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Development of E-Books Oriented to Banten Culture Integrated with Challenge Based Learning to Improve Elementary School Students' Creative Thinking Skills in Science Learning

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Abstract

Future demands are very complex, including the ability to generate new ideas, find unique solutions, and think flexibly and elaboratively. The purpose of this study is to develop students' creative thinking skills, especially in the subjects of Natural Sciences and Social Sciences (IPAS), which are often neglected in the learning process using e-books. This study uses the Research and Development (R&D) method with the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. Data analysis was carried out using the one group pretest-posttest model. The subjects of the study were fifth grade students of SD Negeri 5 Banjarsari, Cipocok Jaya District, Serang City. The results of this study indicate that the developed E-Book is feasible and effective for use in the learning process, as evidenced by the assessment of learning design experts obtaining a score of 97.78% (very good), the assessment of content experts obtaining a score of 90.62% (very good), and the assessment of learning design and media experts obtaining a score of 97.50% (very good). The product effectiveness test also showed a significant difference between before and after using the E-Book. The results of the study concluded that the Banten Culture-oriented E-Book integrated with Challenge Based Learning (CBL) was able to improve students' creative thinking skills in science learning. The E-Book also received positive responses from both students and teachers, both in terms of content, design, and usability in the learning process. The recommendation is that this E-Book can be said to be an effective alternative learning media to improve the quality of education in elementary schools, especially in science learning.

Keywords: Book, Banten Culture, Challenge Based Learning, IPAS

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INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals and the skills needed by themselves and society (Rahman et al., 2022).

Education is an important part of a country's efforts to improve the quality of life of all its citizens (Mustaghfiroh, 2020). Ki Hajar Dewantara sees education as a process of providing demands to increase children's potential (Bahri, 2023). Without ignoring the role of other components in education, this goal will determine success in the process of forming high-quality individuals (Aziizu, 2015).

According to the goals and functions of national education stipulated in Law Number 20 of 2003, national education aims to develop the character and civilization of the nation to educate the life of the nation. To achieve this goal, the Minister of Education and Culture Nadim Makariem launched a new program called "independent learning" (Bahri, 2023).

Furthermore, as part of the recovery of learning after the COVID-19 pandemic, the Ministry of Education, Culture, Research and Technology launched the Independent Curriculum, previously known as the Prototype Curriculum. This prototype curriculum is the embryo of the birth of the independent curriculum. The independent curriculum aims to restore and improve student learning losses due to the COVID-19 pandemic (Mustaghfiroh, 2020).

Learning seems interesting, fun, and meaningful so that teachers as educators and students as learners can achieve educational goals. Independent learning includes free conditions for teachers and students in achieving learning goals, methods, materials, and evaluations (Rahmadayanti and Hartoyo, 2022; Bahri, 2023). To improve the quality of Indonesian human resources, especially in the era of the industrial revolution 4.0, the "Independent Learning" program has four main policies: comprehensive USBN assessment, replacing UN with evaluation assessment, shortened RPP, and more flexible PPDB zoning (Belajar et al., 2020; Rahmadayanti and Hartoyo, 2022).

The purpose of science is to foster curiosity and interest in learning, participate in active activities, understand oneself and one's environment, and gain knowledge and understanding of science concepts (Agustina et al., 2022). Natural and Social Sciences (SHS) are fields of science that focus on understanding living and non-living things in the universe and how they interact with each other. It also includes the study of human life as a social being by combining various logical and systematic knowledge, such as cause-and-effect analysis.

When elementary school students study their surroundings, they have the ability to see and experience natural and social events simultaneously. The habit of observing or observing, and exploring is an important foundation before students learn deeper concepts and topics about science and social studies subjects that will be studied in junior high school (Alfatonah et al., 2023; Apriliani et al., 2023). In junior high school (SHS), social studies education focuses on building basic science literacy. Science is the foundation used by students to prepare themselves to study more complex natural and social sciences (Alfatonah et al., 2023). Science lessons also focus on economic activities such as production, distribution, and consumption. In science learning, students can participate in projects to learn the three types of economic activities. Furthermore, activities that correlate with the Pancasila Student Profile Strengthening Project with the theme of entrepreneurship are given to increase knowledge. At every level of education, students must have a Pancasila student profile. Each graduate profile can demonstrate traits and abilities that are in accordance with the main principles of Pancasila (Ratna Yulias Rahmawati, Aprilia Putri Wening, 2020).

The science material also explains the material on regional cultural heritage. An effective way to introduce, preserve, and appreciate cultural diversity and prepare the younger generation to become open citizens, have a national personality, and appreciate plurality in society is to integrate cultural heritage into education (Cahyani, 2024). The integration of cultural heritage material in science subjects is to increase students' understanding of global diversity. This is part of an effort to introduce students to various aspects of Indonesian culture and emphasize the importance of diversity as an integral part of national identity. Global diversity in the context of education also includes understanding and appreciation of cultural diversity around the world but also recognition and appreciation of diversity that exists within the country (Yudha and Aulia, 2023).

Especially for local cultural heritage. Diverse local cultural heritage gives us the opportunity to learn local wisdom as a way to deal with problems that have occurred. However, this local wisdom is often ignored, considered irrelevant to the present or the future. This has an impact on many cultural heritages that are old and neglected, neglected, or even abused. However, many countries that do not have a strong history are actually looking for their identity from the remains of history and cultural heritage that are few (Upaya, Nya and Pendahuluan, 1991).

Judging from the learning objectives above, problem-solving and creative thinking skills are the abilities expected from the curricular objectives of the science subject. However, the objectives and expectations of the subject are not entirely in accordance with the actual conditions in the field. One of the problems that often occurs is that most teachers only concentrate on developing low-level skills, such as memorization and understanding of concepts, while creative thinking and analytical skills are often ignored. Teachers often use conventional teaching strategies such as lectures and Q&A when teaching (Ananda, 2019).

The definition of creative thinking is the process of producing new, innovative products, which comes from activities that have been directed according to predetermined goals (Samura, 2019). Torrancce (in Fauziah, et.al, 2021) defines several criteria for assessing creative thinking as follows: (1) Strength, the ability to generate ideas quickly; (2) Flexibility, the ability to think or consider various approaches to a problem; (3) Innovation, the tendency to produce ideas that are different from others; and (4) Elaboration, the ability to think and apply an idea in depth. Success in problem solving depends on creative thinking skills, which can help people achieve convincing results or achievements through the development stage.

With the challenge-based learning model, students can work together to solve problems. This framework contains challenges from big concepts related to urgent, realistic, and real problem contexts that require real action in the form of solutions published to the public. By integrating the challenge-based learning model, students can construct their own knowledge, making it easier for them to solve problems (Ardiansyah, Mahfiroh and Mulyono, 2024).

In 2008, the concept of challenge-based learning was introduced by the technology company Apple and proposed as a solution for the school system to meet the needs of the 21st century workplace. According to Nichols & Cator, Challenge Based Learning is an engaging multidisciplinary approach to teaching and learning that encourages students to use the technology they use in their everyday lives to solve real-world problems. Challenge Based Learning is collaborative and practical, asking students to work with peers, teachers, and experts in their communities and around the world to ask good questions, develop deeper knowledge of the subject, accept and solve challenges, act, and share their experiences (Leijon et al., 2022).

METHODS

The subjects in the study were 7 content experts and learning media, and 28 students. The role of content experts and media experts is to provide values, comments, and suggestions related to theoretical knowledge on the material and media to ensure scientific truth in the product. While the role of practitioners and students is as assessors who always provide comments from the perspective of media users.

This development research process can be described as follows. First, the analysis stage includes conducting a needs analysis and problem identification. This will define what will be studied and how the textbooks used in this study are available and relevant.

Second, the design stage, where the hardware and software that will be used to design the E-Book, create assessment instruments for the E-Book, and compile the Learning Implementation Plan. Third, the development stage, where the E-Book production activities in accordance with the predetermined design are discussed. The final results of the development stage are tested for feasibility and practicality before being used in the development process. Individual and small group trials are conducted to assess the feasibility of this product. Fourth, the implementation stage, aims to find out how users respond to E-Books for learning activities through product effectiveness tests. Fifth, the evaluation stage determines whether the development of the E-book media that has been designed is successful or in accordance with the planned expectations. Analysis of data obtained with a Likert scale is used to determine the feasibility and practicality of the product. Validity, reliability, difficulty level, discrimination power, and distractor effectiveness tests have been carried out on the instruments used.

The data obtained from this development research consists of qualitative data and quantitative data. Qualitative data in this study relates to data obtained in the form of criticism and suggestions as well as input from material experts, media experts, and language experts. The results of the data analysis are used as a basis for revising the product to be developed. Quantitative data in this study were obtained from the results of filling out an assessment questionnaire about the media from material experts, media experts, and language experts as well as observation sheets whose measurements used a Likert scale

The data obtained from the questionnaire score results are then analyzed with the frequency of answers for each alternative chosen by the respondents multiplied by 100%. The percentage of eligibility results are converted into categories or eligibility criteria based on the following assessment qualification table:

Table 1. Assessment Qualifications

(%)	Eligibility Criteria	Description
P≤ 20	Not Valid	Revision
20 <P≤ 40	Less Valid	Revision
40 <P≤ 60	Quite Valid	Minor Revision
60 <P≤ 80	Valid	No Revision Required
P> 80	Very Valid	No Revision Required

Data collection in the study was carried out using a questionnaire. A questionnaire is a method of data collection carried out by providing written statements to respondents to be answered. The instrument is used to obtain results from reviews by experts. The instrument grid used is in Table 2, Table 3, Table 4.

Table 2. Subject Content Expert Instrument Grid

No	Aspect	indicator	item
1	Material	1. Compliance of indicators with basic competencies	3
		2. Compliance of learning objectives with indicators	1
		3. Compliance of materials with tujuan pembelajaran	
		4. The material presented can be understood	2
2	Message delivery	1. Accuracy of grammar used	1
		2. Accuracy of spelling in the material	
3	Material grammar	1. The material provided is easy to understand	1
4	Material content	1. The level of breadth of the material is in accordance with the characteristics of the students	4
		2. The depth of the material presented	
		total	12

Table 3. Learning Design Expert Instrument Grid

No	Components	Indicators	Item
1	Suitability of Objectives to Media Accuracy and clarity of discussion and grammar	1. Conformity of learning objectives with learning indicators	3
		1. 2. Conformity of material with learning objectives	
		2. 3. Material in the learning E-book is packaged in a coherent and systematic manner	
2	Student interest/attention	1. Language used in the E-book	3
		2. Clarity of description and discussion in the E-book	
3	Presentation of E-book material	1. E-books can increase students' creativity	3
		2. Increase students' interest/attention	
4	E-book media design	1. Facilitate students' understanding of the material	1
5	Components	1. Conformity of colors and animations presented in the E-book	2
		2. Use of images in the E-book can increase creative abilities	
		total	12

Table 4. Instrument Grid for Learning Media Expert Testing

No	Aspect	Indicators	item
1	Visual Quality	1. The attractiveness of the animation display	4
		2. Can attract students' attention	
2	Discussion of material	1. The attractiveness of the material interspersed with quizzes	4
		2. The attractiveness of the material interspersed with puzzles	
3	Eligibility	1. The suitability of the media to the objectives	2
		2. Suitability to the character of the students	
		Total	**10**

RESULTS & DISCUSSION

Result

The results of the needs analysis show that complete digital learning resources are needed for teachers and students. This will include E-books that have pictures, and quizzes and general knowledge for students about the subject matter of Science on Cultural Heritage. The results show that the school where the research was conducted at SD Negeri 5 Banjarsari has sufficient facilities to support the development of this E-Book product. The Competency Achievements (CP) and Learning Indicators selected to improve students' understanding of learning are based on the learning needs analysis that has been carried out.

The goal is that the media developed can help students learn according to learning competencies. In this study, the first stage carried out was analysis. At this stage, there are three things that are analyzed, namely the analysis of student characteristics through the interview stage at school, media needs analysis, and content needs analysis. The results of the analysis of student characteristics in grade V experienced boredom and lack of learning motivation because in learning activities the teacher became teacher centered and used a method that was less creative and innovative, namely the lecture method. Then from the results of the media needs analysis, it was found that teachers need contemporary media that is easier to understand by elementary school students today who are included in the alpha generation where learning media related to technology always gets the main attention among children in the current era, so the learning media that is developed or produced is created in a package in the form of an E-Book. Meanwhile, from the results of the content needs analysis, seen from the results of teacher interviews, it was stated that students were lacking in their learning outcomes, one of which was in the subject of Science.

The next stage is media design. At the design stage, the products produced are E-books, E-Book component designs using tools such as Flip PDF Corporate, and Canva, compiling materials for E-Books, and making assessment instruments. At the development stage, E-Book production activities are in accordance with the previously determined design, and the final product of the development stage. After that, prepare a product assessment instrument that is given to experts and students to determine the feasibility of the product that has been made. The next stage is development. Where this stage begins with the activity of creating the design and content of the E-Book material oriented towards Banten Culture integrated with challenge-based learning.

The design and material for this E-Book were created using the Canva application. Then the material entered was adjusted to the indicators contained in the independent curriculum for grade V with a sub-chapter on cultural heritage material in the subject of Science. Furthermore, the material presented was written in easy-to-understand language and animations/illustrations were also included to support the delivery of the material. After being created one by one, they were then combined into one file using the Flip Chart application. Then after that, a product validation questionnaire was created and pre-test and post-test questions were created which were used to measure the results of the effectiveness test of the E-Book media that had been created. After that, product testing activities were carried out using a questionnaire instrument given to experts consisting of learning material experts, design experts and learning media.

The next stage is implementation where at this stage the E-Book that was created is then applied in learning activities to determine the effectiveness of the media developed on students' creative thinking abilities which is measured by providing pre-test and post-test questions. The last stage is Evaluation, where this evaluation is carried out based on the results of the pre-test and post-test score analysis using a correlated t-test. To conduct a t-test, the previous stage that must be done is to conduct a prerequisite test by looking for a normality test of data distribution and homogeneity of variance.

Table 7. Results of the Product Test of the Banten Culture-Oriented E-Book Integrated with Challenge Based Learning

No.	Test Subject	**Percentage**	Qualifications
1.	Learning Material Expert	90,83%	Very Good
2.	Learning Design Expert	91,11%	Very Good
3.	Learning Media Expert	95,28%	Very Good
4.	Individual Response Test	90%	Very Good

Based on the results of the product test in Table 7, it shows that the results of the product test, both in terms of material, design, media and through individual response tests, obtained very good qualifications, meaning that the E-book media is suitable for use in the learning process. After that, the improvement stages were carried out regarding the products that had been assessed by experts and students who were used to improve the product. The following are the final results of the E-Book product that has gone through the improvement stages, which can be seen in Figure 1 below.

Figure 1. Display of Banten Culture-Oriented E-Book Products discussion

The product produced in this study is an E-book oriented to Banten Culture integrated with challenge-based learning to improve the creative thinking skills of elementary school students in science learning that has gone through a product feasibility test carried out by experts and students. The product manufacturing process is guided by or refers to the ADDIE model. Based on the results of the study, it was found that this E-book is feasible and effective to be applied in learning activities. It is said to be feasible because it has been adjusted to the characteristics and learning needs of students. The characteristics of elementary school children, especially in grade V of elementary school, are related to their cognitive level, including concrete operations. This means that students need media to concretize information because they cannot think abstractly (Saragi and Tageh, 2022; Susanti and Wibawa, 2022).

The characteristics of the E-Book that was created have also been adjusted to the needs analysis conducted by interviewing homeroom teachers who found that it was necessary to create interesting learning media that helped students learn to think critically. In addition, the characteristics of the E-Book have also been adjusted to the analysis of the characteristics of students who use the E-Book. This E-Book is also equipped with interesting animations and explanations that are easy for students to understand. One of the characteristics of e-books is that they allow others to learn independently and not depend on others (self-instruction), all learning materials are contained in the e-book (self-contained), do not need to be used with other teaching materials (standalone), and the information presentation is helpful and user-friendly (Rananda, no date; Arni Yunita, SMA Negeri and Barat, 2019).

The Banten cultural heritage material selected to be delivered in this E-book product has been adjusted to the learning achievements and learning objectives. So that it can help teachers understand the limitations of the material given to students so that the material delivered is not too broad which can make it difficult for students to understand the concept of the material, because students' knowledge abilities in processing information are still specific (Kadek Dwi Puspita Sari and Komang Ngurah Wiyasa, 2021; Laksmi and Suniasih, 2021). Understanding and appreciating cultural heritage is the first step to strengthening diversity and appreciating differences. By understanding

cultural heritage, a person can better appreciate the diversity that exists around them, both in local and global contexts. For this reason, media is needed that can motivate students to carry out cultural literacy in their respective regions.

Cultural literacy is a skill or ability to process information and knowledge in the field of culture (both material culture and non-material culture) for life skills (Rohman, 2023; Cahyani, 2024). In other words, the birth of this product can create student creativity in literacy by understanding and appreciating their cultural heritage. This E-book uses easy-to-understand language that is adjusted to the characteristics of students whose users have used the EYD (enhanced spelling) guidelines. The use of language and content in learning media must be considered and adjusted because the level of student understanding differs at each age level and their class level (Dian Anggraeni and Kustijono, 2013; Kartika et al., 2023; Putri, Suarjana and Bayu, 2023). Then when viewed in terms of design, this E-Book gets very good qualifications. This media is designed using a challenge-based learning approach where students are given a test of understanding of Banten culture that requires a challenge in the real world which will later produce a product according to their creativity.

By overcoming challenges, students can learn and show what they are capable of, and can imagine themselves in an achievement that they have never considered before and this will produce creative thinking power (Willis, Byrd and Johnson, 2017). This challenge-based learning approach involves students in real-world problems and makes them participate in developing solutions to certain problems. Challenge Based Learning offers open general issues where students will determine the challenges they will face, the goal is to process competency development that will ultimately produce a product in the form of something real or a solution to the challenge (Kohn Rådberg et al., 2020; Membrillo-Hernández et al., 2021). Challenge Based Learning encourages students to have creative thinking skills because it has clear goals and materials, valid evaluation questions, and directed activities where students will be more active in solving problems, thinking critically in analyzing existing problems and facts, and finding concepts and principles based on real experiences, so that learning becomes more meaningful (Nawawi, 2017).

Students' interest in this E-Book makes it easier for students to understand the material and easier to explain what they have read without further explanation from the teacher. Moreover, because the material taught is about cultural heritage, they are also more familiar with Banten culture in general, namely the culture that comes from where they come from and live.

CONCLUSION

Integrated Challenge-Based Learning Oriented to Banten Culture using E-Books received the predicate of feasible, practical, and effective in influencing critical thinking skills in science subjects for grade V of elementary school. The Challenge-Based Learning Model in E-Book-Based Science Learning is one of the constructivist learning. The Challenge-Based Learning Model invites students to think creatively in solving problems related to learning. Through Challenge-Based Learning, students can have the ability to think creatively when given a challenge, then think critically in facing a problem, have the ability to interpret plays a role in observing characteristics, interpreting data, and expressing the meaning of various experiences, the ability to evaluate plays a role in assessing the credibility of statements, representations of others, and assessing the logical strength of statements, descriptions, or questions, the ability to conclude plays a role in drawing conclusions or hypotheses based on facts, judgments, beliefs, principles, concepts, or

representations, the ability to explain plays a role in describing phenomena, causal relationships, and strengthening arguments by using empirical data as a basis for explanation, and the ability to teach independently plays a role in directing oneself to help students manage thoughts, behaviors, and emotions in order to successfully direct themselves in the learning process.

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