



Development of Video Microlearning for 10th-Grade Marketing Students Anchored in Technological Pedagogical Content Knowledge

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Abstract

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It is important to foster 21st-century skills in the context of modern education. However, integrating these skills into the curriculum remains challenging. This study addresses the gap by developing TPACK-based (Technological Pedagogical Content Knowledge) video microlearning towards relevant curriculum in Indonesia. The objective of this research is to create effective video microlearning content that aligns with the TPACK framework. Utilizing Thiagarajan's 4D model—define, design, develop, and disseminate—the study employed a research and development approach. Data were gathered through expert evaluations of media and content, and feedback from teachers and students. The sample included 10th-grade Marketing students at SMKN 12 Jakarta. The findings demonstrated a 95% feasibility rate for the media and a 92% success rate for the content, indicating high effectiveness and suitability for instructional purposes. Further testing with teachers and students yielded positive responses of 94% and 95%, respectively. These results highlight the significance of TPACK-based video microlearning as a valuable instructional tool, capable of enhancing 21st-century skills in students. The novelty of this research lies in its application of the TPACK framework to video microlearning, addressing the urgent need for innovative educational strategies.

Keywords:

21st Century Competencies, TPACK, Microlearning, Video

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INTRODUCTION

Education does not merely serve the purpose of imparting knowledge; rather, it also uplifts the standard of living for learners. This effort can be realized through the mastery of 21st-century competencies, primarily characterized by critical thinking and problem-solving in everyday life (Mutohhari et al., 2021). 21st-century competencies are designed to cultivate skills, talents, and attitudes to prepare individuals for the workforce and society (González-pérez & Ramírez-montoya, 2022). Learning is no longer confined to concepts and theories but must also provide wide-ranging benefits to learners in order to enhance their quality of life.



Based on a survey conducted by the Organisation for Economic Co-operation and Development (OECD) within the Programme for International Student Assessment (PISA), which aims to measure the level of literacy and student competencies in various countries, the survey results indicate a decline in the abilities of Indonesian children when evaluated based on three indicators closely related to 21st-century competencies: reading, mathematics, and science performance (Kendari, 2020). The PISA survey offers insights into the extent to which students in various countries have developed 21st-century competencies (Idrissi et al., 2020; Schleicher, 2016).

21st-century competencies can be broadly categorized into three main areas: learning and thinking skills, literacy skills, and life skills (Chaiyama & Kaewpila, 2022). Students are trained to have critical thinking skills, collaborate, and solve problems. Furthermore, literacy skills involve the wise and adept access to information across various media. Lastly, life skills encompass adaptability and flexibility in the face of change, having clear goals, and effective time management (Cronin et al., 2019).

Teachers face both opportunities and challenges when using technology in education, requiring knowledge of the integration of technology and the learning process (Sarsar & Harmon, 2018). This knowledge can be acquired by applying the Technological, Pedagogical, and Content Knowledge (TPACK) framework. The TPACK framework was first introduced by Koehler and Mishra in 2006, emphasizing that teaching is a highly complex activity involving a wealth of knowledge, ranging from mastery of the content to be taught (content knowledge), how to teach (pedagogical knowledge), and the use of technology (technological knowledge) within the learning process (Karat et al., 2017; Turmuzi & Kurniawan, 2021).

In tandem with the shift towards digital learning, teachers are transitioning from the use of traditional media such as chalkboards and markers to utilizing images, slide presentations, audio recordings, videos, and more, depending on the subject matter and the characteristics of the students. Ideally, teachers should be able to select instructional media that engage the students' senses as much as possible, enhancing the learning experience and deepening students' understanding in the learning process (Isnaeni & Hidayah, 2020; Suryani et al., 2022). One of the instructional media that engages multiple senses is video, as it involves visual perception, auditory input, and physical movement in accordance with video instructions (Guedes et al., 2019).

Educational videos are easily found on platforms like YouTube, where they are often available in long durations of more than 25 minutes. This can pose challenges when seeking specific information and resulting in a tendency for high video quality. However, students may be difficult to access if there are network constraints (Marti et al., 2023). Hence, there is a need for instructional media developed in smaller, easily accessible formats for students.

Short and focused instructional videos that align with the learning objectives can be developed using the microlearning method. Microlearning is a detailed, small-scale learning approach aimed at delivering precise information in a brief period (Fitria, 2022; Nugraha et al., 2021). The concise and straightforward characteristics of microlearning enhance comprehension, creating a more effective

and efficient learning experience (Sedaghatkar et al., 2023). Learners can access learning materials more easily, anytime and anywhere, without spatial or temporal limitations, and enjoy an engaging learning experience.

METHODS

This type of research is development research. The development method employed in this project is Research and Development (R&D) development. R&D development is a structured and systematic scientific approach aimed at developing a product according to specific needs (Erna et al., 2021; Okra & Novera, 2019). The subjects of this development are students from SMKN 12 Jakarta, consisting of one class, namely Class X Marketing, with a total of 36 students. The selection of development subjects was carried out based on the development procedure. The development object is focused on Technological, Pedagogical, and Content Knowledge (TPACK)-based microlearning videos for the subject of Fundamentals of Marketing, specifically covering Unit 1: Marketing Business Processes in the Industrial Sector. The development framework adopts the 4D approach introduced by Thiagarajan, namely Define, Design, Development, and Disseminate (Jazuli, 2020), with the exception of the information dissemination stage.

The framework for this development is as follows:

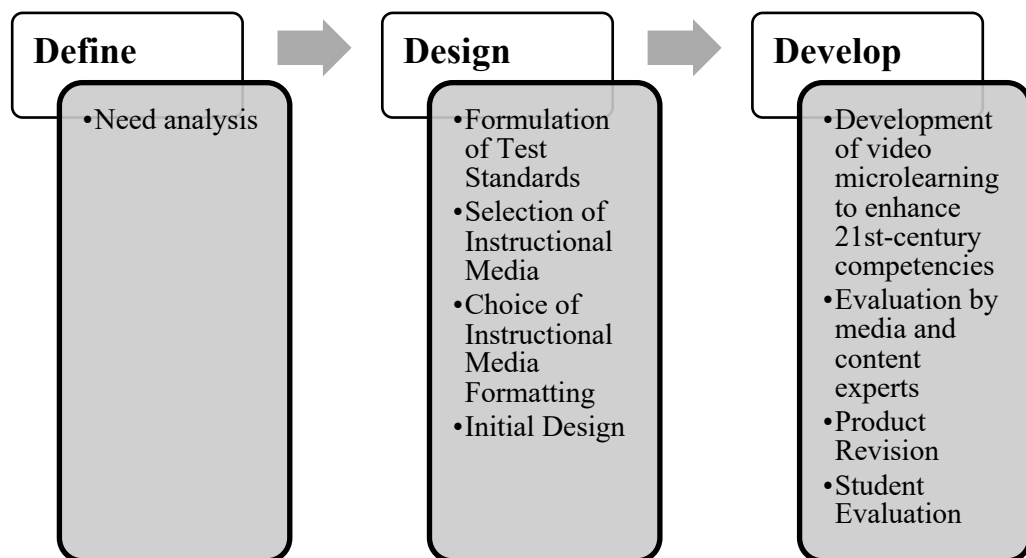


Figure 1. Framework of Development

In the earliest stage, a needs analysis is necessary to define and understand the subject. Therefore, an interview is conducted first. Further Data collection in this development involves quantitative data using a questionnaire. A questionnaire is a data collection technique that involves a set of written questions given to respondents (Supandi et al., 2020). Several tests using a questionnaire in the development of this microlearning video include a feasibility test conducted by media and content experts. After conducting the feasibility test, it is followed by a

trial with teachers and students. The assessment is conducted using a Likert scale consisting of five points, ranging from 1 to 5, with categories ranging from very poor, poor, fair, good, to excellen

Table 1. Media Expert Instrument Grid

Aspect	Indicator	Number of Items	Item Number
Microlearning	1.Duration	1	1
	2.Material Excerpts	3	2,3,4
	3.Technology Utilization	1	5
	4.Learning Process	2	6,7
	5.Visual	2	8,9
Video	1.Audio	5	10,11,12,13,15
	2.Video Quality	3	16,17,18
	3.Content	1	19
	4.Accessibility	1	20
	5.Material Excerpts	1	21

Table 2. Material Expert Instrument Grid

Aspect	Indicator	Number of Items	Item Number
Content	1.Content Validity	4	1,2,3,4
	2.Presentation Validity	3	5,6,7
	3.Language Validity	3	8,9,10

Table 3. Learning Design Expert Instrument Grid

Aspect	Indicator	Number of Items	Item Number
Teknological Knowledge (TK)	1. Ease of Technology Use	3	
	2. Compatibility of Technology with Learning Materials	3	1,2,3,4 5,6,7 8,9
	3. Technology Interactivity	3	
Pedagogical Knowledge (PK)	1. Learning Strategies	3	
	2. Classroom Management	3	10,11,12, 13,14,15,
	3. Student-Centered Learning Approach	3	16,17,18
Content Knowledge (CK)	1. Accuracy of Material	3	
	2. Depth of Material	3	19, 20,21,
	3. Structure and Organization of Material	3	22, 23,24, 25,26,27

Tabel 4. Trial Test Instrument Grid

Aspect	Indicator	Number of Items	Item Number
Video	1.Visual	2	1,2
	2.Audio	2	3,4
	3.Language and Writing	2	5,6
	4.Duration	1	7
	5.Accessibility	1	8
Content	1.Content	4	9,10,11,12
	2.Clarity of Material	3	13,14,15

The data analysis technique employed in this development utilizes quantitative analysis. This quantitative analysis is conducted using data obtained from feasibility assessments by experts and trials conducted by learners. The assessments of these tests are performed using the following formula:

$$\text{Percentage (100\%)} = \frac{\text{Number of Data Collection Scores}}{\text{Criteria Score}} \times 100\%$$

RESULTS & DISCUSSION

Result

Define

In the defining stage, interviews were conducted with teachers responsible for the subject of Fundamentals of Marketing. Based on the interview results, it can be stated that teachers are expected to integrate digital technology, such as using slide presentations, displaying videos or images, or interactive quizzes, in every topic they teach. Students are also mandated to engage in learning using various digital learning media. However, resources and media are limited, so teachers have not entirely become facilitators because much of the information still comes directly from the teacher. When they do find media like videos that align with the learning objectives, the content tends to be lengthy and challenging for students to comprehend. Therefore, both teachers and students require learning media that contain core content and are accessible in a flexible manner.

Design

In the product design stage, it is essential to consider feasibility factors to ensure that the product can be effectively used in the field. The detailed steps in product design are as follows:

a. Formulation of Test Standards

The formulation of test standards refers to the Learning Objectives (LO) within the Learning Outcomes (LO) for Unit 1: Marketing Business Processes in the Industrial Sector, as found in the Teaching Module for Class X Marketing at SMKN 12 Jakarta.

b. Selection of Instructional Media

The selection of instructional media. Learning at the vocational school level provides both theoretical and practical content, so students require instructional media that assist in their understanding of both. Video is an appropriate instructional medium to facilitate comprehension of theoretical and practical content because it engages all the students' senses, including sight, hearing, and physical movement (Hidayati et al., 2019).

c. Choice of Instructional Media Formatting

The development of video microlearning based on technological, pedagogical, and content knowledge has specific formatting requirements that must be met (Díaz Redondo et al., 2021), including:

1. Learning content should have a duration of no more than 6 minutes, making

it consist of small, digestible segments.

2. Video presentations should include the instructor, showing at least the instructor's head, not just slides.
3. It is recommended to use an informal background for the video.
4. Video quality should be neither too high nor too low to ensure ease of accessibility.
5. Parts of the video should contain prompts for students to review.

d. Initial Design

The initial design of the development of video microlearning based on technological, pedagogical, and content knowledge consists of two phases: the compilation of materials and storyboard.

Development

In the development stage of video microlearning, it consists of three phases: production, feasibility testing, and response testing. The production of video microlearning begins with creating a presentation that organizes the material in a sequential manner. This is done to ensure that the information to be conveyed is presented clearly and structured. In addition to the content, the video includes several questions to engage the audience in the comments section. Next is the recording and editing of the video. Each text, image, and additional elements are arranged at intervals to avoid overlapping with each other.

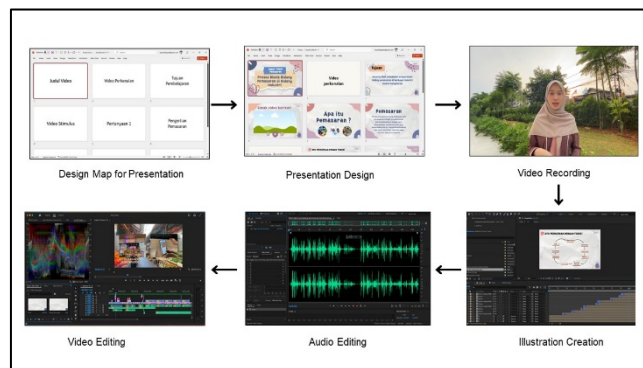


Figure 2. Microlearning Video Development Process

Once the video is perfectly formed, it undergoes feasibility testing by media and content experts, as well as response testing by teachers and students. This is to assess the suitability of video microlearning as a learning medium for the subject of Fundamentals of Marketing. The assessment is conducted using a Likert scale. The results of feasibility and response testing are as follows:

Table 4. Test Result

No	Subject	Validity Results (%)	Remarks
1	Media Expert Review	95%	Very Good
2	Material Expert Review	92%	Very Good
3	Learning Design Expert Review	85%	
3	Teacher Response Testing	94%	Very Good
4	Student Response Testing	95%	Very Good

The results of expert feasibility testing and response testing show that the TPACK-based video microlearning, overall, received a very high percentage of excellent ratings.

Discussion

This study successfully developed a technological, pedagogical, and content knowledge-based video microlearning is an innovative product developed with the aim of enhancing 21st-century competencies. The primary objective is to augment 21st-century competencies, with a specific focus on 10th-grade Marketing students engaged in the study of element 1 of the Marketing Business Process in the Industrial Field. The concise and targeted design of the video microlearning consists of two videos, each lasting 2-4 minutes. The development description of this video microlearning is as follows:

Table 5. Microlearning Video Description

No	Title	Duration	Purpose	Link
1	Business Process in the Marketing Field in the Industrial Sector (Part 1)	02:44	After watching this learning video, participants will be able to comprehend the business process in the marketing field across various industries comprehensively.	https://youtu.be/xP4rXrmFgWs
2	Business Process in the Marketing Field in the Industrial Sector (Part 12)	03:56		https://youtu.be/m--GbE2k_d4

After the microlearning video has been successfully prepared, the next step involves ensuring the product's feasibility through a feasibility test. The feasibility testing process engages media, content and learning design experts. The evaluation results indicate that the media feasibility reaches 95%, the content feasibility reaches 92% and the learning design reaches 85%. Based on these three values, the microlearning video is declared feasible as a learning medium. Subsequently, a trial of the microlearning video is conducted involving teachers and students to measure their responses. The results show that teachers give a positive response of 94%, and students give a response of 95%. This indicates that the microlearning video is considered appropriate as a learning medium.

This technological, pedagogical, and content knowledge-based video microlearning is published through the YouTube channel "Rabia Aladawiya" with the aim of providing easy access for learners anytime, anywhere. It can be accessed not only during guided learning sessions with the presence of a teacher but also independently, serving as a reflective resource for learners to revisit the marketing material they have studied. The instructions presented in the video microlearning encourage learners' independence and flexibility in developing an understanding of the learning material.

CONCLUSION

This development has created a product in the form of TPACK-based video microlearning on the topic of Business Processes in Marketing Industry for 10th-grade students in vocational schools (SMK). The video microlearning is designed to deliver the content in a concise and focused manner, aligned with the learning objectives, enabling learners to easily and quickly grasp the material. The development process of the video microlearning uses the 3D method by Thiagarajan, with the Define, Design, and Development stages. The video microlearning has been well-prepared and subsequently assessed for feasibility by media and material experts. The results indicate a media feasibility rating of 95% a content feasibility rating of 92% and a learning design feasibility rating of 85%. Based on this assessment, the video microlearning is considered suitable for utilization as an learning medium. Subsequently, it was tested with teachers and students, receiving positive responses of 94% and 95%, respectively. This reaffirms the appropriate of video microlearning as a learning medium.

Various previous research prevail that the use of video-based learning improves both the teaching methods and learning outcomes. This aligns with findings from this studies that emphasize the importance of interactive and visually engaging content in enhancing learning outcomes. Video microlearning can be used as an additional learning medium in the subject of Marketing Fundamentals, which can enhance student learning achievement. Video microlearning can also serve as an interactive learning tool that supports learners in managing their own learning styles. For future research, it is recommended to focus on expanding the content scope of video microlearning to other subjects within the Marketing curriculum, such as Consumer Behavior and Digital Marketing Strategies or other subject of study. Additionally, exploring the integration of adaptive learning technologies and interactive assessments within video microlearning could further improve learner engagement and personalization, leading to more innovative and creative educational products.

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