

Development of 21st Century 4C Skills-Based E-Books in Basic Social Science Concepts Courses

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Abstract. The project's goal is to create an e-book on 21st-century 4C skills based on the fundamental ideas of social science. It is a research and development sort of study. Development and Research (R&D). Model in usage. The five steps of the ADDIE model—analysis, design, development, implementation, and evaluation—are used in development research. The research was conducted at Medan State University's Faculty of Education's Primary School Teacher Education study program. A questionnaire was used in this study's data gathering method. Following data collection, researchers conducted both qualitative and quantitative analyses. Expert opinions and recommendations in the fields of materials science and design might be used as qualitative data in this study. According to the study findings, the 21st Century 4C Skills-Based E-Book in the Basic Concepts of Social Sciences course satisfies the valid requirements according to the evaluations of media/design experts (3.83) and material expert validators (3.80 and 4.80). The study's findings indicate that the 21st Century 4C Skills Based E-Book product is appropriate for use as instructional materials in the Primary School Teacher Education study program's Basic Concepts of Social Sciences course at Medan State University's Faculty of Education.

Keywords: Development, E-books, Skills, 4C, Social Sciences

1 Introduction

Understanding the creation of e-books based on 21st century 4C abilities in the PGSD FIP UNIMED Basic Social Sciences Concepts course is crucial for understanding contemporary education. Faced with the problems of the twenty-first century, 4C skills—critical thinking, creative thinking, communication, and collaboration—are competences that are absolutely necessary. Given this, education in Indonesia is confronted with significant obstacles because of the poor level of critical thinking and literacy among students, as seen by the country's low literacy rankings relative to other nations [1].

Utilizing cutting-edge educational resources, including e-books, may help students' 4C capabilities. According to research, creating engaging and interactive learning materials may improve student engagement and the efficacy of instruction [2]. In addition to imparting knowledge, a well-designed e-book inspires students to think critically, act creatively, and work together to solve issues. This is consistent with research showing that project-based learning strategies might enhance students' capacity for higher-order thought [3].

Furthermore, it is imperative that 4C skills be included into the basic education curriculum, particularly in the social studies courses. According to research, social studies education has to embrace cutting-edge and relevant learning methodologies in order to meet the problems of the twenty-first century [4]. Therefore, it is anticipated that the creation of e-books that include 4C skills into social studies instruction would significantly enhance the caliber of aspiring basic education instructors.

The research and development (R&D) strategy becomes very pertinent in the context of developing e-books. Applying the five steps of the ADDIE model—analysis, design, development, implementation, and evaluation—will guarantee that the final e-book is legitimate and useful for educational purposes [5]. For e-books to be accepted by educators and students and to be utilized efficiently in the teaching and learning process, they must be legitimate and practical.

Making sure the material offered in e-books is not just educational but also engaging and interactive is a problem. Empirical evidence suggests that including multimedia and interactive components into e-books might enhance student engagement and facilitate the development of critical thinking abilities [6]. As a result, it's critical to create e-books that motivate students to engage in active learning in addition to providing knowledge.

In order to create e-books, collaboration between instructors and students is equally crucial. Studies indicate that collaborative projects and group activities may enhance one's ability to work with others [7]. In addition to learning about the subject matter, students who participate in the e-book production process acquire social and collaborative skills that are crucial in the twenty-first century.

The local context and the requirements of the students must be taken into account while developing 4C skills-based e-books. According to research, students' motivation and interest in learning may be raised when the material is relevant to their everyday life [8]. In order to create e-book material that is appropriate for students' needs and experiences, it is crucial to include students in the process of content development.

Continuous assessment is also required to meet the objectives of this e-book's development. Studies indicate that user feedback—from instructors as well as students—is crucial for enhancing the quality and efficacy of instructional materials [9]. Regular assessments allow developers to make the required tweaks and enhancements to keep e-books current and useful for promoting learning.

All things considered, the creation of e-books for the Basic Social Sciences Concepts course at PGSD FIP UNIMED that are based on 21st century 4C abilities is a calculated move to raise the standard of education in Indonesia. It is believed that by including critical thinking, creativity, communication, and teamwork into the educational process, students will be more equipped to handle the problems of a world that is becoming more and more complicated. It is

envisaged that by using a creative and cooperative approach, this e-book would be able to enhance students' learning more effectively and meaningfully.

2 Method

Research and Development (R&D) encompasses the research methodology used in the creation of the 21st Century 4C Skills-Based Learning E-Books for the Social Sciences Basic Concepts course. Instead of proving out current hypotheses, this kind of study focuses on developing a new product. As to Borg and Gall's perspective, "Educational Research and Development is a process used to develop and validate educational products" [10]. Stated differently, the goal of this research and development is to create and refine a product.

The ADDIE methodology, including five stages—analysis, design, development, implementation, and evaluation—was used in this development research study. Educational practitioners often employ the ADDIE paradigm to create infrastructure and tools for training or learning programs that are dynamic, efficient, and enhance the learning process [11]. This study uses the 4D development stage for the e-book production process, which is then applied to the Elementary Social Sciences Basic Concepts course. The analysis, design, development, implementation, and evaluation phases make up the ADDIE model's stages.



Fig.1. The ADDIE Model's Stages

The Basic Social Sciences Concepts course uses the ADDIE methodology to create the 21st Century 4C Skills Based Learning E-Book. The process consists of five key phases that are organized both sequentially and iteratively.

a. Analysis Stage

A number of specific student requirements were noted, including how to include the 4Cs—Critical Thinking, Communication, Collaboration, and Creativity—into e-books. This stage includes curriculum analysis, identification of required skills, as well as collecting data about student learning preferences and supporting technical conditions. The results of this analysis are used to set clear learning objectives.

b. Design Stage

Focuses on designing e-book structure and content that supports the development of 4C skills and is appropriate to course requirements. At this stage, an e-book outline is prepared, including the placement of interactive elements, visual appearance and easy-to-use navigation. An interactive material presentation strategy and appropriate evaluation tools are also designed at this stage.

c. Development Stage

The process of making an e-book is in accordance with the planned design. E-book content, including text, images, videos and other interactive elements, is thoroughly developed and

integrated. Initial trials were carried out to ensure the quality and effectiveness of the e-book, accompanied by collecting feedback from experts for further improvement.

d. Implementation Stage

Students are given access to e-books, and their usage in the learning process is tracked. E-books are presented to students, and their use in teaching and learning activities is closely observed to make sure the 4C skills are used in real-world situations.

e. Evaluation Stage

focuses on finding areas that need development and evaluating how well e-books teach 4C skills. Formatively, evaluation occurs while the e-book is being used, and summatively, after the learning phase is over. To evaluate how well the learning goals were met, feedback from lecturers and students is gathered. To guarantee the e-book's continued relevance and efficacy, it was updated and changed in light of the evaluation's findings.

The subjects in this research and development consisted of materials expert validator and design expert validator. Research sample is Regular PGSD B students, totaling 30 students. The 21st Century 4C Skills-Based Learning E-Book for the Basic Social Sciences Concepts course is the subject of the investigation.

In this study, learning outcomes assessments (pretest and posttest) and questionnaires were utilized as data gathering methods. With the use of a questionnaire, data on the viability of the creation process for e-books based on 4C abilities is gathered using this instrument. Validation instruments from material specialists and design experts are among the instruments used in this research's data collection, which is separated according to the source of data collecting. Pretest and posttest for learning outcomes are used in product efficacy assessments.

The following steps are included in the data analysis approach used in this development research:

1) Product Feasibility Analysis

Input, remarks, and recommendations are taken into consideration while analyzing data from expert validator validation findings. The analysis's findings serve as a roadmap for making changes. The questionnaire completed by qualified validators and the responses to the questions and answers throughout the validation process provide insight into the e-book's validity. The measurement scale uses a 1-5 Likert scale. Next, the scores obtained are analyzed:

a. Calculate the overall average with a formula

$$\bar{X} = \frac{\Sigma X}{n} \quad [12]$$

Description:

- \bar{X} : Average score for validation
- ΣX : Total score for validation
- n : Number of evaluated factors

b. Classifying the results of material expert and design expert assessments

Table 1. Classification of Assessment Results from Material Experts and Design Experts

Score Intervals	Classification
$X = 5,00$	Very Valid/Very Eligible
$4,00 \leq X < 5,00$	Valid/Eligible
$3,00 \leq X < 4,00$	Fairly Valid/Decent Enough
$2,00 \leq X < 3,00$	Invalid/Inadequate
$1,00 \leq X < 2,00$	Invalid/Not Eligible

2) Product Effectiveness Analysis

The efficacy of the product under development is derived from the outcomes of experimentation conducted by students. Effectiveness is analyzed based on students' learning completeness which refers to the minimum completeness criteria, namely 70. Students are declared to have achieved learning completeness if their test results are ≥ 70 , conversely students are declared not to have achieved learning completeness if their test results are < 70 .

3 Results and Discussion

The results of the development of the 21st Century 4C Skills Based Learning E-Book in the Basic Concepts of Social Sciences course using the ADDIE model, seen from the validity, feasibility and effectiveness of use, are explained as follows:

Table 2. Summary of E-Book Validation Results

Stage Expert Validator	Stages	Total Score	Mean Score	Assessment Criteria
Materials Expert	1	57	3,80	Fairly Valid
	2	72	4,80	Valid
Design Expert		46	3,83	Fairly Valid

The validation results of material and media experts in table 2 show the average total score of material expert validation results at stage 1 of the 21st century 4C skills-based learning e-book that was developed is 3.80 or is classified as quite valid and needs to be revised. After revisions were made, from the results of stage 2 validation, the average total score of the material expert validation results was 4.80 or classified as valid. Meanwhile, the design expert validation results show an average validation score of 3.83 or quite valid and the revision notes on the cover are less attractive, but there is no need for a second stage of validation because the e-book design expert validator results are suitable for field testing. The presentation of material in textbooks must describe the minimum substance (facts, concepts, principles and theories) contained in Basic Competencies [13]. The presentation of material and practice questions starts from easy to difficult in order to help students understand the material presented because it adapts to students' stages of thinking [14].

Based on the validation results from material and design experts, it was concluded that the e-book for the Basic Concepts of Social Sciences course based on 21st century 4C skills had met the valid criteria and was suitable for use in field trials without revision. The provision of material must be adjusted to needs, level of understanding, and make it easier to receive the material [15]. E-books are digital versions of printed books which are a form of technological progress and development in the era of globalization [16] [17].

The E-Book product for the Elementary Social Sciences Basic Concepts course was declared feasible, so an effectiveness test was carried out. The results of the effectiveness of product use were obtained from test results with a total of 30 students as subjects. The pretest and posttest results are explained in table 3 below.

Table 3. Summary of Effectiveness Based on Student Learning Test Results

Test Type	Average Value	Classical Completeness		Assessment Criteria
		F	%	
Pretest	37,80	0	0%	Ineffective
Posttest	80,93	28	93,3%	Effective

The results of the effectiveness of product use based on table 3 show that the pretest of 30 students obtained an average score of 37.80 with a classical completion percentage of 0% or no students completed. Furthermore, based on the posttest results after learning using e-books for the 21st century 4C skills-based Social Sciences Basic Concepts course, the average posttest score was 80.93 and there was an average increase and difference of 43.13 (80.93 – 37.80) with a classical completion percentage reaching 93.3%. Teaching materials are part of the learning tools for lecturers to help themselves in improving student learning outcomes [18]. E-books get a positive response from students [19]. Information technology develops in line with the development of theory and communication technology that supports the practice of learning activities [20]. The benefit of e-books is that they are able to overcome diverse learning patterns and provide services for a more digital generation of students.

4 Conclusion

The study findings indicate that the e-book for the Basic Concepts of Social Sciences course, which was created based on 21st century 4C skills, was deemed valid based on indicators of content and appearance aspects. Additionally, design experts validated the e-book based on indicators of appearance, consistency, and use aspects, including letters and physical criteria. The developed e-book for the 21st century 4C skills-based Social Sciences Basic Concepts course has been shown to be effective in facilitating the use and application of the course for Unimed PGSD FIP students. The course achieved a classical completion rate of 93.3% and showed a significant difference in post-test scores compared to the pretest, resulting in an average increment of learning outcomes of 43.133.

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