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Role of AI-Generated Instructional Videos: A Systematic Literature Review

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Abstract

The application of AI-generated videos in education has gained significant attention for its potential to enhance the learning experience by creating personalized, engaging, and adaptive learning content. Understanding the rationale and value of AI-generated videos in teaching and learning is essential, as it enables educators and learners to adapt to advancements in educational technology. There are many literature reviews on AI technology, focusing on the application of AI technology, while very few discusses on AI-generated instructional videos. This study conducts a systematic review of existing literature on AI-generated instructional videos to explore their role in higher education and examines the educational theories supporting the implementation. Data were collected from six databases resulting in 3271 articles using PRISMA method. This study found 21 relevant articles based on the selected keywords on AI-generated video instructional videos. From data analysis, AI-generated videos are found to play the role as auxiliary learning tools as well as learning assistance tool for the students. Additionally, these videos were found to apply educational theories during design and development process. Conclusively, this study establishes a reference framework for the use of AI-generated instructional video in education and identifies key directions for future research.

Keywords: AI-Generated Instructional Video, Literature Review, Instructional Design, Video-Based Learning, Generative Artificial Intelligence

Introduction

Artificial intelligence (AI) has transformed content creation across industries such as journalism and the creative arts (Xue, 2024; Banafi, 2024). Generative AI produces text, images, audio, and video, reshaping production processes and enabling innovation. In journalism, for example, it automates reporting, transcription, and data analysis (Banafi, 2024). Among AI technologies, AI-generated video (AIGV) can create realistic and engaging content efficiently and is also one of the crucial tools for innovation.

As the development of AI-generated video in content creation, its integration into the educational process creates new opportunities. For teachers, AI-generated instructional videos can automate content generation aligned with learning objectives, significantly improving productivity (MacDowell et al., 2024). The study has proved integrating AI into

teaching has also been shown to enhance overall effectiveness (Roshan et al., 2024). For learners, AI-generated video can deliver personalized educational content that boosts motivation and engagement (Leiker et al., 2023a). Leiker (2023) further found that synthetic video technologies enrich learning through diverse and innovative resources. As a transformative educational tool, AI-generated instructional videos have attracted substantial scholarly attention.

Current research examines the impact of AI-generated video on learning outcomes and experiences, often comparing it with traditional videos to assess its effectiveness as a replacement. Netland et al. (2024) have found that AI-generated instructional videos show comparable learning performance to human-made videos. Other studies investigate how specific design factors influence learning, using mixed methods that combine qualitative and quantitative approaches (Brünner & Ebner, 2024; Pellas, 2023). However, research requires further exploration.

Most existing reviews focus on the application of AI technologies in education, including their roles and potential across various contexts (Ogunleye et al., 2024; Zhai et al., 2021), or examine generative AI's effects in specific disciplines such as language learning (Pelaez-Sanchez et al., 2024). Other studies analyze the strengths and weaknesses of AI applications in education (Ahmed et al., 2024; Davis, 2024). However, few focus specifically on AI-generated instructional videos (Orak & Turan, 2024), resulting in a lack of systematic reviews on this topic. This review addresses that gap by analyzing the educational role of AIGVs and examining the theoretical frameworks supporting their implementation, offering a broader perspective to guide future research.

Research Questions

To explore the existing studies on the trends related to AI-generated instructional videos the following research questions are formulates:

- What is the role of generative AI video in higher education?
- What are the learning strategies supporting the use of generative AI video in higher education?

Methods

This study systematically searched literature on AI-generated videos in education (2021–2024) across major academic databases, including Science Direct, Scopus, Web of Science, SAGE Journals, Taylor & Francis Online, and Wiley Online Library. Google Scholar was used as a supplementary source for peer-reviewed articles and conference papers (e.g., IEEE, Elsevier). Only peer-reviewed journal and proceedings papers were included; non-academic sources were excluded.

An iterative search process employed varied terms describing AI-generated videos (Short et al., 2021), refined using Boolean operators. Initial broad terms (Table 1) yielded many irrelevant results outside instructional contexts. Refined search terms (Table 2) incorporated keywords such as "AI-generated instructional videos" and "synthetic instructional videos" to focus on educational applications and exclude non-instructional uses. This process ensured a targeted and relevant literature set.

Table 1
Using broad searching terms

Topics	Keywords	Parameter
AI-generated video in education	"AI-generated video" OR "artificial intelligence educational / instructional video" OR "generative AI educational video" OR "AI-made video" OR "educational video made by AI" OR "AI-generated video problem" OR "AI-generated instructional video" OR "synthetic instructional video" OR "AI-based video generation in education"	Abstract of these papers Subject of these papers

Table 2
The search using refined keywords

Topics	Keywords	Parameter	Subject
AI-generated video in education	"AI-generated instructional video" OR "Synthetic instructional video" OR "generative AI instructional video" OR "AI-generated video in education"	Abstract and subject	Education

Inclusion and Exclusion Criteria
To be included in this review, studies had to meet the following criteria: the period, the relativity of the theme, the detail of the content, type of literature, the source of article, and language used, shown as Table 3:

Table 3
Inclusion and exclusion criteria

Number	Criteria	Inclusion	Exclusion
1	Period	From 2020-2024	Earlier than 2020
2	The relativity of theme	1. The application of AI-generated video in education. 2. Includes research on educational practices related to generative AI video (e.g., text-to-video generation, etc.).	1. It does not involve applications in the field of education. 2. Research other AI techniques, not AI-generated video.
3	The detail of content	1. Discussing that Literature exploring the impact of AIGV on educational outcomes such as learning outcomes and student engagement. 2. The research includes the impact of AI-generated videos on teaching and learning processes, personalized learning, teaching evaluation, and human perception.	1. Explore the evolution and impact of AI-generated video itself. 2. There is only a brief reference to the application and impact of AI-generated video in education, without systematic argumentation and analysis.
4	Type of literature	Original research (quality; quantity; mix-method)	1. Non-peer-reviewed journal 2. Abstract; the chapter of book

5	Source	1. ScienceDirect 2. Scopus 3. Web of Science 4. SAGE journals 5. Taylor& Francis Online 6. Wiley Online Library 7. Google (as a supplement)	Specify a source other than the search source
6	Language	English	Non-English

Outcomes of the Searching

To ensure rigor and transparency, this study followed PRISMA guidelines to retrieve, screen, and analyze literature. Figure 1 presents the flowchart outlining identification, screening, and inclusion steps.

The initial search across six academic databases using broad terms (Table 1) yielded 3,271 articles. After removing duplicates, 3,088 remained. Titles and abstracts were screened to exclude irrelevant studies—such as those focused on entertainment or general AI in education—resulting in 44 articles.

A second search using refined educational keywords (Table 2) and narrowed subject filters added four relevant studies. Following full-text screening and inclusion criteria, 18 studies were selected. To supplement coverage, three additional articles were identified via Google Scholar, resulting in 21 studies for final analysis.

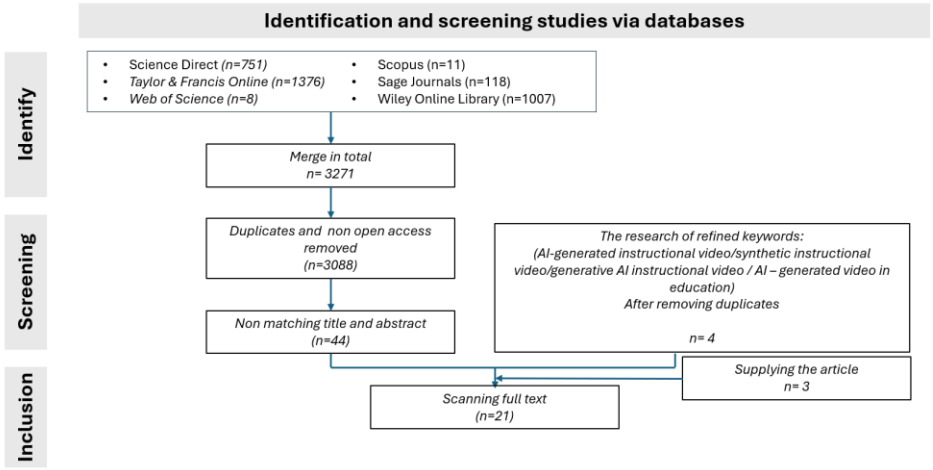

Figure 1. Searching procedure using PRISMA method

Data Analysis

To synthesize current research, this study examined each article's research questions, methods, and findings, then applied relevant theoretical foundations to support the study objectives.

To answer the first research question, the SAMR model (Puentedura, 2014) was used to classify the role of AI-generated instructional videos across four levels: Substitution and Augmentation (Enhancement), and Modification and Redefinition (Transformation). The former reflects low complexity and interactivity, while the latter involves deeper integration of technology. Based on these categories, the 21 studies were mapped into SAMR levels, further grouped as either auxiliary learning tools or learning assistance tools. For the second research question, learning strategies used in the selected literature were analyzed to

understand the pedagogical foundation supporting AI-generated instructional videos in educational contexts.

Results and Findings

The Role of Generative AI Videos in Higher Education

The SAMR model classifies AI-generated instructional videos into four levels: Substitution, Augmentation, Modification, and Redefinition, based on their impact on teaching and learning. These levels also correspond to two broader educational functions: auxiliary and learning assistance tools.

According to the data, 19% of applications fall under Substitution, 28% under Augmentation, 43% under Modification, and none under Redefinition (Figure 2). Most uses cluster around Augmentation and Modification, indicating that AI-generated instructional videos primarily enhance existing practices rather than transform them.

Four key roles of AI-generated instructional videos in higher education are identified: (1) improving learning efficiency, (2) increasing personalization and interactivity, (3) serving as auxiliary and assistance tools, and (4) showing limited transformative impact.

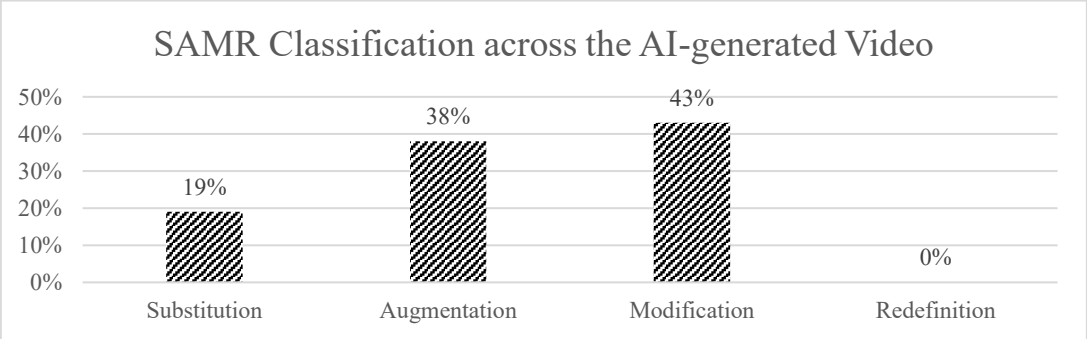

Figure 2. SAMR distribution

Improving Learning Efficiency Rather than Creating New Ways of Learning

In the Substitution and Augmentation classifications, AI-generated instructional videos primarily serve as productivity tools. In Substitution, AI-generated instructional videos replace traditional resources like explainer videos and subtitles, achieving the same learning outcomes in areas such as language learning (Verma & Leddo, 2024; Y. Xu, 2024; B. Zhang & Taranikanti, 2024). In Augmentation, tools like Synthesia enhance content vividness and accessibility without altering core teaching models. Studies report gains in performance, motivation, and instructional efficiency (Leiker et al., 2023b; Pataranutaporn et al., 2022; Pellas, 2025; Takeda-Kolb & Ohsawa, 2024; Weerakoon et al., 2024).

Overall, AI-generated instructional videos at these levels enhance delivery rather than transform pedagogical methods, supporting instructional efficiency without fundamentally changing learning practices.

The Increasing of Personalized and Interactive Learning

The role of AI-generated instructional videos in personalized and interactive learning is expanding. A high proportion of studies classified under Modification (Figure 2) suggests a

trend toward adaptive and learner-centered environments (Puentedura, 2014). These include AI-driven feedback and adaptive learning systems. Zhang et al. (2023) found that AI video feedback systems can analyze student performance and deliver tailored support, while AlShaikh et al. (2024) highlight AI-generated instructional videos' potential in personalized instructional design. This shift marks a transition from passive delivery to interactive learning, positioning AI-generated instructional videos as emerging learning assistants.

As an Auxiliary Learning Tool and Learning Assistance Tool

Analysis of 21 selected studies shows that AI-generated instructional videos function primarily as auxiliary learning tools (12 studies) and learning assistance tools (9 studies), based on their SAMR classification (Figure 3).

At the Substitution and Augmentation levels, AI-generated instructional videos improve efficiency through one-way interactions, such as voiceovers, subtitles, and summarization (Arkün-Kocadere & Çağlar Özhan, 2024; Netland et al., 2024; Pellas, 2024; Zhang et al., 2024). In the Modification classification, AI-generated instructional videos offer personalized, adaptive learning with two-way interaction. However, none of the studies reached Redefinition, indicating that while AI-generated instructional videos support innovation, they have yet to transform instructional design. Currently, AI-generated instructional videos serve as enhancements rather than replacements in educational practice.

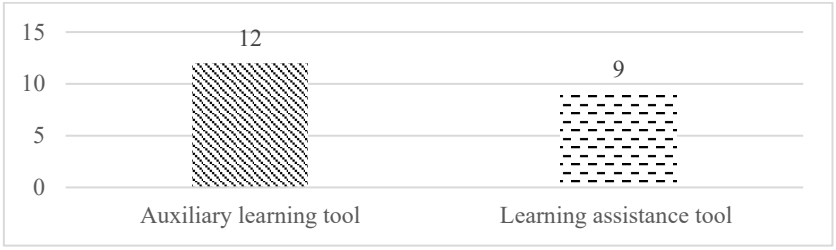

Figure 3. The role of AI-generated instructional videos in higher education

Limited Evidence of Transforming Education

Current evidence indicates that AI-generated instructional videos have not yet transformed education. None of the 21 reviewed studies reached the Redefinition level of the SAMR model, which entails fully AI-driven, immersive learning environments. Although AI-generated instructional videos can generate personalized content and feedback, they still require human oversight. Their limitations, such as dependence on traditional curriculum and lack of open-ended learning, suggest that AI-generated instructional videos remain tools for enhancing, not reshaping education.

Learning Strategies in the Studies of AI-Generated Instructional Videos

Learning strategies are essential for advancing research and practice on AI-generated instructional videos. It is used to explore learning processes, cognition, motivation, and engagement, guiding instructional design and enhancing outcomes. Among the 21 selected articles, a mix of learning strategies and learning theories were identified through detailed analysis (Appendix A): Technology Acceptance Model (TAM), Multimedia Learning Theory (MLT), Cognitive Load Theory (CLT), Social Presence (from Community of Inquiry Model), Emotional Engagement Theory, Social Constructivist Theory, and Self-efficacy Theory. All the learning strategies/theories were explicitly cited and only Social Constructivist Theory was

applied implicitly. These frameworks support discussions of learning effectiveness, engagement, and cognitive processing.

Explicit Mentioned Learning Strategies/Theories

- TAM (Technology Acceptance Model)
  The Technology Acceptance Model (TAM) explains how users adopt technology based on two key factors: perceived ease of use and perceived usefulness (السيد & Elsayed, 2025). One study explicitly applied TAM to examine students' acceptance of AI-generated short videos over traditional paper materials, suggesting their usefulness in foreign language learning. Although Pellas (2025) did not cite TAM directly, the study addressed related aspects of learner attitudes and acceptance. TAM thus offers a valuable framework for evaluating learners' perceptions of AI-generated instructional videos.
- Cognitive load theory
  Cognitive Load Theory (CLT), developed by Sweller (2024), emphasizes the limits of working memory and distinguishes intrinsic, extraneous, and germane load. Xu et al. (2024) found that AI-generated instructional videos better manage intrinsic load than traditional formats, while Brzezinska (2024) and AlShaikh et al. (2024) showed reduced extraneous load through synchronized visuals and audio. CLT has been widely used to enhance comprehension via segmented content and multimodal design.
- Multimedia learning theory
  Multimedia Learning Theory (MLT), developed by Mayer (2024), emphasizes dual-channel processing of visuals and audio to enhance comprehension and retention. AI-generated instructional videos are most effective when aligned with MLT principles, such as integrating visuals with narration and reducing cognitive load. Studies show that well-designed AIGVs improve learning by synchronizing text, images, and audio (Brzezinska, 2024; Hadi & Ainy, 2023.; Weerakoon et al., 2024). Research also supports MLT principles like modality, redundancy, and personalization(Arkün-Kocadere & Çağlar Özhan, 2024; Brünner & Ebner, 2024). These findings confirm AIGVs grounded in MLT can manage cognitive load and deepen learning.
- Social presence
  Social Presence Theory refers to the psychological perception of being with others, which helps reduce feelings of isolation in online learning (Weidlich et al., 2024). Lim (2024) found that AI-generated pedagogical agents can foster social interaction, with human-like agents increasing student engagement. Similarly, Pataranutaporn et al. (2022) showed that virtual instructors resembling admired figures enhance learner motivation through greater social presence. Thus, AI-generated instructional videos can utilize AI instructors with strong social presence to promote trust, emotional connection, and engagement in digital environments.
- Emotional engagement theory
  Emotional engagement theory holds that emotions influence motivation, retention, and overall engagement. Fostering positive emotional engagement is key to enhancing the learning experience in AI-generated instructional videos (Prayogo et al., 2023). Two studies emphasized the importance of aligning video content with learner needs and avoiding uncanny valley effects (Brzezinska, 2024; Xu et al., 2024). Thus, emotional engagement theory is a fundamental component that shapes learning experiences and outcomes.
- Self-efficacy theory

Developed by Bandura, Self-Efficacy Theory focuses on individuals' belief in their ability to succeed (Li, 2020). Pellas (2024) found that AI-generated instructional videos improved science teacher education by enhancing learners' confidence in problem-solving and academic success. These videos can reduce frustration and foster a greater sense of accomplishment, thereby improving motivation and learning outcomes.

Implicit Applied Learning Theory

Based on Vygotsky's work, Social Constructivist Theory views learning as a socially mediated process in which knowledge is co-constructed through interaction and scaffolding. AI-generated instructional videos can support this by providing personalized content, feedback, and interactive prompts. Takeda-Kolb and Ohsawa (2024) found that AI-driven video feedback offers just-in-time support to enhance understanding, while Zhang (2023) showed how AI-generated instructional videos facilitate interactive, individualized language learning. These studies suggest that AIGVs designed with scaffolding principles can promote learner autonomy and engagement.

Beyond social constructivism, most studies referenced foundational theories such as TAM, MLT, CLT, Social Presence, and Self-Efficacy. MLT and CLT were most frequently used to address multimedia design and cognitive load (AlShaikh et al., 2024; Arkün-Kocadere & Çağlar Özhan, 2024; Y. Zhang et al., 2024). However, many studies lacked clear theoretical grounding, highlighting the need for more deliberate integration of diverse frameworks in future research.

Discussion

The Role of AI-generated instructional videos in higher education

This review analyzed the role of AI-generated instructional videos (AIGVs) in higher education using the SAMR model: Substitution (19%), Augmentation (38%), Modification (43%), and no cases of Redefinition. These levels align with AIGVs functioning as auxiliary (12 studies) and assistance tools (9 studies), enhancing efficiency and personalization, though without transformative impact.

Despite increasing interest in generative AI, few reviews focus specifically on AI-generated instructional videos. Most studies group them under broader AI in education, with limited attention to their pedagogical functions. This review addresses that gap and provides a reference framework for future research. Prior research supports our conclusion that AI-generated instructional videos promote personalization and learner engagement (Orak & Turan, 2024; Pradeep et al., 2024).

Currently, AI-generated instructional videos serve as augmentation tools that complement, rather than replace, traditional teaching. Their limited adoption stems from their categorization under broader AI, insufficient theoretical integration, and their emerging role in higher education. Future research should explore how AI-generated instructional videos can evolve into autonomous, adaptive systems that support learner-centered instruction and real-time interaction.

The Application of Learning Strategies/Theories in AI-Generated Instructional Videos

Most studies apply educational theories to inform research design and interpretation. MLT and CLT are most frequently used; TAM, social presence, emotional engagement, and self-efficacy also offer key insights. This review is among the first to systematically examine theory use in AI-generated instructional videos research. Some studies clearly define supporting frameworks, while others remain implicit, reducing practical impact. Future research should more consistently apply diverse theoretical models, such as motivation theory, behaviorism, and social learning theory, to deepen understanding and improve AI-generated instructional videos design.

Conclusion

This review analyzed 21 studies on AI-generated instructional videos, focusing on their educational roles and theoretical foundations. AI-generated instructional videos primarily function as auxiliary and assistance tools: they enhance content efficiency, reduce teacher workload, and support personalized instruction. However, they have not yet transformed learning models and still rely on teacher guidance.

Theoretical analysis highlights the frequent use of multimedia learning theory and cognitive load theory, affirming the pedagogical value of AI-generated instructional videos. Yet challenges remain in aligning AI-generated instructional videos with instructional goals, ensuring ethical use, and fostering deep engagement. As AI evolves, its educational role must support—not replace—human instruction. AI-generated instructional should enrich learning in pedagogically sound, meaningful ways.

Limitations and Future Studies

The study provides valuable insights into the role of AI-generated instructional videos, but several limitations should be noted. First, because the research area of AI-generated instructional video is very new, the sample size was relatively small, which may weaken the representativeness of findings. Second, this literature review focused specifically on AI-generated instructional videos, meaning the results may not be directly applicable to other types of generative AI in education. Future research should address these limitations by incorporating larger and more diverse samples to improve the representativeness of findings.

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