

**Interactive E-book in Problem-Based History Learning to Enhance Students'
Knowledge of the Fall of the Dutch East Indies**

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Abstract

History is often perceived as monotonous and unengaging by students, primarily due to traditional teaching methods focused on memorization with minimal interaction. This issue is exacerbated by the lack of innovative learning media aligned with technological advancements. This study aims to develop an interactive e-book as a history learning tool, integrating real-world problems, specifically "The Fall of the Dutch East Indies," for Grade XI students at SMA NU 05 Brangsong (Private High School). The interactive e-book is expected to increase the appeal of history lessons, foster more active interaction, and help students gain a deeper and more comprehensive understanding of the subject through engaging and easily understandable visualizations. The study employs the Research and Development (R&D) method with a modified 4D development model, reducing it to 3D: Define, Design, and Develop. Data was collected through observation, interviews, document studies, and surveys. Qualitative and quantitative data analyses were used to evaluate the effectiveness and feasibility of the developed learning media. The results demonstrate that the interactive e-book is viable for use and effectively enhances students' understanding of historical topics, particularly the fall of the Dutch East Indies. This research underscores the importance of integrating technology in history education to improve student engagement and learning outcomes.

Keywords: *Interactive E-book, History Education, Student Engagement*

Introduction

History in education has quite an important role, especially in shaping character, identity, nationalism, and awareness of the past. History learning helps shape and provide awareness in preserving various past relics as part of an inseparable identity. History learning also builds awareness of learning from the past or history about life. History Learning as Living History makes history learning not only contain memorization of events, figures, and times but also about the meaning of socio-cultural life that has occurred. History learning teaches an in-depth understanding and analysis of past events related to human life (Irawan, 2021, p. 251).

History learning not only dwells on transferring ideas or knowledge but also teaches about the meaning or taking wisdom from a past event. History learning is also a maturation process because it encourages students to recognize the nation's identity through in-depth identification and analysis related to past events. Studying history teaches the process because it encourages students to recognize the identity and identity of the nation through in-depth identification

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and analysis related to past events. Studying history teaches the importance of past identity both regionally and events; this is called learning history, which impacts historical consciousness. History learning, in essence, aims to give birth to historical awareness; departing from that essence, efforts are needed to create a situation that can foster historical awareness in students. There are at least five history learning objectives. First, building awareness of time and place related to the past, present, and future. Second, train critical skills to analyze, understand, and criticize historical events and facts. Third, it fosters appreciation and a sense of protecting various past relics as part of the nation's identity, and fourth, it fosters an understanding of a historical process. And fifth, fostering historical awareness that can be implemented in life. The objectives in learning history foster attitude and cognitive aspects for students to be able to understand historical events as a continuous process and to encourage awareness to take care of historical remains (Saidillah, 2018, pp. 223–225)

However, students often need to pay more attention to history learning because it is boring, monotonous, and irrelevant to daily life. This problem is exacerbated by using dominant teaching methods with lectures and the need for interactive learning media (Aeni & Suryadi, 2019, p. 197; Hamidi, 2012, p. 11). Minimal learning media causes students not to be able to see the historical events taught directly, so it feels unclear or absurd (Ahmad, 2010, p. 109). This is very different from the essence of history learning, which is supposed to be a dialogue between the past and the present, which helps students understand, analyze, and take lessons from historical events (Anggraeni et al., 2019, p. 60).

The lack of use of learning media in schools adds to the saturation of students in attending history lessons. Conventional learning methods that focus too much on lectures reduce students' interest in learning and suppress students' critical and creative thinking skills in analyzing historical events. Using innovative and exciting learning media is crucial in improving students' interest and learning outcomes (Bohari & Wajnah, 2018, pp. 191–192).

In addition, the era of the Industrial Revolution 4.0 brings new challenges to the world of education, including learning history. Technology should be used to create more interactive and engaging learning. However, technological adaptation in history learning is still considered less than optimal. For example, PowerPoint is often not accompanied by audio or video material that can help students better understand the material (Liady et al., 2022, pp. 547–548). Even though technology has begun to be integrated into learning, many teachers still are not optimal in utilizing digital media.

Technological developments should be able to create more creative and innovative history learning, thereby eliminating the negative stigma about boring history learning (Utomo et al.,

2021, p. 57). In addition to media problems, material problems are also a challenge. Since the Reform era, historical writing has developed, but teachers are still not ready to face it. This limited mastery of material impacts less challenging learning and does not encourage students to think critically (Dannari & Muna, 2019, p. 155).

The passive role of students in history learning still needs to be solved. Students are only considered passive recipients of knowledge without being invited to analyze historical events critically. In addition, the material taught is often only in the form of memorizing dates, names, and events, which makes history learning seem monotonous (Felinda & Sugiyono, 2018, pp. 3–4). An evaluation process that encourages an active attitude is very important in building a deep understanding of history.

The observations at SMA NU 05 Brangsong show that despite the sufficient learning facilities, students' interest in history lessons is still low. Students consider history only about memorizing dates and names irrelevant to their lives. The history teacher at the school also stated that learning media such as LCD projectors have been available, but their use has yet to be maximized. This shows an urgent need for more exciting and interactive learning media (Munawar & Suryadi, 2019, p. 175).

One way that can be done to improve the quality of history learning is by developing digital technology-based learning media, such as interactive eBooks. Interactive ebooks have the advantage of containing a variety of media such as text, images, audio, and video that can help students more easily understand the material being taught. This research aims to develop learning media to improve students' understanding of historical knowledge.

Research Questions

1. What are the needs of teachers in learning history in grade XI in the material The Collapse of the Netherlands East Indies?
2. How Do Students Understand the Material of the Collapse of the Netherlands East Indies?
3. How was the Netherlands East Indies Collapse Material Interactive eBook Product created, and what is its feasibility level?
4. How is the implementation of Interactive Ebooks when used in learning trials?
5. What is the level of effectiveness of interactive ebooks on students' understanding related to the Material on the Collapse of the Netherlands East Indies?

Method

Research Design

This research uses a Research and Development (R&D) design with a 4D development model approach that is modified into 3D, including the Define, Design, and Develop stages. At the Define stage, the needs of history learning in class XI of SMA NU 05 Brangsong was analyzed, especially on the material "The Collapse of the Netherlands East Indies." This process involves classroom observations, interviews with history teachers, and the distribution of questionnaires to students to identify the main problems in the learning process. The analysis results found that history learning is still conventional, with the lack of innovative interactive media, which impacts the low level of student understanding of the material taught. Based on these findings, it was determined that the development of eBook-based interactive learning media is a solution that suits the needs.

The Design stage includes designing interactive eBook learning media products that combine text, images, audio, and interactive elements to create a more exciting and dynamic learning experience. This product is designed with a multimedia approach that allows students to interact with the material presented actively. In the development stage, the product that has been designed is validated by experts, namely material experts and media experts, to assess the feasibility and quality of the learning media developed. After going through a revision process based on expert input, the product was tested on a limited basis on grade XI students through pre-test and post-test methods to measure the effectiveness of using interactive ebooks in improving students' understanding of the material "The Collapse of the Netherlands East Indies." The trial results showed a significant improvement in students' understanding, which indicates that the design of this study is effective in achieving learning goals.

Data and Data Sources

This section describes the data and data sources used in the study. The main data sources came from two groups, namely history teachers and students of grade XI MIPA 2 at SMA NU 05 Brangsong. History teachers function as informants in providing insights related to the conditions of history learning. At the same time, students play the role of research subjects to measure the effectiveness of the learning media developed.

Data is collected through several methods, including observation, interviews, questionnaires, and documentation. Observations were made to see the learning process and student interaction in the classroom, especially when using interactive eBook learning media. Interviews were conducted with history teachers to obtain information about the need for learning media and

challenges in teaching the material "The Collapse of the Netherlands East Indies." A questionnaire was given to students to measure their understanding before and after using the interactive eBook, as well as to find out their response to the use of the media. In addition, documentation in the form of learning notes and teaching materials is also used as supporting materials in data analysis. The data obtained were analyzed qualitatively and quantitatively to provide an overview of the effectiveness of learning media in improving students' understanding of historical materials.

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Table 1. Data Collection Based on Research Sources and Objectives.

Research Aspects	Data Source	Data Collection Methods	Research Instruments
The need for learning media	History Teacher	Interview	Interview guide
Students' understanding of the material	Grade XI MIPA 2 students	Questionnaires, Pre-test, Post-test	Questionnaires, Pre-test and Post-test Questions.
Student responses to interactive Ebooks	Grade XI MIPA 2 students	Questionnaire	Questionnaire
Learning process in the classroom	Observation of learning	Observation	Observation sheet
Validation of learning media	Material experts and media experts	Product validation	Expert validation sheet

The table above illustrates how data was collected from various sources to answer the research objectives. Interviews with teachers were conducted to determine the need for learning media, while questionnaires and tests were used to measure students' understanding before and after using interactive ebooks. Experts perform product validation to evaluate the feasibility and quality of the learning media developed.

Data Collection Techniques

The data collection technique in this study is carried out through four main methods, namely observation, interview, questionnaire, and documentation. The observation was carried out directly in class XI of SMA NU 05 Brangsong to identify the interaction between students and interactive eBook learning media. This observation aims to see students' activeness in the learning process and how the media is used in learning. Instruments in the form of observation sheets are used to record various activities that occur during the learning process.

In addition to observations, in-depth interviews were also conducted with history teachers to collect information about learning needs, challenges faced, and expectations for the development of interactive eBook media. The interview guide is designed to direct questions around the use of media in previous history learning and how teachers assess the effectiveness of the media in improving student understanding.

The questionnaire is used to measure students' understanding before and after the use of interactive ebooks through pre-tests and post-tests. In addition, a questionnaire was also given to find out the students' responses to the learning media used, including how interactive ebooks affect their interest in learning. The questionnaire is designed based on the indicators of historical understanding determined in this study.

As a complement, documentation in the form of learning notes and teaching materials is also collected to provide additional context regarding the initial conditions of history learning in the classroom. This documentation helps give an overview of the differences between the previous teaching materials and those presented through interactive ebooks. These four data collection methods are used simultaneously to provide a comprehensive overview of the effectiveness of using interactive eBook learning media in improving students' understanding of historical materials.

Data Permissions

The accuracy of the data in a study is very important to ensure the validity of the research results. Therefore, in this study, the data must meet the requirements of truth, objectivity, and

relevance to the topic discussed. Data was collected through direct observation, interviews with history teachers, and reviews of relevant literature, including sources such as textbooks and related academic journals.

This study uses qualitative and quantitative approaches to understand the need for learning media in grade XI, especially the material The Collapse of the Netherlands East Indies. The validity of the data is guaranteed by triangulation methods, namely combining the results of interviews, observations, and learning media trials. In addition, the triangulation method also ensures that the research results depend not only on one data source but are supported by various perspectives that strengthen the correctness of the findings.

The data obtained from students were analyzed descriptively to understand their level of understanding before and after using the interactive eBook. Developing an interactive eBook also goes through a trial and validation stage by learning media experts, ensuring that the resulting product is practical and feasible to use in the history learning process. Thus, the correctness of the data in this study can be accounted for based on strict scientific procedures and reliable data sources.

Data Analysis

Data analysis in this study was carried out with qualitative and quantitative approaches. In the initial stage, qualitative data obtained from interviews and observations were analyzed by triangulation techniques, which compared data from various sources. Quantitative data obtained from student trials were analyzed using the N-Gain test to measure the improvement of students' understanding before and after using interactive eBook media. Furthermore, a Paired Sample T-Test statistical test was conducted to test the significance of improving student understanding. Data from validation results from material experts and media experts were analyzed to determine the feasibility of the product, with evaluation criteria in the form of levels of achievement divided into four categories: excellent, good, adequate, and not good. Analysis of student learning outcomes based on the Big Six (Historical Thinking) indicator is also carried out to ensure students understand the material deeply and critically. This analysis is important to assess the effectiveness of the media in encouraging students' critical thinking towards history. The results of the trial show that the interactive eBook based on actual problems effectively increases students' interest and understanding.

Research Results

Define

Based on the data obtained through observation techniques, interviews, initial assessment results, and analysis questionnaires, the researcher concluded that there are three main problems in history learning at SMA NU 05 Brangsong, namely; (1) Lack of availability and use of learning media, especially interactive ones, (2) Low level of students' understanding related to the material on the Collapse of the Netherlands East Indies, and (3) There are no actual problems in learning history in the material on the Collapse of the Netherlands East Indies, (4) History learning that still puts students in a passive position so that the material is only limited to being delivered by the teacher through lectures with occasional questions and answers.

The material on the collapse of the Netherlands East Indies sourced from package books in schools could be more extensive. The material contained and taught was limited to the defeat of the Netherlands East Indies due to the Japanese attack without considering other factors. In addition, there is no mention of the connection between the collapse of the Netherlands East Indies, the Treaty of Kalijati, and actual events regarding the reason why the Netherlands carried out military aggression and was reluctant to recognize Indonesia's independence on August 17, 1945, and the phrase of the Handover of Sovereignty to KMB. The material on the collapse of the Netherlands East Indies in the package book does not encourage students to think in multi-perspective, multicausality, and critical-analytical thinking.

Departing from the problems in the field and the need for developing learning models, the researcher then formulates the objectives of discussion in the interactive eBook learning media based on actual problems. The formulation of the goals of the debate consisted of; (1) Analyzing the policies in the late period of the Netherlands East Indies (1940-1942) and (2) Analyzing the Kalijati negotiations and their relationship with decolonization after the Proclamation of Indonesia's Independence, (3) Analyze the background and relationship of World War II to the entry of Japan into the Netherlands East Indies (Indonesia), (4) Analyze the war won by Japan during the campaign in the Netherlands East Indies (Indonesia).

Design

Phase *design* or design consists of the preparation of test standards used by experts to assess the feasibility of products and product design starting from the selection of media and product formats. Interactive ebooks can be categorized as Interactive Learning Multimedia if, first, interactive ebooks can combine various media such as text, visual/image, audio/sound, video,

and film, or at least two different types of media into one integrated media. Second, interactive ebooks can generate feedback or provide an interactive experience between ebooks and users. The interaction experience in question is that when the user gives an action, multimedia will give a reaction such as pressing a button, moving a page, and typing something. The interaction contained in interactive multimedia is divided into several levels: (1) Controlling video and audio; (2) Controlling the page; (3) Control menus or links; (4) Control animation; (5) Controlling Hypermap; (6) Feedbacks (e.g. interactive quizzes); (7) Drag and Drop; (8) Controlling simulation; (9) Games As a multimedia learning medium, it must have the depth of material used by certain learning objectives (Surzano, 2017, pp. 41–49).

This research develops learning media products in the form of interactive ebooks. The interactive eBook media was selected based on four considerations: First, the condition of the learning environment, including facilities and infrastructure both in schools and in the classroom. Second, obstacles and needs should be considered based on the results of surveys and teacher suggestions. Third, effectiveness is based on the results of tests or research that has been carried out. Fourth, the paradigm, objectives, and learning models are used. Based on the results of the observations made, the results of the facilities and infrastructure to support learning in schools are adequate, especially with the availability of computer laboratories. The learning conditions still show a lack of student participation during learning, and some students ignore the teacher but instead dwell on their busyness.

The obstacles and needs needed in learning history in grade XI based on the results of interviews, observations, and questionnaires show the need for teaching media that contains material on the collapse of the Netherlands East Indies more complexly. Regarding observation and interviews, the obstacles experienced are limited access to computer laboratories, package books that only contain material with insufficient depth and scope, and existing learning media are less effective. The questionnaire and assessment results show that there is a need for exciting history learning media that can increase or encourage students' activeness so that active and interactive learning is realized and has an impact on increasing understanding.

Interactive ebooks have proven to be effective in creating interactive learning. Several previous studies evidence this. The development of interactive e-books carried out by researchers is then based on the effectiveness of interactive ebooks that have been carried out by previous research, this is the third consideration. The first research that the researcher used as a reference for the effectiveness of interactive eBook development was Riki Andi Saputro, who developed an interactive eBook on learning local history. The results of Riki Andi Saputro's research show that there is an increase in students' interest in learning local history, the learning atmosphere

also becomes more active and not boring, which impacts improving students' understanding. The second research is from Rizka Fauzan, Jemi Yawati, and Eko Ribawati, who developed an interactive ebook of local history material Geger Cilegon 1888 at SMAN 1 Ciruas. The results of the study show that there are benefits obtained from interactive ebooks, such as displaying a variety of media, making learning more efficient, and adding to a fun atmosphere because students are given various media choices. In terms of effectiveness, based on the study, 89% of students received a feasibility response, meaning that students felt the personal benefits of the presence of the interactive ebook developed. Finally, there is research that develops an interactive ebook with Fiqh material at the MTS AlHikmah school (a junior high school). The study results showed an increase in the learning outcomes of 163 students based on the percentage of completeness, which amounted to 78% and was included in the high category. In addition, the selection of ebook formats is also inseparable from Yusnimar's research data and Jannah's research which shows an increase in the use of ebooks. The first consideration is Yusnimar's (Yusnimar, 2014) research entitled *Ebook and Higher Education Library Users in Jakarta*, revealing the large use of ebooks. Based on the study, in the United States alone, the growth of ebook users increased from year to year, and in 2012, it touched 53%. Data from Kominfo shows that the use of ebooks in learning activities is 27.0%. Thus, the selection of ebooks is not only because of convenience but also because of existing trends. The second consideration of Naimatil Jannah, et al. research shows the advantages of interactive ebooks that become interactive digital media. Naimatil Jannah's research revealed that interactive ebooks are multimedia-based media innovations that can integrate with technological developments. Interactive ebooks based on the research are also able to attract and increase students' understanding because interactive ebooks make students active by interacting with the media (Jannah et al., 2017, p. 187; Yusnimar, 2014, p. 36). In addition, interactive ebooks were chosen because they are per the development of the times and technology. Interactive Ebook media has several advantages supporting history learning and improving understanding. The advantages of Interactive Ebooks include, first, having an attractive appearance, such as loading images and videos that can add to the attraction and interest of students. Second, interactive ebooks can allow students to interact with the media through discussion forums, interactive quizzes, and Google Earth-based map features. This interaction encourages students to explore the material independently to help students build knowledge based on experience. Third, interactive ebooks developed are based on actual problems so that they can encourage students to learn critical and analytical thinking to answer these problems. The design of interactive ebooks is also inseparable from the characteristics of

interactive media relevant to Constructivism Theory, which consists of five components: active, cumulative, integrative, reflective, and goal-directed (Ivers & Barron, 2002).

Piaget's theory of constructivism is the theory that underlies the creation of interactive ebooks. Piaget's Constructivist theory assumes that the child, in this case, is a learner considered to be a small scientist who compiles an understanding based on the experience of the interactions made, both interactions with the environment, social, and objects. Based on Piaget's theory, students are not a *tabula rasa*, meaning that students, from the beginning of entering the school world, have brought knowledge. However, it is still not conceptualized, so interaction with others is needed to mature their knowledge. Interactive ebooks are thus designed and created to encourage students to be more active in exploring the material so that they can create valuable experiences in compiling knowledge and understanding (Marti, 1996, pp. 143–144). The development of interactive E-book material is based on covering historical holes while bringing a different perspective. Where history textbooks in schools are more inclined to the Indonesian perspective, then in the interactive E-book that the researcher develops brings a perspective from the Netherlands East Indies or the Netherlands. This difference in perspective is in line with Piaget's learning theory, which requires cognitive conflict in 174 learning processes. Based on Piaget's Theory, cognitive conflict in learning has several functions. First, to help the assimilation process become more effective. Second, cognitive conflict can help students to perfect their understanding through the process of accommodation and assimilation. Cognitive conflict is an inseparable part of Piaget's theory because students need conflict to test, maintain, and improve their understanding so that students can build their understanding. Cognitive conflict can occur when a learner encounters different concepts, facts or material found in books, environments or even discussions with his or her friends (Puspasari, 2017, pp. 2–5).

The initial design or *prototype* consists of 7 parts, namely, (1) cover, (2) Instructions for use, (3) Basic competencies, objectives, and learning models, (4) Table of contents, (5) Prologue, (6) The core of the material includes three chapters, (7) Bibliography. The core of the material consists of three chapters, namely, (1) CHAPTER I regarding the condition of government during the leadership of Governor-General de Jonge; (2) CHAPTER II regarding the first period of Governor General Tjarda's administration in 1936-1941; (3) CHAPTER III regarding the final period of Governor General Tjarda in 1941-1942 and the events of the Kalijati Negotiations.

Develop

The initial product (prototype) creation uses various applications such as Google Doc and Microsoft Word to create the ebook's content in the form of raw materials containing text, images and links from various supporting applications consisting of google group, google form and google earth. Use Google Groups as discussion spaces and Google Forms to collect tasks. Google Earth also creates battle maps with images and videos stored in Google Drive. Files in Google Docs or Microsoft Word are then converted into PDF format to be uploaded to PDF Corporate to convert into interactive ebooks in the form of flipbooks.

The products that have been made are then tested by experts, including material experts, media experts, and practitioner experts, to determine the feasibility of the product. Here are the experts who are testers of the products made.

Table 2. Research Product Valuation Expert

No	Name	Expert
1	Nugroho Bayu Wijanarko, M.A.	Material Expert
2	Atno, S. Pd, M. Pd.	Media Members
3	Siti Masriah, S. Fil., S. Pd.	Expert Practitioners

Source: Researcher Primary Data

Before the product enters the development trial stage, the product will go through a feasibility assessment stage by experts with the following feasibility criteria.

Table 3. Research Product Eligibility Criteria

Achievement Rate (%)	Qualification
$81.25\% \leq \Gamma_{11} \leq 100\%$	Excellent
$62.50\% \leq \Gamma_{11} \leq 81.25\%$	Good
$43.75\% \leq \Gamma_{11} \leq 62.50\%$	Enough
$25\% \leq \Gamma_{11} \leq 43.75\%$	Not Good

Source: Ernawati&Totok, 2017: 207

The product feasibility assessment consists of one stage, except for media experts who carry out two stages. In the first stage the product must be revised aesthetically in terms of images, link arrangements and writing layout. Here are the results of the revised product:

Table 4. Product Revision Results

Product improvement feedback and suggestions

Realization or product revision results


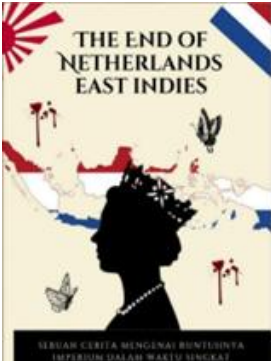






Picture	Information	Picture	Information
	The cover size is not the same as the ebook size, so it looks out of sync.		Researchers adjust the size of the cover to the size of the ebook.
	The "country ball" image is irrelevant to the ebook's content and thus interferes with the aesthetics.		Removing the "country ball" image
	Poorly organized subheading layout		Subtitle layout fixed
	Uneven image layout with unequal text and image size		Streamline image layouts and make them the same size.



Image sizes vary so they look inconsistent



The colors of the images vary and look contrasting



The link display is confusing, in other words, it is not smooth



Correcting the image size so that it becomes uniform



Uniform image colors into black and white



Smoothing the appearance of links

Source: Researcher Primary Data

The following are the results of the overall product feasibility assessment by experts.

Table 5. Table of Results of Calculation of Overall Validation Score

It	Expert	Presented	Qualification
1	Material Expert	75%	Good
2	Media Members	86.4%	Excellent
3	Expert Practitioners	80%	Good
Average presentation score		80.46%	
Category		Good	

Source: Researcher Primary Data

Based on experts' product feasibility assessment results, the history learning media developed was declared feasible to be applied in a limited trial process for 20 students of class XI MIPA 2 SMA NU 05 Brangsong. Limited product testing is done by distributing interactive ebook learning media and testing students' understanding through the Pre-Test-Post Test scheme.

The questions in the Pre-Test-Post Test use the Seixas and Morton indicators known as the Big Six concept. The Big Six concept consists of six indicators, namely: (1) Historical Significance, (2) Evidence, (3) Continuity and Change, (4) Cause and Consequence, (5) Historical Perspectives, and (6) Ethical Dimension. The Big Six concept was chosen because it is relevant to the theory of constructivism, where the evaluation by the theory of constructivism is in the form of a description evaluation that tests understanding. Previous Pre-Test-Post Test questions were tested for validity and reliability. Based on the results of the validity and reliability test of the 30 questions, 23 were declared valid and reliable. The 23 questions include five questions on the Historical Significance indicator, four on the Evidence indicator, four on the Continuity and Change indicator, three on the Cause and Consequence, three on the Historical Perspectives indicator, and three on the Ethical Dimension.

The development trial was carried out in three meetings every Monday, during which the schedule and decisions of the history teacher were adjusted. The research conducted for three days consisted of:

On the first day, the teacher explained the material on the Collapse of the Netherlands East Indies as had been done before. The researcher distributed pre-test questions on the first day to test students' understanding. The pre-test questions were tested using questions made based on the Big Six Historical Thinking from Seixas and Morton.

The researcher shared an interactive ebook link with students on the second day. The role of researchers and teachers is only limited to facilitators and helping students if there are technical obstacles. On this second day, the researcher observed the response and condition of students when given interactive ebook learning media.

The researcher shared post-test questions based on Seixas and Morton's Big Six Historical Thinking indicators on the third day. The researcher also distributed a response questionnaire to students to find out the responses and input of students personally regarding the interactive ebook learning media used. The effectiveness analysis was measured based on the calculation of N-Gain and the paired sample T-test.

The observation results showed that students were enthusiastic about the Interactive Ebook, shown by their curiosity in reading the material and watching the existing 182 videos. Students also look very interactive when studying the Netherlands East Indies military campaign based on Google Earth. The observation results also showed several obstacles while using Interactive Ebook media, such as weak signal strength, some mobile phones becoming

slow or lag, and some mobile phones not having Google Earth installed, so they could not open the military campaign map feature.

The researcher observed that students experienced cognitive processes and conflicts that occurred during interactive ebook media. The cognitive process is assimilation, in which students integrate new and old knowledge. Old knowledge here is knowledge the teacher gives, while new knowledge is gained when using Ebooks. If students actively learn using ebooks, they also build the concept of understanding based on knowledge gained outside of school in actual problems with knowledge gained on the first day of learning and new knowledge gained from active interaction with students. This is to the opinion in Piaget's study that the role of schools and teachers is to facilitate and help students to compile and mature concepts between the material taught in school and the knowledge brought from outside the school because of their interaction with their environment.

The following process is that students experience the accommodation process to form a new understanding according to the conditions, such as the problems presented in the interactive ebook. Cognitive conflict occurs when students find contradictory things between new knowledge and old knowledge, where in old knowledge, the process of the Collapse of the Netherlands East Indies is presented briefly and uses an Indonesian perspective. At the same time, the material in the interactive ebook is more in-depth and uses a Neerlandocentric perspective. The cognitive consolidation of students with cognitive conflicts was also seen in the discussions that occurred even though they were online. The cognitive conflicts created are by the stages expressed by Lee and Kwon which consist of presenting problems, clashing knowledge, and resolving conflicts through discussion. The problem is presented by placing the problem at the beginning of the book. Cognitive conflicts in the form of knowledge clashes occur in the material described in the book, and the discussion is completed at the end of the book.

Discussion plays a significant role in Piaget's Theory, where, according to Piaget, discussions that are autonomous, independent, and free to express opinions influence the formation of knowledge and understanding of students. Piaget argued that in social interaction (discussion) there are two critical things: independence and freedom and intellectual reversibility (the ability to integrate). The existence of social interaction in the form of discussion is expected to enable students to switch from egocentrism (personal cognitive development) to more complex cognitive coordination. The discussion will give rise to cross-opinion behavior, strengthening opinions and intersecting ideas so that the result is that students can conclude the interaction that takes place and make it part of understanding.

According to Piaget, the process of cognitive conflict that occurs in the discussion shows behaviours as referred to in the social interaction paradigm. The research subjects were seen to have different opinions when answering the initial problem, which was used as a discussion starter. Based on the observation results, students freely and independently express their opinions on the understanding prepared before the discussion. Evidence of differences in understanding and impacting cross-opinions is the emergence of differences of opinion. Social interaction in the form of this discussion is different from what was expressed by Vygotsky, who leaned toward Peer Tutors. In the discussion, it was clear that every student who participated was independent, or no one was smarter than the others; they were autonomous and free to express their opinions.

During the use, students also work on assignments to summarize battles previously enthusiastically and independently learned by students. This summary assignment is an applicative form of Piaget's Theory at the Formal Operational stage, where at this stage, individuals can draw conclusions and form concepts from the knowledge obtained. Agree with Piaget's theory that three thinking skills are possessed at the Formal Operational stage, namely scientific, deductive-hypothetical, and reflective thinking. Summarizing itself is one of the applications of reflective thinking where students conclude an event.

Using ebooks during the study applies Piaget's constructivism learning, which is independent learning that impacts students' learning experience. During the research, researchers and teachers only become facilitators whose role is limited to helping students if there are obstacles when using signals, for example. Students are actively involved and independently explore the material in the interactive eBook. This is in line with Suparno's opinion in Haerullah and Said (2017) that constructivist learning has four principles, namely: (1) Students build their knowledge both personally/individually and socially; (2) students are active in reasoning; (3) Students conduct independent exploration to gain more detailed knowledge; and (4) The role of teachers is limited to only playing the role of facilitators. (Haerullah & Hasan, 2017).

The effectiveness of the history learning model in this study is the level of students' understanding based on the Seixas, and Morton indicators planned with the implementation of the learning plan using Piaget's constructivism learning model. Based on the results of the N-Gain analysis, the N-Gain value obtained was 0.9, which shows a significant increase in students after using interactive eBook learning media based on actual problems. The results of the Paired Sample T-Test analysis showed that the sig result = 0.00, smaller than 0.05; thus, it can be concluded that there is a difference in students' understanding of the material of the

Collapse of the Netherlands East Indies before and after the application of interactive eBook learning media. Based on the results of the students' responses also show that interactive eBook learning media is proven to provide personal benefits. Although the interactive eBook developed by the researcher has effectiveness and usefulness, it still has shortcomings. The shortcomings or obstacles in the interactive eBook that the researcher developed include (1) internet network constraints, (2) the need to install the Google Earth application for mobile phone users, and (3) The eBook display is slow in the case of some mobile phones.

Discussion

Research and development of interactive eBook-based learning media with an actual problem approach to the history of the collapse of the Netherlands East Indies shows that this media can potentially increase the effectiveness of learning in schools. Based on the results of research carried out at SMA NU 05 Brangsong, the use of interactive learning media can overcome several main problems in history learning, such as the lack of available media and the low level of students' understanding of history materials. With interactive ebooks, students are more active in learning because they can interact directly with the media through videos, pictures, or quizzes presented in multimedia format. This aligns with constructivist learning theory, which emphasizes the importance of interaction in building student understanding (Suparlan, 2019). The 4D development model (Define, Design, Develop, Disseminate) has proven effective in producing quality learning media products. The main problems in history learning are identified in the Define stage, such as the lack of integration of actual problems in the material and learning methods that still tend to be passive. This problem is then overcome by developing learning media that utilize actual problems relevant to the material so that students can connect history with the current world situation. This improves students' understanding of the material and helps them develop critical and analytical thinking skills.

In the Design stage, the design of interactive ebooks is carried out by paying attention to various aspects, including selecting media and suitable formats for the learning environment. The developed interactive ebooks blend text, images, videos, and other interactive features to create engaging and participatory learning experiences. Based on the results of observations and interviews, students showed greater interest in learning history when they could interact directly with the media. Using features such as drag-and-drop, simulations, and interactive quizzes encourages students to be more active in learning and helps improve their understanding of the material presented.

In the development stage, the development of an interactive eBook prototype is based on the results of previous research that shows the effectiveness of this media in increasing student participation and understanding. The resulting product has a clear structure, with three main chapters that present historical material in detail and depth. The material presented not only includes information from the perspective of Indonesia but also brings the perspective of the Netherlands East Indies so that students are invited to see historical events from various perspectives. This dual perspective is based on Piaget's theory, which emphasizes the importance of cognitive conflict in learning. By presenting different perspectives, students are encouraged to evaluate and enrich their understanding (Babullah, 2022).

Interactive ebooks have also been proven to overcome several obstacles in history learning, such as limited access to physical resources such as books and computer labs. With ebooks accessible online, students have the flexibility to learn anywhere and anytime. This is particularly relevant to the trend of technology use in learning, which indicates the increasing use of ebooks among students. Based on previous research, using ebooks in history learning can increase students' interest in the material, create a more active and fun learning atmosphere, and significantly improve their understanding (Wardani et al., 2021; Utomo et al., 2021).

Finally, developing this interactive eBook based on actual problems in history learning has increased learning effectiveness and opened new opportunities in learning media innovation. The interactive eBook solves various problems faced in history learning while providing students a more prosperous and deeper learning experience. The use of interactive media is also by technological developments and the needs of today's students, who tend to be more interested in interactive and participatory digital media.

Conclusions, Implications, and Limitations

Based on research on the development of interactive eBook learning media based on actual problems in the material The Collapse of the Netherlands East Indies in class XI of SMA NU 05 Brangsong, it can be concluded that this development has succeeded in responding to the need for more engaging, innovative, and interactive learning. History learning, which is usually passive, becomes more active by involving students in interactive activities such as quizzes, discussions, and material exploration using features such as interactive maps and videos. Interactive ebooks have been proven effective in improving students' understanding of the material being taught, as evidenced by the results of the N-Gain test and the Paired Sample T-Test. Overall, experts consider this interactive eBook feasible and can positively impact students' interest and engagement during history learning.

The development of interactive ebooks based on actual problems shows excellent potential in improving the quality of learning, especially in history subjects that require a more dynamic and contextual approach. The implementation of this media makes a significant contribution to increasing student participation and understanding. Features such as interactive maps and quizzes that support active learning encourage students to think critically and analyze the material more deeply. Interactive ebooks can also combine technology with education to facilitate more flexible online and offline learning.

Although the problem-based interactive eBook media has proven effective, some limitations arise during implementation. First, technical obstacles, such as the slow loading of pages and videos and some student devices that do not support using interactive maps due to application limitations, are obstacles to maximizing the learning experience. Second, not all students have devices that support the optimal use of this media, so further adjustments are needed to ensure that the media is accessible to all students. These problems need to be considered and corrected so that the implementation of this technology-based learning media is more inclusive and optimal.

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