

# The development of digital literacy smart e-book (CERI) as a resource for learning digital literacy skills in elementary schools



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## ABSTRACT

This Research and Development (R&D) study focuses on creating Smart Digital Literacy E-books to serve as a valuable learning resource for enhancing digital literacy skills among elementary school students. Employing the ADDIE model, encompassing the Analysis, Design, and Development stages, the research seeks to address the critical need for effective digital literacy education in elementary schools. The subjects of this investigation comprised grade VI students at SDN 02 Palur. To gather comprehensive data, a combination of interviews, observations, and questionnaires was employed. Interviews with resource persons provided insights into students' current digital literacy skills, while observations were conducted to understand their digital literacy activities at school. Additionally, a questionnaire, administered by a validation expert, assessed the effectiveness of the CERI E-book. The validation tests yielded encouraging results, with language validation scoring 87.5%, subject validation at 83.33%, and media validation at an impressive 95.83%. Feedback from the feasibility test, conducted among students, affirmed the CERI E-book's suitability for educational use. Students highlighted its interactivity, ease of understanding, and comprehensive content, reinforcing its efficacy as a learning resource. In conclusion, the outcomes of this research and development endeavor underscore the high suitability of the CERI E-book for fostering digital literacy skills in elementary school students. The interactive features and comprehensive content make it a valuable contribution to the field of digital literacy education.



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## 1. Introduction

Education has entered the 21st-century revolution, necessitating the implementation of digital technology to support students' learning from elementary schools to universities [1]. The 21st-century revolution has ushered in a transformative era for education, marked by profound changes in teaching and learning methodologies [2]. In response to the demands of this revolution, the integration of digital technology has become imperative across all levels of education, ranging from elementary schools to universities [3]. This paradigm shift recognizes the pivotal role that digital tools play in enhancing the educational experience and preparing students for the challenges of the modern world [4]. The acknowledgment that education has entered this revolutionary phase underscores the need for a comprehensive and widespread adoption of digital technology [5]. It emphasizes that the implementation of such technology is not merely a choice but a necessity to address the evolving landscape of education [6]. The phrase "from elementary schools to universities" highlights the universality of this transformation, emphasizing that students at every stage of their educational

journey should benefit from the advantages offered by digital tools. By embracing this technological evolution, educational institutions can better equip students with the skills and competencies required to thrive in the dynamic and rapidly changing 21st-century landscape.

Embracing the ongoing technological evolution in education holds the promise of empowering educational institutions to more effectively equip students with the skills and competencies necessary for success in the 21st century [7]. The integration of digital technology into the learning environment offers a transformative opportunity to prepare students for the dynamic and rapidly changing landscape they will face throughout their lives [8]. Through strategic implementation, educational institutions can cultivate a learning environment that not only adapts to technological advancements but actively leverages them to enhance the educational experience [9]. In this technological era, students need more than traditional academic knowledge; they require a set of digital skills and literacies to navigate an increasingly complex and interconnected world [10]. By incorporating digital tools into the curriculum, institutions can foster critical thinking, problem-solving, and creativity, essential components for success in the modern workforce [11]. Moreover, exposure to technology in the learning process helps students develop a comfort with innovation, preparing them to embrace future advancements with confidence [12]. Furthermore, the recognition that technology is not merely a supplement but an integral part of education emphasizes the need for a holistic approach [13]. Educational institutions must invest in teacher training and infrastructure to effectively integrate technology into various facets of the learning experience [14]. By doing so, they ensure that students graduate with a well-rounded set of skills, positioning them to thrive in an ever-evolving global landscape. Ultimately, the embrace of technological evolution in education represents a commitment to preparing students for a future where adaptability and technological literacy are integral to success [15].

The integration of digital technology in schools aligns with the rapid technological development in Indonesia. This necessitates enhancing the digital literacy skills of both students and teachers, exemplified by improving skills in using presentation tools [16]. While 65% of elementary schools in Indonesia have technological facilities, their effective utilization remains a challenge [17], attributed to the low digital literacy of teachers and students. Digital technology literacy encompasses understanding, skills, and application by students, achievable through digital literacy activities [18]. It involves the appropriate use of digital tools to access, manage, integrate, evaluate, and analyze resources, contributing to knowledge building, learning media creation, and societal development [19]. Observations at SDN 02 Palur, Sukoharjo, revealed low digital literacy among grade VI students. Teachers primarily employ digital literacy for presentation activities, revealing gaps in students' knowledge of alternative presentation media beyond Microsoft PowerPoint. The absence of easily accessible manuals contributes to students' low digital literacy [20]. To address this, the research proposes the development of interactive, digital literacy-based guidebooks, leveraging an e-book titled "Smart Digital Literacy (CERI)." E-books, as a technological innovation, offer advantages such as multimedia content, including videos [21]. CERI e-book specifically focuses on understanding and utilizing applications like Canva, Powtoon, and Prezi, featuring accessible links and barcodes for user convenience. This initiative aims to serve as a valuable learning resource for enhancing digital literacy skills among elementary school students, contributing to overall improvements in their digital literacy.

## 2. Method

The research methodology employed in this study is Research and Development (R&D). The e-book was developed utilizing the ADDIE (Analysis, Design, Development, Implementation, Evaluation) instructional design model, as proposed by Robert Reiser. During the analysis phase, this research will examine existing digital literacy activities at SD N Palur 02 and assess specific requirements to enhance digital literacy skills, currently unavailable at the school. Subsequently, in the design phase, the e-book will be crafted with an interactive design, facilitating direct content access. The CERI e-book will be created using Canva, presented in the Portable Document Format (PDF), and uploaded via Flipbook. During the development phase, the CERI e-book will undergo validation by experts specializing in media, language, and content. After expert validation, the e-book will be piloted with a select group of 15 students from Class VI. Data collection methods will include observations, interviews, and documentation. Observational and interview techniques will involve specific inquiries directed at key stakeholders, such as the school principal, the Class VI homeroom teacher, and Class VI students. To enhance data validity and reliability, triangulation techniques will be applied to cross-verify information from multiple sources. The primary research instrument for

data validation will be a standardized validation sheet, see Table 1. Expert assessment data will be presented using a percentage calculation table for product eligibility criteria, as follows.

$$P = \frac{F}{N} \times 100\% \quad (1)$$

In the research methodology described, the formula  $P=F/N \times 100\%$  is utilized as a quantitative means to calculate the Percentage Amount ( $P$ ) based on Frequency ( $F$ ) and Amount ( $N$ ) of occurrences. This formula is commonly employed in research to quantify and express the prevalence or occurrence of certain phenomena within a given context. In this specific study, the formula is intended to assess the frequency of specific criteria met by the CERi e-book during the development phase. For instance, it could be used to evaluate how frequently the e-book aligns with predetermined eligibility criteria for media, language, and content, as validated by experts. By employing this formula, the researchers aim to provide a standardized, quantitative representation of the e-book's adherence to the specified criteria, enhancing the objectivity and clarity of the assessment process. Furthermore, the application of this formula aligns with the broader goal of ensuring the validity and reliability of the collected data. By presenting expert assessment data using a percentage calculation table, the researchers aim to offer a transparent and quantifiable evaluation of the CERi e-book's eligibility. This quantitative approach contributes to the robustness of the research findings, enabling stakeholders to interpret and compare the e-book's performance against predefined criteria. The use of this formula not only enhances the precision of the evaluation process but also facilitates a more straightforward communication of results, supporting the overall rigor of the research methodology employed.

**Table 1.** Validation Test Assessment Criteria

Presentation (%)	Eligibility Rate
83% < scor ≤ 100%	Very Proper
66% < scor ≤ 83%	Proper
33% < scor ≤ 66%	Not Proper

### 3. Results and Discussion

#### 3.1. Analysis Stage

During the analysis stage, observational and interview activities were conducted to analyze both the activities and the needs related to the digital literacy skills of elementary school students. The analysis of digital literacy skills activities aims to discern the specific activities within schools that contribute to the development of students' digital literacy skills. The observational results yielded data from the science and science teaching module in grade VI at SDN 02 Palur, Merdeka Curriculum 2023 Phase C, focusing on the elements of the solar system. Learning in this context involved digital literacy activities, such as exploring learning resources using the laptops available at the school. In addition to exploring learning resources, the promotion of digital literacy activities was also observed through presentation activities. This observation is corroborated by the findings from the subsequent interviews. The results obtained through interviews provide further insight into the encouragement and integration of digital literacy skills through presentation activities. This comprehensive analysis at the elementary school level sheds light on the multifaceted approach to fostering digital literacy skills, incorporating both exploration of digital resources and active engagement in presentation activities. This is confirmed by the following interview results:

*"Students' digital literacy activities are done through exploration activities and presentation activities, presentation activities are done as an assessment of students. Students can already use PowerPoint, Google, YouTube, and Microsoft Word media. Students also have Google accounts to access the internet."* (W/WK/11-10-23).

The aim of the digital literacy skills needs analysis is to ascertain the specific requirements that students have for enhancing the digital literacy skills that have been promoted within the school. The results of the needs analysis were derived from the interview outcomes, summarized as follows.

*"Students need guidebooks as an interesting source of learning digital literacy skills because students' digital literacy skills are still low, students in making presentations can only use power point media and are not interactive."* (W/WK/11-10-23)

This is affirmed by the observational findings, indicating that students do not have access to any guidebook to enhance their digital literacy skills. However, it is noteworthy that the digital technology facilities and infrastructure at SDN 02 Palur are sufficiently comprehensive. The available digital literacy support facilities in this elementary school encompass 20 laptop devices, school WiFi access, LCDs, and projectors in each grade. Consequently, based on the outcomes of the needs analysis, it is evident that students require additional support for digital literacy activities, such as the provision of a guidebook as a fundamental source for learning digital literacy skills.

### 3.2. Design Stage

Through the needs analysis, during the design stage, the researcher formulated and crafted a guidebook aimed at enhancing students' digital literacy skills, ensuring accessibility and engagement. The initial phase of developing this product involved selecting the concept and subject for the book. The chosen concept for this guidebook is digital, intending to present the material as a digital book or an E-book, incorporating illustrations reflecting teachers and students in a school setting. The subject matter of the CERI E-book was determined with careful consideration of students' needs, particularly addressing their limited knowledge of presentation media beyond Microsoft PowerPoint. The content of the CERI E-book encompasses explanations, features, usage instructions, video tutorials, and evaluations of Canva, Prezi, and Powtoon media. Following the compilation of the subject, the subsequent step involved the creation of the CERI E-book product, packaged into a flipbook format accessible to students through a link or barcode. Comprising 34 pages, the CERI E-book includes sections like a book cover, foreword, table of contents, subject explanation, video tutorial, evaluation activities, bibliography, author biodata, and closing remarks. Fig. 1 provides a visual representation and description of the CERI E-book. This systematic approach ensures the development of a comprehensive and accessible resource to enhance students' digital literacy skills.



Fig. 1. CERI E-book Cover and Foreword

The cover, being the initial page encountered by readers, necessitates attractiveness and clarity. Comprising titles such as "CERI," representing Smart Digital Literacy, the choice of this title is rooted in the content of the subject presented in the E-book, and "CERI" is a language easily comprehensible for students. The cover also features the author's name, facilitating easy identification of the E-book's author. Notably, the CERI E-book cover incorporates a background reflecting a grade room setting, along with the selection of teacher and student characters, aligning with the target audience, namely students. On the foreword page, which contains a message to readers from the author, an image depicts the author alongside a teacher character. Fig. 2 illustrates the Table of Contents and the content of the CERI E-book. This thoughtful approach to the cover design and foreword page aims to engage readers visually, aligning with the E-book's subject matter and creating a connection with the intended audience.



Fig. 2. Table of Contents and Content of CERIE E-book

The table of contents is an essential component within a book, serving as a guide to locate specific pages related to various subjects. Within the CERIE E-book, the table of contents comprises sub-subjects along with corresponding page numbers. Sub-subjects in the CERIE E-book include media explanation, usage guidelines, features, and evaluation of Canva, Prezi, and Powtoon media. The content within the sub-subject focusing on the utilization of presentation media includes embedded access links to these media platforms, simplifying the implementation of digital literacy skills for students. Additionally, this section is enriched with interesting and interactive characters, providing a distinct advantage that sets CERIE E-books apart from other digital resources. Fig. 3 visually represents the Video Tutorial and Evaluation section, offering readers a comprehensive overview of the multimedia content available in this segment of the E-book.



Fig. 3. Video of Tutorial and Evaluation

The tutorial videos within the CERIE-book serve the purpose of reinforcing understanding after students have mastered the subject, ensuring clarity in using Canva, Prezi, and Powtoon media. Students can access the video tutorials by simply pressing the provided link, which will automatically connect to the YouTube application. The evaluation activities embedded in the CERIE-book serve as a means to apply students' digital literacy skills after comprehending the subject matter. These evaluation activities are strategically placed at the conclusion of each subject, providing a structured approach to assessing and reinforcing the assimilation of digital literacy concepts.

### 3.3. Development Stage

The development stage aimed to assess the suitability of CERIE-books as a learning resource for students' digital literacy skills in elementary schools. The feasibility test involved validation by language experts, subject experts, and media experts. The obtained data from the assessments by several validators are presented in Table 2.

**Table 2.** Linguist Expert Validation Results

Aspect	Score	F	N	Presentation (%)	Eligibility Rate
Language Compatibility	10				
Curiosity	3				
Language politeness	6	21	24	87,5%	Very Proper
Language comprehension	2				

According to Table 2, language experts provided an assessment of 87.5%, categorizing this value as highly suitable for students to comprehend. Linguists recommended that foreign words should not be italicized, and there should be no punctuation added to the subject section describing how to use the media. The assessment results from the subject expert validator are presented in Table 3.

**Table 3.** Subject Expert Validation Results

Aspect	Score	F	N	Presentation (%)	Eligibility Rate
Completeness of the subject	5				
Subject selection	9	20	24	83,33%	Very Proper
User friendly	6				

According to Table 3, the subject expert provided an assessment of 83.33%, categorizing this value as highly appropriate language. The advice from subject experts includes adding a glossary to aid students unfamiliar with foreign words and incorporating additional subjects. The assessment results from the media expert validator are presented in Table 4.

**Table 4.** Media Expert validation results

Aspect	Score	F	N	Presentation (%)	Eligibility Rate
E-book display	14	23	24	95, 83%	Very Proper
Media use	9				

Based on Table 4, it is evident that the feasibility value for CERIE-book products, as assessed by media experts, is 95.83%. This value categorizes the product as highly feasible in the media category. The advice provided by media experts suggests replacing teacher characters in e-books, previously less represented as Muslim, with Muslim teacher characters to instill character values. Following the assessments from the three validators mentioned above, the product was subsequently revised, and the results were tested on 15 grade VI students at SDN 02 Palur to determine the suitability of the CERIE-book. During the trial, students accessed the CERIE-book through an access link distributed via email to each student. The results of an interview with one of the students revealed that:

*"I like reading CERIE-books. The interesting and interactive characters and illustrations of the CERIE-book made me want to read it. There is an access link to the intended application, making it easier for me to access the application directly. The contents of the CERIE-book are complete with video tutorials and evaluation questions so that the subject in the e-book is easy to understand."* (W/SH/11-10-23).

The interview results led to the conclusion that the CERIE-book is highly suitable for students as a resource for learning digital literacy skills. This conclusion is substantiated by the observations conducted during the trial process, indicating that students exhibited keen interest in reading the CERIE-book. Moreover, students demonstrated proficiency when conducting evaluations or attempting to

create presentations using various applications. The video tutorials proved instrumental in aiding students during these presentation endeavors. Furthermore, the observations highlighted the students' high level of independence in undertaking evaluation activities. This independence is attributed to the comprehensive content within the CERI E-book, which serves as a valuable resource, enabling students to proficiently create presentations.

The development of the CERI e-book occurred in distinct stages, with the initial phase involving an analysis of students' needs. According to the outcomes of interviews with grade VI homeroom teachers, there is a considerable demand for an interactive and easily accessible digital literacy skills manual. This need stems from the integration of technology into learning activities aimed at enhancing the quality of education, yet students' proficiency in digital literacy skills remains inadequate. Recognizing the significance of digital literacy in the era spanning from the Industrial Revolution 4.0 to Society 5.0, students are required to cultivate skills in utilizing technology as a learning tool to keep abreast of ongoing developments [22]. The strategic approach to improving digital literacy skills involves aligning with current trends, and utilizing media that resonates with students. Popular media among students is characterized by its interesting, simple, and user-friendly nature. Among the technologically developed media options, e-books, e-quizzes, e-modules, and e-PUB have gained prominence. This research and development project focused on creating an e-book containing instructional content for digital literacy skills, specifically addressing presentations. The selection of e-book media was driven by its accessibility, allowing anyone to access it at any time through an internet connection. Observations revealed the availability of facilities and infrastructure at SDN 02 Palur, such as Wi-Fi networks and laptops, facilitating students' access to e-books through the Internet. This accessibility is anticipated to contribute to the enhancement of students' digital literacy skills. In addition to accessibility, e-books offer attractive features directly accessible to students. Prior research emphasizing students' digital literacy skills indicated that features on how to use a subject enhance understanding and implementation. Therefore, e-books are employed in the development of interactive guidebooks.

During the design stage, informed by the analysis of student needs and media selection, the initial step involves determining the concept and subject of the guidebook. The chosen concept is a digital book or e-book focusing on digital literacy skills related to presentations. This developmental product is the CERI (Smart Digital Literacy) E-book. The development of the CERI e-book incorporates engaging illustrations portraying the characters of teachers and students. Additionally, the chosen subject in this e-book revolves around presentation media, namely Canva, Powtoon, and Prezi. Canva, a graphic design application, is utilized for creating various visual content such as social media graphics, presentations, and posters. The comprehensive features in Canva contribute to its selection as the subject in the CERI E-book, enabling students to develop skills beyond presentation creation. Powtoon, a cloud-based animation software, is employed for crafting animated presentations and explainer videos [23]. The interactive animation in Powtoon adds an intriguing element for students, justifying its inclusion as a subject in the CERI E-book. Prezi, a software for internet-based presentations with a zooming effect, captures students' curiosity during presentation activities, making it a favored choice for the CERI E-book. The subject selection process considers various factors aimed at enhancing students' digital literacy skills. The CERI E-book encompasses subject explanations, features, usage instructions, video tutorials, and evaluation questions. According to Bergstrom *et al*, a digital book is considered complete if it incorporates evaluation questions, serving as a benchmark for students to comprehend the subject [24]. Hence, the CERI E-book attains completeness in the development of digital books. The second step in this design stage involves developing the CERI E-book by packaging it in PDF form into a flipbook accessible to students via links and barcodes through laptop or cellphone devices. This aligns with the statement [25] that E-books are recognized in the literature as portable document formats, enabling readers to access content via computers, laptops, or cell phones. The advantage of the CERI E-book lies in the inclusion of tutorial videos and access links to the presentation application, providing direct access for students.

In the development stage, researchers conducted feasibility testing of the CERI E-book involving language, media, and subject validation experts. The assessment of e-books, much like traditional books, deems them suitable if the content, presentation, language, graphics, and illustrations align with the book's theme and prove engaging. The language validation assessment resulted in an 87.5% score, media validation achieved 95.83%, and subject validation reached 83.33%. These validation outcomes, aligned with feasibility indicators, affirm that the CERI E-book is highly suitable for use. However, linguistic experts suggested incorporating a glossary to enhance students' understanding of

unfamiliar vocabulary and provide clear meanings [26]. Expert feedback was considered by researchers for product revisions before testing the CERIE-book's feasibility on students. The student feasibility test was conducted for 35 minutes in the classroom using laptops available at the school. The development of CERIE-books leverages students' basic digital literacy skills, as indicated by interviews with homeroom teachers, revealing that grade VI students possess fundamental digital literacy skills, including using Google and YouTube, with some even creating their own Google accounts for accessing learning resources. The feasibility test involving 15 students proceeded smoothly due to the ease of access to the CERIE-books, aligning with the student's abilities. Student interviews during the feasibility test indicated that the subject in the CERIE-book was comprehensible, and the content was deemed complete with video tutorials and evaluation questions. This assertion aligns with the feasibility indicators for e-book development in research, emphasizing that e-books are considered feasible if the subject can be easily read and understood by readers. Combining the results of the expert validation feasibility test and the student feasibility test, the CERIE-book is deemed highly suitable as a learning resource for students' literacy skills.

#### 4. Conclusion

The development of CERIE-books as a learning resource for digital literacy skills has produced favorable outcomes. The identified needs of grade VI students at SD N Palur 02, namely a guidebook to support digital literacy activities at the school, have been addressed. The validation results from language, media, and subject experts categorize the CERIE-book as highly feasible according to the established product feasibility criteria. Trials conducted with students further affirm that the CERIE-book is exceptionally suitable for use as a digital literacy learning resource. This suitability is attributed to its ability to engage readers and facilitate the direct implementation of digital media content within the subject. Based on these conclusive results, it is affirmed that the CERIE-book stands as an exceptionally fitting learning resource for students' digital literacy skills. Furthermore, it emerges as a viable solution to the existing problem of a dearth of digital literacy guidebooks for students.

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