ANALYSIS VIDEO-BASED LEARNING DESIGN IN PRACTICE COURSE AT VOCATIONAL SCHOOL

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ABSTRACT

This study aims to design educational videos as video-based learning and determine the design that makes students more interested in paying attention to the distance learning process. If students want to pay attention to the material during the learning process, students will also get the maximum learning experience. The study was focused on the Department of Fashion at SMKN 1 Dawuan Subang to improve clarity. To obtain empirical data, this study used quantitative comparative with data collection using questionnaires with census sampling. The number of respondents is 22 students. The steps are input measurement design video with Bandicam and output measurement obtained from the evaluation results based on three elements for video design and implementation: cognitive load, student engagement, and active learning together. The data collection technique used a questionnaire. The results indicate that video-based learning using Bandicam was most effective in organizing tempo, but more attention must be paid to segmentation because the visualization video was formal and tended to be static. Further research should explore video-based learning using more engaging and dynamic applications like Prezi or similar tools.

INTRODUCTION

The COVID-19 pandemic has impacted the world since the end of December 2019, significantly affecting various sectors such as the economy, health, social interactions, tourism, and culture [1]. Not only them but also the education system in Indonesia during the COVID-19 pandemic has several changes. This has been announced by the Minister of Education and Culture, Mr. Nadiem Makarim, at his press conference[2]. However, education is a process without end [3], so education is endless, and whatever the conditions, education must be going continuously. So, Indonesia began to implement a distance learning system.

The distance learning system is also utilized in vocational education. In Indonesia, the implementation of distance learning is regulated by Permendikbud. This system involves students being geographically separated from their educators, using various learning resources delivered through information, communication technology, and other media [4]. One common form of distance learning is video-based learning, which allows for the simultaneous presentation of both the teacher and the instructional material

Dawuan Vocational School is among the many vocational schools prepared proactively for distance learning during this period. Their commitment is demonstrated through their involvement in a program known as In-House Training. This year, the school organized a session on creating video-based learning content using the Bandicam application, held from 16-18 July 2020. This training aimed to equip teachers with the skills to manage distance learning effectively. Video-based learning serves as a virtual classroom representation, offering the benefits of being repeatedly accessible and downloadable, allowing students to revisit and review the material whenever necessary. Brame's theory emphasizes that videos become valuable learning tools when they include three essential components: 1) Cognitive load management, 2) Student engagement, and 3) Active learning [5]. Together, these elements provide a robust framework for creating and utilizing videos as practical educational tools.

Various applications can be used to create videos with basic screen recording and presenter features, such as Bandicam, Screencast-O-Matic, Kinemaster, Prezi Video, Video Show, and Filmora. While these applications share core functionalities, each has distinct characteristics. Video in education is highly advantageous as an effective tool for tutoring and learning enhancement [6][7]. To be an effective medium for sharing knowledge, videos must incorporate specific elements that enhance the learning experience [8][9]. This study will focus on designing a video-based learning module using the Bandicam application. It will be analysed through Brame's theory to ensure it provides an optimal learning experience for students, even in a remote learning setting. The outcomes of this study aim to assist teachers in creating more effective and engaging instructional videos and evaluating the role of educational video technology in supporting the teaching and learning process in remote learning for vocational high schools. This includes assessing the platforms used, the accessibility of the content, and the technical quality of the videos.

METHODS

This research used a comparative quantitative approach to analyze the effectiveness of video-based learning among students in the Department of Fashion at SMKN 1 Dawuan, located at Raya Cisampih St. No.08, Subang, West Java, Indonesia. The study involves two main steps: input measurement and output measurement.

1. Input Measurement

The input measurement involves creating and evaluating a Proportion Body Course design video produced using Bandicam software. The video is 16 minutes long and is developed based on three elements of video design and implementation proposed by Brame: cognitive load, student engagement, and active learning. These elements were selected to ensure the video content is easily digestible and engaging and promotes active participation from students.

2. Output Measurement

The output measurement analyzes the effectiveness of the video by assessing it against the same three elements: cognitive load, student engagement, and active learning. The efficacy of these elements is evaluated through data collected using a structured questionnaire.

3. Data Collection and Analysis

The respondents for this study are students from the Department of Fashion at SMKN 1 Dawuan. A total of 22 students of Class X participated in the study. The sampling method used was census sampling. Total sampling is used because the population is small and manageable, it avoids bias and sampling errors, and the data obtained is more accurate and comprehensive.

The questionnaire used for data collection was designed to capture responses related to cognitive load, student engagement, and active learning. To ensure the reliability and validity of the questionnaire, it was pre-tested with a smaller group of students and reviewed by two experts in educational research.

Data analysis was conducted using descriptive statistics. This included calculating the percentage of responses in each category and interpreting these results in the context of the study's objectives. A descriptive quantitative approach was deemed appropriate for this study as it provides a clear and straightforward analysis of the data, allowing for an accurate representation of the student's experiences and perceptions.
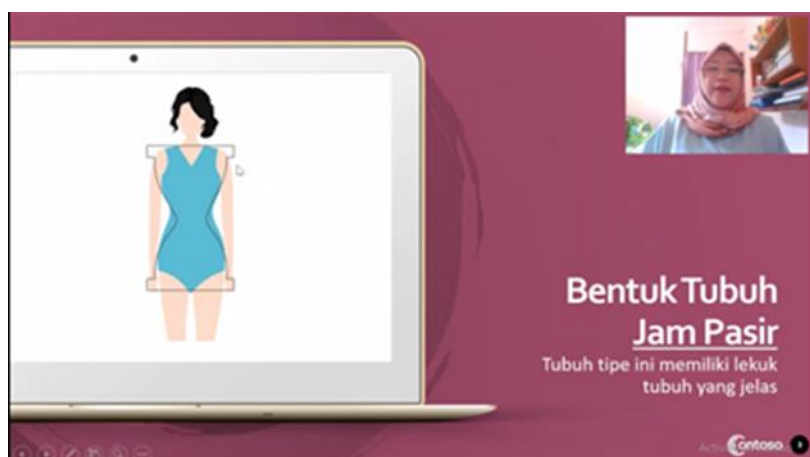

Figure 1. Video 1 was designed by the Bandicam application

RESULTS AND DISCUSSION

 A. Application of Brame's Theory to the Design of Proportion Body Video Learning.

Brame's theory, which consists of three elements—cognitive load, student engagement, and active learning—is utilized in designing the instructional video. The first element, cognitive load, highlights that memory is limited in capacity, requiring teachers to be selective with the information they present. According to Brame's theory, a practical learning experience involves minimizing extraneous load, optimizing germane load, and managing intrinsic load. Extraneous load refers to cognitive effort that does not contribute to learning outcomes. Germane load is the cognitive activity needed to achieve learning goals, such as making comparisons, conducting analyses, and explaining steps. Intrinsic load is inherent to the subject matter and is influenced by the topic's complexity. [5].

Table 1. Implementation of cognitive load aspects in instructional video design

Video Learning Design at Cognitive Load	Rational Reasons	Implementation Form
Signalling (Emphasize important information)	Reduce extraneous load Increase germane load	Emphasizes important information Not given too much materials Use of colour
Segmenting (Cut information)	Manage intrinsic load Increase germane load	Video duration
Weeding (Delete unimportant information)	Reduce extraneous load	Reduce/use music Reduce/use background
Matching modality (Use audio and visual)	Increase germane load	Use audio and visual, Use actual picture/ animation that explains a phenomenon

The second element is student engagement, incorporating features that facilitate student involvement. To enhance engagement, videos should be kept relatively short, utilize conversational rather than formal language, and be delivered lively and energetic. It's also important to ensure that the content is applicable across different classes and that audio and visual elements are effectively used.

Table 2. Implementation of Student Engagement aspects in instructional video design

Video Learning Design at Student Engagement	Rational Reasons	Implementation Form
Designing a variety of short video	Increase the percentage of videos that the students have watched So it also can increase the total times viewing	Short video duration
Use daily conversation	Creating flavour social partnerships between students and teachers encourages students to try harder to understand the lesson.	Use daily conversation
Tempo speak	It can improve taste and social partnership between students and teachers.	Talk with enthusiasm, with a speaking rate in the range of 185-254 words per minute. There is an expression of joy instructor, like "I'm so happy we can meet again", or "I like the next part".
Designing video which Relevant to student purpose	Increase the percentage of videos that the student has watched. Increase germane load.	Use phenomena picture/illustration problem solving by showing the steps.

The third element is active learning. This component includes strategies that assist students in processing information and assessing their comprehension, such as assigning tasks through videos.

Table 3. Implementation of Active Learning Together aspects in instructional video design

Video Learning Design at Active Learning Together	Rational Reasons	Implementation Form
Packaging video with interactive questions	Increase germane Improve memory through Test, and improve self-assessment	Ask an interactive question on video such as: "Do you still remember what is body proportion?"
Make a part of the video as a task	Increase motivation, Increase germane and self-assessment.	Give a task through video.

B. Impact of Instructional Video Design on Student Learning and Comprehension

The design of instructional videos is critical in enhancing student learning and comprehension in vocational education settings. This study aimed to explore how different video design elements affect cognitive load, student engagement, and active learning. The results indicate that specific design choices can significantly influence these aspects, thereby impacting the overall effectiveness of instructional videos.

1. Cognitive Load

Table 4. Percentage of Respondents Answer from Cognitive Load

Element to consider	Recommendation	Video Answer		Number of respondents	Mean	Sample Standard Deviation	Population Standard Deviation
		Video	%				
Signalling	Practice course that served in video	Simple and easy to understand	77	17	11	10	8
		Complex but easy-to-understand	18	4			
	Use of colour	Attractive color	95	21			
		Unattractive color	5	1			
Segmenting	Watching behaviour	Without speeding up	86	19	7	7	6
		Sometimes speed-up video	14	3			
	Duration video	20 minutes	27	6			
		11-15 minutes	46	10			
		5-10 minutes	27	6			
		Less than 5 minutes	0	0			
Weeding	Using music in the video	Uninterfere	59	13	11	8	7
		No music	41	20			
	Using background	Uninterfere	91	20			
		No Background	9	2			
Matching modality	Using text and audio	Video includes text, images, music, audio, and presenters	64	64	11	9	8
		Text video pictures without the presenter's voice	36	36			
	Using illustration	A reality visual	100	22			
		A text visual	0	0			

The aspect of the cognitive load was assessed based on simplicity, use of colour, segmenting, weeding, and modality matching. The findings suggest that videos that present content simply and straightforwardly are more accessible for students to understand, with 77% of respondents finding the material simple yet informative. This supports Mayer's research on the importance of minimizing cognitive overload to enhance learning [10]. The use of attractive colours, preferred by 95% of students, aids in maintaining attention, a finding consistent with previous studies on multimedia learning [11].

The segmentation of video content, which allows students to control the pace of their learning, was shown to be beneficial. While 86% of students watched the videos without speeding up, suggesting that they found the pace appropriate and manageable, this aligns with Mayer's Cognitive Theory of Multimedia Learning, which emphasizes that proper segmentation helps manage cognitive load. The preference for videos with background music to prevent drowsiness, cited by 59% of students, raises exciting implications. While the absence of music was originally intended to minimize distractions, it appears moderate and well-chosen background music might enhance student alertness without increasing extraneous cognitive load.

The mean values across various categories mostly range from 7 to 11, indicating moderate preference levels. The standard deviations vary across categories, reflecting different levels of agreement among respondents. High variability (higher standard deviations) is seen in categories like signalling, where opinions about the ease of understanding and colour attractiveness might vary more. Lower variability is seen in categories like watching behaviour and duration, where preferences are more consistent. These insights can be valuable for designing effective video content that aligns with audience preferences. These findings highlight the key strategies to reduce complexity, use appealing colors, and optimise video length and background elements.

2. Student Engagement

Table 5. Percentage of Respondents Answers from Student Engagement

Application form	Video Answer		Number of respondents	Mean	Sample Standard Deviation	Population Standard Deviation
	Video	%				
Practice course that served in video	Formal conversation	82	18	11	10	7
	Daily conversation	18	4			
Use of colour	The tempo is right	91	20	11	13	9
	Fast-talking tempo	9	2			

Student engagement was analyzed in terms of language use and speaking tempo. Formal language was preferred by 82% of the students, likely because it aligns with the expectations of a formal educational setting. Using language appropriate to the context can increase students' engagement by making the content feel more relevant and severe. Additionally, the proper speech tempo, recognized by 91% of respondents, ensures that the content is neither too fast nor too slow, which could otherwise lead to disengagement. This insight aligns with research by Guo et al. in 2014, indicating that the pacing of video instruction plays a vital role in maintaining student interest and comprehension [12-13].

Both sections have a mean of 11, indicating a positive but moderate general response. The "Practice Course served in video" has lower variability (as indicated by lower standard deviations), suggesting more consistency in respondents' preferences for formal conversation content. In contrast, "Use of color" shows higher variability, particularly in the sample standard deviation, indicating a broader range of opinions on the preferred tempo and possibly other elements associated with the use of colour in videos. These insights suggest that while respondents generally favour structured content and appropriate tempo, individual preferences can vary, especially regarding the dynamic elements of video presentation.

3. Active Learning

Table 6. Percentage of Respondents Answer from Active Learning

Application form	Video Answer		Number of respondents	Mean	Sample Standard Deviation	Population Standard Deviation
	Video	%				
Using questions interactive in video	The questions can help remember the material	86	19	7	11	9
	Just a few questions to help you remember the material	5	1			
Video as a media assignment	No question	9	2	8	11	9
	Doing task	95	21			
	Postponing the task	5	1			

Active learning is a crucial component of effective education, and this study's findings underscore the importance of incorporating interactive elements into instructional videos. Including questions to help students reflect on and remember the material was adequate, with 86% of respondents finding them helpful. This supports Prince's argument that active engagement in learning processes improves retention and understanding of the material [14-15]. Encouraging students to actively participate in their learning, even in a video format, can lead to better educational outcomes. The data showed that most students were motivated to complete tasks given through the videos, indicating a high level of engagement and the potential for videos to facilitate active learning.

The high standard deviation values relative to the mean indicate a significant response spread. This suggests variability in how respondents feel about using interactive questions in videos. The mean, being 7, lower than the maximum score, might indicate a generally moderate reception. Similar to the previous category, the high standard deviation compared to the mean of active learning in video as a media assignment shows that responses are quite spread out. A mean of 8 indicates slightly more favourable feedback than the previous category, but the high variability suggests mixed opinions.

Both categories show high mean values, indicating general approval of using questions interactively in videos and using videos as media assignments to prompt immediate task completion. The standard deviations suggest some variability in opinions, with the "Using questions interactive in video" category showing slightly higher variability. This variability indicates that while most respondents see the benefits of these approaches, there are different acceptance levels, possibly due to personal preferences or

different learning styles. The preference for using interactive questions and engaging videos in tasks suggests that these methods are generally effective for enhancing engagement and retention. However, it might be essential to consider varying levels of interaction to cater to all respondents.

 C. Comparison with Existing Literature

While the results align with existing literature in many aspects, they also provide unique insights specific to the vocational education setting. For example, the finding that vocational students might benefit from slightly longer video durations (11-15 minutes) compared to the general recommendation of 6 minutes suggests that vocational education requires a tailored approach due to the practical nature of the content being taught. Furthermore, contrary to some studies advocating for its elimination to avoid distraction, the high acceptance of music highlights the need for contextual considerations in video design.

The study's findings offer valuable insights for teachers in vocational education, highlighting specific strategies that can enhance the effectiveness of instructional videos. These strategies are crucial for engaging students and meeting learning objectives. The implications for teachers are based on the study's results below.

1. Adjust Video Length to Suit Vocational Students

One of the key findings from the study indicates that vocational students may benefit from slightly longer video durations, ideally between 11 to 15 minutes, as opposed to the general recommendation of six minutes for instructional videos. This suggests that the nature of vocational education, which often involves practical, hands-on learning, requires more time for thorough explanation and demonstration. Teachers should, therefore, consider extending the duration of their instructional videos to accommodate the in-depth coverage of practical skills and concepts. Doing so can provide students with sufficient time to absorb and understand the material, leading to better comprehension and retention.

2. Incorporate Appropriate Background Music

Contrary to the findings of some studies that advocate for its elimination, the acceptance of background music among students highlights the potential of music to enhance the learning experience when used appropriately. Teachers should consider integrating moderate, well-chosen background music into their videos. Music can help maintain students' attention, reduce monotony, and create a more engaging learning environment. However, selecting music that is not too loud or dominant is essential, ensuring that it is focused on the instructional content. Teachers can use music thoughtfully to enhance student alertness and engagement, making the learning experience more enjoyable.

3. Tailor Content to Practical Applications

Given the focus of vocational education on practical skills, teachers need to design instructional videos that are directly relevant to real-world applications. The study's findings suggest that students' engagement and interest levels increase when they see the practical relevance of what they are learning. Therefore, Teac,hers shoul,d include

examples, demonstrations, and scenarios showing how the skills and knowledge being taught can be applied in real-life vocational contexts. This approach makes the content more engaging and helps students understand the significance of their learning, making it more meaningful and impactful.

4. Use Contextual Language and Examples

The preference for conversational language observed in the study indicates that students are more engaged when the instructional content is delivered in a relatable and understandable manner. Teachers should use language appropriate for the context of vocational education, avoiding overly formal or technical jargon that might alienate students. By using everyday language and incorporating practical examples that students can relate to, teachers can make complex concepts more accessible. This approach helps bridge the gap between theoretical knowledge and practical application, facilitating better understanding and engagement.

5. Provide Active Learning Opportunities

Active learning is a crucial component of effective education, and the study's findings emphasize the importance of incorporating interactive elements into instructional videos. Teachers should include opportunities for students to engage actively with the material, such as through interactive questions, prompts for reflection, and assignments delivered via video. These elements encourage students to think critically about their learning, apply their knowledge, and monitor their understanding. By fostering an active learning environment, teachers can enhance students' ability to retain and use the material, leading to more successful educational outcomes.

 D. Implications for Practice and Further Research

The implications of these findings are significant for educators and instructional designers. To optimize the effectiveness of instructional videos, designers should consider incorporating elements that enhance cognitive processing without overloading students. Ensuring that videos are designed with appropriate pacing, engaging content, and opportunities for active learning can make them powerful tools in vocational education. Educators should also be open to experimenting with background music and segmenting features that allow students control over their learning pace.

Future research should delve deeper into understanding the nuanced preferences of vocational students, exploring other multimedia elements like interactive simulations or VR that could further enrich learning experiences. Additionally, longitudinal studies could provide insights into the long-term impacts of these video design choices on student performance and retention.

CONCLUSION

The video designs effectively align with Brame's three elements of learning. The use of Bandicam for video-based learning excels in adjusting the tempo but requires greater attention to segmentation. This is because videos that consistently display material can become monotonous, especially with longer durations, leading students to speed up or skip sections, which may result in missed assessments. To address these issues,

exploring video-based learning using applications that offer more dynamic and engaging features, such as Prezi, is recommended. Prezi and similar tools provide interactive and visually stimulating presentations that can break the monotony, enhance segmentation, and maintain student engagement. These tools allow for more flexible and visually appealing content delivery, making learning experiences more interactive and less likely to lead to student disengagement. Future research should examine these applications to assess their effectiveness in improving video-based learning outcomes compared to traditional tools like Bandicam.

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