

RESEARCH ARTICLE

Innovating Videography Instruction in Vocational Schools: A DBR-Based Multimedia Approach

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ABSTRACT

This study aims to develop and validate an interactive learning medium for the Vocational Videography course at SMK Negeri 2 Padang Panjang using a Design-Based Research (DBR) approach. The media, developed with Adobe Captivate, integrates multimedia elements such as visuals, audio, video tutorials, and interactive quizzes to enhance student engagement and comprehension. The development process followed iterative DBR phases, including problem analysis, prototype design, expert validation, implementation, and reflection. Validation by six experts in educational technology and subject matter resulted in ratings of "valid" to "highly valid" in terms of content quality and instructional design. Practicality testing involving 15 students yielded a score of 85.97%, indicating high usability and acceptance. The findings suggest that the interactive media significantly boost student motivation and support competency-based learning in videography education. This study contributes to advancing instructional innovation in vocational education through effective multimedia integration, offering practical implications for educators seeking to enhance digital learning environments.

KEYWORDS

Interactive learning media; videography education; design-based research; vocational training

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1. INTRODUCTION

The rapid evolution of digital technologies has revolutionized educational paradigms, fundamentally transforming how knowledge is delivered and acquired [1], [2]. In vocational education, particularly in Indonesia, where the synergy of practical skills and digital proficiency is crucial, this transformation is both critical and challenging [2]. Limited technological infrastructure and a gap between curriculum and industry needs often hinder the preparation of skilled graduates [3]. Videography, as a dynamic

field blending technical expertise and creative expression, epitomizes this challenge. Mastery of camera operation, lighting, composition, and video editing demands immersive, hands-on learning environments that transcend the limitations of traditional pedagogical approaches [4].

Despite the pressing demand for innovative instructional strategies, many vocational high schools worldwide remain tethered to outdated teaching methods, such as lectures and textbook-based learning, which often fail to spark student engagement or cultivate essential practical skills. In Indonesia, Sekolah Menengah Kejuruan (SMK), the nation's vocational high schools, grapple with these challenges, exacerbated by limited technological infrastructure and a persistent disconnect between curricula and the evolving needs of the creative industries. Such traditional approaches frequently dampen student motivation, hinder hands-on learning, and yield suboptimal outcomes, leaving graduates underprepared for professional demands [5]. With the rapid rise of the global creative economy, encompassing digital content creation, filmmaking, and media production, there is an urgent need to equip students with industry-relevant skills and competencies. The challenge lies in designing instructional media that not only align seamlessly with vocational curricula but also ignite active participation, foster creativity, and empower students to thrive in a competitive, technology-driven global market.

To address this critical gap, this study employs a Design-Based Research (DBR) methodology, an iterative and collaborative approach that is uniquely suited to vocational education. DBR facilitates the co-creation and refinement of educational innovations in authentic learning environments, ensuring contextual relevance and practical applicability [6]. Through cycles of design, implementation, and reflection, DBR engages stakeholders, educators, students, and industry professionals to develop solutions that are both pedagogically robust and responsive to the dynamic needs of vocational training [7]. This methodology enables the creation of interactive learning media that seamlessly integrate theory and practice, fostering more profound understanding and skill development.

This research focuses on the development and evaluation of an innovative interactive learning media tailored for the videography course at SMK Negeri 2 Padang Panjang, Indonesia. The media incorporates a blend of visual, audio, video, and interactive quiz components, designed to create an engaging, student-centered learning experience aligned with the vocational curriculum. By leveraging multimedia elements, the platform aims to enhance student motivation, foster active engagement, and improve learning outcomes in technical and creative competencies [8], [9].

The following research questions guide the study:

1. How does the implementation of interactive learning media influence student motivation and engagement in videography education?
2. To what extent is the developed interactive media valid, practical, and effective for enhancing learning outcomes in vocational videography classes?

By addressing these questions, this study seeks to make a meaningful contribution to the field of educational technology within vocational training. It aims to provide actionable insights for educators and institutions striving to innovate teaching practices, elevate student experiences, and prepare learners for success in the digital age. Through the development of contextually relevant and engaging instructional media, this research aspires to set a precedent for transformative education in technical and creative disciplines.

2. METHODS

2.1 Research Design

This study employed a Design-Based Research (DBR) methodology to design, develop, and evaluate an interactive learning medium for videography instruction at SMK Negeri 2 Padang Panjang. DBR was chosen for its iterative and collaborative characteristics, allowing integration of design, implementation, evaluation, and reflection phases within authentic educational settings [10]. This approach enabled the researchers to generate practically relevant and theoretically informed innovations by systematically incorporating feedback from real classroom interactions [11].

2.2 Participants and Setting

The research took place in the videography class (XI DKV 1) of SMK Negeri 2 Padang Panjang during the 2023/2024 academic year. Participants included 15 students who participated in the practicality testing phase and six expert validators, comprising three subject matter experts (videography teachers) and three instructional technology specialists. The experts contributed during the validation phase to assess the content and usability of the developed media.

2.3 Research Procedure

The DBR process followed four main stages: (1) Needs Analysis, (2) Design and Development, (3) Implementation and Evaluation, and (4) Reflection and Revision. Each phase is described in Figure 1.

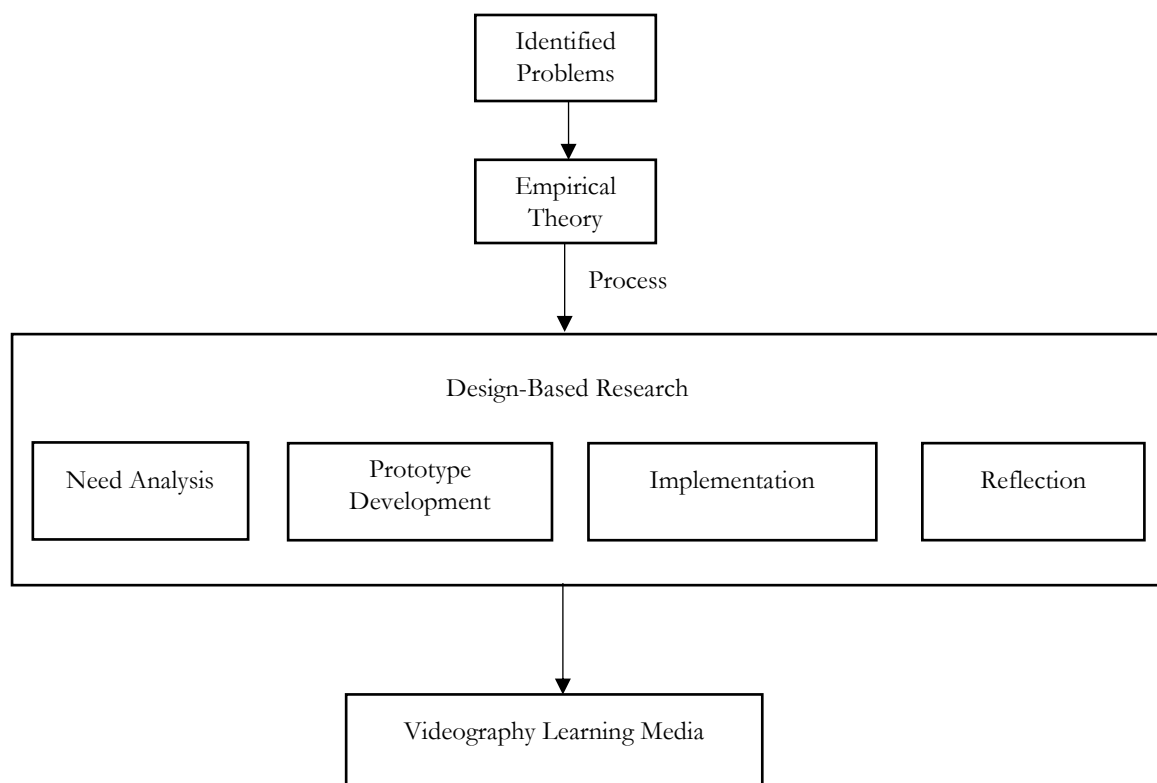


Figure 1. Research procedure

2.3.1. Need Analysis

A comprehensive needs analysis was conducted to identify instructional challenges and content gaps in existing videography teaching practices. This phase involved direct classroom observations to assess student engagement and instructional strategies, semi-structured interviews with teachers and students to gather insights into specific learning needs, and analysis of curriculum documents aligned with the national vocational education framework to ensure conformity with formal standards [12]. Additionally, a review of relevant literature on multimedia learning and videography education was performed to integrate evidence-based practices. The findings from these activities informed the design requirements and pedagogical framework for developing the interactive learning media [13].

2.3.2. Design and Development

Guided by the results of the needs analysis, a prototype was designed using Adobe Captivate, incorporating multimedia components such as instructional videos, audio narration, interactive quizzes, and structured learning modules, as illustrated in Figure 2. All content was aligned with the Indonesian national vocational curriculum under the Kurikulum Merdeka (Freedom to Learn Curriculum) [14]. Within this framework, Capaian Pembelajaran (CP) refers to learning outcomes that specify the expected knowledge, skills, attitudes, and values upon completion of a learning phase. At the same time, Tujuan Pembelajaran (TP) refers to specific learning objectives derived from the CPs to guide classroom instruction [15]. These terms were consistently abbreviated as CP and TP throughout the development process and integrated into the learning media interface to ensure compliance with the policy guidelines established by the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia.

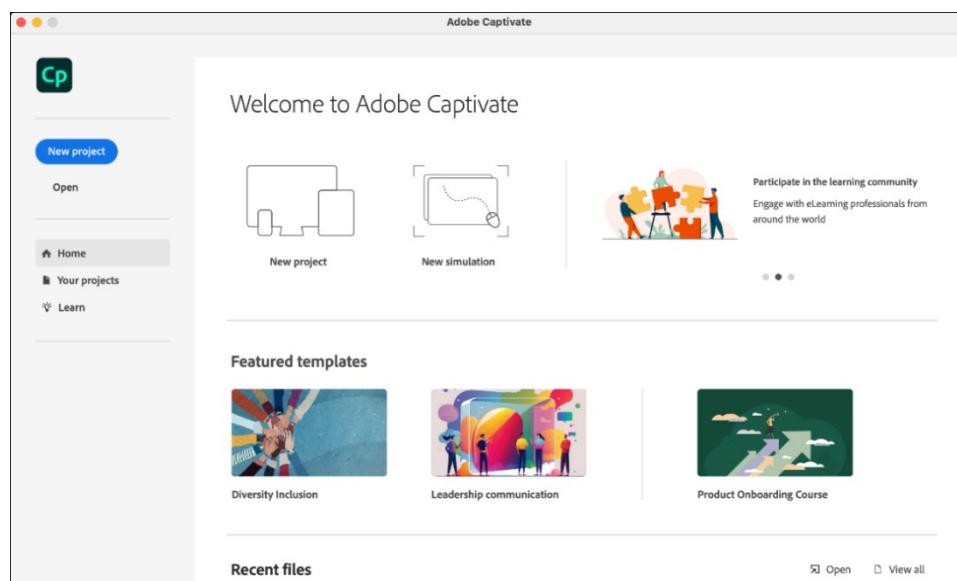


Figure 2. Adobe Captivate interfaces

The interface design was developed following a detailed storyboard and comprised several key pages: a Login Page featuring institutional logos and a “Start” button; a Home Page presenting four main menus, CP & TP, Materials, Learning Videos, and Quiz; a CP & TP Page providing intended outcomes and objectives in downloadable PDF format; a Materials Page containing instructional content on camera types, video shooting techniques, lighting, and editing steps; a Learning Videos Page delivering

video-based instruction on practical videography skills; and a Quiz Page offering interactive assessments with immediate feedback and scoring.

The design process followed a detailed storyboard that guided the development of key interface pages:

a) Login Page

The Login Page serves as the initial interface, displaying the logos of the developing institutions, SMK Negeri 2 Padang Panjang and Universitas Negeri Padang, alongside the title "*Videography Learning Media*" to establish the platform's identity. A prominent "Start" button serves as the primary navigation element, allowing users to access interactive learning content, as illustrated in Figure 3(a).

b) Home Page

The Home Page serves as the central navigation hub, providing access to four main menus: Learning Outcomes & Objectives (CP & TP), Materials, Quizzes, and Learning Videos. The CP & TP menu displays the competency guidelines by outlining the expected learning achievements and objectives. The Materials menu systematically organizes the videography topics for structured study. The Quiz menu provides interactive assessments designed to evaluate learners' understanding, while the Learning Videos menu delivers visual instructional content to enhance learner engagement. These interface elements are shown in Figure 3(b).

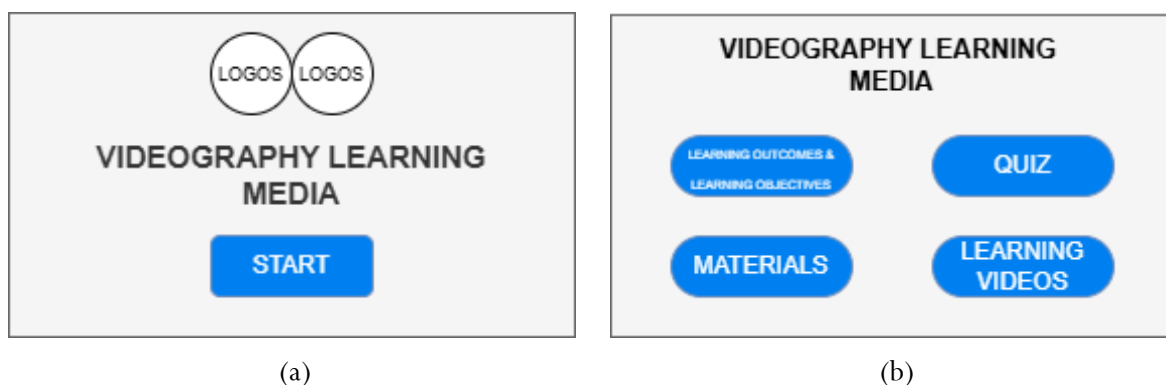


Figure 3. Design interface of the interactive learning media: (a) Login Page; (b) Home Page.

c) Learning Outcomes and Objectives Page

The Learning Outcomes and Objectives Page is structured into two main sections: Learning Outcomes and Learning Objectives. The Learning Outcomes section outlines the expected competencies, encompassing knowledge, skills, attitudes, and values, that students are expected to demonstrate by the end of the learning phase, serving as holistic indicators of student success. Complementing this, the Learning Objectives section provides specific, measurable instructional goals designed to guide both teaching and learning activities. These objectives are presented in a downloadable PDF format to facilitate easy access and reference, ensuring alignment with the broader curriculum standards and supporting systematic achievement monitoring throughout the instructional process, as shown in Figure 4(a).

d) Materials Page

The Materials Page systematically organizes the core videography topics to be covered in the course, including foundational concepts such as camera definitions and types, as well as practical skill areas like video shooting techniques, lighting setups, and video editing workflows. Each topic is presented clearly and concisely, incorporating multimedia elements where appropriate to enhance conceptual understanding and learner engagement. This modular content design enables learners to progressively develop technical competencies while connecting theoretical knowledge with hands-on practice, thereby fostering an integrated and effective learning experience that aligns with vocational education objectives, as illustrated in Figure 4(b).

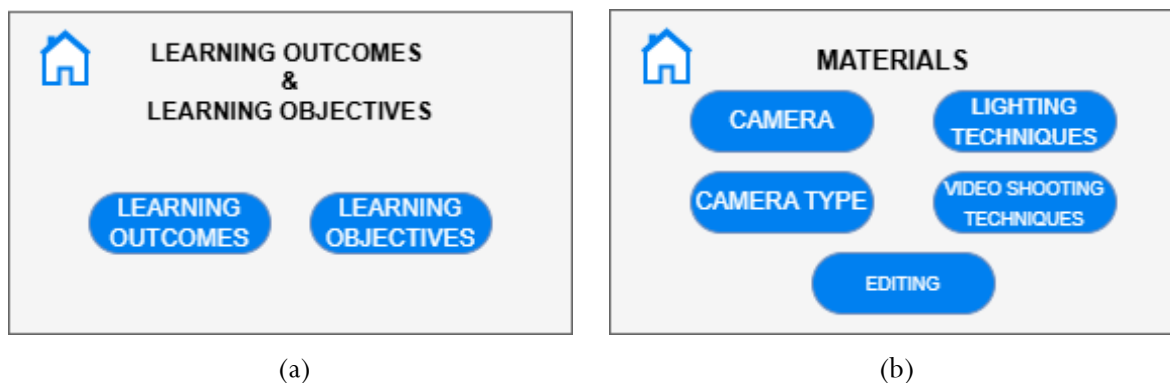


Figure 4. Design interface of the interactive learning media: (a) Learning Outcome and Objectives Page; (b) Materials Page.

e) Learning Videos Page

The Learning Videos Page contains a range of instructional videos, including lighting techniques and video shooting methods, which are embedded within the media to allow direct access for learners, supporting practical understanding and engagement, as illustrated in Figure 5(a).

f) Quiz Page

The Quiz Page offers an interactive assessment interface featuring a start button that initiates a sequence of questions. After completion, learners can view their scores and review both correct and incorrect responses, enabling effective self-evaluation and reinforcement of the material covered, shown in Figure 5(b).

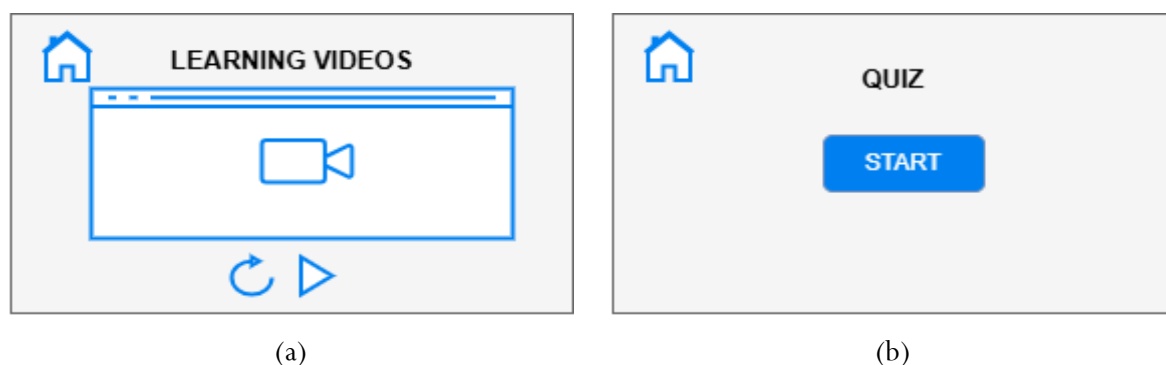


Figure 5. Design interface of the interactive learning media: (a) Learning Videos Page; (b) Quiz Page.

2.3.3. Implementation and Evaluation

The prototype underwent expert validation focusing on content accuracy, pedagogical appropriateness, media design quality, and interactivity. Structured questionnaires employing a 4-point Likert scale were distributed to six expert validators, and the results were analyzed using Aiken's V coefficient to assess content validity. The Aiken's V index (V) was calculated using Equation (1), where s represents the adjusted score obtained by subtracting the lowest score (l) from each validator's given score (s_0), n is the total number of validators, and c is the highest score on the scale. In this study, the values of l and c were 1 and 4, respectively. This method, as referenced in Equation (1) and Equation (2), provides a quantitative measure of expert consensus regarding the validity of each item.

$$V = \frac{\sum s}{n(c - l)} \quad (1)$$

$$S = s_0 - l \quad (2)$$

The analysis indicated that most items achieved an Aiken's V coefficient above 0.4, denoting acceptable relevance and content alignment. Items scoring below this threshold were flagged for revision or removal, ensuring that the final instrument met established standards of validity and reliability [16].

Following expert validation, practicality testing was conducted with students to evaluate the learning medium's usability, instructional clarity, visual design, and navigational ease within an authentic classroom setting [17]. The level of practicality was determined using Equation (3), which yields a percentage-based score reflecting overall user acceptance. The resulting data provided insight into the tool's functional effectiveness in supporting student learning during videography instruction.

$$\text{Practicality Value} = \frac{\text{The Obtained Questionnaire Score}}{\text{Maximum Score}} \times 100 \quad (3)$$

2.3.4. Reflection and Revision

A systematic analysis of feedback gathered from both experts and students was conducted to identify areas requiring improvement. Revisions focused on simplifying complex concepts, improving the intuitiveness of the user interface, and enriching the visual design to maximize learner engagement [18]. This iterative process of reflection and refinement ensured the final version of the learning media was pedagogically robust, user-centric, and contextually tailored to the vocational education environment. The cyclical nature of this phase aligned with the principles of Design-Based Research, fostering continuous improvement grounded in empirical evidence [19].

2.4 Data Collection Instruments

Multiple data collection instruments were employed to capture comprehensive insights across research phases and participant groups. Expert validation utilized structured questionnaires designed to evaluate critical dimensions of the interactive learning media, including content accuracy, pedagogical soundness, visual appeal, and interactivity [20]. These instruments applied a 4-point Likert scale to obtain nuanced expert assessments. For practicality assessment, a separate questionnaire targeting

students was used to gather data on usability factors, including ease of navigation, clarity of instructions, interface attractiveness, and overall user experience [17]. Additionally, during the needs analysis phase, observation protocols and semi-structured interview guides were implemented to collect qualitative data on current instructional practices and learner engagement, providing essential contextual information to inform the design and development of the media [21].

2.5 Data Analysis

Quantitative data from expert evaluations and student practicality testing underwent descriptive statistical analysis to summarize central tendencies and variability. Content validity was rigorously assessed using Aiken's V coefficient, with a threshold of 0.4 set as the minimum acceptable standard for item relevance and consensus among experts [22]. Practicality scores were computed as percentages of the maximum possible scores and categorized according to established benchmarks, where scores exceeding 80% indicated high practical usability. Qualitative data derived from interviews and classroom observations were subjected to thematic analysis, complementing quantitative findings by uncovering nuanced insights into user experiences and contextual factors. This mixed-methods approach facilitated data triangulation, enhancing the credibility and validity of the research outcomes while informing iterative media refinement.

3. RESULTS

3.1. Requirement Analysis

The initial analysis conducted at SMK Negeri 2 Padang Panjang identified critical challenges in the videography learning process. Observations revealed that traditional lecture-based methods and reliance on textbooks led to low student motivation and limited active participation. Interviews with teachers and students confirmed the absence of interactive and multimedia learning resources, which hindered students' comprehension of practical videography skills. The limited integration of technology constrained engaging and contextualized learning opportunities. These insights emphasized the necessity for an interactive learning media designed to enhance student engagement, align with the vocational curriculum, and support skill mastery.

3.2. Media Design and Content Development

In response to the identified needs, an interactive learning media prototype was developed using Adobe Captivate. The design adhered to a detailed storyboard featuring key interface pages, including a branded login page, a home page with clear navigation menus that included Learning Outcomes and Objectives (CP & TP), Materials, Quiz, and Learning Videos. The media content systematically covers essential videography topics, including camera types, shooting techniques, lighting, and video editing. Multimedia elements, including video tutorials and interactive quizzes, were integrated to cater to diverse learning styles and enhance student engagement.

3.1.1. Opening Page

The opening page of this learning media (Figure 6) features key elements, including the subject title, institutional logo, academic year, and a navigation button to initiate the use of the media. The page is visually designed to be appealing through the selection of typography and an aesthetically arranged layout, aiming to create a positive first impression.



Figure 6. Open page display

3.1.2. Home Page

The home page (Figure 7) features several navigation buttons, including settings, learning objectives, materials, instructional videos, and quizzes. Each button directs the user to a page that corresponds to its specific function. For instance, the settings button provides comprehensive guidelines on how to use the media, facilitating user interaction throughout the learning process.



Figure 7. Home page display

3.1.3. Learning Outcomes and Objectives Page

This interface (Figure 8) features buttons for "Learning Outcomes" and "Learning Objectives," each directly linked to a PDF file containing the relevant information. When a button is clicked, users are directed to open the corresponding document. Additionally, a home icon is positioned in the upper-right corner, serving as a navigation tool that allows users to return to the main page.



Figure 8. Learning outcome and objectives page display

3.1.3. Materials Page

The materials page (Figure 9) presents five main topics: camera fundamentals, camera components, video shooting techniques, editing, and lighting techniques. Each topic is represented by a distinctively colored rectangular button, facilitating identification and enhancing visual appeal. The background features a cartoon-style forest illustration, designed to create an engaging and enjoyable learning atmosphere. A home icon is placed in the upper-right corner, functioning as a navigation button to return to the main page. This design integrates interactivity, aesthetics, and intuitive navigation to increase student engagement in learning videography.

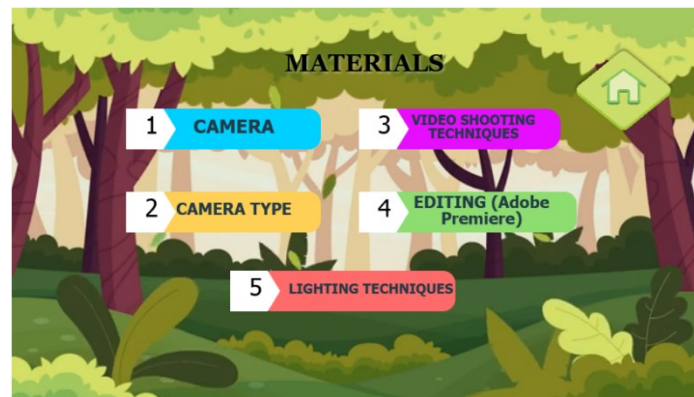


Figure 9. Materials page display

3.1.3. Learning Video Page

The learning video page (Figure 10) displays four instructional videos that can be accessed directly via clickable links to YouTube. Each video corresponds to a specific topic covered in the course content. For example, Video 1 discusses the definition of a camera and its components.



Figure 10. Learning video page display

3.1.3. Quiz Page

The quiz page (Figure 11) features an interactive interface with a "Start" button, which, when clicked, directs users to a series of questions to be answered. Upon completing the quiz, users can view their results and review the questions they answered correctly or incorrectly.



Figure 11. Quiz page display

3.2. Validation Results

Six experts, consisting of three subject matter specialists and three instructional technology professionals, evaluated the interactive learning media using structured questionnaires based on a 4-point Likert scale. The evaluation criteria covered content accuracy, pedagogical relevance, visual design, and interactivity. The results, analyzed using Aiken's V coefficient, indicated content validity scores ranging from 0.7 to 1.0, classifying the media as valid to highly valid. The experts provided constructive feedback suggesting simplification of complex concepts, improvement of navigation elements, and enhancement of visual aesthetics. These suggestions were incorporated into subsequent revisions to optimize the media's effectiveness and usability.

Figure 12 presents the summary chart of expert validation results, while Table 1 provides detailed scores across the evaluated aspects.

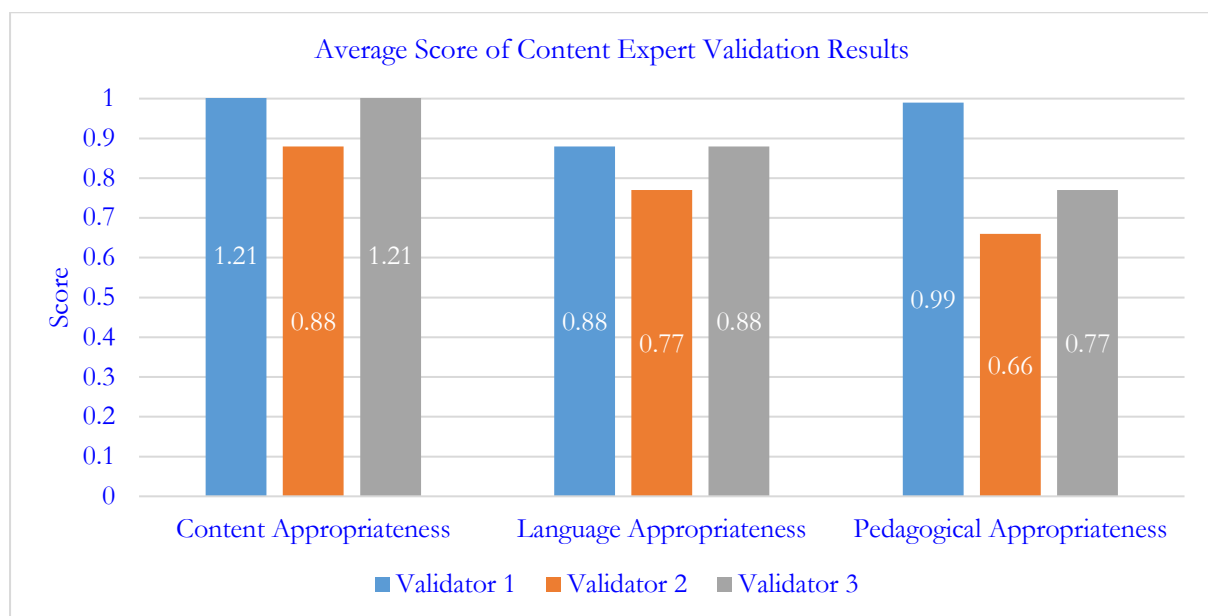


Figure 12. Average results of expert validation

Table 1 presents the validation results from the media expert regarding the developed interactive learning media, which include assessments across various aspects such as visual design, interactivity,

and technical suitability. The scores obtained from this validation process are used to evaluate the feasibility of the media as an effective learning tool.

Table 1. Testing results using the black box method

No	Aspect	Statement	Validator			Σs	V	Note
			1	2	3			
1	Visual Design and Aesthetics	P1	3	4	3	7	0.7	Valid
		P2	4	3	4	8	0.8	Valid
		P3	3	4	3	7	0.7	Valid
		P4	3	4	4	8	0.8	Valid
		P5	3	3	4	7	0.7	Valid
2	Interactivity and effectiveness	P1	4	3	4	8	0.8	Valid
		P2	4	4	4	9	1	Very Valid
		P3	4	4	4	9	1	Very Valid
		P4	3	3	3	6	0.6	Valid
		P5	3	4	4	8	0,8	Valid

3.2. Practicality Testing

Following the expert validation, a practicality test was conducted with 15 students from class XI DKV who utilized the developed interactive learning media. The assessment examined several key dimensions, including ease of use, clarity of instructions, user interface design, and the effectiveness of navigation in supporting students' understanding of videography material. Data were collected using a structured questionnaire based on a 5-point Likert scale, designed to capture students' perceptions, experiences, and satisfaction across these aspects.

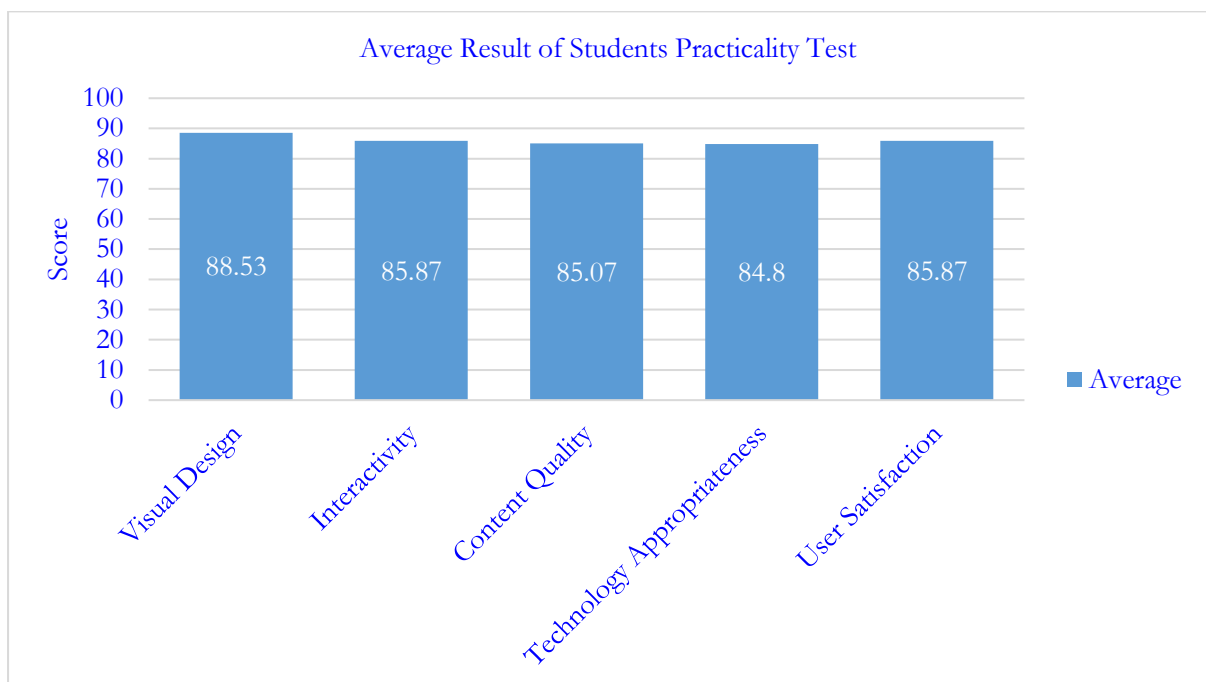


Figure 13. The average result of the student's practicality test

As presented in Figure 13, the results revealed that the media attained a practicality score of 85.97%, which falls into the “very practical” category according to established evaluation benchmarks. These findings suggest that the interactive learning media is not only theoretically valid based on expert judgment but also functionally effective and well-accepted in real classroom practice. In addition, qualitative feedback from students underscored enhanced engagement and motivation, indicating that the media fosters active learning and improves comprehension of complex videography concepts.

4. DISCUSSION

4.1. Alignment of Requirements with Vocational Education Needs

The requirement analysis revealed that students experienced low motivation and engagement when learning videography through traditional lecture-based methods. This resonates with evidence showing that vocational education requires practice-oriented and technology-supported approaches rather than conventional teacher-centered delivery [23]. The absence of interactive media in the school context underscores broader challenges in vocational high schools, particularly in regions with limited infrastructure and digital divide issues. By identifying these needs, this study supports the argument that vocational learning demands immersive, multimodal, and student-centered learning environments [24].

4.2. Design Principles and Multimedia Integration

The media prototype, developed using Adobe Captivate, integrates multiple components: a login interface, learning outcomes, instructional materials, interactive quizzes, and video tutorials. This design aligns with contemporary principles of multimodal learning, which emphasize that student engagement and comprehension are significantly enhanced when verbal, visual, and kinesthetic elements are combined [24], [25]. Moreover, structured navigation and visual design promote user-centered learning, addressing both functional and aesthetic dimensions that are essential for sustaining motivation. Similar findings in higher vocational education indicate that multimodal and interactive instructional designs foster deeper conceptual understanding and skill mastery by bridging theoretical content with authentic practice [24], [25].

4.3. Expert Validation and Pedagogical Robustness

The validation results indicated that the media achieved high content validity across visual design, interactivity, and technical appropriateness, with Aiken’s V values ranging between 0.7 and 1.0. These findings underscore the media’s pedagogical relevance and alignment with instructional objectives. The iterative improvement process, guided by expert feedback, aligns with the Design-Based Research paradigm [26], which emphasizes collaboration among researchers, practitioners, and domain experts. This iterative co-creation process ensures contextual fit and enhances the usability of instructional innovations in vocational training.

4.4. Practicality and Student Engagement

The practicality testing demonstrated that the media was perceived as “very practical” (85.97%) by students, with qualitative feedback suggesting improved motivation and engagement. This result aligns with recent studies showing that vocational learners are more engaged and perform better when exposed to multimodal and interactive teaching strategies, compared to traditional text-heavy methods [27], [28]. The incorporation of video-based tutorials and interactive quizzes is particularly relevant, as

evidence indicates that immediate feedback and active participation are crucial in enhancing both technical competencies and creative problem-solving skills [28].

4.5. Implications and Future Directions

Taken together, these findings support the argument that integrating interactive media into vocational education can bridge the gap between curriculum objectives and industry-relevant competencies. The media developed in this study exemplifies how technology can transform videography instruction from passive knowledge transfer to active, experiential learning. However, scalability remains a challenge, particularly given resource disparities across schools [23]. Future research should investigate the long-term impacts on student performance, broader scalability in resource-constrained vocational institutions, and the integration of emerging technologies such as Virtual Reality [28] or multimodal teaching innovations [25] to enhance authenticity and immersion in videography education.

5. CONCLUSION

This study developed and validated an interactive learning media for the Videography subject at SMK Negeri 2 Padang Panjang using Adobe Captivate. The needs analysis highlighted significant challenges in traditional videography learning, including limited student engagement, a lack of interactive resources, and low motivation. To address these issues, a prototype was designed that integrates multimedia elements such as instructional videos, interactive quizzes, and structured learning modules aligned with the *Kurikulum Merdeka*. Expert validation results, analyzed using Aiken's V, confirmed that the media achieved validity scores ranging from 0.7 to 1.0, indicating that the developed product is valid to highly valid across dimensions of content accuracy, pedagogical relevance, visual design, and interactivity. The practicality test involving 15 students further demonstrated an average score of 85.97%, classifying the media as “very practical.” These findings confirm that the developed learning media are both theoretically sound and practically effective in enhancing students' understanding and motivation in videography learning. In conclusion, this research contributes to the improvement of vocational education by providing an interactive, engaging, and curriculum-aligned digital learning tool. Future research should expand testing to larger and more diverse student populations, integrate advanced features such as adaptive feedback or augmented reality, and evaluate the long-term impact of such media on student performance and creativity in vocational contexts.

DECLARATIONS

Author Contributions

Dita Luthfillah: Conceptualization, Methodology, Software, Investigation, Data Curation, Visualization, Writing – Original Draft. **Asrul Huda:** Supervision, Validation, Formal Analysis. **Ika Parma Dewi:** Resources, Validation. **Yevgeniya Daineko:** Formal Analysis, Writing – Review & Editing.

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Ethical Approval

This study involved human participants (students). All procedures were conducted in accordance with the institutional ethical guidelines of the Study Program of Informatics Engineering Education at Universitas Negeri Padang and adhered to the principles outlined in the Declaration of Helsinki. Formal approval was obtained at the program level, and the study was conducted with full consideration of the participants' rights and well-being.

Informed Consent

Informed consent was obtained from all participants before data collection. Participation was voluntary, and confidentiality and anonymity were assured throughout the study.

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Competing Interests

The authors declare that they have no conflicts of interest.

Generative AI and AI-Assisted Technologies Statement

During the final stages of manuscript preparation, the authors used Grammarly as an AI-assisted tool to improve readability, coherence, and linguistic precision. The tool was used to provide suggestions for grammar, punctuation, sentence structure, and style. The final version was thoroughly revised and manually edited to ensure alignment with the authors' intended meaning and compliance with academic standards. The authors take full responsibility for the accuracy, content, and conclusions presented in this manuscript.

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