The Development of e-Book Based on Problem and Project Based Learning Assisted by Book Creators

Dewi Zakiyatus Sholihah[1](*), Naniek Sulistya Wardani[2], Aris Kukuh Prasetyo[3]
[1,2,3] Satya Wacana Christian University, Salatiga, Indonesia

Abstract

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The aim of this research is; 1) develop an initial e-book assisted PPjBL approach platform Book Creator for fourth grade elementary school students; 2) describes the initial draft form of teaching materials in the form of an e-book based on the PPjBL approach assisted by a platform Book Creator for fourth grade elementary school students. This research is a kind of research and development or R&D (Research & Development). This study uses the Sukmadinata modification research stage which consists of 3 stages, such as; preliminary study (stage 1) consists of library research activities, field observations, and preparation of an initial draft; development (stage 2) consists of the product preparation stage, design validation, improvement, product testing, product improvement and determination; and product testing and socialization (stage 3). Data was collected using test and non-test techniques in the form of observation. This study uses qualitative data analysis techniques. Based on the results of the study, it was concluded that the e-book developed was "Very Appropriate" with a percentage of 81%. Moreover, based on the results of the product trials at a 95% confidence percentage obtained that the average value of the students after using the e-book was equal to 80.

Keywords: e-book, PPjBL, book creator, teaching materials

(*) Corresponding Author: 952021587@student.uksw.edu, 085712285005

INTRODUCTION

The term industrial revolution 4.0 is used to denote enormous developments in the field of digital technology. The rapid development of technology affects various areas of people's lives, one of them is in the field of the education in Indonesia (Tangahu et al., 2021). Technology has been considered as one of the most important elements in the advancement of the education system (Al-Qatawneh et al., 2019). The development of technology is the main driving factor for changes in the education system, where learning must begin to be oriented to the use of information and communication technology (ICT) in the process. Thus the learning process does not need to be done in the classroom (Cholily et al., 2019).

ICT has produced a very large effect on teaching and learning activities for both teachers and students (Ghavifekr & Rosdy, 2015). The ease of access to information in the 21st century gives rise to the characteristics of students who like freedom in learning, like practical new things, comfortable with an internet-connected environment, like to communicate with images, symbols, short attention span, can interact with complex media, and exist in the social media (Pujiriyanto, 2019). Students in the 21st century depend on the internet to find various

information quickly and without limits. This causes the creation of students who are more active and creative during learning. Learning resources used are not only conventional, but also use a variety of learning resources that can be accessed easily through digital technology. In addition, the learning process has also changed from being teacher centered to student centered. Learner-centered learning will foster an independent attitude to the students.

To face life in the 21st century, it is necessary to prepare a generation that is able to compete, such as the generation of 21st Century Skills. The 21st century learning is oriented to the development of students' abilities such as critical reasoning, communication, collaboration, creative thinking, and innovation (Sumardi et al., 2020). In the 21st century, it is easy for students to track information and knowledge through the internet, so that learning is more focused on the ability of students to analyze, evaluate, and create.

Therefore teachers act as facilitators in 21st century learning. Teachers are expected to be able to develop and implement ICT-based learning that supports the development of students' abilities. Educators in Indonesia are required to improve competence and quality in order to be able to apply 21st century learning well. The competencies needed by the teachers include the teaching competence, the use of technology, professionalism, and the competence in learning (Pineida, 2011).

Technological developments that have led to the emergence of various sophisticated devices such as smartphones, tablets, and laptops can be utilized to maximize the learning process. The various devices that the students have are not only for playing games and social media, but can also be used as a learning tool. The use of gadgets and the application of ICT in learning motivate the students for being more interested in teaching and learning activities. On the other hand, educators must also learn to use various devices and online learning resources to ensure that their material is interesting and up to date (Haleem et al., 2022). So there is needed to have the teaching materials that can accomplish the needs of students in the current 4.0 era.

All digital era in human life is the result of technological sophistication. This can be seen in almost the whole parts of human life, including books as a support for humans when increasing knowledge. The digital era increasingly exists in the development of human life as evidence of human success in technological development (Makdis, 2020). Technological innovation has now reached the world of education. In the world of education, the use of technology begins with teachers who use technology to help achieve learning goals. However, at this time the use of technology begin to reach the students. The students are taught how to use technology responsibly and strategically, which is able to help them in making decisions and developing self-discipline. Technology in education can help students prepare for lifelong learning. This technology provides students with a virtual world and the freedom to access digital knowledge according to their learning style (Haleem et al., 2022). E-learning and m-learning programs provide students and teachers to access a broad collection of information content. While technology will play an important role in shaping the future education, as well as ensuring that the new teaching tools will be used effectively (Haleem et al., 2022).

The importance of using technology in education makes many technological innovations in education. One of the technological innovations in learning that has been developed is through e-books or electronic books that are used as learning media. Some developed countries have used e-books as a medium of learning, while developing countries such as Indonesia have not been able to use it to its full potential (Embong et al., 2012) The Indonesian government has begun to initiate the use of technology as a tool in the world of education to obtain information. One of them is by replacing printed books with electronic books (e-books). Electronic books are one of the solutions offered by the Ministry of Education and Culture of the Republic of Indonesia to the problem of the high cost of printed books and the reduction of trees logging as the basic material for paper making.

E-books can be used as learning materials in the classroom with easy access to various types of learning media in one tap (Embong et al., 2012; Liu et al., 2020; Turel & Ozer Sanal, 2018; Zarzour et al., 2020). E-books are easier to store and don't need much space. E-books are also easy to store, access, and publish. A platform that can be used to create e-books is Book Creator.

For students, Book Creator is a new thing that can increase the enthusiasm and curiosity of students. The use of Book Creator is very suitable for students to use in the current industry 4.0 era. Media Book Creator combines several types of media in learning. Learners easily access a video, an audio, and an images. Students are also facilitated in accessing various supporting sources that are presented through the links in the e-book. Book Creator is a form of hypermedia that is presented in the form of a book.

There are several things to consider when creating an e-book such as the content of the book according to the characteristics of the students, the content of the book, the convenience function, and the appearance of the book so that students are interested in reading. The research of Kumnuansin & Khlaisang (2015) shows that one way to encourage people to read is because of the interesting content, materials, covers, illustrations, and reading innovations that are different from books in general. The use of e-books must be balanced with an attractive appearance and motivate students to use the e-book, so that learning objectives can be achieved (Ghofur & Kustijono, 2015). According to the design of the e-book, it is necessary to develop teaching materials that have been adapted or developed according to the environment where students live.

However the use of e-books has a different effect on each student. The presence of multimedia in e-books does not guarantee a better for learning. It is better e-books with theoretical learning designs and appropriate learning approaches tailored to students' personalities (Liu et al., 2020). The approach that can be used is the Problem and Project Based Learning (PPjBL) approach. PPjBL is a modification of Problem Based Learning and Project Based Learning. Indonesia SDG academy, (2020) believes that the Problem Based Learning (PBL) approach is a way to structure projects in the Project Based Learning (PjBL) approach. Based on that opinion of PPjBL includes a student centered and emphasizes the provision of everyday problems or an open topic, for students to find solutions by producing a product.

Previous research on the use of e-books by (Makdis, 2020) with the title "The use of e-Books in the Digital Era". This study identifies several benefits of using e-books in the digital era, are it is more convenient, easy to carry everywhere, environmentally friendly, durable, easy to copy/distribute, easy to be read anytime and anywhere. The research conducted by Siti Rodi'ah (2021), regarding the use of Book Creator in PJOK learning at the Elementary School Level. Siti Rodi'ah in her research uses Book Creator as a form of technology utilization that combines content with technology. The research Lestari & Listiadi (2021) regarding the development of e-book teaching materials based on a scientific approach. Lestari's & Listiadi's Research uses 4D models in product development but does not carry out the dissemination due to research limitations. Based on the results of the feasibility test, it was concluded that the e-book developed was very effective to be used in learning. The similarities between the previous research and the recent research are the development of teaching materials in the form of e-books and the use of Book Creators, more over in this research the dissemination stage has not been carried out due to research limitations.

The advantages of this developed teaching material are (1) it is presented in the form of an e-book that is in accordance with the era, (2) it uses the Book Creator platform which is able to present books interactively that combines several types of media that can be linked using links (hypermedia), (3) materials that are in accordance with the development of fourth grade of elementary school students, (4) the themes in teaching materials that are very contextual and close to the environment around students and also raise local wisdom, thus providing convenience for students in learning, (5) e-books is attractive, effective, efficient and easy to be used in both online and offline classes.

This development is held to improve the teaching materials that can accomplish the needs of students in the current 4.0 era, such as by utilizing the Book Creator platform with PPjBL approach and teaching materials that have been adapted or developed according to the students' environment, like teaching materials that contain the subject of the area around them. The aim of this research is; 1) develop the first design of e-book that is assisted of PPjBL approach platform of Book Creator for fourth graders of elementary school; 2) describes the first draft form of teaching materials in the form of an e-book based on the PPjBL approach assisted by a platform Book Creator for fourth grade elementary school students.

METHODS

This research is a kind of research and development or R&D (Research & Development) which aims to develop products in the world of education (Rayanto & Sugianti, 2020; Sa'adah & Wahyu, 2020; Sugiyono, 2015; Sukmadinata, 2013). In this study, we develop an e-book based on the PPjBL approach with the Book Creator Platform. This study uses the Sukmadinata modification research stage which consists of 3 stages, such as; preliminary study (stage 1), development (stage 2), and product testing and socialization (stage 3) (Sukmadinata, 2013). Stage 1 consists of library research activities, field observations, and preparation of an

initial draft. Stage 2 consists of the product preparation stage, design validation, improvement, product testing, product improvement and determination. Stage 3 consist of an efficacy test activity used with the approach normally used.

At the preliminary study stage, interview techniques and document analysis became the techniques of data collection in this study. Then at the development stage, product development (e-book) is carried out and testing the quality of the developed product. This study focused on the product quality testing includes the feasibility of content, language, graphics, and the implementation of the PPjBL approach. The product compiling stage begins with compiling teaching materials according to themes that are close to students, then associate between learning to be integrated. The next step is to design teaching materials and transfer them to the Book Creator's platform. Then the e-book is validated by the expert assessors who are outstanding teachers, linguists, and design expert. The results of the assessment can be used as material for product improvement.

The improved product was then tested on a limited basis to determine the quality of the resulting e-book. The limited trial was held in SDN Salatiga 12, the research subjects were teachers and 14 students in fourth grade of Elementary School. Data was collected using test and non-test techniques in the form of observation. This study uses qualitative data analysis techniques. Data from the limited trial results were analyzed by comparing the average test results and the comparison value, by KKM (80).

This research is said to be successful if 4 aspects of the assessment are categorized as "Eligible" with a percentage lessthan 61%, as described by Lestari & Listiadi (2021) and has been modified to be in the table below,

Table 1. Percentage of Eligibility

Percentage	Category
21% - 40%	Less Eligible
41% - 60%	Fairly Eligible
61% - 80%	Eligible
81% - 100%	Very Eligible

In addition, the research is successful if the results of the t-test on the limited trial show that the average test score of the students who use e-books is higher than the KKM (80).

RESULTS & DISCUSSION

RESULTS
Phase 1 (Preliminary Study)
The results of the first studies that have been carried out, obtained data on the need for teaching materials that can accomplish the needs of students in the current 4.0 era and it is necessary to develop teaching materials that have been adapted or developed according to the environment where students live.
Stage 2 (Development)
At the product development stage (e-book) the product is compiled based on

the results of the needs analysis. E-books which are compiled using the platform Book Creator is a digital book application that is able to package visuals, audio, and audio visuals in one application. The product development stage (e-book) begins with compiling teaching materials according to themes that are familiar to the student's environment, then associate between learning to be integrated. The next step is designing the teaching materials and send them to the Book Creator platform. The stage of developing teaching materials in this study is in accordance with the stages of developing teaching materials from the Ministry of National Education which consists of the needs analysis, mapping of the teaching materials, making of the teaching materials, and evaluation and revision(Depdiknas, 2008). The following is an example of the appearance and themes in the developed teaching materials.

Figure 1. Example of the display on an e-book

The product (e-book) that has been compiled and then validated by the expert appraisers who are media and book practitioners, the elementary school teachers, and the design experts. The results of the assessment are used as material for product improvement and has a purpose to test the quality of the products developed. The focus on product quality testing consists of material assessment and media (design) assessment. The results of the assessment given by the expert are presented as follows:

Table 2. The results of the material expert's assessment

Aspect	Expert 1		Expert 2		Average Percentage	Category
	Percentage	Category	Percentage	Category		
Feasibility Content	75%	Eligible	85%	Very Eligible	80%	Eligible
Feasibility of presentation	78 %	Eligible	80%	Eligible	79%	Eligible
Contextual	78%	Eligible	83%	Very Eligible	81%	Very Eligible

Based on the expert's assessment, there are several things that need to be improved on the teaching materials: they are the material expert's assessment, the

case example section that is not yet specified and no concept is given, and in the bibliography section there are still sources that are more than 5 years, and the format of references that are not match yet. In the assessment of media experts, the use of lighter colors and the selection of many fonts are a more appropriate.

Table 3. Results of media expert assessment (design)

Aspect	Percentage	Category
Feasibility Graphics	86%	Very Eligible
Language eligibility	88%	Very Eligible

In the product testing phase, the test result data was obtained. The data from this test first required a normality test, the normality test in this study used the Shapiro-Wilk because the number of data was not more than 50 samples (Herawati, 2016). The results of the normality test showed that the significance value (p) in the Shapiro-Wilk test was 0.391 (p > 0.05), meaning that the data were normally distributed. The data that is declared to be normally distributed is then carried out with a different test using a one sample t-test with the formula:

$$t = \frac{x - \mu_0}{s/\sqrt{n}} \text{ (Budiyono, 2016)}$$

This one sample t-test compares the students's average test scores with the comparison score, by the KKM (80). Tables 4 and 5 below present the results of the one sample t-test:

Table 4. The results of one-sample statistics

	N	Mean	Std. Deviation	Std. Error Mean
Learning outcomes	14	83,7857	10,79301	2,88455

Table 5. Test results one sample t-test

	Test Value = 80					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Result	1,312	13	,212	3,78571	-2,4460	10,0174

Test hypothesis:

H_0 : the mean score of the student's test results is 80.

H_a : the mean score of the participants' test results education is not equal to 80.

The decision is taken on the basis, if $t_{count} > t_{table}$, then H_0 rejected. If $t_{count} < t_{table}$, then H_0 accepted. Based on the data from the test results that have been carried out, showed that the t_{count} is 1,312, while t_{table} with = 0,05; df = 13 is 1,771. The value of t shows $t_{count} < t_{table}$ with 1,312 < 1,771, then H_0 accepted. At the 95% confidence level, the average value of the student tests after using e-books PPjBL-based Book Creator Platform is 80.

DISCUSSION

The results of the first studies that have been carried out, obtained data on the need for teaching materials that can accomplish the needs of students in the current 4.0 era and it is necessary to develop teaching materials that have been adapted or

developed according to the environment where students live. The 4.0 era is a condition where technological progress is already at the stage of having an internet network. The existence of the internet network makes the students close to gadgets. There are so many benefits that we can get from using gadgets, but the tendency of the students who know gadgets only to play games, as well as the ease of access to information in the 21st century which gives rise to the characteristics of students who like freedom in learning, like practical new things, comfortable with an internet-connected environment, like to communicate with pictures, symbols , short attention span, can interact with complex media, and exist on social media (Pujiriyanto, 2019). This is reinforced by the COVID-19 pandemic, which causes the students learn online and they became closer to gadgets without knowing the limits and misuse gadgets to play games and social media only. Therefore, the assistance in using gadgets is very necessary in order to provide some benefits for students.

Using something that is close to the students and being liked by them can motivate them in having more interest in learning. The proximity of students to gadgets can be used by the teachers to deliver learning materials that have such attractive packaging and make it easier for students to learn in the form of e-books. In addition, the selection of themes that become sub-discussions in learning also needs to be considered. It is similar with the use of gadgets which are loved by the students, choosing a certain theme that is familiar to the students is able to increase the enthusiasm of students in learning.

The analysis results of the documents on the teaching materials that is used by teachers in learning, is the integrated thematic book of the curriculum 2013, showed the results of the analysis that the themes presented in learning books are not familiar to the students; they are still unfamiliar with the discussion in the book. Thus, the difficulties for the students in understanding the material. So it is necessary to develop teaching materials that have been adapted or developed according to the environment where students live. The use of themes which are raised from the environment that is close to the students to help them understand the things being discussed and the concepts being taught. The selection of environmental themes that are close to the students is in accordance with Marinda's opinion (2020) that the materials, strategies, and learning media given to elementary/MI students must be connected with daily life. After carrying out the first study of the needs that need to be developed, the next stage is the product development stage.

The use of Book Creator which is a new thing for the students can increase their curiosity and in accordance with the current development of educational technology. This is in accordance Siti Rodi'ah's opinion (2021), the use of Book Creator can create learning that is not boring and can improve the student achievement. Moreover, the theme raised in the e-book that was developed could raise things that were familiar and close to students (utilizing the environment around students).

In the field of material, the data obtained from the validation results on the content feasibility aspect showed an average percentage of 80% and was categorized as "Eligible", in the presentation feasibility aspect it showed an average

percentage of 79% and was categorized as "Eligible", and in the contextual aspect, it showed an average percentage of 81% and was categorized as "Eligible". In the field of media (design) data obtained from the validation results on the feasibility aspect of graphics showed a percentage of 86% and was categorized as "Very Eligible", in the language feasibility aspect it obtained a percentage of 88% and was categorized as "Very Eligible". Assessment of the feasibility aspects of content, contextual, and design in accordance with cognitive theory that the elementary school-aged children experienced a concrete operational cognitive development stage, students already had the ability to think through a causal sequence and explored many ways to solve everyday problems (Marinda, 2020) is also in line with the use of the problem and project based learning (PPjBL) approach in e-book.

The PPjBL approach to this e-book presents problem-based material, students are faced with everyday problems that require resolution, both individually and groups. Based on the existing problems, students formulate existing problems. After that, students are invited to collect information, make observations, and analyze the information obtained from the presentation on the e-book. Then students are asked to make reports and present them (Sholihah, 2022). The steps in the PPjBL approach make learning more meaningful for students. This is in accordance with Setiyaningrum's research (2018) which states that the thematic learning recommends a learning model that makes learning activities relevant and meaningful for students by utilizing the knowledge that they already have and experience to help them understand the world of their lives.

In line with the results of the test data, the observation data showed that the learning activities using e-book went well and received good responses from the students. Students are actively involved in learning, the emergence of enthusiasm in learning and student achievement can be optimal. The Use of e-books in learning in the 4.0 era is able to facilitate the students who have different levels of learning speed. The students are free to access the features contained in e-books that facilitate students to learn according to the characteristics of the students. This is in accordance with the results of research by Haleem et al. (2022), that the use of technology connects students with the virtual world and gives students the freedom to access according to their learning styles. So that the use of e-books can provide the benefits of convenience, effectiveness, and efficiency to the students in building their knowledge. This is in accordance with the opinion of Tang (2021), the advantages of e-books are flexibility, interactive, and easily accessible. In addition for being effective and efficient in building students' knowledge, e-books also stimulate the students' interest and attention (Yakovleva & Goltsova, 2016) so that student achievement can be achieved optimally (Kao et al., 2016).

There are deficiencies and suggestions for improvement from the experts based on expert validation. These deficiencies are then corrected, so that the e-book can be used comfortably and provide easy access. The results of the normality test showed that the significance value (p) in the Shapiro-Wilk test was 0.391 ($p > 0.05$), meaning that the data were normally distributed. After the teaching materials are improved, the activities can proceed to the next stage, such as the product trial stage. The value of t shows $t_{count} < t_{table}$ with $1,312 < 1,771$, then H_0 accepted. At the 95% confidence level, the average value of the student tests after using e-books PPjBL-

based Book Creator Platform is 80. In this study, the average value of students' tests is higher than the comparison value, which is 83,7857 (84) but not too significant if compared to the comparison value, which is 80. Although the results of the different test show that the average value of the students' test is equal to 80, in fact the average value of the students' test is higher than the comparison value, which is 83,7857 (84) but not too significant compared to the comparison value.

The developed e-book product has many benefits: such as (1) served in a form of e-book that is appropriate with the development of industrial era 4.0, (2) uses the Book Creator platform which can present books interactively that combines several types of media that can be linked, using links (hypermedia), (3) the material presented is in accordance with the development of fourth grade elementary school students, (4) the themes raised in the teaching materials are very contextual and close to the environment around the students and also raise local wisdom, making it easier for students to understand the learning, (5) e-book is interesting, effective, efficient and easy to use in the online and offline classes. The superiority of these teaching materials is in line with previous research includes; Makdis (2020) identifies several benefits of using e-books in the digital era. Siti Rodi'ah (2021) in her research uses Book Creator as a form of technology utilization that combines content with technology.

CONCLUSION

This e-book was developed through several stages, starting from stage I, that is the preliminary study stage to obtain data on existing needs in the field. Then proceed to stage 2, that is the development stage, e-book starts from compiling teaching materials, designing teaching materials and transferring them to the Book Creator platform. Then the e-book is validated by the expert assessors who are outstanding teachers, linguists, and design expert. Then make improvements to the shortcomings and inputs given by the experts.

Based on the results of the validation of the expert appraisers, it was concluded that in terms of material, the percentage of feasibility was 61%, shows 80% and was categorized as "Eligible". In the terms of media (design) obtained a percentage of 87% and categorized "Very Eligible". Overall, the ebook that was compiled obtained a percentage of eligibility of 81% and was categorized "Very Eligible". The results of product trials to fourth grade students obtained results with a 95% confidence level, the average test score of students after using e-books PPjBL that is based on the Book Creator Platform is equal to 80. This means that the use of e-books can help students achieve KKM is even bigger than KKM.

Some suggestions for the use of e-book, are (1) before using e-book, it is expected to read the instructions on the teaching materials, (2) e-book is interesting, effective, efficient and easy to use in online and offline classes, (3) before using e-book , it is expected to learn how to use and estimate time in each lesson, (4) in the use of the product for a wider area, the product needs to be tested for the effectiveness in small groups and large groups, (5) on the target of further development, this research is still in the early stages of compiling an e-book.

Therefore, further research is needed based on the results of this study.

CONFLICT OF INTEREST

The research we do is for the education sector. By knowing the types of learning styles in students, it becomes a parameter for teachers to teach better.

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