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Developing A Local Wisdom-based Interactive Flipbook with the Problem-based Learning Model to Enhance Critical Thinking Skills

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Abstract

Less varied and less integrated learning materials with technology causing students had limited learning materials and coverage. Thus, the local wisdom-based interactive flipbook developed in this study was expected to provide learning materials and real problems so that students are encouraged to respond critically and finally have their critical thinking ability improved. Further, this study aimed to develop, analyze the feasibility, and examine the effectiveness of a local wisdom-based interactive flipbook with a problem-based learning model on the social science subject taught to grade five at SDN 1 Bandengan Jepara. It belonged to Research and Development (R&D) as developed by Brog and Gall. In addition to data collection technqiues, tests, observations, interviews, questionnaires, and documentation were employed. Once the data were collected, those were analyzed using several initial tests, namely product viability and response questionnaire, while the final data analyses covered normality test, t-test, and n-gained test. Here, 40 students of grade five at SDN 1 Bandengan Jepara were involved as the population of this study. Findings showed that the viability of this product in each aspect was presentation 100%, content was 95.31%, and language was 93.75%. In terms of effectiveness, it gained the value of sig. (2-tailed) of 0.000 <0.05 in t test, meaning that there was a significant difference between the results of the pretest and posttest with the n-gain test of 0.454 in the medium category. To sum up, the local wisdom-based interactive flipbook is viable and effective to use in social science learning.

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INTRODUCTION

Education holds an important role for the nation's intellectual life. It is because the national education has the function and purpose of realizing a organized learning process and learning atmosphere so that students can develop their potential optimally.

Social science is a subject that covers surrounding phenomena such as economy, geography, history, sociology, and others. It aims to encourage students to have an ability to analyze problems from various perspective (Meldina et al., 2020).

Critical thinking is a basic skill developed in the 21st century learning. It is so because this skill is expected to emerge critical ideas, enable students to analyze and evaluate information they obtain and formulate problems clearly (Sari et al., 2019). According to Sholikhah et al. (2022) some efforts to realize this objective can be done by improving learning quality, encouraging students to develop their cognitive skills, implementing innovative learning models, and creating meaningful learning for students.

The learning of social science which emphasizes reading and memorizing materials sometimes make students difficult to understand. It is in line with a study by Karima & Ramadhani (2018) that the memorization in social science learning makes students' thinking skills develop less optimally.

In reality, most of students feel less enthusiastic about learning subject that has broad scope like social science because it requires them to read and memorize a lot of materials which in turn makes the learning feel boring. This phenomenon is explained in a study by Sumitro et al. (2017) that social science learning materials cover pretty broad concepts and demand students to memorize and not solve problems in it, so many tend to find it difficult to relate the materials and daily lives.

Another factor causing boredom in learning is the less varied learning sources by an social science teacher in form of the textbook provided by the government that causes students tend to be bored and less interested in following the lesson. It is stated in Ratri's study (2022), namely teachers only focus on one learning source, so students are less enthusiastic about learning social science.

The social science learning in elementary school seems passive because students keep quiet and only listen to what teachers explain. Based on a study by Komar & Winarsih (2020) the social science learning carried out in one-way direction results in students' less participation.

Similarly, the above problem happens in one of elementary schools in Jepara Regency. Based on the results of a preliminary study in form of observation and interviews with the teachers of grade five at SDN 1 Bandengan Jepara, it was found that the learning sources were limited, namely textbooks, and students' worksheets provided by the Government. These made the students less interested and passive during the learning. Certainly, it affects students' thinking skills in the way they express opinions, ask, and provide solutions to existing problems.

Regarding the previous explanation, this study developed a local wisdom-based interactive electronic flipbook with problem-based learning model to enhance elementary students' critical thinking skills. Flipbook is a computer-based interactive teaching material that utilizes technology. Here, the technology aims at enriching the learning environment and providing multimedia-based learning materials (Becker et al., 2020). Kisworo et al. (2022) explain that the existence of technology in learning can realize effective learning, more efficient lesson time, and more understandable learning materials.

A technology-based interactive teaching material can encourage students to study more active than using conventional media (Rafianti et al., 2018). Meanwhile, the use of local wisdom in the flipbook attempted to present students more attractive look with daily life examples. Furthermore, the integration of local wisdom and learning is expected to increase a sense of love for the local culture and environment.

Local wisdom is very important to be applied in learning, especially at the elementary school level because basically students will more easily understand the concept of subject matter when starting from their immediate environment. With learning materials containing local wisdom, students not only gain knowledge, but also apply the results of their knowledge in the form of practice in everyday life (Utari et al., 2016).

Local wisdom is appropriate to be implemented in problem-based learning because both deal with students' daily life problems. In details, problem-based learning presents daily life problems which involve students to actively solve the problems (Praptiwi et al., 2021). This learning model is assumed to enhance students' activeness in learning, problem solving abilities, develop better attitudes in understanding concepts and principles through observation and experiments (Sunaryo et al., 2022).

A study supporting the above ideas comes from Dayanti et al. (2021). Their study has found that the electronic flipbook used in teaching fine arts was considered more interesting and viable. Another study by Cáceres et al. (2020) revealed that critical thinking skills must be taught in education by integrating it into a subject that aims to train students to analyze real-world problems. Then, Siew & Mapeala (2016) explain that the learning process that applies problem-based learning can stimulate students' interest in finding solutions through the ideas they get by discussing together.

Based on the above elaboration, the problems in this study are: 1) how is the design of the local wisdom-based interactive flipbook electronic teaching materials used in social science learning for the fifth grade students at SDN 1 Bandengan Jepara?; 2) how is the viability of the By referring to Borg and Gall, this study followed these steps: 1) analyzing potential and problems through a preliminary study in forms of observation, interview, and documentation. Some learning problems were found namely limited

local wisdom-based interactive flipbook used in social science learning for fifth grade students at SDN 1 Bandengan Jepara?; 3) how is the effectiveness of the local wisdom-based interactive flipbook with a problem based learning model on critical thinking skills in social science learning for fifth grade students at SDN 1 Bandengan Jepara?. The development of the local wisdom-based interactive flipbook with a problem based learning model was expected to facilitate students to understand learning materials, increase students' knowledge about their area, increase students' motivation through problem-based learning processes which later can improve critical thinking skills in social science learning.

METHODS

This study used Research and Development (R&D) method by Borg and Gall (Mahardika & Siswoyo, 2021). It was done until step eight due to the need for examining the effectiveness and viability, not to mention limited time and cost to do mass production. In details, the full steps are presented in Figure 1

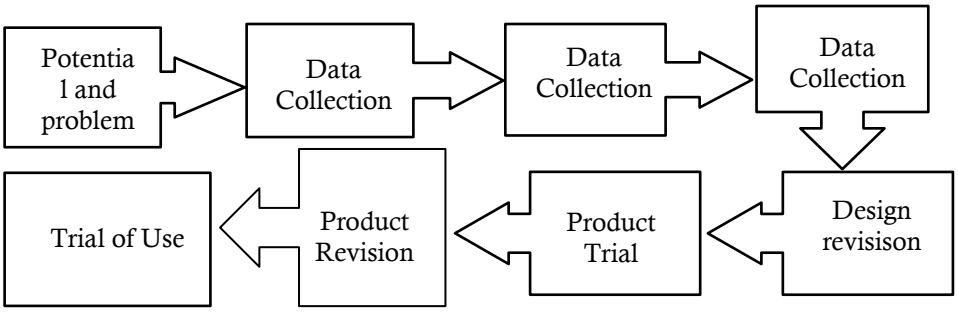

Figure 1. Borg and Gall Research and Development Stages

Learning sources and low students' critical thinking skills; 2) collecting olan the product to overcome such problem by distributing questionnaires to teachers and students; 3) designing the local wisdom-based interactive electronic flipbook based on the results of questionnaires; 4) validating the viability of the product by the experts of media, materials, and language; 5) performing revision to the product until meeting the criteria for try-out; 6) doing a small group try-out; 7) revising the product based feedback in the questionnaires filled out by the teachers and students; 8) doing the use trial after the product was revised by involving all fifth grade students at SDN 1 Bandengan Jepara.

Source of data in this study concsisted of: 1) grade five students at SDN 1 Bandengan Jepara in the academic year of 2022/2023 as the main source for the development of the product prototype amounted to 40 students; 2) teachers; 3) experts to validate the product, covering media, materials, and language experts. In a small scale trial, 9 students of grade five were involved, while the large scale consisted of 40 students, covering 16 male and 24 female. In addition, the instrument test was conducted at SDN 3 Bandengan Jepara with 30 students.

The type of test used was an objective test in the form of multiple choice to measure the critical thinking ability of social science with a total of 40 questions. Prior to the use of the instrument during pretest and posttest, there have been done a series of tests to the instrument items, such as validity test, reliability test, discriminatory power test and social difficulty level. Test items in this study were designed based on Ennis' critical thinking skill indicators in Supriyati et al., (2018), covering five aspects, namely: 1) providing an explanation; 2) building basic skills; 3) drawing conclusions; 4) providing further explanation; 5) setting tactics or strategies.

Observations were conducted to determine the existing problems in the preliminary study. It used non-participant and structured observation methods. Here, the interviews used were structured using interview guidelines with teachers to obtain in-depth information about the learning process. The documents obtained were in the form of a list of names, the number of students, and the students' scores.

This study used the questionnaires of need analysis, experts' validation, teachers' responses, and students' responses. Those all used close-ended questions. The results of need analysis questionnaires were used as consideration in designing the local wisdom-based interactive electronic flipbook in social science learning. Then, the validation questionnaire was filled out by the experts of materials, media, and language. Meanwhile, the response questionnaire was filled out by the teachers.

Data Viability and Validity

The viability of the local wisdom-based interactive electronic flipbook in social science learning on the material of human interaction with the environment and its effects was tested by an expert validator based on a feasibility questionnaire. The instruments used in the research must be of high quality, so testing was carried out as a step in the instrument development. The instrument trial was carried out by involving students other than the subjects. The test results in the form of multiple choice were then analyzed for each item regarding the level of difficulty and distinguishing power, validity test, and reliability test.

Data analysis technique

Media Viability Analysis

The instrument to assess the viability of the local wisdom-based interactive electronic flipbook was analyzed by expert validators using a percentage descriptive test with the raw score obtained divided by the maximum score multiplied by 100%. If the percentage result is 61%, then the teaching materials are declared suitable for use (Saski, 2021).

Preliminary Data Analysis

The normality test was carried out in the initial data analysis to determine whether the data to be analyzed were normal or not. In this

study, to test the normality of the data, the Shapiro-Wilk test was carried out in SPSS software version 26. If the significance value of the two tests in the Shapiro-Wilk column is > 0.05, then the data are normally distributed.

Final Data Analysis

The final data analysis was carried out using the t test, namely the paired sample t-test with the help of SPSS 26. If t count < 0.05, Ha is accepted, whereas if t count > 0.05, then Ho is accepted. Ha showed that the local wisdom-based interactive electronic flipbook was effective on students' critical thinking skills, while Ho was less. The assessment between the pretest and posttest scores was calculated using the gain index analysis obtained from comparing the difference between the pretest and posttest scores with the difference in SMI (Ideal Maximum Score).

RESULTS AND DISCUSSION

In designing this teaching material product, the computer software was utilized to make the presentation look attractive. It is in association with a study by Gusman et al. (2021) that a flipbook-based poetry writing digital teaching material can support the learning process to be more engaging because of the use of technology.

The implementation of electronic flipbook is in line with the demand of the 21st century learning, namely utilizing technology in learning to encourage students higher thinking skills through the innovative learning. In their study, Rahmawati & Atmojo (2021) state that 21st century learning is characterized by the use of digital-based learning media by utilizing technology and innovatively packaged learning processes, so as to improve students' thinking skills.

Inside the product, there can be found other things than texts, such as figures, learning videos, and interactive quizzes. Certainly these features can engage students to be more enthusiastic and active in learning. Rahmawati et al. (2022) explain that flipbook is an interesting teaching materials because it can liven up learning.

All materials available in the flipbook are based on local wisdom, namely the influence of Jepara community interaction on their surroundings in terms of social, culture, and economy, such as social relations in fishing villages, Larungan traditions, and various fish processing industries in Jepara Regency. Learningactivities by presenting materials containing local wisdom can help students build comprehensive knowledge by observing and analyzing social events which in turn are expected to develop students' critical thinking skills based on their learning experiences.

The above findings are reinforced by a study by Hunaepi et al. (2020) the integration of learning and local wisdom can make students curious about materials being studied and enhance their problem solving skills. Besides, critical thinking can develop optimally by providing analyzing real phenomena in students' surrounding environments. This is in line with a study by Permana & Sujana (2019) which states that social science is related to contextual learning because the learning materials studied are aimed at understanding community relations in everyday life and realizing meaningful learning which is characterized by student activity in critical thinking during learning.

The product developed in this study was designed based on the cognitive learning theory by Jean Piaget. Also, it was adjusted to elementary school students' thinking stages aided by real examples in daily life, so it is expected that students will be curious about exploring their own understandings through experiences. Rahmatih, et al's study (2020) supports the above findings that elementary school learning must be adjusted to students' characteristics at concrete operational stage (7 to 11 years old) by providing materials containing surrounding environments aiming at familiarizing students with the learning materials.

Initially, the draft of the flipbook was made in Microsoft Word software then saved in PDF format using Flip PDF Professional. The

presentation of the PDF file can be seen in the following Figure 2.

Figure 2. The Display of the local Wisdom-based Interactive Electronic Flipbook Design

Further steps after the conversion to PDF were editing processes, covering adding animation, music, interactive quizzes, and learning videos to clarify the learning materials for later being compiled into a flipbook form. Figure 3 shows the display of materials in the flipbook.

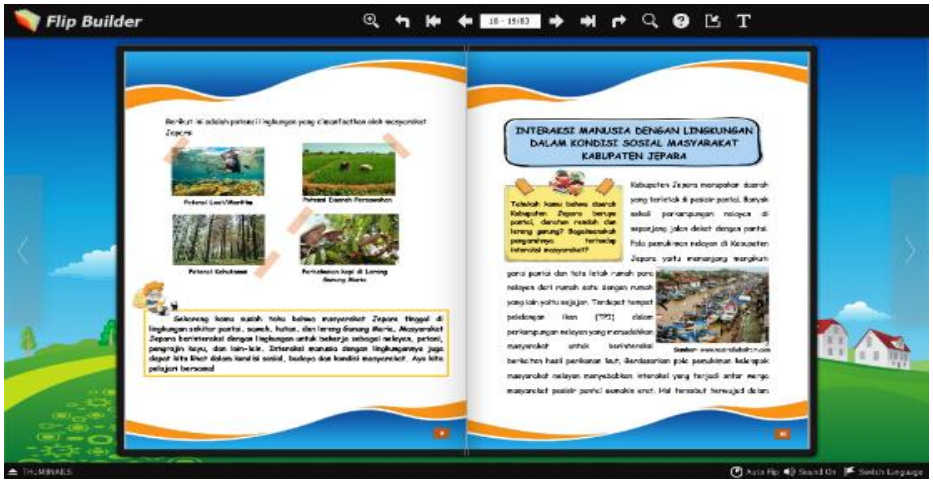

Figure 3. The Display of Subject Contents in the Electronic Teaching Materials

students. The underlying assumption behind this ideas are from a study done by Iswara et al. (2018), namely teaching materials should engage students' interest in learning.

With regard to grammar, this product presents proper language and readability adjusted to the students at fifth grade, such as the vocabulary students usually hear, and effective sentences. In short, it uses communicative language based on students' developmental cognition. It is similar to that of Purwani's study, (2020) which shows that the use of clear and The teaching materials in this flipbook are designed in accordance with the learning objectives for the ease of access. As presented in the above figure, the materials are supported with attractive look, illustrations, clear pictures, full of colors, and handy access for both teachers and communicative sentences can make it easier for students to understand the material content of the products developed,

namely picture story books, so they are suitable for use as learning resources.

From the results of the recapitulation of component assessment validation carried out by media experts, material experts and linguists, it can be concluded that the local wisdom-based interactive electronic flipbook design is viable to use. The following Figure 4 shows the overall data from the recapitulation of the assessment.

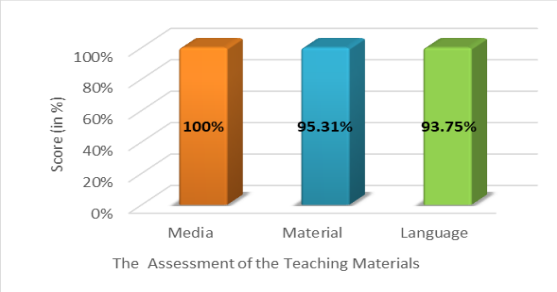

Figure 4. The Diagram of The Assessment Validation of Each Component

Based on Figure 4, the media expert gave score 64 with the percentage of 100% categorized

very viable. In addition, the language expert gave score 61 with the percentage of 95.31% or categorized very viable for the content viability. Meanwhile, the language component got score 60 or 93.75% and declared very viable. Once the validation has been done, the flipbook was said to be viable to be used to teach the material of the human interaction with environment and its effects in social science learning.

Regarding the validation results, the product was concluded attractive and easy to operate independently by the students, so students are expected to get motivated to read and use the prototype. Accordingly, a study by Nurbaeti (2019) explains good teaching materials must have attractive illustration designs and be easy to use by students.

The developed flipbook is relevant to the learning competences, including core competences, basic competences, indicators, and objectives proved by the results of media validation, so it can be concluded this product can create a good learning atmosphere. According to a study by Husada et al. (2020) teaching materials are not only used to assist the learning process, but also meet the achievement of basic competencies.

A study by Utami & Lena (2022) reinforces this current study findings. In their study, the results of the media validity test percentage is 92.25%, material validity is 81.25%, and language is 78.33%. From the results of the study, the integrated thematic learning teaching materials based on Flip PDF Professional in Grade IV SD Negeri 24 Parupuk Tabing can be declared valid and practical.

Another relevant research is by Farih & Nasikhah (2022). The results of this study reveal that the thematic e-book based on project based learning of Qur'an using the Flip PDF Professional application is categorized as very good or viable with the average percentage gain obtained from the validation test of material experts, media experts, and educator practitioners is 86.73 %.

The effectiveness of local wisdom-based interactive electronic flipbook can be seen from the students' critical thinking skills. Pretest and posttest scores are guidelines to determine the level of students' critical thinking skills. The results of the pretest and posttest critical thinking skills are presented in Table 1.

Table 1. The Results of Critical Thinking in Pretest and Posttest

Information	*Pretest*	*Postest*
Mean	64.43	80.93
Highest Score	87.5	95
Lowest Score	30	65
Number of Students Passed	18	34
Learning Mastery (%)	45%	85%

In this study, the learning model applied while using the flipbook was the problem-based learning model. Through PBL students critical thinking skills are expected to enhance so that they can face challenges in daily life because PBL trains students to have an open, critical, communicative, and reflective mindset. It is in line with a study by

Hagi et al. (2019) that the problem-based learning model can improve students' critical thinking skills that affect learning outcomes and provide benefits for students to overcome real problems in the future. Some activities to stimulate students' critical thinking in PBL are asking questions about a real problem in the surrounding environment, inviting students to discuss with each other related to learning materials, carrying out brainstorming activities through group work, giving open-ended questions according to students' level of understanding of the learning material that has been studied. Skills in solving problems are needed in the learning process so that elementary school students, especially high grade students are accustomed to using their cognitive abilities in critical thinking.

The above ideas are reinforced by Saputri's study (2020) which explains that learning activities that apply the problem based learning model can improve the critical thinking skills of fifth grade elementary school students from the lowest score of 0.61% to the highest of 18.15%. This is because the problem based learning model provides encouragement to students to solve real problems by collecting various information through observations, discussing together, and conducting joint evaluations with the teacher.

After obtaining the pretest and posttest data, the normality test was performed to determine the statistical analysis technique to be used. The results of the normality test using the Shapiro-Wilk test with the help of SPSS 26 are presented in Table 2.

Table 2. The Results of Normality Test on Pretest and Posttest

	Shapiro –Wilk		
	Statictic	Df	Sig.
Pretest	.949	40	.070
Postest	.953	40	.095

Based on Table 2, it is known that the pretest data had a significance value of 0.070 or more than 0.05 (0.070 > 0.05), meaning that the data were normally distributed. The results of the normality test on the posttest data yielded a significance value of 0.095 or more than 0.05 (0.095 > 0.05), meaning that the data were normally distributed. The data in the table showed that both data in all tests were normally distributed, so the analysis technique used next was parametric statistics.

After the two tests data were declared normally distributed, the mean difference test was conducted by using a parametric statistical analysis technique. The mean difference test used the t-test test formula with the paired sample t-test. Table 3 shows the results of the average difference between the pretest and posttest using SPSS 26.

Table 3. The Mean Difference Test of Pretest and Posttest using Paired Sample T-test

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	df	Sig. (2-tailed)
Pair 1	Pretest - Posttest	-16.56	8.35	1.32	-19.23	-13.89	-12.54	39	.000

Table 3 shows the significant difference in the critical thinking skills before and after the treatment with the significant value less than 0.005. The increase can be seen from the gain value as presented in Table 4.

Table 4. The Results of N-Gain test

Category	Score
Pretest	64.37
Posttest	80.93
Mean Difference	14.5
n-gain of class	0.454
Criterion	Currently

The diagram of improvement before and after using the local wisdom-based electronic interactive flipbook during the pretest and posttest is showed in Figure 5.

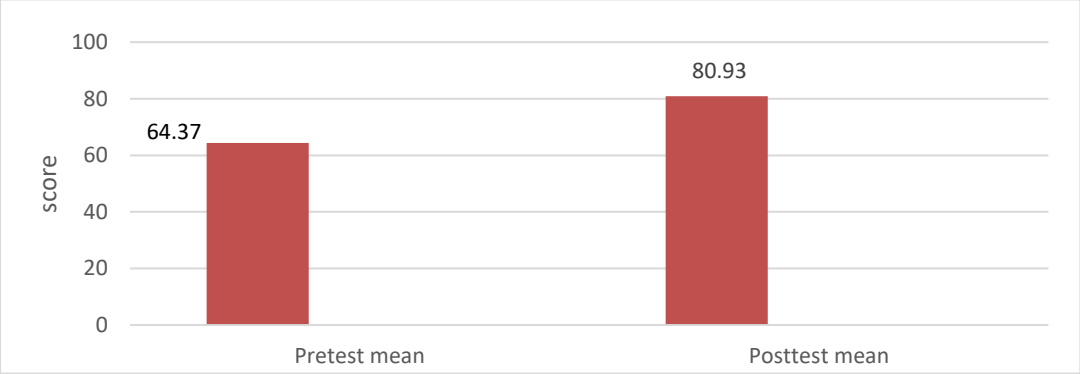

Figure 5. The Increase in Critical Thinking Skills

Known that the increase was 14.50. Sari et al. (2022) explain that the problem-based learning model contains learning steps that can encourage students to be directly involved in learning so that it can increase student's activeness which can later affect students' critical thinking skills. Then, Awalsyah et al. (2018) states that flipbook media can make the learning process run effectively because students are interested in being directly involved in learning with a fun and interactive learning atmosphere.

A study by Marvelia & Rukmi (2022) shows that the results of media validation got a value of 91% and material validation got 91%, indicating that the e-flipbook learning media is very valid. Another relevant research is by Ulandari & Syawaluddin (2022). The results of their study revealed that ICT-based flipbook

teaching materials that present an attractive display in the form of learning videos and pictures are appropriate to be used as learning resources for natural resource materials in grade four.

Another supporting study is from Friska et al. (2022). Based on the results of the evaluation criteria for the validation of language, media, and material their module in form of PBL-based flipbook maker for grade four obtained the score of 86.30% and was included in the very viable category with the practicality value percentage of 83.22% which was categorized as very practical.

From these data, it was known that the use of the local wisdom-based interactive electronic flipbook with the problem-based learning model was effective for the grade five students at SDN 1 Bandengan Jepara in social science learning. It was.

CONCLUSION

According to the findings, the local wisdom-based interactive flipbook has been proved to increase students' critical thinking of the materials by associating with environmental conditions around students in the form of interaction between the Jepara community and the environment so that students' thinking power develops optimally. Then, in terms of experts' validation, the media expert gave the presentation component of 100%, the material expert gave an assessment of the content viability component of 95.31%, and the language expert gave an assessment of the linguistic component of 93.75%. Overall the local wisdom-based interactive flipbook with the problem-based learning model can effectively be implemented in social science learning as a means to increase the critical thinking of the grade five of elementary school students by having the n-gain value of 0.454.

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