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## DEVELOPMENT OF HISTORICAL MAP USING PADLET TO IMPROVE STUDENTS' CHRONOLOGICAL THINKING SKILLS

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**Abstract.** This research aims to develop Historical Map media to improve students' chronological thinking skills. This research uses the R&D method which consists of four stages, namely define, design, development and disseminate. The research subjects consisted of 6 experts consisting of 2 material experts, 2 media experts, and 2 language experts, 2 teachers, and 150 class X students who provided assessments related to the media being developed. The data collected was analyzed through validity, reliability, T test and N-Gain tests. The research results show that the Historical Map media obtained a validation score of 3.65. Meanwhile, the practicality score for the Historical Map media obtained a score of 4.01, which shows that the media developed can be easily implemented in history learning. The T test was obtained with a score of 0.000 which shows the influence of using Historical Map media on students' chronological thinking skills. The results of the N-Gain Test show that the use of Historical Map media on students' chronological thinking skills increased by around 71%. Therefore, it can be concluded that the development of Historical Map media to improve students' chronological thinking skills has proven to be valid, reliable, practical and effective.

**Keywords:** Historical Map; Padlet; local history; historical thinking skills

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### I. INTRODUCTION

Chronological thinking skills are one of the historical thinking skills that are very important in understanding historical events. Chronological thinking skills emphasize a series of events in time sequence (Anis et al., 2020; Nasheeda et al., 2019). Chronological thinking has the benefit of identifying the time sequence of each event, measuring calendar time, interpreting and compiling timelines, and explaining the concept of historical continuity and change (Ofianto et al., 2022; Sel & Sözer, 2020). So, in studying history, one aspect that needs to be paid attention to is chronology, namely the sequence of development of events, especially to interpret changes or sequences of historical events (Blossfeld et al., 2019; Capano, 2020; Dawson & Sykes, 2019). Chronological thinking skills encourage students to be able to recognize the chronology of

historical events, manage time dates, interpret data contained in time diagrams, and reconstruct patterns of historical events (Craig et al., 2021; Ofianto et al., 2023; Putro, 2013). Events have been classified and arranged chronologically according to the time sequence in which they occurred (Barros et al., 2019; Khair et al., 2021; Longato et al., 2020). In learning history, students are empowered to understand that every event occurs in a sequential time context. Without having chronological sensitivity it will cause difficulties in tracing event relationships in a structured manner (Kuhn et al., 2021; Liu et al., 2020; Monico et al., 2020). Therefore, the ability to think chronologically is an essential skill for students in learning history (Abbas et al., 2022; Anis et al., 2020; Lim & Lim, 2020).

The process of reconstructing the time of a historical event requires a careful and multidimensional approach (da Silva et al., 2020; Karakostis & Harvati, 2021). Steps such as

tracing historical sources, document analysis, and detailed study of historical context are the main foundations for accurately depicting past events (Argyres et al., 2019; Dobson & Ziemann, 2020; Morgan, 2022). In addition, engaging in reading various historical sources, examining archaeological evidence, and understanding contemporary narratives also plays an important role in detailing and deepening perspectives. In addition, participation in group discussions provides a new dimension in historical exploration. Through interactions with people who have different backgrounds and views, we can enrich our understanding of these times and events (Blossfeld et al., 2019; Clandinin, 2019; Rauschnabel et al., 2022). Group discussions also provide opportunities to investigate multiple viewpoints that may be missed in individual analysis, thereby supporting a more holistic and accurate reconstruction process. Thus, the combination of these methods can produce a comprehensive and in-depth understanding of the historical context of a period (Argyres et al., 2019; Oliveira et al., 2021).

In fact, based on the results of research conducted by the author, it was found that: (i) students' chronological thinking skills are still low; (ii) the media or learning resources used by the teacher are inappropriate in developing students' chronological thinking skills; (iii) the maps usually used by teachers are geographic maps; and (iv) lack of relevance of history learning to everyday life. Based on these problems, the researcher wants to provide a solution by developing historical learning media for Historical Maps based on local history in West Sumatra. A simple map is a visual representation of an area, where information is conveyed through symbols (Hogräfer et al., 2020; Roth, 2021; Taylor et al., 2019). Maps are used to present data regarding regional boundaries, public facilities, building structures, land use and road systems. In other words, Historical map media has an important role in history learning because it is able to provide a visual interpretation of past realities (Graham et al., 2013; Harley et al., 2020; Slocum et al., 2022). Although any map, as an interpretation of current reality, can be considered historical because it has not evolved over time, the term "historical map" generally refers to maps that are considered outdated for current use, but have great value in showing the past (Chiang et al., 2019; Hvizdák et al., 2023; Schlegel, 2019). Then, historical sources of information are very important because they are contemporary with the reality they describe. Historical maps, as interpretations of realities that cannot be reconstructed, show interpretations of past realities that we cannot experience again. Maps provide images of things we cannot see, and historical maps add a fourth dimension to this concept by showing features we cannot see at a time that we cannot experience (Kokalj & Somrak, 2019; Szeliński & Shum, 1997). These characteristics make historical maps very important in understanding the past. As stated Reyes (2019), historical maps are usually studied from two points of view. First, in the context of the history of cartography, namely how significant the map was in demonstrating printing methods, techniques and skills. Second, in the

context of the content itself, namely the features displayed by the map. However, often overlooked is the social context of maps as a product of the society and era in which they were produced.

Several studies on historical map media, such as those conducted by Varvara et al. (2019), who emphasized that the benefits of story maps in history learning are very significant. Story maps not only function as an interactive tool for science and spatial data communication, but also have the potential to be an effective tool in the history learning process. Other research conducted by Idris (2020) also shows similar results, namely that the use of historical map media can improve student learning outcomes. Furthermore, Kurniawan's (2019) research noted that historical map media can increase students' independence in understanding and mastering history learning material. However, there has been no research that focuses on improving chronological thinking skills. So research into developing historical map learning media based on local history to improve chronological thinking skills is important.

## II. METHODS

This research uses research development (R&D) methods. The stages of this method are divided into four stages, namely define, design, development, and disseminate. At the define stage, researchers analyzed and identified the history learning process in schools. Data collection techniques at this stage are carried out through interviews and observation. The results of this stage will be the basis for designing learning media. The second stage, namely design, includes creating a predetermined media design which is developed in accordance with the goals and competencies to be achieved by students, as well as the limitations of existing local historical sources. The third stage, namely development, includes media testing. Media trials are carried out by providing assessments from experts and product trials in small groups. The expert assessment consists of 2 material experts, 2 media experts, and 2 linguists who are experts in each field. The expert's assessment aims to find out whether the media being developed is valid or not. Input and assessment from experts will be taken into consideration in improving the media to make it better. Furthermore, product trials were carried out in small groups with 2 history subject teachers and 50 students in Bukittinggi City to assess the practicality of the media being developed. Media validity criteria follow the following table.

TABLE 1  
 THE FEASIBILITY CRITERIA OF THE DEVELOPED INSTRUMENT

Score	Description
≥ 4.00	Very Feasible
3.00 – 3.99	Feasible
2.00 – 2.99	Less Feasible
1.00 – 1.99	Not Feasible

In the final stage, disseminate, where the media that has been developed and has gone through a validity and practicality process is implemented to a larger group. The

purpose of this implementation is to assess how effective the media that has been developed is in improving students' chronological thinking skills. A total of 150 students were involved in evaluating the media that had been created. The media influence test was carried out using a t test with an independent sample t-test and to find out how much media contributed to students' chronological thinking skills, it was evaluated using the N-Gain test. The assumption in the evaluation results is that if the score obtained is in the medium or high range, the media developed has been successfully used to improve students' chronological thinking skills. Conversely, if the score obtained is in the low range, it indicates that the media is not effective in improving chronological thinking skills. The N-Gain criteria uses Hake's (1999) formula to determine the impact of historical map media on students' chronological thinking skills which can be seen in the following table.

TABLE 2.  
 CRITERIA FOR N-GAIN SCORE

Intervals	Criteria
$g \geq 0.7$	High
$0.3 \leq g < 0.7$	Middle
$g < 0.3$	Low

Learning media such as PowerPoint will be used in control classes. Meanwhile, in the experimental class, students will be taught using historical maps as media. The chronological thinking skills test was carried out twice, namely pretest and posttest. The pretest aims to evaluate students' initial abilities before receiving treatment. The posttest was carried out in the experimental class after following the treatment using historical map media. The test design can be seen in the following table.

TABLE 3.  
 DESIGN OF THE USE PRIMARY SOURCE EVIDENCE SKILLS TEST

Group	Pretest	Process	Posttest
Controls	<b>Chronological thinking skills</b>	Teachers use power points in the learning process	<b>Chronological thinking skills</b>
Experiment	<b>Chronological thinking skills</b>	Teachers use Historical Maps in the learning process	<b>Chronological thinking skills</b>

Testing students' chronological thinking skills is carried out by designing essay questions that include predetermined chronological thinking indicators. There are three main indicators that will be measured through this test, namely: i) identifying the time sequence of historical events; ii) recognize patterns of historical events; iii) interpret data by presenting it in the form of a logical time sequence.

To find out whether the questions that will be tested to assess students' chronological thinking abilities are valid and reliable, a validity and reliability test of the instrument was carried out which can be seen in the following table.

TABLE 4.  
 RESULTS OF ITEM VALIDITY

No	The items of chronological thinking	Sig value. (2-tailed)
1.	identify the time sequence of historical events	0.702
2.	recognize patterns of historical events	0.714
3.	interpret data by presenting it in the form of a logical time sequence	0.689

Table 4 shows that the three items have a significance value greater than 0.05. This shows that the three questions are valid to use as instruments to assess students' chronological thinking abilities. Apart from that, the results of the instrument reliability test are presented in the following table.

Table . Test results for instrument reliability

Cronbach's Alpha	N of Items
,734	50

The results of Cronbach's Alpha show that the instrument's reliability value is  $0.734 > 0.05$ . Thus it can be concluded that the 3 question items are reliable for assessing students' chronological thinking skills.

In this research, researchers used qualitative and quantitative data analysis. A qualitative approach is used to determine the impact of the media being developed and collect input from experts regarding the quality of the media. Meanwhile, a quantitative approach was used to determine the effect of using historical map media on students' chronological thinking skills using the Independent Sample T-test with the SPSS version 25.0 program.

### III. RESULTS

#### A. Define Stage

##### 1) Interview With Tecaer

History subject teachers were asked about the media used to support the implementation of history learning. The following are the results of interviews conducted with teachers.

*"I often use PowerPoint as the main medium for delivering material. This allows me to present information in a structured manner. I also use video or photo media occasionally. This depends on the material I am teaching. For example, when we discuss certain historical events, sometimes I insert documentary videos or show photos to provide a more vivid picture..... I always consider learning materials and time efficiency. For example, if I am teaching a topic that is better conveyed with graphs or diagrams, I will use PowerPoint. However, if I want to highlight a particular aspect of history in more depth, I will choose video or photo media."*

The results of the interview show that the teacher often uses PowerPoint as the main media for presenting history learning material. This media allows it to convey information in a structured manner. Apart from PowerPoint, he also sometimes uses video or photo media, depending on the material being taught. For example, when discussing certain historical events, he includes documentary videos or displays photographs to provide a more vivid picture. Decisions in choosing media are based on considerations of learning material and time efficiency. If the topic being taught is more suitable to be conveyed with graphs or diagrams, he will use PowerPoint. However, if he wants to highlight certain aspects of history in more depth, he chooses video or photo media. This approach reflects the teacher's awareness of the diversity of media which can improve the quality and attractiveness of history learning in accordance with learning needs and objectives.

Furthermore, the researcher asked questions regarding the history learning process and the influence of the media used. The following are the results of interviews conducted with teachers.

*“So far, my experience has been quite positive. Students are usually more engaged when media is used variedly. PowerPoints help them understand basic information, while videos or photos can provide a greater emotional dimension to historical material. Students also feel more interested and involved in learning.”*

The interview results show that teachers' experiences in using media in history learning are generally positive. The use of media, especially PowerPoint, helps students understand basic information with a structured presentation. Furthermore, the use of varied media such as videos or photos brings a significant emotional dimension to historical material. With this approach, students tend to be more interested and actively involved in the history learning process.

Next, the researcher asked questions regarding the relevance of the media that had been used to improving students' chronological thinking skills. The following are the results of interviews conducted with teachers.

*“Honestly, after considering this question, I realized that the media I used did not fully support the development of students' chronological thinking skills. In its use, I focus more on understanding facts and concepts than on helping students build strong chronological skills. I see several obstacles that I face, such as students still having difficulty describing historical events in the correct chronological order, and often they have difficulty connecting these events with a wider historical context.”*

In the interview results, the use of media in history learning does not fully support the development of students' chronological thinking skills. Teachers identified several

obstacles, including students' difficulty in describing historical events in correct chronological order, and their difficulty in connecting these events to the broader historical context.

## 2) Curriculum Analysis

In developing historical map learning media to improve students' chronological thinking skills, researchers conducted an analysis of the learning curriculum currently in effect in senior high schools in Indonesia, namely the independent curriculum.

TABLE 6.  
 ELEMENTS DEVELOPED IN HISTORY LEARNING BASED ON THE  
 INDEPENDENT CURRICULUM

Class X	Class XI	Class XII
Understand historical events diachronically (chronologically) and synchronically.	<ul style="list-style-type: none"> <li>Develop diachronic concepts (chronology) and synchronic to describe historical events.</li> <li>Evaluate historical events diachronically (chronologically) which focuses on processes and/or synchronicity emphasize on structure.</li> <li>Analyze and evaluate historical events from development patterns.</li> </ul>	<ul style="list-style-type: none"> <li>Develop diachronic (chronology) and/or synchronic concepts to analyze historical events.</li> <li>Evaluate historical events diachronically (chronologically) which focuses on processes and/or synchronicity emphasize on structure.</li> <li>Analyze and evaluate historical events from development patterns.</li> </ul>

Based on the information contained in Table 5 above, it can be concluded that in the context of learning history, students are expected to develop two main skills, namely historical conceptual skills and historical thinking skills. These two skills are considered an important basis for students' ability to understand historical material. At grade X level, the initial step is a chronological understanding of historical events, where students need to understand the time sequence of relevant events. To achieve this understanding, students need to have access to materials that can connect these events based on time sequence. When they reach the class XI level, students' skills are enhanced by the ability to describe historical events in more depth. Students are expected to be able to convey a series of historical events sequentially and explain the processes that occurred during each event. Apart from that, it is also hoped that students

will be able to identify historical patterns that may emerge in these events. At the class XII level, students are expected to have the ability to analyze historical events in more depth. Students are expected to be able to evaluate these events chronologically and identify more complex patterns in these events.

**B. Design Stage**

In order to create valid, reliable and practical Historical Map learning media, this research developed a media design. This design includes selecting the material to be developed and preparing a media draft. The material developed is specifically related to the local history of West Sumatra. The selection of materials is based on three principles for developing teaching materials, namely relevance, consistency and adequacy. It is hoped that the material developed will have a relevant relationship with the competencies to be obtained. Several competency indicators to be developed should be reflected in the learning material, and the material must also be sufficient to increase student potential in accordance with the goals to be achieved. Based on the criteria above, the historical map media framework for improving students' chronological thinking skills is presented in the following table.

TABLE 7.  
 HISTORICAL MAP LEARNING MEDIA FRAMEWORK

History Learning Objectives	Competencies to be developed	Indicators	Material
Develop historical thinking skills	Skills in using Chronological Thinkig Skills	<ul style="list-style-type: none"> <li>identify the time sequence of historical events</li> <li>recognize patterns of historical events</li> <li>interpret data by presenting it in the form of a logical time sequence</li> </ul>	Local History of Minangkabau during the Colonial Period




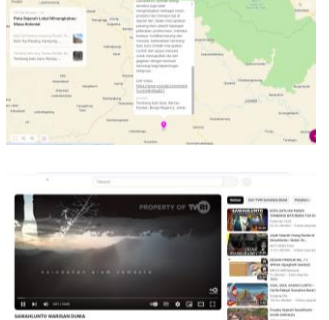
Based on table 6 above, local Minangkabau history material during the colonialization period has been determined as material that will be developed in historical map learning media. The determination of material is based on the completeness of sources available in several places in West Sumatra, both written sources, people and object sources so that it is very relevant and consistent with the competencies to be developed.

The next stage in developing learning media is determining the tools or software that will be used. Researchers use the Padlet website as a tool in developing historical map media based on several considerations where the Padlet website is easy to operate, free, flexible, and does not require downloading or installing applications. In addition, the Padlet website allows researchers to include

several other relevant historical source components into historical map media.

Below is a draft of local history map learning media.

TABLE 8.  
 DRAFT OF LOCAL HISTORY MAP LEARNING MEDIA

No.	Part	Information
1.		Initial Media Display
2.		A brief description
3.		In-depth explanation
4.		In-depth explanation video link

**C. Development Stage**

**1) Expert Validity Test**

In this phase, researchers involved six experts who have expertise in various fields such as historical materials, media and language. The selection of expert team members is based on their competency and expertise in the field of Indonesian history material, language skills, mastery of learning media in history subjects. The main aim of validation by this expert team is to evaluate the suitability of the learning media products that have been developed in improving students' chronological thinking skills. The results of this validation will be a very significant basis in the further development process, ensuring that the media is in accordance with the learning objectives to be achieved. The results of the evaluation by this expert team will be described in the following table.

TABLE 9.  
 EXPERT VALIDATION RESULTS

Aspect	Score	Information
Material	4.12	Very Valid
Media	3.98	Valid
Language	4.01	Very Valid
<b>Average</b>	<b>4.03</b>	<b>Very Valid</b>

The results of the validation test on the historical map media that has been developed show a score of 4.03, which is categorized as "Very Valid." This average score provides a strong indication that this historical map media meets the validity standards required to be used in improving students' chronological thinking skills in understanding historical events. This confirms that the use of historical map media can make a positive contribution to students' history learning.

### 2) Practicality Test

The Practicality Test was carried out to measure the extent to which this media can be practically applied in actual history learning situations. The practical test process involved two experienced teachers in the field of history and involved the participation of 50 students from high schools in Bukittinggi City. The selection of teachers and students as practical test subjects was carried out carefully, ensuring that they were a comparable representation of the various high schools in Padang City. Therefore, the results obtained from this practical test can provide a more comprehensive picture of the experience of using this learning media in various school contexts. The overall results and conclusions of this practical test will be expressed in the table provided.

TABLE 10.  
 PRACTICALITY TEST RESULTS BY TEACHERS AND STUDENTS

No.	Aspect	Score	Criteria
1.	Content	4.09	Very good
2.	Practicality	4.17	Very good
3.	Language	4.11	Very good
4.	Design	4.23	Very good
	<b>Average</b>	<b>4.15</b>	<b>Very good</b>

Through analysis of the data in the table above, it can be clearly seen that the average practicality score given by teachers and students is 4.15. This score is categorized as "very good," reflecting a positive assessment of the historical map media that has been developed. Thus, the conclusion that can be drawn is that historical map media is considered very practical and has high quality in supporting students' learning of chronological thinking skills. This confirms that the use of this media is the right choice to increase students' understanding of historical events with an interactive and practical approach.

### D. Disseminate Stage

This research used a T test to assess the effectiveness of the historical map media that had been developed in improving students' chronological thinking skills. This t test data was obtained through media testing which involved the participation of 150 students as research subjects. The basis for decision making in the t test, namely if the Sig. < 0.05, then historical map media has an influence on students' chronological thinking skills. conversely, if the Sig value. > 0.05, then there is no effect of using historical map media on students' chronological thinking skills. The media effectiveness testing process consists of two testing stages, namely pre-test before media use and post-test after media

use, which were carried out on the same respondents. The results of this t test will be presented in the attached table below.

TABLE 11.  
 T TEST RESULTS

t-Test Results	Significance
<i>of the Independent Sample Test</i>	0,000

From the table above, it can be seen that the t test significance value is 0.000, less than the significance threshold value of 0.05. This shows that there is a significant influence from the use of historical map media on improving students' chronological thinking skills.

Next, to further understand the extent to which students' chronological thinking skills have improved, an N-Gain test was carried out. The results of the N-Gain test will be presented in the table below.

TABLE 13.  
 N-GAIN TEST RESULTS

No	Indicators	N-gain Score	Categories
1	identify the time sequence of historical events	0.71	High
2	recognize patterns of historical events	0.74	High
3	interpret data by presenting it in the form of a logical time sequence	0.68	Medium
	<b>Mean</b>	<b>0.71</b>	<b>High</b>

Based on the analysis of the data recorded in the table above, it can be concluded that in total, the use of historical map learning media in the history learning process has succeeded in increasing students' chronological thinking skills by 0.71 or the equivalent of an increase of around 71%. Through the results of the N-Gain test that has been carried out, it can be concluded that the application of historical map learning media has proven to be very successful in improving students' chronological thinking skills. The use of historical map media contributes to improving students' chronological thinking skills. This indicates that this media is not only relevant in the context of history learning, but is also able to achieve a significant increase in students' understanding of historical events with a chronological thinking approach.

In addition, the findings from this research provide the conclusion that the learning media development that has been carried out shows strong validity, a high level of reliability, good practicality, and proven effectiveness in the context of history learning to improve students' chronological thinking skills. These results confirm that the use of historical map learning media is the right step and has a positive impact on the educational process, making a significant contribution to increasing students' understanding of historical events through a chronological thinking approach.

#### IV. DISCUSSION

The results of the research show that the local history map learning media developed is valid, reliable and practical for use in history learning. Students' chronological thinking skills increased by 71% using historical map media. This shows that historical eras are effective for improving students' chronological thinking skills. The results of this research consistently support the findings of previous research, especially research conducted by Varvara et al. (2019), who emphasized that the benefits of story maps in history learning are very significant. Story maps not only function as an interactive tool for science and spatial data communication, but also have the potential to be an effective tool in the history learning process. Other research conducted by Idris (2019) also shows similar results, namely that the use of historical map media can improve student learning outcomes. Furthermore, Kurniawan's (2019) research noted that historical map media can increase students' independence in understanding and mastering history learning material. Thus, the consistency of these findings provides additional support for the importance of story maps as an effective learning tool and has a positive impact on learning outcomes and student independence in the context of history learning.

Implementing historical maps in the learning process offers a different and effective approach in understanding students about past events and the geographical conditions that surround them. Through historical maps, teachers have the opportunity to provide in-depth explanations about geography at a certain time. This map not only presents information about geographic locations, but also illustrates the relationship between historical events and geographic conditions at that time. Comparison with the use of conventional geographic maps shows that the historical map approach makes it easier for students to interpret and understand the geographic context of the past. This is because historical maps are specifically designed to show the location of historical data and information, creating a clearer link between historical events and their geographic space. Apart from being a tool to understand geographic conditions, historical maps also have the aim of highlighting locations where certain historical or historical events occurred. This helps students visualize history more concretely and in relation to their geographical area. By mapping these events, students can more easily place and connect various historical elements in a spatial context. Historical maps also play an important role in learning national history. In this context, historical maps are not only a visual aid, but also a teaching aid that supports the development of students' skills in three learning domains: cognitive, affective and psychomotor. Students are invited to appreciate the relationship between historical heritage and important events in various regions of Indonesia. The use of historical maps can create a more holistic learning experience, allowing students to be more engaged in understanding the historical context. Through mapping historical events, students can capture the diversity of culture, geography and environmental influences in the dynamics of Indonesia's historical journey. Thus, the

implementation of historical maps becomes a valuable strategy in conveying historical material in a comprehensive and memorable manner. The importance of using historical maps is increasingly visible in efforts to develop students' spatial understanding. Historical maps provide a spatial dimension to historical facts and events, allowing students to reflect on the geographic impact of social, political, and economic change. This helps students develop spatial thinking skills, which is an important aspect of historical literacy. Historical maps also provide the possibility to align history learning with developments in information technology. By utilizing digital technology, historical maps can be presented interactively, allowing students to be more actively involved in the learning process. By directly manipulating maps, students can better understand the concepts of space and time in a historical context. Apart from being a teaching aid, the development of historical maps involves the selection of relevant and accurate material. In compiling a historical map, teachers need to select historical events and data that have significance for students' understanding. This requires research and selecting appropriate historical resources to create informative and meaningful maps.

#### V. CONCLUSIONS

The results of the t test show that the use of historical map media significantly influences students' chronological thinking skills. The N-Gain test shows an increase of around 71%, which is high. The historical map media developed is valid, reliable and practical for use in history learning. Historical map media has the advantage of displaying historical sources presented chronologically. Historical maps provide the possibility to align history learning with developments in information technology. By utilizing digital technology, historical maps can be presented interactively, allowing students to be more actively involved in the learning process. By directly manipulating maps, students can better understand the concepts of space and time in a historical context. In addition to being a teaching aid, developing historical maps involves the selection of relevant and accurate materials, requiring research and selecting appropriate historical resources to create informative and meaningful maps.

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