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Preliminary Research on Artificial Intelligence-Based Learning Video Media in Economics Subject in High School

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ABSTRACT

Objective: Addressing this gap requires preliminary research on the development of AI-based educational videos. This research focuses on high school economics subjects and aims to examine how such media can help improve students' understanding of complex economics material. **Method:** This research employs the ADDIE development model; however, at this stage, the study is only at the preliminary phase, specifically the needs analysis. This phase involves an analysis of the needs of prospective users (students and teachers), curriculum analysis, and an analysis of student characteristics. The methods employed include interviews, documentation studies, and surveys of students to identify preferences and challenges faced in the economics learning process. **Results:** The findings indicate that some teachers tend to use conventional learning media that are less effective in enhancing students' understanding of economic concepts. Furthermore, there is a clear need for innovative learning media that can facilitate students' comprehension of economic concepts more effectively. Based on these findings, it can be concluded that AI-based learning media represents a relevant solution to address the challenges of learning in the digital era, particularly in improving the quality of economics education at the high school level. **Novelty:** conducting a comprehensive preliminary needs analysis as the basis for developing AI-based educational videos for high school economics learning. The integration of curriculum analysis, teacher and student needs, and student characteristics provides a systematic foundation for designing AI-supported learning media that is pedagogically relevant and responsive to the demands of digital-era education.

INTRODUCTION

The advancement of technology has brought about drastic changes in how we learn and teach, transforming the educational paradigm from conventional methods to more modern and technology-integrated approaches (Fitriansyah, 2020; See et al., 2022). Currently, the trend of research in the field of educational videos is experiencing rapid development, in line with technological progress that offers various new tools and platforms that can be utilized to support the learning process (Garlinska et al., 2023; Hamzah et al., 2024). This makes the use of technology in education not merely an option, but a necessity that cannot be ignored.

Teachers, as the primary facilitators in the learning process, are expected not only to understand the latest technology but also to be able to adopt and integrate it into effective teaching strategies (Stumbrienė et al., 2024; Suchita et al., 2023). This includes the ability to select the appropriate technology based on the needs of the students and the subject matter, as well as designing learning media that can maximize the potential of that technology. For example, by using innovative educational videos, teachers can create a more dynamic and engaging learning experience that enhances student engagement and deepens their understanding of the material (Sharma et al., 2024; Umami et al., 2024).

However, although technology can provide various sophisticated features that can make learning more innovative, the key element of success in the learning process still lies in the strength and relevance of the content being delivered (Junaidi, 2019). Strong educational content is not only informative but also designed with consideration of the students' needs and characteristics, as well as the learning objectives to be achieved (Abuhassna & Alnawajha, 2023). In this context, technology serves as a supporting tool that enriches the learning process. However, the essence of learning itself remains dependent on the quality of the content and how it is delivered (Alam & Mohanty, 2023).

Conventional education, still dominated by lecture-based methods and limited instructional media, often renders the learning process monotonous, thereby diminishing students' interest, motivation, and engagement. In this digital era marked by rapid technological advancement, students have become more accustomed to visual, interactive, and multimedia-based content (Abdullah & Sadiah, 2025; Lintangesukmanjaya et al., 2025). When instruction remains teacher-centered and lacks engaging media, students often struggle to grasp concepts, maintain focus, and relate the material to real-life contexts (Takona, 2025). Consequently, integrating technology-based media such as instructional technology is essential to creating a more engaging, interactive, and contextual learning experience. Technology can present material through a combination of text, images, animations, audio, and simulations, thereby enhancing conceptual understanding, learning motivation, and active student participation in the learning process (Sholeh et al., 2024).

Therefore, the integration of technology in learning must always be accompanied by efforts to ensure that the content delivered is relevant, in-depth, and suitable for the students' learning needs (Kiryakova, 2022; Kumar et al., 2021). Teachers must continuously develop their skills in creating quality content while leveraging technology to deliver that content most effectively and engagingly (Nurhidayat et al., 2024; Vásquez et al., 2024). In this way, technology and strong content can work synergistically to create an optimal and meaningful learning experience for students. One rapidly developing technology is the use of artificial intelligence (AI)-based videos across various fields, including education, health, and media (Finlay, 2020; Pretorius & Kotze, 2021). This technology allows for the creation of more dynamic, interactive, and personalized digital content. The use of AI in the learning process, particularly in the form of educational videos, can be optimized to create more effective and efficient educational content (Sayed et al., 2023).

Technology not only provides consistent and engaging visuals but also allows students to access learning materials more flexibly, anytime and anywhere (Procel et al., 2024). However, although video-based learning media is widely used, the application of artificial intelligence (AI) within it is still not optimal at the high school level, especially in economics subjects. Economics is often considered difficult by students due to the abstract nature of the material and the high level of analytical skills required (Jamil et al., 2024; Riznyk, 2024). Therefore, the development of AI-based educational videos has great potential to provide a solution to these challenges.

Previous research has shown that the use of video-based media can enhance students' motivation to learn and improve learning outcomes, especially in subjects that are conceptual and analytical in nature. For example, a study conducted by Pratiwi found that the use of educational videos was able to increase understanding of learning concepts in science subjects (Pratiwi et al., 2022). Similarly, research by Haleem revealed that the use of digital technology in learning can increase student participation and make the learning process more engaging (Haleem et al., 2022). However, there is still a lack of research specifically exploring the use of artificial intelligence in the development of educational videos for economics subjects, particularly at the high school level.

This research highlights the need for further exploration into how artificial intelligence can be integrated into economics educational videos. This study aims to fill this gap by conducting preliminary research on the development of AI-based educational videos. The focus of this research is on high school economics to examine how such media can improve students' understanding of complex economics material. To respond to ongoing technological advancements, this research aims to explore the development of AI-based video learning media designed to enhance students' cognitive abilities, with the hope of creating more adaptive and inclusive learning media (Alshaikh et al., 2024; Gruenhagen et al., 2024). The advantages of this technology lie not only in its ability to facilitate independent learning but also in its capacity to improve the overall efficiency and effectiveness of the learning process (Amin, 2023; Jia & Tu, 2024). AI can be used to standardize the delivery of material to all students, even across different classes, thereby significantly enhancing students' cognitive skills.

RESEARCH METHOD

The process of developing educational video media involves the ADDIE development model, which includes analysis, design, development, and evaluation (Spatioti et al., 2022; Umar et al., 2023). However, this research is focused on the initial phase (Preliminary Research), specifically the analysis stage (Pauline-Graf & Mandel, 2023). This includes analyzing the needs of potential users (students and teachers), curriculum analysis, and student characteristic analysis to understand their needs. The procedures and activities conducted in this research are shown in Table 1.

Table 1. The preliminary research stage

Research Analysis	Activity Description
Curriculum analysis	The curriculum analysis is conducted to review the alignment of the economics learning material with the competency standards and learning outcomes set forth in the current curriculum. This process involves a thorough examination of the curriculum documents to ensure that the developed learning media supports the established learning objectives, including the achievement of basic competencies and the development of students' critical thinking skills.

Research Analysis	Activity Description
Student characteristics analysis	The analysis of student characteristics involves studying the demographic profile, cognitive level, learning styles, and interests and needs of the students. Data obtained from surveys and interviews with students is used to determine the features of the media that can support the learning process, such as the use of visuals, audio, and interactivity.
Prospective user needs analysis (students and teachers)	The analysis of user needs focuses on identifying the requirements of students and teachers for effective and practical learning media. From the students' perspective, this analysis evaluates their need for media that can help them understand economics material more deeply and engagingly. From the teachers' perspective, this analysis aims to understand their needs in using media as a supportive teaching tool, facilitating the delivery of material, and enabling more efficient learning evaluation. Interviews and surveys are conducted to gather data from both parties, which then serves as the basis for developing appropriate and functional media.

The overall data from the research results are analyzed using a qualitative approach (Ardiansyah et al., 2023; Gill, 2020). Qualitative research employs methods such as participant observation, descriptive narratives, and descriptive notes about a setting or practice (Matta, 2022; Wiegler et al., 2020). A qualitative approach is a method of observation and case study with results in the form of descriptive narratives. The use of qualitative research is due to the development of concepts based on the data obtained. Data collection techniques were conducted through interviews with economics teachers and students at SMAN 3 Pariaman, direct observation of the learning process, and a documentation study of the curriculum used. In addition, a survey based on a questionnaire was given to students to identify student characteristics and learning needs that could be aligned with the development of AI-based educational videos. Using interview guidelines for teachers and students, a curriculum analysis instrument, and an instrument for analyzing student characteristics, the following research instrument blueprint is presented in Table 2 above.

Table 2. The preliminary research stage

No.	Research Instrument	Component Analysis
1.	Teacher interview guide sheet	Knowledge of Ai technology
		Learning approach
		Economic learning media
		Economic content
		Assessment of students
2.	Students interview guide sheet	Economic learning
		Economic content
		Economic learning media
3.	Curriculum analysis sheet	Suitability of learning devices
		Learning objectives
		Development of teaching materials and materials
		Learning methods

No.	Research Instrument	Component Analysis
		Learning steps
		Learning resources
		Assessment
4.	Student characteristics analysis sheet	Ability and background
		Response to learning

Table 2 serves as the framework for the preliminary research instruments used as a reference in the development of research instruments (Draganoudi et al., 2023). There are four categories of instruments organized based on research needs. The first category is the interview guideline sheet for teachers, the second is the interview guideline sheet for students, the third is the curriculum analysis sheet, and the fourth is the student characteristic analysis sheet. Overall, Table 2 provides an important foundation for the development of the Preliminary Research instrument sheets, ensuring that the research instruments developed align with the research objectives and the needs of the respondents.

RESULTS AND DISCUSSION

This research is still in the early stages, specifically the preliminary research phase focused on economics education at the high school level. This preliminary research is the initial step in the ADDIE model development procedure. The results of the analysis conducted in this research can be explained as follows:

Curriculum Analysis

The analysis of the economics curriculum at SMAN 3 Pariaman, which implements the Merdeka curriculum, shows a fairly good alignment between the main components of the teaching module and the learning outcomes, learning objectives, indicators of learning objectives achievement, and the principles of the Pancasila student profile. The teaching module has been structured to ensure the achievement of expected competencies, namely the mastery of economic concepts relevant to daily life and the development of character based on Pancasila values, such as cooperation, integrity, and critical thinking.

In terms of learning objectives, the curriculum is designed to guide students in understanding economic theory and practice, analyzing economic problems, and developing critical and creative thinking skills (Jamil et al., 2024; Roshid & Haider, 2024). The established learning objectives aim for the mastery of cognitive, affective, and psychomotor abilities, in line with achieving an independent and competitive student profile. In the aspect of material and teaching module development, in line with the research conducted by Surjanti, the material has been developed based on basic economic concepts (Surjanti et al., 2023).

There is an adjustment in the structure of the material for grade XI, indicating a need to provide sufficient prerequisite knowledge before students learn more complex material. The teaching materials used are quite varied, including textbooks, journal articles, and digital sources that support learning. However, further innovation is needed

in the presentation of teaching materials to make them more effective and adaptive to technological developments.

For teaching methods, the approach used focuses on lectures, group discussions, and case studies. These methods are suitable for the needs of economics education but need to be optimized with project-based or inquiry-based learning methods to make students more active in the learning process, especially in developing analytical skills and problem-solving (Eshun et al., 2026). In terms of Learning Media, conventional media such as blackboards and presentations still dominate. The use of digital media like educational videos or AI-based simulations is a new development (Atabekova et al., 2025). The development of more engaging media, such as AI-based videos that support the visualization of economic concepts, can enhance students' understanding and engagement in learning.

The steps of the learning process applied are quite systematic, starting with concept introduction and discussion, and ending with evaluation. However, these steps can be further optimized by adding reflection activities or peer teaching to strengthen students' understanding of the material. In terms of learning resources, in addition to official textbooks, students are also directed to use various learning resources from the internet, such as articles and videos. However, the use of digital learning resources still needs to be regulated to match students' level of understanding and support the achievement of learning objectives (Wong et al., 2025).

Assessment and evaluation are conducted through written tests and individual assignments. Cognitive Assessment already covers various levels of thinking abilities, from understanding to analysis (Yusuf et al., 2024). Overall, the high school economics curriculum is well-designed and relevant to learning needs. However, there is room for further development, especially in the use of technology and in employing more creative, innovative teaching methods.

Student Characteristics Analysis

The analysis of student characteristics is conducted to understand individual students' behavior, abilities, and needs to improve the effectiveness of the learning process (Afriana et al., 2021). Based on the analysis results, the characteristics of the 11th-grade students who are the subjects of this research reflect various aspects related to their abilities and backgrounds. In general, students' cognitive abilities in understanding economic concepts vary, with some showing strong understanding, while others still need further guidance (Lin & Bates, 2022). In terms of background, the majority of students come from diverse socio-economic environments, which affects their access to learning resources such as technology and supporting reading materials. This factor contributes to differences in their level of understanding and interest in economics material.

The students' overall response to economics learning is quite positive, although some students express that the material presented is sometimes difficult to understand, especially topics that require in-depth analysis. They show a high interest in more innovative learning methods, particularly those involving visual media and technology,

which are considered to facilitate the understanding of abstract economic concepts. However, some students also feel that the current teaching methods are less engaging and monotonous, which affects their motivation to delve deeper into the material.

Prospective User Needs Analysis

The purpose of analyzing the needs of potential users through interviews with teachers and students is to obtain in-depth information about learning needs, with a focus on learning media, so that appropriate solutions can be developed to improve learning effectiveness and academic outcomes (Ilyasa et al., 2023). Based on the interview results with teachers, it was found that their knowledge about AI technology in the context of learning is still limited. Teachers generally do not utilize AI technology optimally in the teaching and learning process, although they are open to innovations that can enhance learning effectiveness. The teaching approaches applied tend to use conventional methods such as lectures and class discussions, with little interactive variation (Hareni et al., 2026). In terms of learning media, teachers more frequently use textbooks and PowerPoint presentations. In contrast, the use of more advanced digital media, such as interactive videos or AI-based simulations, is still rare.

Teachers also identified several economics contents that are often considered difficult by students, especially topics that require data analysis and understanding of macroeconomic concepts, such as inflation, monetary policy, and international trade. As a follow-up, teachers stated a need for learning media that can explain these concepts visually and innovatively (Rahim et al., 2022), thereby making them easier for students to understand. In addition, student assessment is still conducted through conventional written tests and project assignments.

From interviews with students, it was found that the economics learning process is often considered boring due to a lack of interaction and insufficient variation in teaching methods. Students mentioned that the material that is difficult to understand usually involves abstract concepts and economic theories that require deeper explanations. They desire more engaging teaching methods, such as the use of animated videos or simulations to clarify these concepts. Besides, the learning media commonly used are still limited to textbooks and printed materials, so students hope for more innovative and technology-based media, such as applications or AI-based videos, that can make learning more dynamic and easier to understand.

CONCLUSION

Fundamental Findings: The findings indicate that the economics curriculum is aligned with the Learning Outcomes and the Pancasila Student Profile; however, its implementation requires more innovative AI-based learning media. Students show high interest in AI-supported learning, while teachers recognize its potential despite having limited AI competencies. These findings demonstrate a strong need for AI-based educational videos that align with curriculum objectives and learner characteristics.

Implication: The results provide an empirical basis for developing AI-based educational videos that support students' conceptual understanding and engagement in economics

learning. They also emphasize the importance of enhancing teachers' AI literacy and pedagogical competencies to facilitate the effective integration of AI into classroom instruction. **Limitation:** The research is limited to the needs analysis stage of the ADDIE model and does not include the development or evaluation of AI-based educational videos. In addition, the findings are based on a single school context, which may limit their generalizability. **Future Research:** Future research should focus on developing and validating AI-based educational videos and evaluating their effectiveness in improving students' conceptual understanding and learning outcomes. Studies involving diverse educational settings are also needed to strengthen the generalizability of the findings.

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M Topit Hidayat contributed to the research design, methodology development, and data analysis. **Armia** contributed to the research methodology, critical review, data validation, interpretation of findings, and manuscript review. All authors reviewed, revised, and approved the final version of the manuscript.

CONFLICT OF INTEREST STATEMENT

The authors confirm that there are no conflicts of interest, either financial or personal, that may have influenced the content or outcome of this study.

ETHICAL COMPLIANCE STATEMENT

This manuscript complies with research and publication ethics. The authors affirm that the work is original, conducted with academic integrity, and free from any unethical practices, including plagiarism.

STATEMENT ON THE USE OF AI OR DIGITAL TOOLS IN WRITING

The authors acknowledge the use of digital tools, including AI-based technologies, as support in the research and writing stages of this article. Specifically, Grammarly was employed for correcting writing and grammar errors. All outputs generated with digital assistance were critically evaluated and revised to ensure academic rigor and ethical standards were upheld. The final responsibility for the manuscript rests entirely with the authors.

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