



The Development of Hybrid Audiovisual E-book with Local Wisdom-Based Real-World Problems in Ngada's Wela Maka

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ABSTRACT

The imperative drives this research for educators to access high-quality online learning materials that facilitate practical, enjoyable, and contextually relevant Physics instruction. The primary objectives of this study are twofold: firstly, to develop a product in the form of an audiovisual e-book employing a hybrid model and integrating real-world problems for Physics instruction, drawing inspiration from the local wisdom Wela Maka of the Ngada community. Secondly, the research aims to assess the product's viability through validation by subject matter experts, media experts, instructional design experts, and language experts. Additionally, the study involves product testing with prospective users. The research adopts a Research & Development approach, utilizing the ADDIE model developed by Dick & Carey. The research cohort comprises five teachers and 34 high school students from Citra Bakti. Data collection methods encompass validation sheets and questionnaires, employing instruments such as validation assessment sheets and user response questionnaires. Data analysis involves both descriptive and inferential statistics. The research findings indicate that the average validation scores provided by subject matter experts, media experts, instructional design experts, and language experts are 4.60, 4.50, 4.35, and 4.48, respectively—all falling within the 'very good' category. Furthermore, the average product testing scores for both teachers and students are 4.49 and 4.54, respectively, also categorized as 'very good.' Based on this comprehensive data, it can be concluded that the audiovisual e-book hybrid model product is deemed suitable for integration into online learning platforms.

Keywords: Audio Visual, E-book, Hybrid, Real World Problem, Wela Maka

INTRODUCTION

The contemporary world is entering the epoch of Society 5.0, characterized by a paradigm where technology is centred around humans but collaborates seamlessly with technological systems such as Artificial Intelligence and the

Internet of Things. This collaboration aims to tackle societal challenges through the integration of the virtual and real worlds. Society 5.0 signifies a pivotal era where mastery of technology becomes a fundamental requirement (Maretto et al., 2023). The rapid progression of technology and information, coupled with widespread accessibility, presents a formidable challenge that individuals and societies must adeptly navigate.

In this era, an individual's and a nation's advancement is intricately linked to their proficiency in both virtual and real-world technology. Society 5.0's development is poised to have far-reaching impacts on various facets of human existence, touching upon areas such as health, urban planning, transportation, agriculture, industry, and education (as outlined in the Republic of Indonesia Law on the National Education System). As we navigate this transformative period, the ability to harness and adapt to technological advancements will be a crucial determinant of progress at both individual and societal levels.

The landscape of education has undergone significant development in response to the Society 5.0 era. The transition from traditional face-to-face learning to online modalities, initially prompted by the COVID-19 pandemic, has now transformed into an indispensable component of the educational landscape (Hwang et al., 2021). What was once merely a topic of discussion, digital transformation, has become a tangible reality in the learning process.

In this new educational paradigm, educators find themselves no longer confined to conventional teaching methods characterized by manual books, limited learning resources, and traditional approaches (Leszczyński et al., 2018). The role of educators has evolved, necessitating the introduction of various innovations in the teaching process through the integration of technology (Kumari et al., 2020). This shift signifies a departure from the traditional constraints of education, opening opportunities for dynamic, technology-enhanced learning environments that better align with the requirements of Society 5.0. As education embraces these changes, educators play a pivotal role in navigating and harnessing the potential of technology to create a more effective and responsive learning experience.

Online learning activities have emerged as a viable alternative educational model, offering students more practical, flexible, enjoyable, and personalized learning experiences. Online learning leverages Internet networks to provide accessibility, connectivity, flexibility, and the capacity to facilitate diverse interactive, enjoyable, and practical learning interactions. In the current era of Society 5.0, marked by rapid technological advancements, education is witnessing numerous innovations. Among these, the development of technology-based learning media stands out as a valuable tool that educators can incorporate into their instructional design (Birch & Gardiner, 2005). There is a growing encouragement for educators to be proficient in delivering online learning across various disciplines, ensuring students have flexible access to the information they require, irrespective of time or location (Hwang et al., 2021). This adaptation to technology-based learning not only aligns with the demands of the present educational landscape but also fosters an environment where learning becomes more dynamic, interactive, and adaptable to the diverse needs of students in the digital age.

In his research, Santoso, Budi et al., (2018) delineates that an e-book enriched with audiovisual elements encompasses the presentation of educational materials comprising text and graphics complemented by auditory components, animations, and videos. Audiovisual e-books amalgamate textual information with artistic elements like sound, images, animations, and motion delivered through a computer, creating a lucid and captivating learning experience (Simon & Benghozi, 2022). However, it is essential to recognize that learning with audiovisual e-books often falls short of providing a fully immersive experience because students are directed to comprehend the learning content presented solely

through technological devices. Consequently, educators are obligated to devise effective strategies for incorporating e-books into instruction to mitigate these limitations.

Employing a hybrid audiovisual e-book model that integrates real-world problems into content presentation stands out as an alternative capable of enhancing the effectiveness of learning. The inclusion of real-world problems in the learning process offers students opportunities and facilitates the application of their skills to solve practical issues. Real-world problems are one of the alternative solutions, which, in this case, are used to introduce students to real problems in understanding the concepts of physics (Weng et al., 2022). Learning activities structured around media that emphasize real-world issues empower students to glean insights from their immediate environment. This approach not only enriches the learning experience but also equips students with the ability to connect theoretical concepts to tangible, real-life situations, fostering a deeper understanding and practical application of the subject matter.

Local culture represents an indispensable aspect of students' surroundings that merits exploration, comprehension, and appreciation. In the context of the Ngada community, Wela Maka holds significance as a traditional game played following hunting activities, intricately woven into the fabric of Ngada community culture. Such local wisdom serves as a valuable resource for elucidating physics concepts, especially within the realm of Circular Motion.

Given the cultural relevance and richness of Ngada's Wela Maka, it becomes imperative to develop a hybrid audiovisual e-book model for physics instruction. This model would seamlessly integrate real-world problems inspired by the local wisdom of Ngada's Wela Maka. By incorporating these elements, the learning experience becomes not only academically enriching but also culturally resonant, fostering a deeper connection between theoretical physics concepts and the lived experiences of the students within the Ngada community. This approach not only promotes a more inclusive and holistic understanding of physics but also acknowledges and celebrates the cultural diversity inherent in the educational environment (Pornpimon et al., 2014).

METHODS

This research adopts the Research and Development (R&D) methodology. The resultant product is a hybrid audiovisual e-book featuring real-world problems inspired by the local wisdom of Ngada's Wela Maka, explicitly designed for the Physics subject, with a focus on the Circular Motion material. The development of this instructional media adheres to the ADDIE model proposed by Dick & Carey (Allen, 2017). The ADDIE model encompasses the Analysis, Design, Development, Implementation, and Evaluation phases, providing a systematic framework for the creation and refinement of educational materials. Through the application of this model, the research aims to produce a comprehensive and practical hybrid audiovisual e-book that not only imparts physics knowledge but also integrates cultural relevance, mainly drawing from the local wisdom of Ngada's Wela Maka. The research design is illustrated in the following figure 1:

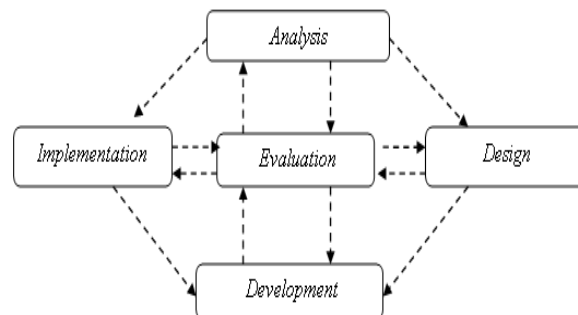


Figure 1: ADDIE Model (Allen, 2017)

This research took place at Citra Bakti High School, located in the Golewa District of Ngada Regency, East Nusa Tenggara Province. The participants in the research comprised five teachers and 34 high school students from Citra Bakti. The primary focus of the study was the hybrid audiovisual e-book designed for physics instruction.

To gather data, the research employed validation sheets assessed by experts and questionnaires distributed to prospective users, namely the teachers and students. The instruments used for data collection were the assessment sheets, which evaluated the validity of the hybrid audiovisual e-book, and the questionnaires, which gathered responses and feedback from the users. It is noteworthy that these instruments underwent thorough validation procedures to ensure their accuracy and reliability in measuring the relevant aspects of the research.

Instrument validity testing was conducted using the SPSS for Windows version 17.0. Decision-making was based on the value of Corrected Item-Total Correlation, which was > 0.378 for $df = 20 - 2 = 18$ and $\alpha = 0.05$, indicating that all statements for each assessment were considered valid. Furthermore, the instrument's reliability was tested using Cronbach's Alpha formula in SPSS. Each instrument had a Cronbach's Alpha value > 0.600 , signifying that all instruments were considered reliable.

The data collected in this research underwent analysis employing both descriptive and inferential statistical methods, encompassing the following steps: Qualitative data explicitly concerning the quality of the hybrid audiovisual e-book product, as assessed by expert validation, were subjected to descriptive analysis. This involved systematically grouping the acquired information to yield insights into the high-quality attributes of the product. The qualitative analysis aimed to provide a detailed understanding of the expert evaluations and recommendations, contributing to the refinement and improvement of the hybrid audiovisual e-book. Quantitative data related to the quality of the product gathered through testing with teachers and students regarding the utilization of the hybrid audiovisual e-book underwent analysis through score conversion using a Likert scale. This quantitative analysis aimed to quantify the feedback and responses received from teachers and students, providing a numerical representation of the perceived quality and effectiveness of the hybrid audiovisual e-book. The Likert scale facilitated the conversion of qualitative responses into measurable and interpretable quantitative data, allowing for a comprehensive assessment of the product's impact on users.

The product development began with the analysis phase, involving analyzing the needs of teachers and students in online learning and analyzing the physics learning materials within the framework of the 2013 curriculum (K-13). Subsequently, activities during the design phase involved the preparation of a conceptual and theoretical framework based on the needs analysis and material

analysis, resulting in an overview of the product to be developed. The development phase included creating the hybrid audiovisual e-book based on the analysis.

The implementation phase consisted of product validation by experts in their respective fields, including subject matter experts, media experts, instructional design experts, and language experts in both Indonesian and the local Ngada language. Additionally, testing the use of the hybrid audiovisual e-book with teachers and students was carried out. The evaluation phase involved revising the results of the product testing until the final research product was obtained. Score conversion into qualitative values is presented in Table 1 below (Widoyoko, 2014).

Table 1. Scale 5 score Conversion Guidelines

Score Intervals	Criteria
$\bar{x} > 4,2$	Perfect
$3,4 < \bar{x} \leq 4,2$	Good
$2,6 < \bar{x} \leq 3,4$	Fair
$1,8 < \bar{x} \leq 2,6$	Not good

RESULTS AND DISCUSSION

The research began with an analysis that included (a) the needs of teachers and students at Citra Bakti High School in the Ngada Regency of East Nusa Tenggara Province in the process of online physics learning, and (b) the physics learning materials for grade X high school within the framework of the 2013 curriculum. The analyzed physics material was Circular Motion with core competency 3, which requires students to understand, analyze, apply, and evaluate acquired knowledge, both procedural, conceptual, and factual, in the fields of science and the humanities with national and state insights. It also involves the ability to apply procedural knowledge based on talent and interest to solve problems. Specific competency 3.3 requires students to analyze physical quantities with constant velocity in circular motion and their application in technology. Teaching the physics topic of Circular Motion is one that demands teachers at Citra Bakti High School to create various learning experiences to ensure the quality of online learning because of the COVID-19 pandemic. Teachers must ensure students' learning needs are met so that students can easily access information flexibly, without limitations of place and time. For this purpose, a learning media is required that can meet the needs of both students and teachers, which is the hybrid audiovisual e-book with real-world problems based on the local wisdom of the Ngada's Wela Maka.

Subsequently, the activities during the design phase involved the development of a conceptual and theoretical framework based on the analysis of the needs of teachers and students at Citra Bakti High School and the analysis of Circular Motion material. This resulted in a draft research product that includes elements to facilitate teachers and students in the online learning process. The software used was Adobe Flash CS6, and the hardware consisted of an Intel Core i5 PC. Next, the research instruments were prepared, including validation sheets from experts and questionnaires for prospective users, and their validity and reliability were tested. The instruments used in this research have been deemed valid and reliable. The testing was conducted with 20 respondents, and the results were analyzed using SPSS for Windows version 17.0.

The development phase involves creating the research product. The

characteristics of this developed instructional media include a product in the form of a textbook converted into a digital book. It includes text, art, sound, images, animations, motion, and videos. This program can be used by students individually (self-paced learning) and offers students the opportunity to actively engage in online learning. Users have control over its utilization, allowing students to access high-quality learning experiences without being constrained by time. Additionally, the product is supplemented with various case studies, motion simulations, and animations that incorporate elements of the local wisdom of the Ngada's Wela Maka. It specifically explains circular motion, creating an engaging and enjoyable learning environment without compromising the quality of the instruction. The hybrid audiovisual e-book product is presented in Figures 2, 3, and 4 below:

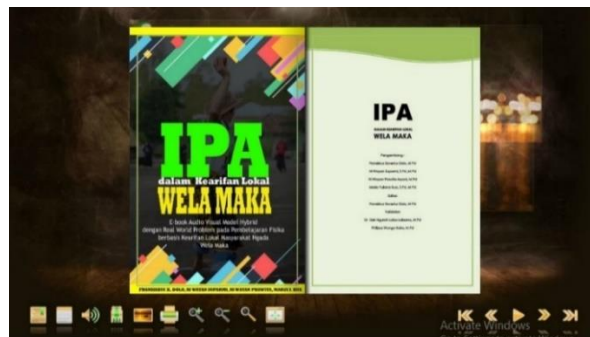


Figure 2. Product Cover Page Display



Figure 3. Hybrid Audiovisual E-Book Display

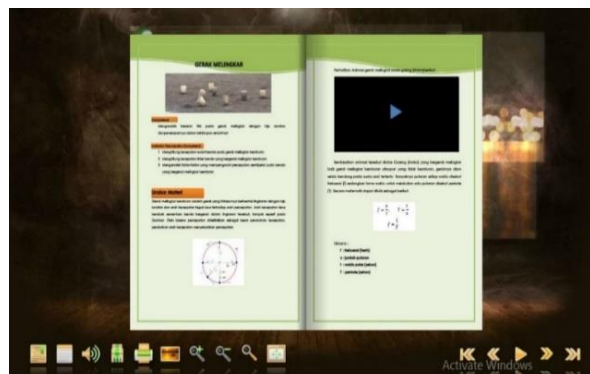


Figure 4. Hybrid Audiovisual E-Book Display

The hybrid audiovisual e-book was subsequently validated by four expert professors. The assessment results for the developed product by the four validators were in the 'excellent' category. The average score data from the validation by the four validators is shown in Figure 5 below:

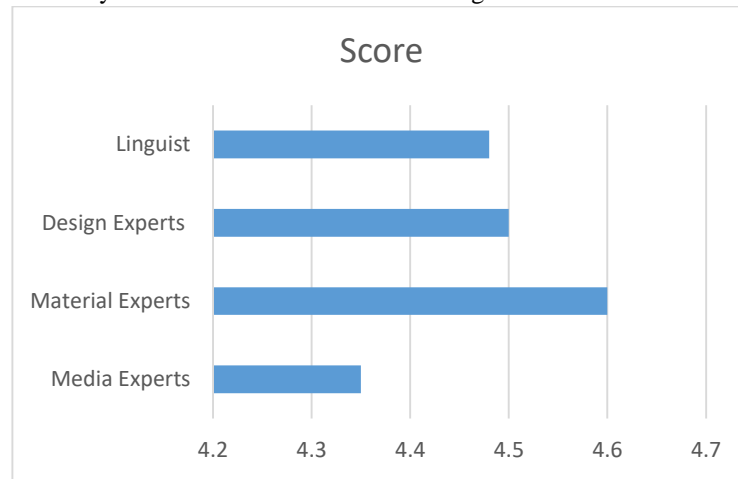


Figure 5. Validation Results from Experts

This instructional media was then tested with 5 teachers and 34 students from Citra Bakti High School. The data from the product testing by the teachers can be seen in Table 2.

Table 2. Product Test Results by Teachers

No	Assessment Aspect	Average	Category
1	Material Presentation	4,62	Very Good
2	Learning design	4,43	Very Good
3	Media design	4,52	Very Good
4	Use of language	4,47	Very Good
5	Usability	4,45	Very Good
	Total	4,49	Very Good

The feedback from the 5 teachers regarding the use of the media, in terms of content presentation, instructional design, media design, language use, and usability, achieved an average score of 4.49, falling into the 'excellent' category.

Conducting online physics education with relatively challenging material is an aspect that requires special attention. Based on the analysis of the needs of teachers and students in the online learning process, the development of a hybrid audiovisual e-book was carried out. This digital media was developed to provide ease of access to learning. The current education landscape, influenced by Society 5.0, supports the utilization of digital technology in the learning process (Haleem et al., 2022). This allows for a broader learning opportunity for both teachers and students.

The shift in the learning paradigm poses a challenge for all educators to conduct high-quality online learning. The quality of the learning process is determined by several aspects, including the teacher's ability to develop learning activities such as formulating learning objectives, selecting appropriate strategies, instructional media, and conducting proper learning evaluation (Han & Ellis, 2019). This ability is essential to achieve effective and efficient online learning.

Therefore, it is crucial for an educator to precisely understand the learners' needs for effective online learning. This hybrid audiovisual e-book enables independent learning activities that are not limited by space and time while presenting an engaging learning process, as it offers innovations in textbooks, including text, art, sound, images, animations, motion, and video based on the local wisdom of the Ngada Wela Maka culture.

The digital media resulting from this research has been developed, validated by experts, and tested with potential users. Expert validation was conducted by subject matter experts, instructional design experts, media experts, and language experts. The aspects assessed by subject matter experts include various components such as learning, material substance, material alignment with real-world problems, clarity of material related to real-world problems based on the local wisdom of Ngada, presentation techniques, and supporting materials. The average score from the subject matter experts' assessment falls into the 'excellent' category. The evaluation by instructional media experts covers aspects like cover design, typography, layout, visual communication components, and software engineering. The average score from the instructional media experts' assessment is 'excellent.' Meanwhile, the assessment by language experts concerns the use of both the Indonesian and Ngada regional languages in the media and encompasses elements required for online learning, interactivity, self-sufficiency, accessibility, and enrichment (Pornpimon et al., 2014). The average score from the language experts' assessment is 'excellent.'

The development of this instructional media is primarily aimed at assisting educators, particularly the teachers at Citra Bakti High School, in conducting high-quality online learning activities without being constrained by physical limitations of space and time. Students can access learning materials easily, according to their individual needs and pace, anytime and anywhere (Rawashdeh et al., 2021). This means that the quality of digital instructional media used by both teachers and students has a significant impact on the achievement of learning outcomes. The questionnaire results from potential users, including both teachers and students from Citra Bakti High School, indicate a positive response. This is evident from the average scores achieved in each assessment aspect, all of which fall into the 'excellent' category.

One of the strengths of this developed hybrid audiovisual e-book product is the integration of the local wisdom of Ngada Wela Maka into the presentation of learning materials. Wela Maka, one of the traditional games of the Ngada community played after hunting activities, is familiar in the daily lives of students. Learning activities based on real-life experiences in the context of local culture provide students with the opportunity to transfer this knowledge or information into their own understanding of the material being studied (Lidi et al., 2020). Additionally, the development of digital instructional media with good audio-visual components will help students receive messages and information, including the material, clearly, thereby minimizing misconceptions. The numerous advantages offered by this product indicate that the hybrid audiovisual e-book, supported by the results of product testing by potential users, is ready to meet the challenges of education during the pandemic. This means that the developed product is suitable for use in online learning activities.

CONCLUSION

The digital instructional media in this study underwent a comprehensive development process following the stages of the ADDIE model: 1). Analysis: The initial stage involved analyzing the needs and materials in accordance with the Merdeka curriculum framework. 2). Design: Subsequently, the design phase

focused on formulating the structure and features of the digital instructional media. 3). Development: The development phase encompassed the actual creation and refinement of the digital instructional media. 4). Implementation: Following development, the media was introduced and implemented in the online learning environment. 5). Evaluation: The final stage involved an evaluation of the digital instructional media, considering its effectiveness and appropriateness in meeting the learning objectives. The results of this development process yielded a digital instructional media product that received commendable feedback. The average scores from three sets of experts—subject matter experts, media experts, and language experts, both in Indonesian and the local Ngada language—fell into the 'excellent' category. Moreover, the trials conducted with potential users also resulted in ratings within the 'excellent' category.

Based on this robust data, it can be confidently concluded that the research product, the digital instructional media, is well-suited for implementation in online learning processes. The positive evaluations from experts and users affirm the quality and effectiveness of the developed instructional media, highlighting its potential to enhance the online learning experience in the context of the Merdeka curriculum framework. In this research, the limitation of media development is specifically focused on the Circular Motion material.

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