thinking skills. This visual-based learning media proved to be more effective in helping students understand the sequence of historical events in a systematic and ordered way. These findings confirm that innovation in learning media plays a strategic role in overcoming the limitations of conventional methods, which tend to rely on lectures and memorization of facts. Therefore, Thematic Map media can be considered a relevant alternative to improve the quality of history learning processes and outcomes.

The effectiveness of Thematic Map media indicates its strong potential in improving students' understanding of the sequence of historical events and the causal relationships between them. This media allows students to see connections between events visually, so their thinking process is not only linear but also analytical. This is in line with the view that history learning should not only focus on mastering chronology, but also on understanding the meaning

and relationships between events in the context of space and time (Efrindah & Yefterson, 2021). This is supported by Dava (2024), who used a digital history timeline to improve students' chronological thinking skills. The media presents historical events in sequence along a timeline, helping students understand relationships between events in a structured way.

Similarly, Nisa et al. (2021) state that the use of digital history timelines as learning media is supported not only by theory but also by empirical evidence showing improvements in students' historical or chronological thinking through structured and interactive media. This is based on Dara & Setiawati (2017), who argue that timelines have effective characteristics for supporting history learning in the classroom. Field research results show that this media helps students better understand time order and cause–effect relationships in historical events. Likewise, Abidin (2018) found that visual media, such as mind maps and timelines, can improve students' understanding and retention of historical information. Visual media help students organize complex information into simpler and more understandable structures, allowing them to see history as a connected series of events rather than separate facts.

In addition, the use of structured and visual-based learning media has been shown to have a positive impact on students' overall learning outcomes. Darne et al. (2024) and Fakhruddin et al. (2024) state that well-designed learning media can trigger different cognitive responses compared to conventional methods, especially in understanding concepts. In the context of history learning, Thematic Map media acts as a cognitive tool that helps students build a more logical and structured historical understanding. This finding is supported by Kisson (2021), who explains that focusing on chronological understanding helps students organize events systematically and understand relationships between them over time.

Timeline media in history learning functions not only as a visual aid but also as a teaching strategy that helps develop students' historical thinking in a more structured way. By presenting events in a clear time sequence, timelines help students think in order, understand continuity and change, and identify cause–effect relationships more logically (Dayusman et al., 2023). Similarly, Harmonika et al. (2022) found that using timeline methods helps students not only identify chronological sequences but also analyze patterns and relationships between events. This ability helps students build a structured way of thinking, allowing them to make historical generalizations and predict possible developments based on past events. Timelines are also effective tools for understanding the development of civilizations or cultures over time.

According to Kochhar (2008), timeline media in history learning can be classified into four main types, each with a different teaching function. First, the progressive timeline presents events in a linear order from the past to the present, helping students understand historical development step by step. Second, the regressive timeline presents events in reverse order, starting from the present and moving back to the past, which helps develop students' analytical skills. Third, the graphic timeline integrates visual elements such as images, icons, and symbols to make the content more interesting and easier to understand. Fourth, the comparative timeline compares events that occur at the same time in different places, helping students understand the relationship between space and time. These types of timelines are designed to strengthen chronological thinking and help students understand continuity, change, and relationships between events more deeply.

Ulya et al. (2024) found that the use of timeline methods significantly improves students' chronological thinking skills. In their study, students who were taught using timeline methods showed better learning outcomes compared to those taught with conventional methods. Statistical results confirmed that the difference was significant. Similarly, Yasin (2022) found that timeline chart media significantly improved students' learning outcomes in social studies.

Critical thinking is also an important aspect of understanding historical events. When students interact with learning materials, they are required to analyze, evaluate, and interpret information logically, similar to how historians examine sources. In historical writing, historians work in a reflective and analytical way; therefore, students should also be trained to think critically and not just accept information passively. Students also need to develop multiperspective thinking. They should understand that a historical event can be interpreted differently depending on perspectives, background, and context. Even events that were once considered important may change in meaning over time. Therefore, history learning should encourage students to be open to different perspectives and to evaluate events critically and contextually (Anggraini & Yafterson, 2023).

Chronological thinking is a fundamental skill in history learning because it is directly related to memory accuracy, understanding time order, and interpreting events correctly. With good chronological skills, students can arrange events in order based on time, place, and important aspects, reducing misunderstanding and fragmented knowledge. This skill also helps students understand continuity and change, as well as cause–effect relationships in a logical way. Chronological thinking is essential for achieving learning outcomes in Indonesian History under the Merdeka Curriculum, as it helps students understand history in a complete and meaningful way (Khoiroh, 2025).

To compare these findings, Warsani et al. (2025) state that the use of story maps in history learning helps students understand the relationship between space, geographical conditions, environmental dynamics, and human activities in shaping historical events. By combining spatial and narrative elements, story maps help students understand how location and environment influence historical developments. In addition, because they are presented in an interactive digital format, story maps increase student engagement and support independent learning.

Ferdiyanto et al. (2025) found that although the use of digital media is not yet optimal due to limitations in infrastructure and teacher readiness, when digital media such as videos, infographics, and interactive simulations are used effectively, students' interest and engagement increase. Learning becomes more interesting, and complex historical concepts are easier to understand. Digital media also support the development of 21st-century skills such as collaboration, critical thinking, communication, and creativity.

The findings of this study are consistent with previous research that shows strong significance values, indicating that the differences between the experimental and control groups are not due to chance (Khoerudin et al., 2023). Fujiastuti et al. (2019) explain that the use of media such as story maps, digital timelines, and other interactive tools is effective because they combine visual, spatial, and narrative elements. These approaches help students better understand the context of time and space in historical events. This aligns with 21st-century learning principles that use technology to create more active, engaging, and meaningful learning experiences.

Ishwahyudi et al. (2023) state that mind mapping helps optimize both sides of the brain through the use of text, images, symbols, and colors, making it easier for students to understand and remember concepts. Their findings show that mind mapping significantly improves students' conceptual understanding compared to conventional methods. Similarly, both mind mapping and story map approaches integrate visual and narrative elements to help students organize complex information in a more structured way. Just as mind mapping connects ideas visually, story maps combine location, time, and context, strengthening students' understanding of spatial and temporal relationships in history learning. These approaches support the development of historical thinking skills such as chronological, analytical, and reflective

thinking. Therefore, this study provides strong empirical support for the use of Thematic Map media as an effective and innovative strategy in history learning.

Conclusion

Based on the results of this study, the use of web-based interactive thematic map learning media has a significant effect on improving students' chronological and geospatial thinking skills in history learning. The data analysis shows that there was no significant difference in initial ability between the experimental group and the control group, indicating that both groups were at a similar level before the treatment was applied. However, after the learning process, the experimental group showed significantly higher results compared to the control group. This improvement is also supported by the N-Gain value, which falls into the medium category, indicating that the learning media used was fairly effective in improving students' learning outcomes. These findings confirm that the integration of visual and interactive media can help students understand the sequence of historical events in a systematic way and relate them to spatial contexts. As a result, learning becomes more meaningful, analytical, and contextual. However, this study has several limitations that should be considered when interpreting the results. The study was conducted with a limited sample size and only involved one level of education and specific learning material, so the results cannot be widely generalized to different contexts. In addition, this study only focused on measuring cognitive aspects through learning outcomes, without examining affective and psychomotor aspects in a comprehensive way. Therefore, future research is recommended to involve larger and more diverse samples, as well as to include measurements across different learning domains to provide a more complete understanding of the effectiveness of learning media.

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