Development of Digital Flipbook-based History Learning Media to Overcome High School Students' Learning Loss

Hafnita Sari Dewi Lubis[a,1,*], Yushar Tanjung[a,2], M. Ihsan Syahaf Nasution[a,3], Ahmad Arif Budiman Nasution[b,4], Amayra Tannoubi[c,1]

[a]*Universitas Negeri Medan, Jl. William Iskandar Ps. V, Kenangan Baru, Deli Serdang 20221 Indonesia*
[b]*Universitas Jember, Jl. Kalimantan Tegalboto No.37, Jember, 68121, Indonesia*
[c]*University of Jendouba, Av. de l'UMA, Jendouba 8189, Tunisia*
[1]*hafnitasari@unimed.ac.id*;* [2]*tanjungyushar@gmail.com;* [3]*Ihsansyahafnasution@unimed.ac.id,* [4]*budimanarif371@gmail.com*
** corresponding author*

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ABSTRACT

This research aims to develop interactive learning media, especially digital flipbooks, to address the issue of learning loss in history education. The research method involves needs analysis, design creation, media development, and testing and evaluating its impact on student understanding. For the research subjects, 12 expert validators participated, with 3 experts for each aspect. Expert validators were selected based on their expertise in learning, historical materials, media, and language. Apart from that, this research also involved 50 Pertiwi Medan Private High School students who were randomly selected to assess the prepared media. Data was collected by interviews and distributing questionnaires, while the data analysis involved comparing test results using paired t-tests. The results of the study demonstrate the efficacy of digital flipbook media in mitigating learning loss. The t-test analysis reveals statistically significant differences between pre- and post-intervention scores with a significance value of 0.000. In conclusion, the findings suggest that the digitized flipbook learning material has considerable potential to address learning deficits in history education and positively impact students' academic performance.

I. Introduction

History courses are essential in the high school education curriculum, as they offer immense value for students (Cahyadi et al., 2022; Fadli et al., 2021; Haniah et al., 2020; Turan, 2020). Aside from providing an understanding of past events, history also imparts crucial insights into the values, conflict, change, and evolution of society and culture(Challenor & Ma, 2019; Fadli et al., 2021; Feinman & Neitzel, 2020; Purwanto, 2022). Learning history helps students develop analytical, critical, and problem-solving abilities, which are important skills in everyday life and the world of work (Bunari et al., 2023; Martinez Hita & Gomez Carrasco, 2017; Ningsih & Abidin, 2022; Van Drie & Van Boxtel, 2008). History broadens students' understanding of different cultures, civilizations, and global perspectives, allowing for better comprehension and appreciation of diversity (Corrales-Serrano et al., 2019; Gonzalez Vargas et al., 2020). In addition to these benefits, the history course also offers valuable, relevant local and national historical context, which helps students understand the identity and history of their own nation. Therefore, history education offers an excellent opportunity to enhance student's knowledge and skills for their personal and academic growth(Gestsdóttir et al., 2018; Hardy & Iwatani, 2021; Mohidat, 2019).

Recently, a crucial challenge has arisen in the form of a decline in students' knowledge and understanding, commonly referred to as learning loss (Aldosemani & Al Khateeb, 2022; Donnelly & Patrinos, 2022; Harmey & Moss, 2023; Skar et al., 2021; Zhao, 2022). Learning loss occurs due to curriculum changes, less interactive teaching methods, and a lack of supporting resources, which reduce or even deprive students of interest in learning (Harmey & Moss, 2023; Zhao, 2022). In history learning, this learning loss hurts students' understanding of historical material and their ability to respond to contemporary issues (Aldosemani & Al Khateeb, 2022). Further, the shift to distance learning, brought about by the COVID-19 pandemic, has caused changes in teaching methods, which worsen the situation, contributing to the loss of direct interaction between students and instructors and limited access to learning support resources. The absence of current teaching materials, traditional pedagogical

approaches, and repetitive instructional media also contribute to deficits in historical learning (Harmey & Moss, 2023; Zhao, 2022).

The occurrence of the learning loss phenomenon has also been reported at Pertiwi Medan Private High School. The school faces multiple issues that exacerbate learning loss in history learning. One of the central issues is the lack of diversification of learning media. Teachers here solely rely on conventional textbooks even though their students have different learning styles. This approach adversely affects their ability to comprehend and contribute to the learning process. Variations in media types, such as videos, images, or audio resources, can assist students with different learning styles. Apart from that, low student participation in class and lack of interaction also contribute to a list of factors that cause learning loss in history teaching. This can hinder students' understanding of learning material as they miss the opportunity to discuss and question difficult material.

Following those issues, it is important to overcome learning loss in history courses with strategic and effective solutions, such as using various innovative strategies, methods, and learning media. Utilizing technology and online resources as learning media is a viable solution for teachers to mitigate the learning loss in history learning (Hasudungan & Ningsih, 2022; J. Singh et al., 2021). The use of documentary videos and interactive software also enables more interesting and relevant learning. Besides, the adoption of interactive learning media can effectively address the issue of learning loss, particularly during the ongoing global pandemic. This material mixes interactive components like games, simulations, and interactive exercises with multimedia components, such as audio, video, and pictures (Saripudin et al., 2022; Shafawi & Hassan, 2018; Untari et al., 2020). Students may retain their interest in learning through the in-depth and interactive learning facilitated by this method. More significantly, students may implement self-directed learning at their own speed using customized interactive learning materials. This aids pupils who might have experienced learning difficulties during the pandemic due to frequent interruptions during the learning process. Through the use of interactive learning media, students may access a broader range of engaging learning resources, ultimately leading to a more successful recovery from learning loss (Marianto, 2019; Nurtanto et al., 2020, 2021; Sahronih et al., 2020). An electronic flipbook is one of the interactive learning instruments.

A digital flipbook is an electronic version of a book featured with interactively flipped pages using a digital device (Asrizal et al., 2022; Roemintoyo & Budiarto, 2021; Sulistianingsih & Annisa, 2019). Digital flipbooks enable instructors to improve the learning experience by bringing text, pictures, music, and video together on a handy platform. As a consequence, educators have the ability to provide students with more captivating and dynamic historical data (Evenddy et al., 2021; Solikhatun & Widihastrini, 2018). Students can also interact with the historical material more interactively by clicking on images or videos related to the topic being discussed. This allows for more interesting learning that enhances students' understanding of historical events (Saroinsong et al., 2022; Susanto et al., 2022). At Pertiwi Medan Senior High School, teachers can enhance their students' comprehension and minimize learning loss by incorporating digital flipbook technology into their instructional materials, resulting in more engaging and relevant historical information.

Research on the utilization of digital Flipbook-based learning resources has been carried out widely. For instance, Fortune and Suranto (2023) have reported the effect of Flipbook Maker Media on the learning outcomes of eleventh-grade high school students in history subjects. The results of the research show that the use of flipbook-maker media improves student learning outcomes. Meanwhile, Erna et al. (2021) developed an e-worksheet using Kvisoft flipbook maker software to improve teachers' critical thinking abilities. The results of the research revealed that teachers' critical thinking skills have been successfully improved through flipbook maker-based e-worksheets. Firdaus et al. (2023) also researched flipbook gamification in mathematics learning to increase student collaboration in learning, reporting a significant increase in student collaboration in learning after using gamification flipbooks. However, those studies do not specifically focus on addressing the issue of learning loss in history courses, thereby underscoring the significance of our research.

Based on the relevant problems and research, this research aims to develop Flipbook Digital learning media as an innovative tool to overcome student learning loss in history courses at Pertiwi Medan Private High School, Indonesia. The study's objectives include designing and constructing a Digital Flipbook to serve as an educational tool for history coursework, enhancing students' grasp of historical concepts. Second, the purpose of this study is to assess the effectiveness of Digital Flipbooks in enhancing student comprehension and ameliorating knowledge retention deficits in historical education.

II. Method

A. Research Design

The development research model proposed by Hannafin and Rieber (1989) was selected for designing the digital flipbook media development in this research. The development model comprised three phases, namely need assessment, design, and development or implementation. In this model, assessments and improvements were carried out at each phase. The detail of Hannafin and Rieber's (1989) development model is illustrated in Figure 1.

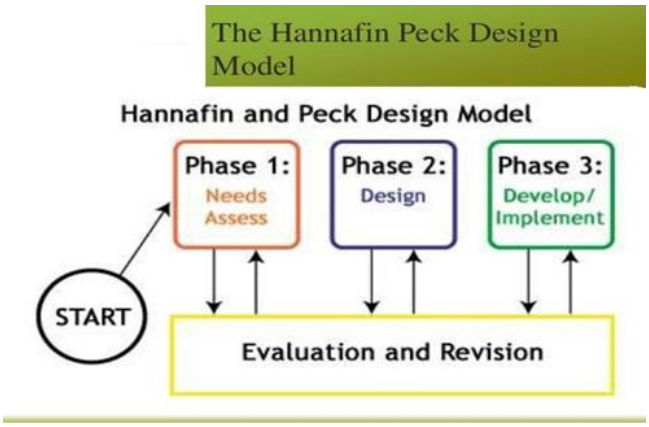

Fig. 1. Hannafin and Rieber (1989) development model

During the needs analysis phase, evaluations were conducted to determine the media utilized by history teachers and the media required for students' effective learning. The outcomes of this initial analysis were utilized as a standard in devising digital flipbook instructional materials to ameliorate learning deficiencies among students in history education. In the following design phase, a storyboard document was prepared following the sequence of teaching activities determined by the lesson requirements and learning media objectives as obtained in the requirements analysis phase. The visual design of history lesson infographics was adjusted to the storyboard, particularly on the appearance and content of the material. In this stage, the infographic design presented in the digital Flipbook learning media, the design of the appearance of teaching materials, the selection and arrangement of images, the size of the text, as well as the explain ability of the content were determined. The final stage was development, in which Hannafin and Peck described that this phase encompassed generating flow charts, testing, as well as preparing the formative and summative assessments. The storyboard served as the foundation for creating flow diagrams that facilitate the development of visual infographics. To appraise the resultant media, expert validation tests and media trials were conducted. The expert validation test comprised a team of specialists in their respective fields. Four expert teams were engaged in evaluating the media produced. The experts were proficient in the areas of learning, materials, media, and language.

In the following stage, the product trial divided into 3 stages was performed, with the first trial involving 10 students, the second stage involving 30 students, and the third stage involving 50 students. Trials were carried out several times to identify and address any problems or weaknesses that arose during the initial use. This process allows for necessary improvements and changes to be made, ultimately enhancing the quality of the learning materials. Repeated trials assist researchers in gathering complete and diversified data. Involving diverse groups of students with various levels of comprehension, studying patterns, and backgrounds enables the accumulation of comprehensive knowledge about the efficiency of learning media. Consequently, it enables the customization of more responsive learning tools for the needs of diverse students. Table 1 presents the media validity criteria being used as a reference in this development research.

Table 1. Media Assessment Criteria (Akbar et al., 2016)

Percentage	Information	Information
25,00 - 40,00	Invalid	It cannot be used
41,00 - 55,00	Less Valid	It cannot be used
56,00 - 70,00	Fairly Valid	It may be used after major revisions
71,00 - 85,00	Valid	It may be used after minor revision
86,00 - 100,00	Very valid	Very good to use

B. Research Subject

The research subjects in this study consisted of 12 expert validators, with 3 experts assigned for each aspect. Expert validators were selected based on their expertise in the fields of learning, historical materials, media, and language. Additionally, 50 students from Pertiwi Medan Private High School students were randomly selected to assess the media. Research subjects were chosen randomly for a number of reasons. First, random methods reduce bias in subject selection, thereby representing a more diverse sample and better defining the population. Second, it helps ensure fairness in participation opportunities for all individuals in the population. Thus, randomly selected research subjects provide more general and reliable results applicable to a larger population. Additionally, it also helps avoid research bias that arises when subjects are selected intentionally, thereby maintaining the integrity and validity of the research.

C. Data Collection and Data Analysis Techniques

Research data was collected through literature study, observation, and questionnaire sheets. A literature study was carried out to select material to be developed in digital flipbook media. The observation was carried out as preliminary research to identify the learning media used by teachers in history courses, while the questionnaire surveys were utilized to accumulate expert validation test data and conduct media trials. A questionnaire sheet was crafted to fulfill the research's objectives and requirements. The outline of the questionnaire adopted in this research is presented in Table 2.

Table 2. Indicator for Questionnaire

Aspect	Indicator	Scale
Learning	1. Conformity of content with the history curriculum. 2. The ability of flipbooks to facilitate active learning. 3. The ability of flipbooks to arouse students' interest in learning. 4. Interactivity that promotes critical thinking.	

Aspect	Indicator	Scale
	5. Ease of access and navigation for teachers and students.	
Material	1. The quality of the historical material presented.	
	2. The relevance of the material to the latest historical developments.	
	3. Availability of various types of learning resources (text, images, audio, video).	
	4. Linkage of material to student needs.	
	5. The ability of the material to facilitate deep understanding.	
Media	1. Quality of visual appearance and aesthetics of digital flipbooks.	
	2. Interactive functionality and learning features.	
	3. Availability of clear instructions and user guides.	
	4. Platform compatibility with various devices (computers, tablets, smartphones).	
	5. The media's ability to enable student collaboration.	
Language	1. Accuracy and clarity of the language used.	
	2. Language skills to facilitate student understanding.	
	3. Readability and fluency of historical narrative.	
	4. Use of languages that support multilingual learning.	
	5. Suitability of language to students' age level.	

Descriptive analysis was utilized to analyze the development of the media, while quantitative data was collected through questionnaires administered by both the validator team and students. Standard data was determined using normality and homogeneity tests to ensure sample homogeneity. The effectiveness of the media to counteract learning loss was assessed using t-test analysis.

III. Results and Discussion

A. Need Analysis

1) Interview results

To collect data about the current usage of learning media and other related problems, interviews were conducted with history subject teachers at Pertiwi Private High School. The example of the interview excerpt is presented in the following.

Question: What type of learning media do you use most often in your class? How does the learning media affect students' engagement level and ability to understand the material?

Answer: The learning media I use most often in class is slide-based presentations. However, I must admit that this media has not been completely effective in increasing student involvement and understanding the material well. Slide presentations often focus only on static information and lack interaction, which can make students lose interest. Apart from that, some students also have difficulty following the rhythm of the presentation, especially when the material is delivered quickly.

The interview results reveal slide presentations as the most frequently used learning medium, but their efficacy on student learning still needs to be improved. Slide presentations focus merely on static information and lack interactivity, thereby lowering students' engagement and diminishing their interest. Moreover, students face challenges in keeping up with the pace of the presentation, particularly when the material is presented swiftly, which can hinder comprehension. Thus, to enhance the effectiveness of educational media in the classroom, it is necessary to incorporate interactive elements that are customized to the specific needs of each student.

In addition, the teachers' responses concerning the level of media interactivity to encourage students to actively participate in learning are shown in the following.

Question: How do you assess the level of interactivity of the learning media that you use? Does the media encourage students to actively participate in learning?

Answer: I feel that the learning media that I currently use has an inadequate level of interactivity. This media is not enough to encourage students to actively participate in learning. I observed that most students were more passive and less engaged when using this medium. This could be one of the causes of the student's learning loss. When students present lower participation, they tend not to be fully involved in the process of understanding the material.

The results of this interview reflect fundamental concerns regarding the effectiveness of the learning media being used in the current teaching process. Teachers identified a low level of interactivity in this media, which seemed to be one of the causes of students' learning loss. The implications of this observation are of utmost importance, especially since student involvement in the learning process is a crucial aspect of material comprehension and retention.

Finally, we inquired about teachers' efforts to develop other interactive learning media to overcome learning loss in history learning and the teachers' response is shown in the following.

Question: What do you think about the capacity of digital flipbook learning media in history learning to overcome learning loss, increase student engagement, and strengthen understanding of historical material?

Answer: Digital flipbook learning materials, in my opinion, may be a fascinating and helpful way to combat learning loss in history classes. Digital flipbooks, with their interactive capabilities and visually appealing content, have the potential to boost student interest in studying history by making the subject matter more engaging and comprehensible. Integrating text, pictures, and multimedia in a user-friendly style helps enhance students' comprehension of historical content. With the

rising use of technology in the classroom today, digital flipbooks can be a valuable tool for improving students' historical comprehension and helping them recover from learning loss.

The interview's findings indicate that slide-based presentations, the most widely used learning medium in recent teaching settings, do not fully foster student engagement and understanding of the subject matter. This medium can lead to learning loss since it frequently concentrates on static content with a lack of interaction. Teachers are aware that interactive learning materials as essential to promote active student engagement. Digital flipbook learning material is regarded as an engaging and useful substitute, particularly for history courses. Digital flipbooks with interactive features and captivating images can stimulate students' interest, improve their comprehension of the subject matter, and boost engagement.

2) Questionnaire Results

During the need analysis phase, questionnaires were also distributed to evaluate the amount of learning loss experienced by students during the history course and the necessity of creating digital flipbook learning resources. The results of the analysis of the questionnaire data are summarized in Table 3.

Table 3. Analysis Results on Questionnaire Data

No.	Statement	Strongly agree	Agree	Neutral	Don't agree	Strongly Disagree
1	I find it difficult to understand historical concepts.	70	25	5		
2	My performance in history subjects has decreased in recent times.	20	80			
3	I feel less motivated to study history.	40	50	10		
4	The learning resources I use are not effective.	30	50	15	5	
5	I have difficulty remembering dates, events, and historical figures.	40	45	5	10	
6	I feel that I have lost interest in studying history.	20	70	10		
7	I have difficulty in answering history test questions.	60	30	5	5	
8	I need more interesting learning resources.	70	30			
9	I believe that the use of technology can help history learning.	65	35			
10	I think that the development of digital flipbooks can help me in studying history.	70	30			
11	I prefer using digital media compared to regular textbooks.	80	20			
12	I feel digital media can make history learning more interesting.	80	20			
13	I would like to have access to history learning materials that can be accessed online.	90	10			
14	I believe that the use of technology in learning can improve my understanding of history.	70	20	10		
15	I believe that the development of digital flipbooks can help me overcome learning loss in history subjects.	90	10			

Table 3 displays the participants' learning loss experience during the history classes, along with their viewpoint on the need to create digital learning resources like flipbooks. First, the findings clearly indicate that pupils are not achieving the expected level of learning in their history classes. The majority of respondents (70%) indicated agreement with the statement "I find it difficult to understand historical concepts" and (60%) with "I have difficulty answering history exam questions." 80% of students agreed with the statement, "My achievement in history subjects has decreased in recent times," which provides further evidence of a decline in historical accomplishment. Additionally, the desire to expand digital learning is evident. The vast majority of students strongly supported the potential value of digital flipbooks for preventing learning loss in history courses (90%) and online access to history learning materials (90%)." This demonstrates that students perceive that technology and digital media may enhance their historical knowledge and prevent learning loss.

Consequently, the questionnaire results were adopted as the foundation for creating digital learning materials, particularly digital flipbooks, to assist students in overcoming learning loss and boost their interest in and comprehension of history courses. This underlines the importance of the use of technology in the teaching process, particularly to inspire students and improve the efficiency of their history learning.

B. Material Analysis

The primary difficulty faced by pupils at Pertiwi Medan Private High School lies in their struggle to grasp the fundamental concepts and principles of guided democracy in Indonesia, according to the findings of this study's material analysis. This material covers a variety of topics, including familiarity with significant personalities from the Guided Democracy era, identification of significant occasions and places, and proficiency in the analysis of historical documents, particularly the Declaration of Independence or Supersemar. Following the analysis of the garnered data, digital flipbooks serve as

a cutting-edge teaching tool that helps pupils comprehend the subject matter more easily. Students have been able to overcome their learning loss via the use of animated movies that explain the idea of guided democracy, character biography pages, animations of significant events, interactive maps, and historical texts with contextual explanations. Besides, the interactive elements, such as music, zoom, and quizzes also transform the learning into more dynamic and interesting. In addition, learners get more comprehension and insight from conclusions, assessments, and connections to other resources. Thus, Digital Flipbook helps increase students' understanding and knowledge of Guided Democracy material. Thus, it can be considered an effective tool for overcoming learning loss in history subjects at Pertiwi Medan Private High School, Indonesia.

C. Design

Based on the results of the analysis, the design of digital flipbook-based learning media to overcome student learning loss in learning history at Pertiwi Medan Private High School is presented in Figure 2.

Fig. 2. History Flipbook Cover View

This digital flipbook consists of 2 contents, namely the core book as in the (.pdf) format, along with the flipbook as a support for interaction between the reader and the digital book (.exe).

Fig. 3. Toolbar flipbook digital

The toolbar on this digital flipbook enhances the user experience by simplifying navigation. The toolbar has several tools, namely bookmark, table of contents, music, share, thumbnails, print, zoom in/out, full screen, and slide multimedia presented in Figure 4.

This digital flipbook is also equipped with a 3-dimensional display visible every time the user opens the sheet. The media allows for seamless sheet flipping, mimicking the experience of opening a traditional book presented in Figure 5.

Fig. 4. Three-Dimensional Display

Fig. 5. Media Content

This digital flipbook contains material derived from the student handbook, developed with a more comprehensive supporting book. The book also incorporates multimedia content, such as music, animation, video, and supporting images.

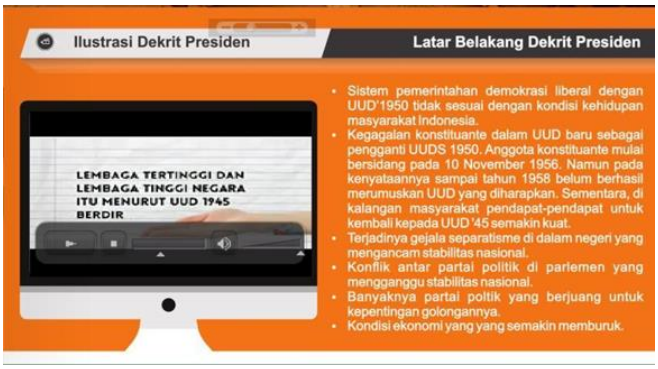

Fig. 6. Animated Content

The animation in this media illustratively explains the material step by step, enhancing students' comprehension during independent study.

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Fig. 7. Video Content

Videos in digital flipbook media serve as supplementary and complementary material, such as in the scenes of presidential decrees that provide an overview of past conditions.

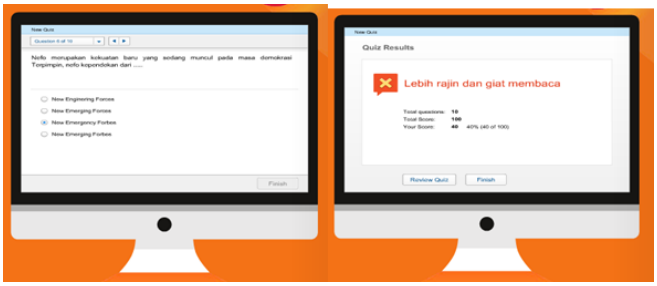

Fig. 8. Training questions

This digital flipbook features practice questions with immediate scoring, increasing student engagement.

Fig. 9. Supporting images

Furthermore, this media includes supporting images that document some of the historical events mentioned in the material.

1) Development

a) Expert validation test results

accordanceessment in media development has an important role in ensuring that learning media achieves the expected quality and is in accordance with learning objectives. In this research, we involved 3 experts for each aspect. The results of the expert assessment of the developed media are summarized in Table 4.

Table 4. Results of Experts Assessment

Aspect	Indicator	Validator 1	Validator 2	Validator 3	Mean
Learning	1. Conformity of content with the history curriculum.	4	5	4	4.33
	2. The ability of flipbooks to facilitate active learning.	5	4	4	4.33
	3. The ability of flipbooks to arouse students' interest in learning.	4	4	5	4.33
	4. Interactivity that promotes critical thinking.	5	5	4	4.67
	5. Ease of access and navigation for teachers and students.	4	5	5	4.67
Material	1. The quality of the historical material presented.	4	5	4	4.33
	2. The relevance of the material to the latest historical developments.	5	4	5	4.67
	3. Availability of various types of learning resources (text, images, audio, video).	4	4	5	4.33
	4. Linkage of material to student needs.	5	4	5	4.67
	5. The ability of the material to facilitate deep understanding.	4	5	4	4.33
Media	1. Quality of visual appearance and aesthetics of digital flipbooks.	5	4	4	4.33
	2. Interactive functionality and learning features.	4	5	4	4.33
	3. Availability of clear instructions and user guides.	5	4	5	4.67
	4. Platform compatibility with various devices (computers, tablets, smartphones).	4	4	5	4.33
	5. The media's ability to enable student collaboration.	5	4	4	4.33
Language	1. Accuracy and clarity of the language used.	4	5	4	4.33
	2. Language skills to facilitate student understanding.	5	4	4	4.33
	3. Readability and fluency of historical narrative.	4	5	5	4.67
	4. Use of languages that support multilingual learning.	4	4	5	4.33
	5. Suitability of language to students' age level.	4	5	4	4.33

Table 4 presents the expert team's uniform assessment with an average score ranging between 4.33 and 4.67, indicating its compatibility of the content with the history curriculum, ability to facilitate active learning, and capacity to arouse students' interest in learning. Interactivity that promotes critical thinking received the highest average score, 4.67, indicating this media's efficiency in encouraging students' critical thinking. Apart from that, in the ease of access and navigation, this media also received positive results.

In the material aspect, expert assessments also indicate excellent quality, with an average score of 4.33 to 4.67. The material pertains to the latest historical developments, and an array of learning resources, including text, visuals, audio, and video, received favorable evaluations. The material has been linked to students' needs and is able to facilitate in-depth understanding. Therefore, the material really supports the learning process.

In the media aspect, experts also provide positive assessments, especially in terms of visual and aesthetic appearance, as well as interactive functionality and learning features in Digital Flipbook. Additionally, the media's capacity to facilitate student collaboration was deemed positive. Clear instructions and user guides were available, which was also viewed positively. Regarding language, experts awarded relatively consistent scores, averaging between 4.33 and 4.67. The language used is precise and clear, thereby supporting student understanding. The readability and fluency of the historical narrative are rated as high, and the use of language that supports multilingual learning was also rated positively.

Thus, the expert assessment shows that this Digital Flipbook generally meets the expected criteria for learning media development in history courses. With necessary improvements based on expert suggestions and recommendations, this media can become an effective and useful learning tool for students.

b) Media Trial

The trials were carried out 3 times, with the first trial involving 10 students, while the second and third trials involved 30 and 50 students. Multiple testing of educational media is necessary due to the imperfect development and refinement process. Iterative testing enables developers to identify technical problems, conceptual errors, or confusion that may arise as the medium is used by learners or end users. In addition, through repeated trials, feedback can be gathered from a variety of learners or media users who come from different backgrounds, levels of understanding, and needs. This helps ensure that the media is truly effective, accessible, and in line with the desired learning objectives so that it can provide a better learning experience.

c) First trial

The first trial of the media was carried out involving 10 students. The test results are presented in Figure 10. The average score for the four aspects evaluated in this initial trial was 4.42, falling within the very good category. Based on these outcomes, no significant flaws in the product were identified in terms of media, material, or language. Therefore, the Digital Flipbook-based History Lesson Diagnostic Assessment Tool can be trialed in the second phase.

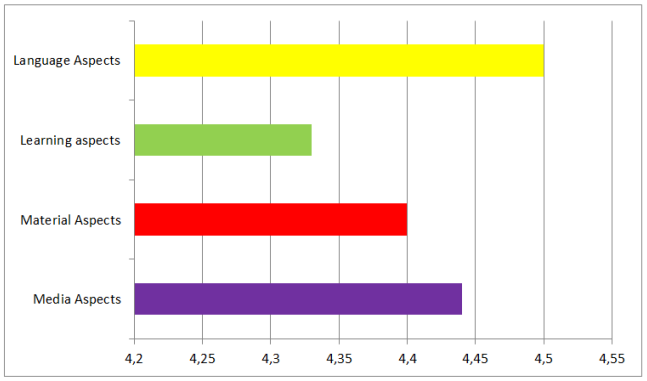

Fig. 10. First Phase Trial Results Diagram

d) Second Trial

The second stage of the trial involved 30 students with high, medium, or low abilities with access to flipbooks through their respective Android or laptops to access media. After they accessed Flipbook Digital, they were asked to assess the media by filling out a feasibility questionnaire. Results from the second round of testing reveal that the media aspect received an average score of 4.34 in the very good category among 30 students, while the material and learning aspects both had an average score of 4.3 in the same category. Additionally, the language aspect received an average score of 4.45 in the excellent category. The average score achieved across the four domains during the second phase of the trial exhibited minimal variance compared to those of the first phase. A graphical representation of the results of the second phase of the experiment is presented in Figure 11.

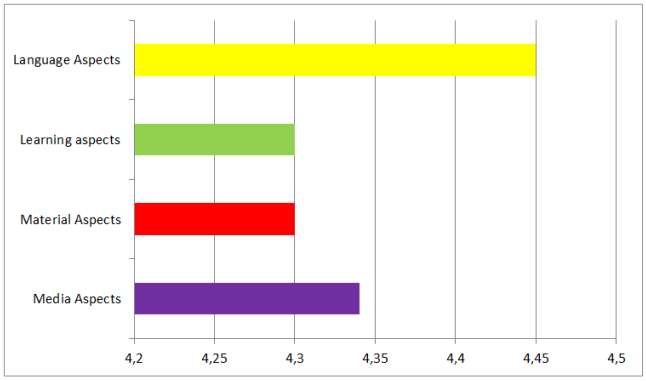

Fig. 11. Second Phase Trial Results Diagram

Based on Figure 11, it is known that the average score for the four aspects assessed reached 4.35, categorized as very good. Student assessments for each aspect were in the very good category, suggesting no fundamental deficiencies in the product that require correction.

e) Third Trial

The third phase of trial activities enrolled 50 students, with each student using a computer device connected to the internet to access Digital Flipbook. The students evaluated the media by completing a feasibility test questionnaire, as instructed by the researcher. Data

obtained from the third stage of testing indicates the average score for the media aspect reaching 4.44 in the excellent category, while the average score for the material aspect is 4.46 in the same category. Meanwhile, the average score for the learning aspect is 4.5, in the very good category, while the language aspect received an average score of 4.58, in the excellent category. The mean scores obtained in the third phase of the trial did not considerably differ from those of the first and second phases. The results of the third phase of the trial are presented in Figure 12.

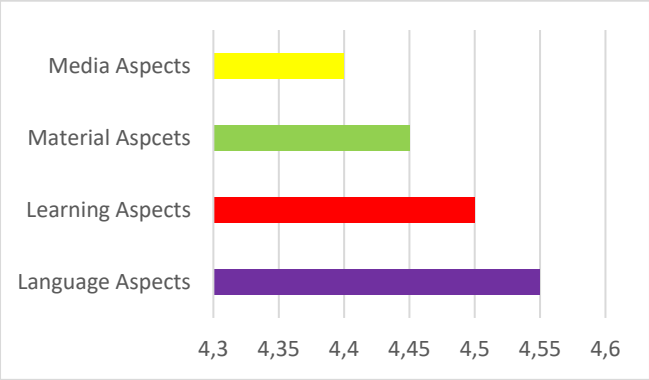

Fig. 12. Third Phase Trial Results Diagram

As shown in Figure 12, the average score for the four aspects assessed reached 4.45, falling into the excellent category. The average score results in the third phase of the trial are like the average score results in the first and second phase trials. From the results of the student assessment, no fundamental deficiencies were found in the History Digital Flipbook in terms of media, material, and language. In fact, during the trial, students exhibited great enthusiasm. They were so enthusiastic about exploring the content presented in Flipbook Digital media. Therefore, we concluded that the Flipbook Digital media did not require revision and is suitable for use as a learning tool in Medan City High Schools.

2) Test Media influence

To examine the possible influence of digital flipbook media in overcoming students' learning loss during history learning, a paired sample t-test was carried out to compare the test results before and after treatment. The results of the paired sample t-test analysis are presented in Table 5.

Table 5. Results of Paired Sample T-Test Analysis

Test Aspect	Statistical Value	p-Value	Conclusion
Uji-t (Paired t-test)	t = 4.272	0.000 < 0.05 (significant)	There is a significant difference between scores before and after media use.

Table 5 presents the result of the paired t-test conducted to analyze the effect of learning media on student learning outcomes. The statistical analysis resulted in a value of t = 4.272 and a p-value value of 0.000, which is lower than the generally used significance level of $p < 0.05$. This indicates that the results of this test have strong statistical significance. Thus, this finding indicates a significant difference between student scores before and after using learning media. Employing learning media, students experience a significant increase in their understanding of knowledge; thereby, this media presents a positive impact in the context of this research. These results support the hypothesis that digital flipbook learning media makes a significant contribution to overcoming learning loss and improving student learning outcomes on certain subjects or topics.

The media developed in this research possesses sufficient validity for utilization in history learning, with the aim of overcoming student learning loss. The validity of this media is evident from the results of trials which reveal significant differences between student scores, before and after using the media. Besides, the results of the paired t-test show that media has a significant positive impact on student learning outcomes, which directly indicates the validity of using media in overcoming difficulties in understanding historical material.

The results of this research are consistent with previous research findings, which underline that using interactive learning media such as digital flipbooks in history learning can overcome learning loss and improve student learning outcomes (Astuti et al., 2020; Olagbaju & Popoola, 2020; Rahmatullah & Ghufron, 2021; Saputri et al., 2022; M. Singh, 2023). This digital flipbook media is equipped with various features that cater to students' needs, such as interactivity, visualization, and good accessibility (Rahmatullah & Ghufron, 2021). Besides, the material presented in this media is designed following the latest historical developments to ensure its relevance, the high quality of the material, and the availability of various types of learning resources that support in-depth understanding (Astuti et al., 2020; Saputri et al., 2022). In terms of language, this media prioritizes clarity and readability of language to aid students in understanding the historical narrative being conveyed.

There are several benefits of employing flipbook media to prevent learning loss in history classes. First, students may learn about historical events and their significance through this medium's potent and interactive visualization (Firdaus et al., 2023; Rezeki & Suranto, 2023). Besides, students may more readily track complicated historical changes and comprehend their cause-and-effect linkages through an interactive timeline. Second, the digital medium provides students with access to a variety of educational materials that promote a deeper comprehension of historical subjects. These materials include text, photos, audio, and video (Ristanto et al., 2020; Sulistianingsih & Annisa, 2019). With an interactive timeline, students can better understand cause-and-effect relationships and keep track of complex historical developments. Additionally, the digital platform provides

students with an array of instructional resources that foster a more profound understanding of historical topics. These resources come in the form of text, images, audio, and video. (Roemintoyo & Budiarto, 2021; Wibowo & Pratiwi, 2018). This helps students remember key details and builds a robust context in history learning.

Furthermore, this media supports the readability and fluency of historical narratives while also employing accurate and precise terminology to enhance student learning. The presentation of historical writings with contextual explanations enables students to more effectively analyze historical documents (Asrizal et al., 2022; Nufus et al., 2020). Ultimately, digital flipbooks provide flexible learning both within and outside of the classroom as it is readily accessible from a range of devices (computers, tablets, and smartphones) (Firdaus et al., 2023; Rezeki & Suranto, 2023; Saputri et al., 2022). Additionally, the use of this media can augment student collaboration, leading to an increase in the level of active engagement in the historical learning process (Erna et al., 2021; Triwahyuningtyas et al., 2020). In conclusion, the benefits offered by digital flipbook media positioned it as an effective instrument for reversing learning loss and raising students' historical comprehension.

Drawing from the discourse, it can be inferred that digital flipbook media has demonstrated efficacy in mitigating the effects of learning loss in the study of history, owing to its notable enhancement of student learning outcomes."

IV. Conclusion

This study suggests that the development of interactive learning resources, especially digital flipbooks, has significant potential for minimizing learning loss in history classrooms. The variation of students' test results before and after using the medium indicates the validity of this medium. Strong visual, accessible content, contextual presentation, and versatility in usage are some of the benefits of digital flipbooks that enhance students' comprehension of historical material and encourage active participation in learning. Even though this study provides valuable information, it is crucial to acknowledge that it has certain drawbacks. First, the study solely examines digital flipbooks as an interactive learning medium. Accordingly, additional learning media modifications that could possibly be useful in overcoming learning loss were not taken into account during the investigation. Second, further research is necessary to determine the enduring impact of utilizing such media on historical comprehension and learning loss. Several recommendations can be made in light of the research's findings. Further research could broaden the range of interactive learning resources available to mitigate learning loss. This would provide a deeper understanding of the usefulness of various forms of media in teaching history. The development of learning materials should be continuously carried out to enhance its features, such as its flexibility, accessibility, and visualization. Furthermore, conducting a comprehensive examination of the impact of the medium on students' understanding of history over an extended period would provide insight into its efficacy.

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