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EDITED BY
Songxin Tan,
South Dakota State University,
United States

REVIEWED BY
Potsirin Limpinan,
Rajabhat Maha Sarakham University, Thailand
Alessio Faccia,
University of Birmingham Dubai,
United Arab Emirates

*CORRESPONDENCE
Nguyen Van Hanh
Hanh.nguyenvan@hust.edu.vn

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A rapid review of using AI-generated instructional videos in higher education

Tran Trieu Hai[1,2], Duong Thi Thuy Mai[1] and Nguyen Van Hanh[1]*

[1]Faculty of Education, Hanoi University of Science and Technology, Hanoi, Vietnam, [2]Faculty of General Education, Hanoi Open University, Hanoi, Vietnam

Introduction: Generative artificial intelligence (AI) has enabled the rapid emergence of AI-generated instructional videos (AIGIVs) as a new form of learning material in higher education. However, evidence on how they are produced, applied, and the reported benefits and risks remains fragmented, highlighting the need for a systematic synthesis.
Methods: This study conducted a rapid review following PRISMA principles. Studies published from 2023 onward were searched on the Web of Science, Scopus, IEEE Xplore, and Google Scholar. Fifteen eligible studies were analyzed using qualitative content analysis and thematic synthesis.
Results: Two production modes were identified: fully AI-based video generation (e.g., Sora, HeyGen, Veo) and AI-assisted human-made production (e.g., DALL·E, ChatGPT). Pedagogical applications included using AIGIVs as instructional alternatives and as tools for reflective pedagogy, particularly ethical and critical reflection. Benefits included efficiency and scalability, improved accessibility and personalization, and enhanced emotional engagement and memory. Risks involved ethical concerns, technical limitations, and inauthentic or unreliable content.
Discussion: AIGIVs show strong potential for higher education, but their value depends on instructional design, human oversight, and responsible governance.

KEYWORDS

video-based learning, artificial intelligence, AI-generated instructional videos, AI-generated videos, higher education

1 Introduction

The COVID-19 pandemic has created a strong acceleration of digital transformation, forcing higher education institutions to rapidly shift to more flexible teaching and learning formats (Lan et al., 2020; Long and Van Hanh, 2020; Tonbuloğlu and Tonbuloğlu, 2023; Tuyet et al., 2020). E-learning and blended learning have emerged as urgent solutions, while also reshaping the long-term development strategies of higher education institutions (Bozkurt and Sharma, 2020). In this form of learning, instructional videos become the "heart" of the digital learning ecosystem (Guo et al., 2014). Instructional videos are present in most modern learning management systems, from regular university courses to distance learning programs. In e-learning, videos often serve as the primary learning material for content delivery, replacing face-to-face lectures. In blended learning, video lectures serve as the core of online learning activities, previewed by students at home before engaging in face-to-face classroom practice and discussion (Bishop and Verleger, 2013).

Video-based learning refers to the process of acquiring defined knowledge, competencies, and skills through the systematic use of video resources (Chen and Feng, 2023). In digital environments, video-based learning enables learners to engage with content through visual, auditory, and interactive means (Guo et al., 2014). Another key advantage of video is its flexibility: learners can rewatch content multiple times, revisit difficult segments, adjust playback speed, or learn at times that best fit their personal schedules (El-Ariss et al., 2021; Xie et al., 2017; Zhang et al., 2006).

Furthermore, with the integration of technologies such as adaptive learning and personalized content delivery, learners can access videos tailored to their learning pace, cognitive level, or personal preferences (Mo et al., 2022; Sanal Kumar and Thandeeswaran, 2025). For example, interactive tools like Edpuzzle and H5P allow learners to answer questions, complete quick assessments, provide feedback, or receive immediate correction while watching the video (Di Cesare et al., 2021). A study investigating the integration of H5P interactive video content into a learning management system found that university students in e-learning courses reported significantly higher satisfaction than students in other environments (Mir et al., 2021). Additionally, instructional video, particularly the talking-head format, where the instructor appears on screen, can enhance feelings of closeness, connection, and help establish "teaching presence," a critical element of the community of inquiry model (Chen and Feng, 2023). The instructor's voice and visual presence help learners feel as though they are being "taught" rather than studying alone (Lazarevic, 2011).

Unlike traditional educational videos which are typically produced by human instructors and instructional design experts (Netland et al., 2025), the emergence of generative artificial intelligence (AI) technologies such as Synthesia, HeyGen, Sora, and Veo has given rise to a new form of instructional material: AI-generated instructional videos (AIGIVs). These videos are defined as instructional materials in which part or all of the content, visuals, voice, or presenter is automatically generated by AI technologies, including natural language processing (NLP), text-to-speech, AI avatars, and text-to-video (Izani et al., 2025; Shu et al., 2025). The benefits of using AI in video production lie in the speed of production, low cost, and potential for large-scale personalization (Netland et al., 2025). AI tools for video creation can democratize production, making video production more accessible to individuals and smaller organizations, especially those who may not have the resources for traditional video production methods (Pellas, 2023).

As universities increasingly experiment with integrating AI into teaching and learning, the emerging presence of AIGIVs has added to the excitement of innovative educators. Early studies have already begun to document the use of AIGIVs, signaling an urgent need to understand their broader implications. Considering this fast-moving trend, it is essential to take stock of the current landscape: What benefits have been observed so far? What risks or limitations are emerging? And what do early studies suggest about the role these videos might play in future instructional design? Given the novelty and potential impact of this trend in education, a rapid review of the existing literature is both timely and necessary. Such a review can help synthesize current evidence, clarify the opportunities and challenges of AIGIVs, and identify gaps that require further investigation. It also lays an important foundation for making informed pedagogical decisions, designing responsible organizational strategies, and shaping future research in the growing domain of AIGIVs.

Therefore, this study aims to conduct a rapid review of existing literature to synthesize emerging evidence on the use of AIGIVs in higher education. The temporal boundary of 2023–2025 was set to capture the post-ChatGPT era, during which generative AI technologies including ChatGPT (launched November 2022), DALL·E 2, HeyGen, Sora, Synthesia, and Veo 2 began to enable fully automated or AI-assisted video production. This review addresses the following research questions:

> *Research question 1 (RQ1)*: What modes and technologies have been employed to create AIGIVs for higher education, and how do these approaches differ in terms of automation and human involvement?

> *Research question 2 (RQ2)*: How have AIGIVs been integrated into teaching and learning practices, and what pedagogical functions do they serve?

> *Research question 3 (RQ3)*: What benefits and risks have been reported regarding the use of AIGIVs in higher education?

2 Methodology

2.1 Research design

This study used a rapid review design to provide a timely synthesis of the emerging literature on AIGIVs in higher education. Rapid reviews are simplified forms of systematic reviews that retain the core principles of transparency and rigor, to provide evidence more quickly for policy and practice. In line with this approach, the review followed the key steps recommended in PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), including explicit eligibility criteria, a multi-database search strategy, systematic screening, and transparent reporting of study selection. To improve methodological clarity, the research questions were also framed using a PICO structure:

- Population (P): Students and educators in higher education, as well as adult learners in professional and societal sectors where AIGIVs are explicitly used as instructional materials.
- Intervention (I): The intervention focused on AIGIVs, defined as videos in which part or all of the content, visuals, voice, or presenter is generated by AI tools (e.g., Sora, HeyGen, DALL·E 2, AI avatars, text-to-video tools).
- Comparator (C): AIGIVs were compared with instructor-made videos or AIGIVs were examined as a standalone intervention.
- Outcomes (O): Reported learning outcomes, learner and instructor perceptions, ethical and epistemic concerns, and other pedagogical or organizational implications.

This rapid review does not aim to provide an exhaustive, comprehensive map of the field but rather to synthesize the most recent, peer-reviewed evidence (2023 onwards) on how AIGIVs are being produced and used, and what benefits and risks have been identified so far.

2.2 Search strategy

The literature search was conducted across four major academic databases: Web of Science, Scopus, and IEEE Xplore. The Google Scholar database was used to search for additional studies in the first 200–300 results displayed (Haddaway et al., 2015).

The online search was conducted in September 2025, focusing on literature published from 2023 onwards, which marks a period of widespread use of generative AI tools such as ChatGPT and Sora. The following Boolean search string was applied:

> *("text to video" OR "text-to-video" OR "AI video generation" OR "AI-generated videos" OR "AI-generated learning videos" OR "AI-generated teaching videos" OR "AI-generated instructional videos" OR "AI-generated avatars") AND ("education")*

The search was limited to each database as follows:

- Web of Science: Articles, proceeding papers, and reviews.
- Scopus: Document type (conference paper, article, and review), and language (English).
- IEEE Xplore: Journal articles and conference papers.
- Google Scholar: Used to identify additional relevant articles not indexed in the above databases.

2.3 Inclusion and exclusion criteria

Studies were included if they met all the following conditions:

- Explicitly investigated the use or pedagogical application of AIGIVs in educational, training, or professional learning settings;
- Addressed higher education or closely related contexts (e.g., adult learning, or professional education).
- Reported empirical data, conceptual analyzes, or design-based implementations related to teaching, learning, or assessment using AIGIVs.

Studies were excluded during full-text screening if they:

- Focused solely on technical video generation algorithms/ models without educational applications;
- Examined AI in education in general but did not involve AIGIVs as part of instructional design or delivery;
- Investigated traditional instructor-made videos or generic video-based learning lacking AI-generated components; were not available in full text.

2.4 Screening process

Figure 1 presents a PRISMA flow diagram summarizing the screening process. The initial search yielded a total of 118 studies across four databases: 30 from Web of Science, 52 from Scopus, 31 from IEEE Xplore, and 5 additional studies manually identified through Google Scholar. After removing 12 duplicates, 106 studies remained for title-and-abstract screening.

At the title-and-abstract screening stage, studies were excluded for several reasons: the paper did not mention or involve AI-generated videos ($n = 15$); the study focused solely on the technical development of AI video generation tools ($n = 48$); or the study was outside the higher education or adult learning context ($n = 8$).

A total of 35 full-text studies were then assessed in detail. At the full-text screening stage, studies were excluded when they: focused solely on technical algorithms or models for video generation without educational applications ($n = 8$); addressed AI in education but did not use AIGIVs in instructional design or delivery ($n = 2$); examined general video-based learning or traditional

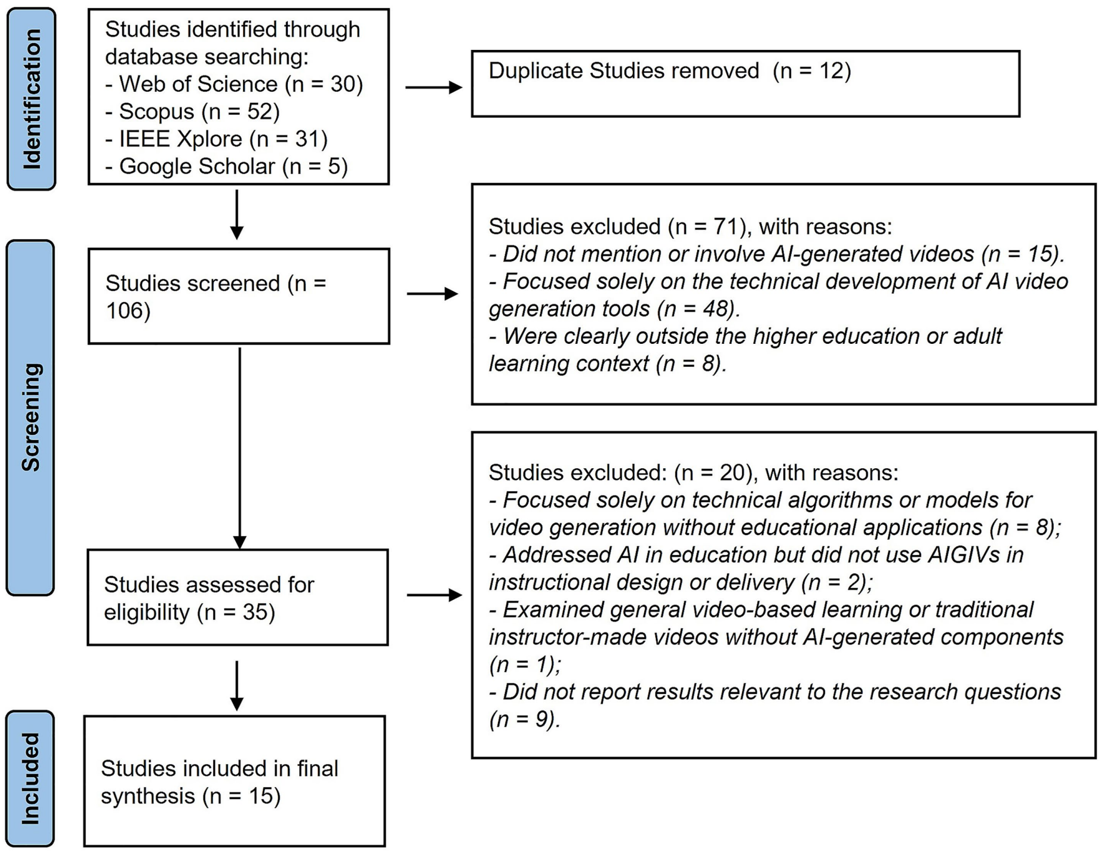

FIGURE 1
PRISMA flow diagram.

instructor-made videos without AI-generated components ($n = 1$); or did not report results relevant to the research questions ($n = 9$). Ultimately, 15 studies met all inclusion criteria and were included in the final synthesis.

2.5 Data extraction and analysis

Key information from the 15 included studies was systematically extracted into a structured Excel matrix. For each study, the following fields were recorded: publication year, country, research design, education or training level, and PICO components. Characteristics of the included studies are summarized in Table 1.

As shown in Table 1, reviewed studies used a variety of research designs, including exploratory analyzes, mixed-methods, surveys, qualitative interviews, experimental designs, and narrative reviews. The geographical distribution includes contributions from countries such as Nigeria, the United Kingdom, Greece, Australia, the United States, Canada, China, Switzerland, the UAE, Austria, Italy, and Saudi Arabia, reflecting a global interest in AIGIVs. A variety of AI tools were reported across the studies, with Sora emerging as the most frequently examined platform. Other tools included Veo 2, HeyGen, ChatGPT, and DALL·E 2. The included studies addressed a range of aims, from exploring the technical capabilities of AI tools like Sora and HeyGen to evaluating pedagogical effectiveness and learner perceptions. Several studies also examined ethical concerns and public attitudes, reflecting the multifaceted perspectives on the use of AI-generated video in education.

To answer the research questions, a qualitative content analysis was conducted to systematically interpret patterns and meanings within the reviewed studies. The analysis followed three iterative stages. First, all extracted findings were segmented into 45 meaning units and assigned descriptive codes that represented key ideas (e.g., automating instructional video creation with Sora, producing avatar-based instructional videos via HeyGen …). Second, similar codes were grouped into eight conceptual categories that reflected broader aspects such as technical limitations, and ethical concerns. Finally, these categories were summarized into four major themes: (1) Modes and technologies of AI-based instructional video generation, (2) Applying AIGIVs for instructional and reflective pedagogies, (3) Reported benefits of integrating AIGIVs into education, and (4) Reported risks and challenges of integrating AIGIVs into education. The results were detailed in Table 2.

2.6 Reliability

As this review was conducted by a single author, reliability was enhanced through peer verification with two colleagues in educational technology. One researcher independently participated in reading and extracting textual segments from the included studies. Agreement between the author and this researcher was calculated for the extraction of 46 meaning units, reaching 41 agreements (≈89%), which indicates a high level of consistency. For the remaining disagreements, a third expert in educational technology was invited to join a consensus discussion. During this session, the three participants jointly reviewed all extracted segments and reached a final consensus on 45 meaning units. We also confirmed the allocation of each meaning unit to its corresponding codes and refined the grouping of categories and overarching themes.

3 Findings

3.1 Theme 1. Modes and technologies of AI-based instructional video generation

Figure 2 illustrates the distribution of AI tools used in instructional video production ($N = 15$ coded instances). Fully AI-generated videos accounted for 73.4% of the reviewed evidence, while AI-assisted human-made video production received less attention. Sora was most frequently studied (46.7%), followed by HeyGen (20.0%) and DALL·E 2 (13.3%), and ChatGPT (13.3%), while Veo 2 (6.7%) appeared less often. This distribution indicates a strong trend toward fully automated video-generation approaches.

3.1.1 Category 1.1: generating fully AI-based instructional videos

Eleven of the fifteen studies analyzed focused on automating video creation through generative AI models capable of producing entire instructional videos with minimal human input. The most frequently mentioned system was Sora, a text-to-video model used in contexts ranging from storytelling to medical training simulations (Adetayo et al., 2024; Dağcı et al., 2025; Mogavi et al., 2024; Mohamed and Lucke-Wold, 2024; Temsah et al., 2025; Waisberg et al., 2024; Zhou et al., 2024). Similarly, Veo 2 was employed in patient education contexts to generate health-related instructional videos (Temsah et al., 2025). HeyGen was also used in a fully automated mode in three studies to create videos with AI avatars and voice synthesis from script-based inputs (Netland et al., 2025; Pellas, 2023; Struger et al., 2025). Overall, these tools represent a new wave of generative AI applications focused on efficiency and automation.

3.1.2 Category 1.2: co-creating instructional videos with AI assistance

In contrast, a smaller group of studies explored AI-assisted video production, where educators remain the primary designers while AI systems serve as creative partners. For example, DALL·E 2 was used to generate visual components integrated into instructor-produced videos (Leiker et al., 2023; Netland et al., 2025). ChatGPT, combined with multimodal tools such as PowerPoint or/and SADTalker, supported educators in co-creating instructional videos, or drafting scripts (Leiker et al., 2023; Xu et al., 2025). These examples illustrate that AI assistance can enhance creative efficiency while preserving pedagogical control, blending human expertise in content and pedagogy with machine-generated visuals and narration.

3.2 Theme 2. Applying AIGIVs for instructional and reflective pedagogies

Theme 2 highlights two major pedagogical directions of AI-generated instructional videos (AIGIVs): (1) adopting AIGIVs as instructional alternatives and (2) integrating AIGIVs into AI-enhanced reflective pedagogies.

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TABLE 1 **Characteristics of included studies.**

Author (Year)	Country	Design	Education level	PICO components			
				Population	Intervention	Comparison	Outcome
Adetayo et al. (2024)	Nigeria	Exploratory	Higher education	Librarians and library staff	Sora	Exploring Sora's educational potential	Sora's strong educational and library potential; immersive storytelling/ gamified learning; ethical, bias, and equitable access concerns.
Leiker et al. (2023)	United Kingdom	Mixed-method	Higher education	83 adult learners	ChatGPT, DALL·E 2	Comparing AI vs. human videos for learning outcomes	No difference between knowledge acquisition and perceived learning experience of learners
Pellas (2023)	Greece	Survey	Higher education	398 undergraduate students	HeyGen	Exploring students' attitudes	Students' favorable attitudes toward AI-supported learning tasks, shaped by sociodemographic and technological factors.
Vallis et al. (2024)	Australia	Interviews	Higher education	10 postgraduate students in business ethics course	AI avatar	Perceptions of AI-generated avatars	Perceived suitability of AI avatars; potential benefits and challenges; three key pedagogical principles of using AI avatars.
Mohamed and Lucke-Wold (2024)	United States	Review	Medical education	N/A	Sora	Sora potential in neurosurgery education	Sora's potential in neurosurgery; technical limitations; patient privacy, bias, and ethics.
Zhou et al. (2024)	United States	Comment analysis	Public education	292 public comments on social media	Sora	Perceptions of Sora on social media	Blurred boundaries between real and fake content; human autonomy, data privacy, and copyright issues.
Mogavi et al. (2024)	Canada	Comment analysis	Industry/professional	602 and 745 comments of Reddit users	Sora	Public opinion on Sora and its impact	Content creation; dynamic storytelling; disinformation, bias, and ethical challenges.
Yu et al. (2024)	China	Mixed (interviews + survey)	Industry/professional	401 practitioners in the video industry	N/A	Factors of AI video tool adoption	Technological maturity; ethics and privacy, user acceptance, data security and copyright.
Waisberg et al. (2024)	United Kingdom	Review	Medical education	N/A	Sora	Challenges and potential in medical education with Sora	Sora's promising potential in medical education; errors in language and syntax; inaccuracy of anatomical information.

(Continued)

TABLE 1 (Continued)

Author (Year)	Country	Design	Education level	PICO components			
				Population	Intervention	Comparison	Outcome
Temsah et al. (2025)	Saudi Arabia	Narrative review	Patient education	41 studies on text-to-video models in healthcare	Sora, Veo 2	AI video in patient education & training	Improving patient education, standardizing customized medical training, and enhancing remote medical consultations; risks of misinformation (or deepfake), privacy breaches, ethical concerns, and limitations in video authenticity.
Netland et al. (2025)	Switzerland	Experiment	Higher education	447 management students	HeyGen, DALL·E 2	Comparison of AI vs. human-made videos	No difference in learning performance; student preference for human-made videos.
Dağcı et al. (2025)	Turkey	Review	Nursing education and patient care	N/A	Sora	Benefits and limitations of AI-generated video platforms in nursing care	The significant potential of AI-generated videos in nursing education and patient care; focus issues, procedural inaccuracies, object inconsistencies, and deviations from clinical standards and best practices.
Xu et al. (2025)	China	Experiment	Higher education (language education)	76 university students	Powerpoint, ChatGPT, SADtalker	Comparison of AI vs. human-made videos	Better student retention in learning with AIGIVs; no difference in knowledge transfer; the need for social presence of human-made videos.
Miranda and Vegliante (2025)	Italy	Experiment	Higher education (language education)	147 participants from diverse educational and professional backgrounds	AI avatar	The use of AI-generated virtual speakers in language education	Improve the accessibility of e-learning content; providing personalized and adaptive learning experiences.
Struger et al. (2025)	Austria	Experiment	Higher education	55 learners	HeyGen and ElevenLabs	Comparison of AI-generated teaching video avatars vs. human-made videos	More effective AI avatars in conveying content, and evoking memorability and emotional response; concerns in emotional authenticity and engagement.

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3.2.1 Category 2.1: adopting AIGIVs as instructional alternatives

Five studies compared AI-generated videos with instructor-made videos to evaluate their pedagogical effectiveness (Leiker et al., 2023; Miranda and Vegliante, 2025; Netland et al., 2025; Struger et al., 2025; Xu et al., 2025). Across these experiments, AIGIVs yielded learning outcomes comparable to those achieved through instructor-produced videos, suggesting that they can feasibly act as replacements in certain instructional contexts. For example, in management courses, AI-generated avatars and narrators resulted in learning outcomes comparable to human-generated videos for undergraduate students (Netland et al., 2025). Additionally, research on student perceptions revealed generally favorable attitudes toward AI-generated avatars (Pellas, 2023; Vallis et al., 2024).

3.2.2 Category 2.2: AI-enhanced reflective pedagogy

Beyond direct content delivery, three studies positioned AIGIVs as catalysts for ethical and critical reflection. Two studies described using AI avatars to encourage ethical reflection and moral reasoning in social science and business ethics courses (Pellas, 2023; Vallis et al., 2024). In one case, the authors redesigned an entire ethics curriculum around AI avatar-based video scenarios, creating opportunities for students to explore complex dilemmas (Vallis et al., 2024). Subsequently, 10 interviewed students felt that AIGIVs were suitable for teaching, even preferable in some cases to human instructors if properly designed (Vallis et al., 2024). Another study mentioned the use of Sora as a powerful tool that provides opportunities for creative and reflective learning through immersive storytelling videos (Adetayo et al., 2024).

3.3 Theme 3. Reported benefits of integrating AIGIVs into education

Theme 3 synthesizes the reported benefits of integrating AIGIVs into educational settings. As summarized in Table 2, three benefit-oriented categories emerged: (1) improving efficiency and scalability of video production, (2) enhancing accessibility and personalization in learning, and (3) enhancing emotional engagement and memory retention.

3.3.1 Category 3.1: improving efficiency and scalability of video production

Across the four related codes, AIGIVs were consistently associated with greater efficiency and scalability in video production. Studies on Sora and related AI video tools reported that educators and institutions could produce instructional videos more quickly and at lower cost compared with traditional recording workflows (Adetayo et al., 2024; Mogavi et al., 2024; Temsah et al., 2025). Furthermore, public and professional commentaries highlighted that AI video platforms can democratize educational video production, enabling smaller institutions, individual educators, and even learners to participate in content creation without substantial financial or technical resources (Mogavi et al., 2024). In general, these findings suggest that AIGIVs can support more sustainable and scalable models of video-based education, especially in contexts where production capacity has traditionally been constrained.

3.3.2 Category 3.2: enhancing accessibility and personalization in learning

This category, formed by two codes, emphasizes how AIGIVs can improve accessibility and personalization. For example, in multilingual higher education settings, AI-generated virtual speakers were used to provide content in multiple languages, making e-learning materials more accessible to diverse student populations (Miranda and Vegliante, 2025). These videos allowed learners to select language options according to their preferences, thereby reducing linguistic barriers. Moreover, AI-generated videos were reported to support personalized learning experiences, for example by adapting pacing and presentation style (Miranda and Vegliante, 2025). Although the current evidence base is small, this initial evidence indicates that AIGIVs can contribute to more inclusive and learner-centered environments when combined with thoughtful instructional design.

3.3.3 Category 3.3: enhancing emotional engagement and memory retention

The third benefit category focuses on emotional engagement and memory retention, drawing on three codes (Struger et al., 2025; Xu et al., 2025). For example, experimental findings suggested that AI-generated teaching avatars can capture learners' attention, evoke stronger emotional responses, and support better recall of key ideas compared with videos with real instructors (Struger et al., 2025). In language and higher education contexts, students reported that AIGIVs were memorable and engaging, which in turn supported their ability to remember and apply content (Xu et al., 2025).

3.4 Theme 4. Reported risks and challenges of integrating AIGIVs into education

Theme 4 synthesizes the risks and challenges associated with integrating AIGIVs into higher education. As summarized in Table 2, 11 risk-related codes were grouped into three categories: ethical concerns, technical and design limitations, and epistemic reliability and authenticity. When comparing production modes, all these risks and challenges were associated with fully AI-generated video.

3.4.1 Category 4.1: ethical concerns

Three studies have highlighted ethical concerns surrounding the creation and use of AI-generated videos. For example, an analysis of 292 public comments on Sora revealed worries that AIGIVs could threaten human autonomy, data privacy, and copyright, such as enabling unauthorized replication of individuals' images or obscuring who controls the content (Zhou et al., 2024). Similarly, further comment analyzes pointed to misinformation and bias risks, with users concerned that AI-generated videos might be deployed to spread distorted narratives (Mogavi et al., 2024). Additionally, deepfake-related ethical risks were raised in medical and public-education contexts, where highly realistic but synthetic videos could be used to fabricate events or statements (Temsah et al., 2025). These concerns highlight the need for clear labeling and increased AI literacy (Zhou et al., 2024).

3.4.2 Category 4.2: technical limitations

AIGIVs still have technical issues that can affect their effectiveness in education. For example, existing research shows that Sora still has

TABLE 2 Codes, categories, and themes identified from the reviewed studies on AIGIVs.

Code	N	References	Category	Theme
Automating instructional video creation with Sora	7	Adetayo et al. (2024), Dağcı et al. (2025), Mogavi et al. (2024), Mohamed and Lucke-Wold (2024), Temsah et al. (2025), Waisberg et al. (2024) and Zhou et al. (2024)	Generating fully AI-based instructional videos	Modes and technologies of AI-based instructional video generation
Automating instructional video creation with Veo 2	1	Temsah et al. (2025)		
Producing avatar-based instructional videos via HeyGen	3	Netland et al. (2025), Pellas (2023) and Struger et al. (2025)		
Integrating DALL·E 2 visuals into educational videos	2	Leiker et al. (2023) and Netland et al. (2025)	Co-creating instructional videos with AI assistance	
Co-creating instructional videos using ChatGPT and other multimodal AI tools	2	Leiker et al. (2023) and Xu et al. (2025)		
Comparing learning outcomes between AI- and instructor-produced videos	5	Leiker et al. (2023), Miranda and Vegliante (2025), Netland et al. (2025), Struger et al. (2025) and Xu et al. (2025)	Adopting AIGIVs as instructional alternatives	Applying AIGIVs for instructional and reflective pedagogies
Examining learner perceptions of avatar-based instructional videos	2	Pellas (2023) and Vallis et al. (2024)		
Fostering ethical and critical reflection through AI-generated videos	2	Pellas (2023) and Vallis et al. (2024)	AI-enhanced reflective pedagogy	
Redesigning ethics curricula with AI-generated videos	1	Vallis et al. (2024)		
Enhancing production efficiency and scalability	3	Adetayo et al. (2024), Mogavi et al. (2024) and Temsah et al. (2025)	Improving efficiency and scalability of video production	Reported benefits of integrating AIGIVs into education
Democratizing educational video production	1	Mogavi et al. (2024)		
Improving accessibility in multilingual e-learning	1	Miranda and Vegliante (2025)	Enhancing accessibility and personalization in learning	
Providing personalized learning experiences	1	Miranda and Vegliante (2025)		
Improving emotional responses	1	Struger et al. (2025)	Enhancing emotional engagement and memory retention	
Supporting memory retention	2	Struger et al. (2025) and Xu et al. (2025)		
Threatening autonomy, privacy, and intellectual property	1	Zhou et al. (2024)	Ethical concerns	Reported risks and challenges of integrating AIGIVs into education
Facing misinformation and bias risks	1	Mogavi et al. (2024)		
Deepfake-related risks	1	Temsah et al. (2025)		
Visualization and rendering inaccuracies	2	Mohamed and Lucke-Wold (2024) and Waisberg et al. (2024)	Technical limitations	
Unnatural or implausible behavior	1	Mohamed and Lucke-Wold (2024)		
Blurring boundaries between authentic and synthetic content	2	Dağcı et al. (2025) and Zhou et al. (2024)	Inauthentic and unreliable content	
Concerns over informational accuracy and reliability	3	Mogavi et al. (2024), Struger et al. (2025) and Waisberg et al. (2024)		

significant limitations when visualizing content, such as physically implausible motion generation, unnatural object morphing, inaccurate physical interactions, and abnormal behavior presentation when generating videos in the field of neurosurgery (Mohamed and Lucke-Wold, 2024). Similarly, videos generated by Sora also contained errors in anatomical content and in common structures such as fingers or

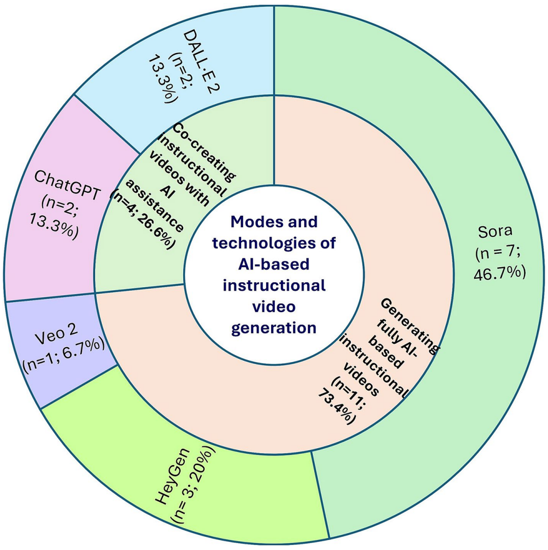

FIGURE 2
AI technologies used in instructional video production.

teeth (Waisberg et al., 2024). These findings show that integrating AIGIVs into curricula requires rigorous validation of the content quality of AIGIVs.

3.4.3 Category 4.3: inauthentic and unreliable content

Finally, some researchers have expressed concerns about whether AIGIVs can be trusted. One important concern noted is the blurred boundaries between authentic and artificial content (Dağcı et al., 2025; Zhou et al., 2024). In educational settings, this ambiguity may lead learners to question whether the instructor is a real expert or an AI simulation. Additionally, other studies have reported concerns about information accuracy in AIGIVs (Mogavi et al., 2024; Struger et al., 2025; Waisberg et al., 2024). This poses the risk of spreading misinformation.

4 Discussion

This rapid review synthesized emerging evidence on how AIGIVs are produced and used in higher education, and how their adoption gives rise to both pedagogical opportunities and critical risks. Figure 3 presents an integrative flow model that links the four themes identified in the findings: (1) modes and technologies of AI-based instructional video generation, (2) applying AIGIVs for instructional and reflective pedagogies, (3) reported benefits of integrating AIGIVs into education, and (4) reported risks and challenges. Rather than viewing technologies, pedagogical uses, and outcomes as separate elements, the model emphasizes their sequential and interconnected nature.

On the left side of the model, AI technologies are grouped into two distinct production modes: fully AI-based instructional video generation (e.g., Sora, HeyGen, Veo 2) and AI-assisted human-made video production (e.g., DALL·E 2, ChatGPT). Fully automated tools offer speed and scalability, enabling low-cost video creation with minimal human effort (Adetayo et al., 2024; Temsah et al., 2025). At the same time, this mode also concentrates most of the reported risks, including ethical concerns, technical limitations, and inauthentic and unreliable content. In contrast, AI-assisted workflows retain a stronger role for educators in shaping content and context (Leiker et al., 2023). This hybrid mode appears less frequently in the current literature but is consistently associated with more fine-grained control over quality, and alignment with learning goals.

The central part of the model concerns how AIGIVs are pedagogically applied. The first approach involves adopting AIGIVs as instructional alternatives, where AI-generated videos replace instructor-made recordings in lectures or explanatory segments. Across multiple experiments, such substitutions did not lead to significant differences in short-term learning performance when compared with human-made videos (Leiker et al., 2023; Miranda and Vegliante, 2025; Netland et al., 2025; Struger et al., 2025; Xu et al., 2025). These findings suggest that AIGIVs can function as viable substitutes for conventional video lectures, offering comparable cognitive outcomes while reducing production effort. However, several studies also reported that learners still value the social and emotional presence of human instructors (Netland et al., 2025), which indicates that replacement should be considered carefully. The second approach emphasizes AI-enhanced reflective pedagogy. AIGIVs are not treated merely as vehicles for content delivery but as prompts for ethical reasoning, discussion, and metacognitive engagement. For example, AI avatar-based instructional videos were used to present complex dilemmas and stakeholder perspectives in business ethics and social science courses, encouraging students to analyze, debate, and justify their decisions (Pellas, 2023; Vallis et al., 2024). This approach highlights the promising applications of AIGIV for students' higher-order learning.

The right side of the model captures both the benefits and risks that emerge from pedagogical applications of AIGIVs. On the benefit side, the reviewed studies converge on three main contributions of AIGIVs. First, AIGIVs can improve efficiency and scalability of video production, enabling institutions and individual educators to generate instructional content more quickly and at lower cost, while potentially democratizing participation in content creation (Adetayo et al., 2024; Mogavi et al., 2024; Temsah et al., 2025). Second, AIGIVs can enhance accessibility and personalization, particularly in multilingual learning environments, where AI-generated virtual speakers and adaptive videos can be tailored to learners' linguistic needs (Miranda and Vegliante, 2025). In other examples, AI avatar-based instructional videos can boost emotional engagement and memory retention of students (Struger et al., 2025; Xu et al., 2025). In addition, this study also notes a substantial cluster of risks and challenges that must be addressed for AIGIVs to be used responsibly in education, including ethical concerns (Mogavi et al., 2024; Temsah et al., 2025; Zhou et al., 2024), technical limitations (Mohamed and Lucke-Wold, 2024; Waisberg et al., 2024), and inauthentic and unreliable content (Dağcı et al., 2025; Mogavi et al., 2024; Struger et al., 2025; Waisberg et al., 2024; Zhou et al., 2024). Thus, the flow model reinforces that benefits and risks are structurally linked to how AIGIVs are produced and pedagogically deployed.

Beyond mapping relationships among themes, the model also has practical implications for instructional design. Viewed through the lens of established instructional design frameworks such as ADDIE or ASSURE, the proposed flow model should be understood primarily as a conceptual design idea. It illuminates the conceptual space where technological, pedagogical, and ethical dimensions of

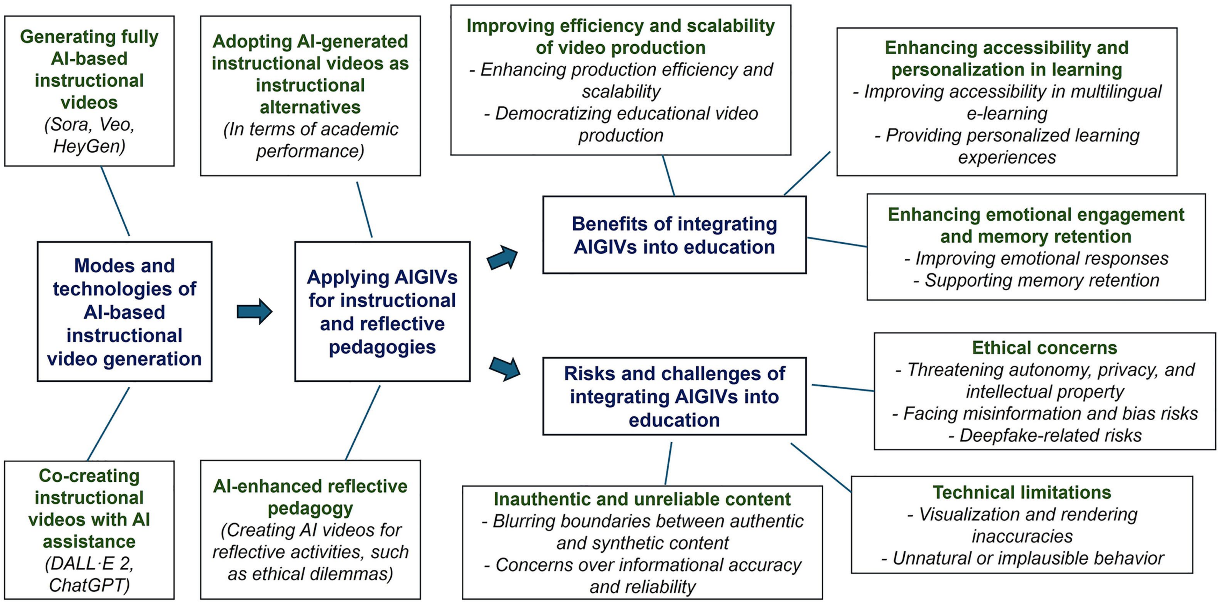

FIGURE 3
Flow model of integrating AIGIVs into education.

AIGIVs intersect. It opens a reflective dialogue about how AIGIVs can be intentionally designed, critically interpreted, and responsibly embedded within diverse educational contexts. For educators, the model provides a structured yet flexible way to promote reflective decision-making across all stages of instructional video design. For researchers, it serves as a generative framework for exploring how AI transforms instructional video design thinking, and inviting empirical inquiry into how AIGIVs evolve in real learning environments. For policymakers, it highlights the necessity of transparent standards, institutional safeguards, and ethical governance frameworks that ensure generative AI effectively serves educational purposes.

Finally, the patterns captured in the model should be interpreted in light of the rapid review design and the still nascent evidence base. The synthesis is based on 15 studies published between 2023 and 2025, spanning diverse disciplines, countries, and methodological approaches. This breadth is a strength in capturing the early landscapes of the field, but it also means that the conclusions are indicative rather than definitive and cannot be generalized to all higher education contexts. As research on AIGIVs matures, future studies should test and refine the proposed flow model, explore long-term learning effects, and consider institutional policies regarding the integration of AIGIVs into instructional practices.

5 Conclusion

This rapid review has synthesized emerging research on the use of AIGIVs in higher education, highlighting three interconnected dimensions: the technologies used in video production, the pedagogical applications of AIGIVs, and the resulting educational benefits and risks. Findings suggest that while AIGIVs offer promising advantages in terms of scalability, efficiency, and innovation, their effectiveness depends on how they are integrated into instructional design and educational contexts. Technical limitations, ethical concerns, and epistemic risks must be carefully addressed to ensure responsible implementation. The proposed flow model illustrates the progression from technological deployment to pedagogical use and educational impact, reinforcing the need for a system-thinking approach. As AIGIVs continue to evolve, educators, researchers, and policymakers must collaborate to develop robust frameworks that maximize pedagogical value while safeguarding educational integrity.

5.1 Recommendations for educational practice and future research

Although research on AIGIVs is rapidly emerging, most existing studies remain preliminary, focusing on short-term outcomes and initial user perceptions. Based on the thematic synthesis of current literature, several key recommendations can be made for educational practice and future research:

5.1.1 Move beyond performance comparisons to explore pedagogical value and deep learner experiences

Much of the current research focuses narrowly on comparing AIGIVs with instructor-made videos in terms of short-term learning outcomes such as test scores or self-reported satisfaction from students (Leiker et al., 2023; Netland et al., 2025). While these studies offer initial insights, they do not capture the deeper pedagogical potential or affective–cognitive impact of AIGIVs. Future research should shift toward investigating students' learning mechanisms activated when engaging with AIGIVs, and examine the role of their emotions, motivation, and reflection in the AIGIVs-based learning process.

5.1.2 Develop pedagogical design frameworks that meaningfully integrate AIGIVs

Studies have shown that the effectiveness of AIGIVs is highly dependent on how well they align with learning objectives and student characteristics (Vallis et al., 2024; Waisberg et al., 2024). Therefore, there is a need to create theoretical frameworks and instructional models that define the role of AIGIVs, whether as replacements, supplements, or reflective triggers.

5.1.3 Enhance digital and AI literacy for both learners and educators

Learners' prior experience with technology significantly shapes their attitudes toward AIGIVs (Pellas, 2023). Likewise, educators who lack foundational understanding of AI may struggle to evaluate the quality, control the accuracy, or strategically use AIGIVs in teaching (Pellas, 2023). Therefore, institutions should offer professional development programs in AI literacy for educators, focusing on how to use, assess, and integrate AI tools in teaching. At the same time, students should be equipped with critical digital competencies to evaluate AI-generated content independently and responsibly.

5.1.4 Establish policies and ethical safeguards for AIGIVs deployment

Several studies have raised concerns regarding the ethical implications of AIGIVs, including deepfakes, misinformation, and blurred boundaries between authentic and artificial content (Mogavi et al., 2024; Temsah et al., 2025; Zhou et al., 2024). In educational contexts, where academic integrity is paramount, the following policy measures are recommended:

- Mandatory labeling of AI-generated content in instructional materials.
- Development of quality standards for AIGIVs in educational settings.

In summary, while AIGIVs offer significant promise for transforming the production of digital learning materials with scalability and cost-effectiveness, realizing its benefits while mitigating risks requires a system-level approach that incorporates not just technological considerations, but also pedagogical strategies, policy frameworks, and human capacity building.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

TH: Methodology, Formal analysis, Resources, Writing – original draft. DM: Conceptualization, Methodology, Formal analysis, Writing – original draft. NH: Funding acquisition, Validation, Project administration, Supervision, Conceptualization, Formal analysis, Writing – review & editing, Methodology, Writing – original draft, Data curation, Visualization, Investigation, Software, Resources.

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Generative AI statement

The author(s) declared that Generative AI was not used in the creation of this manuscript.

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