AI-Based Model with Intelligent Production Stages for Educational Video Creation

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***Abstract*—This research aims 1) to develop an AI-based model with an intelligent production process for educational video creation 2) to synthesize key learner characteristics related to developing creative confidence and 3) to validate the developed conceptual model through expert evaluation. The instrument used is a conceptual model designed by the researchers to support the production of intelligent educational videos and promote learner creative confidence. The model integrates AI technologies such as Natural Language Processing (NLP), computer vision, neural Text-to-Speech (TTS), and machine learning across 4 intelligent production stages: scriptwriting, storyboarding and visualization, voiceover recording, video editing and assembly. Each stage was aligned with traditional media production tasks to enhance instructional relevance and workflow efficiency. In parallel, the researchers conducted a synthesis of learner characteristics related to creative confidence, resulting in 5 domains: intellectual, creative mindsets, creative action, motivational drivers, and reflective awareness. These traits were structured into a pedagogical framework and further operationalized into analytic criteria to inform the design and assessment of learner-centered activities in AI-enhanced educational environments. The results show that the model not only makes AI-based media production more efficient, but also provides a solid foundation for cultivating creativity in digital education systems. This research contributes to the growth of AI in education by identifying creative confidence as a key learner outcome. It also provides educators with validated models and relevant tools for integrating AI into instructional workflows, empowering learners to confidently create, reflect, and express in technology-rich learning contexts.**

***Keywords*—artificial intelligence in education, educational video production, intelligent production stages, Artificial Intelligence (AI)-based content creation, creative confidence**

I. Introduction

In recent years, Artificial Intelligence (AI) has been rapidly transforming the way education is delivered, particularly in the creation, customization, and delivery of instructional content. Among these innovations, AI-powered tools are empowering educators to design and produce educational videos with unprecedented efficiency and flexibility.

Technologies such as Natural Language Processing (NLP), Text-to-Speech (TTS), computer vision, and machine learning enable the creation of visual content, automatic script generation, and multimedia integration, making the production process more efficient while maintaining the integrity of the teaching. However, most AI applications to date focus on automation and efficiency rather than fostering learners' creativity or confidence. In the context of 21st century education, fostering creative confidence and demonstrating initiative are important outcomes that extend beyond technical skills. AI-assisted video production provides a promising context for developing such confidence, allowing learners to interact with intelligent systems in a way that encourages experimentation, expression, and reflection.

This research proposes an AI-based conceptual model for educational video production that integrates smart production steps with the goal of promoting learners' creative confidence. The model is informed by a synthesis of relevant literature, peer review, and the development of an instructional framework that identifies and operationalizes key learner characteristics. The aim is to move beyond performance-based AI applications and toward learner-centered innovations that encourage learners to create, evaluate, and critically engage with digital content, with a primary focus on creative confidence. This research contributes to the debate on AI in education and offers a structured model for integrating intelligent technologies into instructional design in meaningful and transformative ways.

II. Objectives

These objectives of this research are as follows:

1) To develop an AI-Based Model with Intelligent Production Stages for Educational Video Creation.
2) To synthesize key learner characteristics associated with the development of creative confidence.
3) To validate the developed conceptual model through expert evaluation.

III. Literature Review

A. Artificial Intelligence in Education

Artificial Intelligence (AI) is currently playing a major role in transforming the education system in many ways, including learning, teaching, and management within schools. One of the most notable features of AI is its ability to create

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personalized learning experiences for each learner. Intelligent Tutoring Systems (ITS) can also provide tailored recommendations and suggestions to learners, leading to improved learning outcomes [1]. Additionally, using AI to analyze learning data allows teachers to detect students who may have learning difficulties early on and design targeted interventions. AI also has the potential to improve assessment processes by automating grading and feedback, especially in skill-based subjects such as language and mathematics [2]. These capabilities will not only help ease the burden on teachers, but also make assessments more accurate and systematic. Furthermore, AI plays a key role in driving inclusive education, using tools such as speech recognition technology and personalized systems that support learners with diverse abilities and contexts [3]. Despite the many benefits that AI offers, there are still serious challenges that need to be addressed, particularly in terms of data privacy, algorithmic bias and equitable access. To ensure that the use of technology is ethical, AI should not be seen as a tool to replace the role of teachers, but rather to enhance human teaching, promote collaboration and balance technology with the learning process [4]. In summary, AI systems in education have moved beyond concepts to practical applications that produce empirical results. Effective AI integration therefore needs to be guided by pedagogical principles along with professional ethics. This perspective provides a starting point for exploring the role of AI in creating intelligent learning videos that not only enhance learning but also allow for creative outcomes in the teaching and learning process.

B. AI-Based Content Creation

Artificial Intelligence (AI) content generation refers to the use of intelligent systems to create learning media in order to automate or make the process more efficient. This approach has completely changed the way content is created, allowing for greater personalization, faster production of learning media, and greater scalability. Natural Language Processing (NLP) models such as GPT have been used to create easily understandable and relevant learning texts, lesson plans, exercises, and other materials in education systems [5]. The AI technologies behind these systems can collect and process data from large sources, tailor content to learners' ability levels, and support a variety of learning profiles. In terms of multimedia content, AI also plays a key role in creating diverse learning experiences, such as automated video editing, the use of text-to-image technology, or the ability to develop learning media in a variety of formats [6]. Machine learning and computer vision tools can also select the right visual media, match it to a lesson, and precisely adapt the content to specific teaching objectives. Text-to-Speech (TTS) systems also enable the production of high-quality narration on the fly, without the need for a real narrator. This can significantly reduce the time and resources required to develop content [7]. However, while these technologies have significantly improved content production, they still pose significant challenges, such as maintaining academically sound instructional approaches, addressing potential biases in content, and being culturally aware. Therefore, the design of AI-powered content generation systems requires close human supervision to ensure that the content produced remains academically sound and complies with educational ethics.

C. Intelligent Production Stages

The concept of intelligent production stages in educational media creation refers to the systematic integration of artificial intelligence technologies to optimize each critical phase of content development. Recent advances have shown that AI can enhance every production stage from script generation, storyboarding, and voiceover creation to video editing by automating routine tasks and introducing adaptive capabilities [8]. Intelligent production systems enable dynamic content adaptation based on learner profiles, instructional goals, and platform-specific requirements. At the scriptwriting stage, AI models utilizing Natural Language Processing (NLP) can generate coherent, pedagogically-aligned scripts tailored to specific learning outcomes [9]. During the visualization phase, text-to-image and text-to-video technologies powered by machine learning algorithms facilitate rapid storyboard development and the creation of engaging visual assets [10]. Neural Text-to-Speech (TTS) systems contribute by producing human-like voiceovers efficiently, while AI-enhanced video editors assist in integrating multimedia components with minimal manual intervention [11]. These intelligent production stages not only expedite the development process but also allow for greater flexibility in customizing content for diverse audiences. Furthermore, the incorporation of AI decision-support systems helps creators maintain pedagogical consistency, ensuring that instructional design principles are embedded across media outputs. Overall, intelligent production stages redefine the traditional educational content workflow, shifting it from a linear, labor-intensive model to a dynamic, AI-supported, learner-centered production paradigm.

D. AI Applications in Educational Video Production

The integration of Artificial Intelligence (AI) into educational video production significantly improves the production methods and personalizes instructional media. AI technologies help automate critical production processes across a variety of production processes, such as scripting, storyboarding, voiceover, and video editing. For example, Natural Language Processing (NLP) enables the automatic generation of coherent instructional scripts, while Text-to-Speech (TTS) systems enable immersive narration synchronized with images [12]. AI-powered visual tools also support the creation of dynamic storyboards and visualizations of content, allowing instructors to transform complex concepts into engaging, multi-modal learning materials. Machine learning algorithms streamline the video editing process by suggesting transitions, segmenting content, and improving image quality [13]. These technologies reduce production time and reduce technical barriers, making high-quality video production more accessible to instructors without specialized expertise. Importantly, AI-powered media tools enable learner-centered design by providing adaptive pacing, enabling content customization, and accessibility features [14]. As AI capabilities continue to improve, their integration into video production opens up new opportunities for instructional innovation and creative expression, making educational video not only more efficient to produce, but also more engaging and educationally impactful.

E. Educational Video Creation

Educational video creation has emerged as a powerful medium for delivering instructional content in diverse learning environments. Well-designed videos can enhance learner engagement, simplify complex concepts through multimodal presentation, and support self-paced, flexible learning [15]. The process typically involves multiple stages including scriptwriting, storyboarding, narration, visual design, and editing all of which require instructional alignment and technical proficiency [16]. While traditional video production often demands specialized skills and substantial time investment, recent advancements in technology have begun to democratize the process. Educational institutions are increasingly adopting tools and templates to streamline production, ensuring content remains pedagogically effective and visually engaging [17]. Moreover, educational videos are not limited to passive consumption; they serve as tools for interactive learning, flipped classrooms, and learner-generated content. As artificial intelligence continues to evolve, its integration into the video creation process has opened new possibilities for both educators and learners enhancing efficiency while enabling personalized, creative, and adaptive media experiences.

F. Creative Confidence

Creative confidence refers to an individual's belief in their ability to generate, explore, and express original ideas [18]. It encompasses both cognitive and affective dimensions, including self-efficacy, risk-taking, and the willingness to engage in open-ended problem solving. In educational contexts, creative confidence is essential for fostering innovation, learner agency, and adaptability skills that are increasingly vital in technology-mediated environments [19]. Unlike creativity as an abstract talent, creative confidence is a learnable and developable trait. Learners with high creative confidence are more likely to experiment, reflect on their processes, and persevere through challenges. When supported through purposeful instructional design and digital tools such as AI, creative confidence can be nurtured in diverse learners, promoting not only engagement but also meaningful knowledge construction and self-expression.

G. Research Gaps and Motivation for This Research

Despite the rapid advancements in applying technologies to educational media production [20], several critical gaps remain in the existing literature. First, while many studies have focused on isolated AI applications such as automated script generation, text-to-speech narration, or AI-assisted editing there is a lack of comprehensive frameworks that systematically integrate AI technologies across all production stages in a coherent, pedagogically aligned manner [21]. This fragmentation limits the potential of AI to transform educational video production into a fully intelligent and adaptive process. Second, although AI-driven content personalization has gained attention, most existing research tends to emphasize technological capabilities without sufficiently considering instructional design principles, learner diversity, and pedagogical outcomes [22]. The need for models that balance AI-driven efficiency with educational integrity and learner engagement remains largely unmet. Furthermore, empirical studies evaluating AI-supported production workflows in authentic educational settings are scarce, highlighting the need for pilot implementations to assess real-world feasibility and effectiveness. Motivated by these gaps, the present research aims to develop an AI-based conceptual model that integrates intelligent production stages for educational video creation.

IV. Methodology

This research used a multistage research design as follows:

A. Research Design

This research employed a multi-phase design to develop and validate an AI-based conceptual model for educational video production, emphasizing synthesis, expert review, and pedagogical applicability. The research methodology was divided into 3 sequential phases

1) Synthesis of Learner Characteristics for Creative Confidence. This phase synthesized literature to identify key learner traits such as experimentation, self-expression, and reflection to align the model with creativity-oriented outcomes in AI-supported learning.
2) Model Development Phase. This phase involved the identification, analysis, and synthesis of 3 critical knowledge components: AI Algorithms Components, Categories of AI Tools for Video Production, Traditional Video Production Process
3) Expert Validation Phase. Following the model development, expert validation was conducted to assess the model's relevance, clarity, feasibility, and completeness. Structured evaluation instruments, including rating scales and open-ended feedback, were utilized. Quantitative data analysis (Content Validity Index, CVI) and qualitative thematic analysis guided model refinement.

The overall research flow is depicted in the conceptual framework diagram below (Fig. 1).

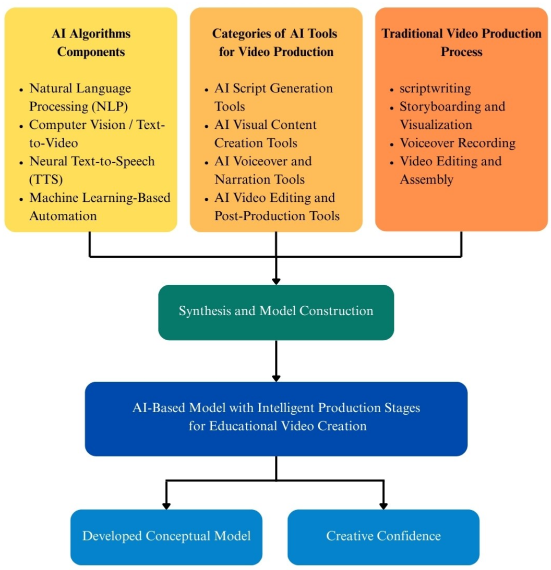

Fig. 1. Conceptual framework for intelligent educational video production using AI.

By integrating AI-driven components into the traditional video production workflow, the conceptual model aimed to transform the process from a manual, resource-intensive task to an intelligent, adaptive, and learner-centered system. This multi-phase research design ensured that the developed model was grounded in both theoretical insights and practical considerations, addressing identified gaps in the current literature and contributing a structured framework for future applications of AI in educational media production.

B. Synthesis of Learner Characteristics for Creative Confidence

To support the model's pedagogical foundation, a focused synthesis was conducted to identify learner characteristics aligned with creative confidence. A systematic review of scholarly sources was performed, focusing on AI-enhanced instruction, creativity in digital learning, and learner psychology. Thematic analysis yielded 5 recurring traits commonly found in creative learners: Intellectual, Creative Mindsets, Creative Action, Motivational Drivers, and Reflective Awareness. These characteristic were integrated into the model's instructional design to ensure alignment with creativity learning goals. The synthesis also informs future development of assessment tools that aimed at measuring creativity confidence in AI-supported learning environments.

C. Model Development Phase

The model development phase of this research involved a systematic and rigorous synthesis of relevant knowledge components to construct an AI-based conceptual model for intelligent educational video production. The development process followed a structured multi-step approach in Fig. 2.

1) Identification of Core Input Components

3 key domains were identified through a thorough review of textbooks, academic articles, technology reports and related research.

2) Thematic Synthesis and Comparative Analysis

Following component identification, thematic synthesis techniques were applied to analyze recurring patterns, key functionalities, and pedagogical considerations across the selected literature. Comparative analysis was used to map how AI technologies could intelligently support or replace tasks within the traditional production process while ensuring educational relevance.

3) Construction of the Conceptual Model

Insights from the synthesis phase were used to develop a conceptual model that integrates AI technologies at 4 critical intelligent production stages. Each production stage was carefully aligned with corresponding AI algorithms and tool categories, ensuring that automation enhanced rather than detracted from pedagogical goals.

4) Model Visualization and Refinement

A conceptual framework diagram was created to visualize the model flow. To verify conceptual clarity, the 7 PhD-level experts who later validated the model also participated in an internal peer review. Each expert independently reviewed the draft diagram using a structured feedback form focused on logical flow, terminology, and coherence. Their suggestions were then synthesized and used to revise the model before formal evaluation.

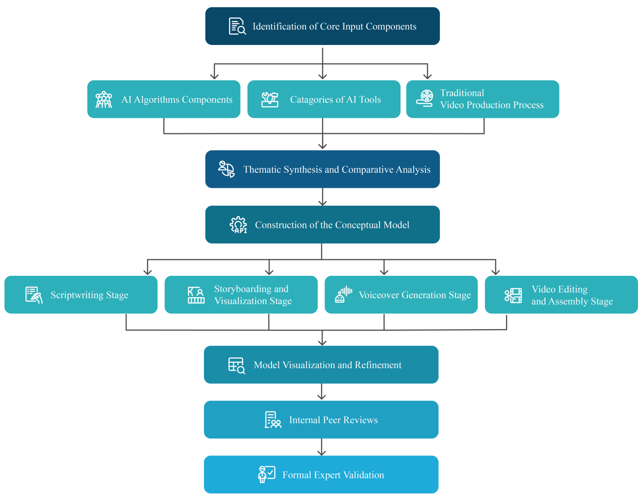

Fig. 2. The development process of AI-based model with intelligent production stages for educational video creation.

Table 1. Synthesis of AI algorithms components

AI Algorithm Components	Description	Key Educational Applications	Reference
Natural Language Processing (NLP)	Enables automated understanding and generation of human language for scriptwriting, text analysis, and conversational systems.	Automated script generation, intelligent tutoring dialogues, educational content summarization	[9, 12, 23–25]
Computer Vision / Text-to-Video	Facilitates the analysis and generation of visual media from text descriptions, enhancing visualization processes.	Storyboarding automation, visual asset generation for educational videos	[10, 13, 26–28]
Neural Text-to-Speech (TTS)	Converts written text into natural-sounding human speech using deep learning models.	Voiceover production for educational materials, multilingual accessibility	[11, 14, 29–31]
Machine Learning-Based Automation	Applies predictive modeling and adaptive techniques to automate tasks across the production workflow.	Video editing optimization, adaptive content sequencing, personalization based on learner profiles	[9, 32–34]

From Table 1, the researchers summarize the key AI algorithm components synthesized for integration into the intelligent educational video production model. Natural Language Processing (NLP) supports the automation of instructional script generation and enhances content adaptation for diverse learning contexts. Computer Vision technologies, including text-to-video systems, enable rapid creation of visual content from textual inputs, streamlining the visualization stage. Neural Text-to-Speech (TTS) systems contribute to efficient and high-quality voiceover production, crucial for multimedia educational experiences. Finally, machine learning-based automation techniques provide adaptive optimization of video editing workflows, ensuring that final outputs are aligned with instructional objectives and learner engagement strategies. These components collectively form the technological foundation upon which intelligent production stages are constructed.

Table 2. Synthesis of categories of AI tools for video production

AI Tool Category	Description	Examples of Applications	Reference
AI Script Generation Tools	Automatically generate educational scripts based on given topics, learning objectives, or curriculum frameworks.	OpenAI GPT models for lesson scripting, Jasper.ai for educational content writing	[9, 10, 35–37]
AI Visual Content Creation Tools	Create images, animations, or short videos from textual prompts to support visualization of instructional concepts.	DALL·E, Runway ML, Synthesia for text-to-video production	[8, 11, 38–44]
AI Voiceover and Narration Tools	Produce natural-sounding voiceovers from textual input, supporting multilingual and inclusive educational resources.	Google Cloud TTS, Amazon Polly, Murf.ai	
AI Video Editing and Post-Production Tools	Assist in automatic sequencing, editing, and enhancement of video content based on predefined structures or AI predictions.	Wisecut, Pictory AI, Descript for AI-driven editing	[45–49]

From Table 2, categorizes the major types of AI tools synthesized for educational video production. AI script generation tools utilize advanced natural language models to automate the creation of lesson scripts and instructional content, significantly reducing time and enhancing alignment with educational standards. AI visual content creation tools leverage generative models to transform textual descriptions into visual assets, enabling dynamic storyboarding and visualization processes. AI voiceover and narration tools facilitate the production of natural and expressive audio narrations, supporting multilingual learning environments and improving content accessibility. AI video editing and post-production tools provide intelligent assistance in assembling and refining video outputs, using machine learning to optimize structure, transitions, and pacing for instructional effectiveness. Each category in this table is supported by 4–5 scholarly sources, as indicated in the reference column, reflecting current trends in AI-supported educational media production. Together, these tool categories operationalize the intelligent production stages of the developed conceptual model.

Table 3. Synthesis of traditional video production process

Production Stage	Description	Key Activities	Reference
Scriptwriting	Development of instructional scripts that outline educational objectives, narration flow, and key messages.	Topic selection, content research, lesson structuring, script drafting	[50–54]
Storyboarding and Visualization	Visual planning of the educational video, mapping scripts to images, animations, or video scenes.	Creating storyboards, visual planning, identifying multimedia needs	[17, 51, 55–57]
Voiceover Recording	Recording spoken narrations based on the script, ensuring clarity, tone, and educational appropriateness.	Voice casting, recording sessions, audio editing	[51, 58–61]
Video Editing and Assembly	Combining audio, visual, and textual elements into a cohesive final educational video product.	Video cutting, synchronization, transitions, adding effects and captions	[51, 62, 63]

From Table 3, outlines the traditional stages involved in educational video production prior to the integration of AI technologies. The process begins with scriptwriting, where educators or instructional designers develop narrative scripts aligned with specific learning objectives. Following script creation, storyboarding and visualization translate the written script into visual plans, detailing how textual content will be represented through images, animations, or live-action scenes. Subsequently, voiceover recording involves producing the narration, emphasizing appropriate pacing, tone, and clarity to enhance comprehension. Finally, the video editing and assembly stage merges all multimedia components into a finalized educational video, focusing on coherent sequencing, audio-visual synchronization, and instructional clarity. Understanding these traditional processes is essential to identifying where AI technologies can intelligently augment or automate stages to improve efficiency, personalization, and pedagogical quality.

Table 4. Application of AI algorithms in production stages

Intelligent Production Stage	Applied AI Algorithms	Key Functions
Scriptwriting	Natural Language Processing (NLP)	Automated generation of instructional scripts, topic expansion, learning objective alignment
Storyboarding and Visualization	Computer Vision / Text-to-Video	Automated storyboard creation, visual content generation, dynamic scene design
Voiceover Recording	Neural Text-to-Speech (TTS)	Realistic voiceover production, multilingual narration, adaptive tone modulation
Video Editing and Assembly	Machine Learning-Based Automation	Intelligent video sequencing, audio-visual synchronization, adaptive pacing optimization

Table 4 illustrates the integration of AI algorithms across 4 intelligent production stages in the conceptual model: scriptwriting, storyboarding and visualization, voiceover generation, and video editing and assembly. At the scriptwriting stage, Natural Language Processing (NLP) supports automated script generation aligned with learning objectives. In the visualization stage, computer vision and text-to-video technologies enable dynamic storyboard creation from textual content. Voiceover generation utilizes neural Text-to-Speech (TTS) systems to produce expressive narration adaptable to tone, language, and pacing. The editing and assembly stage applies machine learning-based automation to sequence scenes, synchronize multimedia elements, and optimize flow for learner engagement.

The model was developed through thematic synthesis and comparative analysis of prior literature. Table 1 identified core AI algorithms, while Table 2 classified AI tools by function. Table 3 analyzed the traditional video production process, revealing opportunities for AI augmentation without compromising instructional quality. Building on these foundations, Table 4 presents a coherent mapping of technologies to stages, demonstrating how AI can enhance efficiency, personalization, and pedagogical integrity in educational video production. This mapping supports the model's practical application in instructional settings and serves as a foundation for its further validation and refinement.

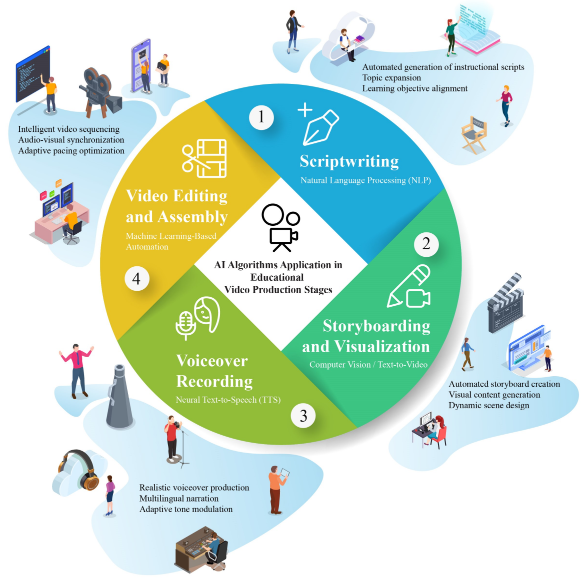

Fig. 3. AI-driven production process diagram in educational video creation.

Fig. 3, This diagram illustrates the application of AI algorithms across 4 intelligent production stages 1) Natural Language Processing (NLP) for automated scriptwriting 2) Computer Vision and text-to-video technologies for storyboarding and visualization 3) Neural Text-to-Speech (TTS) systems for realistic voiceover generation and 4) Machine Learning-based automation for video editing and assembly. Each algorithm is strategically mapped to its corresponding stage to optimize efficiency, personalization, and instructional effectiveness.

D. Expert Validation Phase

This phase evaluated the AI-based conceptual model across 4 key dimensions: relevance, clarity, feasibility, and completeness. 7 experts were purposively selected based on their professional expertise in educational technology, instructional design, and AI in education. All selected experts held doctoral degrees (Ph.D.) and had a minimum of 5 years of experience in their respective fields. Evaluation was conducted using a structured review form with 2 parts: 1) a quantitative Likert-scale assessment and 2) open-ended qualitative feedback. Quantitative data were analyzed using descriptive statistics and the Content Validity Index (CVI), calculated at both item (I-CVI) and scale levels (S-CVI/Ave), with a threshold of 0.83 indicating acceptable validity for panels of 6 to 8 experts [64]. Qualitative responses were thematically analyzed to identify strengths, suggestions for improvement, and practical considerations. The integration of these findings informed revisions to enhance the model's clarity and applicability in educational contexts.

V. Results

This section presents the findings from 3 core components of the research

A. Model Development Outcomes

The AI-based conceptual model was developed through a structured synthesis of 3 core components 1) key AI algorithms 2) categories of AI tools, and 3) the traditional video production process. Relevant textbooks, academic articles, and research publications were reviewed to extract and integrate insights into a coherent framework. The synthesis process resulted in 3 summary tables. Table 1 identifies the major AI algorithms applicable to video production: Natural Language Processing (NLP), Computer Vision, Neural Text-to-Speech (TTS), and Machine Learning-based automation. Table 2 categorizes AI tools into 4 functional groups: script generation, visual content creation, narration, and video editing. Table 3 outlines the traditional workflow of educational video production, including scripting, storyboarding, narration, and editing. These elements were then mapped systematically to corresponding production stages, resulting in a synthesized framework (Table 4) that aligns each AI capability with its respective function. The final model is visually illustrated in Fig. 3, which presents four dynamic production stages: scriptwriting, storyboarding and visualization, voiceover generation, and video editing and assembly. Each stage integrates specific AI applications to streamline production, enhance pedagogical clarity, and support instructional design.

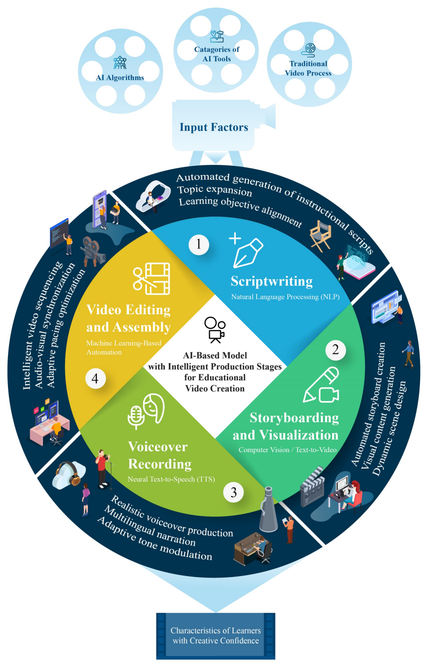

Fig. 4. AI-based model with intelligent production stages for educational video creation.

Fig. 4, Final AI-Based Conceptual Model with Intelligent Production Stages. The model integrates 3 synthesized input components 1) AI algorithm types (NLP, Computer Vision, TTS, ML), 2) categories of AI tools (script generators, visual content tools, narration systems, video editors), and 3) the traditional video production process into a streamlined, intelligent workflow comprising 4 main stages: Scriptwriting, Storyboarding and Visualization, Voiceover Generation, and Video Editing and Assembly. By exposing students to well-crafted, expressive educational media generated through AI, the model supports learners' self-expression, experimentation, and belief in their creative ability's critical competencies in 21st century learning environments. Outputs is Characteristics of Learners with Creative Confidence This refined model served as the foundation for expert evaluation and pilot implementation, as detailed in the following sections.

B. Expert Validation Results

7 experts participated in the validation process. Quantitative results based on the structured evaluation form are presented in Table 5.

Table 5. Expert evaluation of the AI-based conceptual model

Evaluation Dimension	Mean ($\bar{x}$)	S.D.	I-CVI
Alignment with educational objectives	4.71	0.49	1.00
Suitability for AI-integrated instruction	4.57	0.53	0.86
Clarity of model structure	4.61	0.52	1.00
Clarity of terminology and components	4.50	0.58	0.86
Feasibility of classroom implementationin classroom settings	4.43	0.79	0.86
Accessibility of required AI tools	4.29	0.83	0.71
Coverage of essential production stages	4.64	0.50	1.00
Integration of model components	4.50	0.63	0.86
Support for creative thinking	4.39	0.66	0.86
Potential to foster learner creative confidence	4.42	0.59	0.86
Overall	4.53	0.60	0.89

From Table 5 summarizes the results of the expert evaluation of the AI-based conceptual model. The revised evaluation framework covered 5 thematic areas: relevance, clarity, feasibility, structural integration, and pedagogical support for creative confidence. The overall mean score was 4.53, with a standard deviation of 0.60, indicating a consistently high level of agreement among the 7 experts. The average Content Validity Index (S-CVI/Ave) was 0.89, exceeding the commonly accepted threshold of 0.80 for strong content validity. Among the individual items, the highest-rated aspects were alignment with educational objectives and coverage of essential production stages, both receiving mean scores above 4.70 and an I-CVI of 1.00. These results reflect strong consensus on the model's instructional relevance and comprehensive structure. Other highly rated items included the clarity of model structure and the model's potential to foster learner creative confidence, which suggest that experts view the model as both pedagogically coherent and innovation oriented. The lowest, though still favorable, rating was given to accessibility of required AI tools (Mean = 4.29, S.D. = 0.83, I-CVI = 0.71), reflecting ongoing concerns about tool availability and technological readiness in diverse educational contexts.

Overall, the expert feedback supports the theoretical soundness and practical relevance of the model. 3 qualitative themes emerged prominently: 1) the model's capacity to support AI-integrated instructional design, 2) the need for professional development in AI tool adoption among educators, and 3) the model's adaptability for use across various subject areas and learner levels. These findings informed the final refinement of the conceptual model, reinforcing its validity and applicability as a pedagogical framework for intelligent video production that promotes creative learning outcomes.

C. Synthesized Characteristics of Learners with Creative Confidence

This section presents the results of a structured synthesis of learner characteristics associated with creative confidence, specifically within the context of AI-based educational video production. The objective of this synthesis was to provide a pedagogical foundation that aligns with the intended learning outcomes of the conceptual model and to support the integration of creative confidence as a measurable construct. The synthesis resulted in the identification of 5 interrelated domains that collectively define the profile of learners with creative confidence. These domains include: Intellectual, Creative Mindsets, Creative Action, Motivational Drivers, and, Reflective Awareness. Each domain consists of subdimensions that represent specific attributes, skills, or dispositions relevant to AI-assisted media production.

To deepen the practical application of this framework, the synthesized characteristics were organized into a structured reference table that links each domain to its corresponding subdomains and explanatory descriptions.

From Table 6, outlines the 5 synthesized learner domains and their associated subdimensions, offering a clear conceptual scaffold for designing learning environments and instructional activities that support creative confidence. This framework directly informs the development of the model's pedagogical assumptions. Each domain is structured to bridge theoretical foundations and classroom practice, enabling instructors to plan for and nurture creativity in learners through specific strategies and AI-supported interventions. The framework also assists educators in identifying target learner dispositions and designing learning experiences that align with real-world skills such as problem solving, iterative design, and creative media expression. To operationalize the framework into classroom practice and assessment, a rubric was designed to evaluate learner demonstration of creative confidence in AI-based video production tasks.

Table 6. Creative confidence framework for AI-based educational video production

Domain	Subdomain	Description	Reference
Intellectual	- AI-integrated Problem Solving - Design Planning - Reasoned Decision-Making	Refers to the ability to analyze, plan, and make informed decisions when selecting appropriate AI tools throughout each stage of educational video production. This includes, for example, choosing ChatGPT for scriptwriting or Runway for visual generation, based on task relevance and intended learning outcomes.	[18, 65, 66]
Creative Mindsets	- Self-Efficacy - Risk-taking - Tolerance for Ambiguity - Growth Orientation	Encompasses internal learner dispositions that support creative thinking, such as confidence in one's creative ability, willingness to experiment with new AI tools, acceptance of uncertainty in AI-generated outputs, and a belief that creative skills can be developed through effort and feedback.	[19, 67]

Domain	Subdomain	Description	Reference
Creative Action	- AI-assisted Making - Iterative Practice - Outcome Development	Involves the capacity to actively engage in the creation of original media content using AI tools across all stages of production. Learners demonstrate idea-driven decision-making, continuous revision, and refinement of outputs rather than simply following procedural steps.	[65, 66, 68]
Motivational Drivers	- Curiosity - Initiative - Persistence - Autonomous Engagement	Represents internal motivational forces that sustain creative learning. Learners are driven by a desire to explore AI, take initiative in using tools, persist through trial and error, and maintain self-directed engagement—even in the absence of external rewards or evaluations.	[69–71]
Reflective Awareness	- Process Reflection - Self-Evaluation - Adaptive Learning	Captures the learner's capacity for introspective thinking, including critical analysis of their own creative process, evaluation of AI-supported outputs, and the ability to adjust strategies or set new creative goals based on reflective insights and past experiences.	[66, 68]

VI. Discussion

The results of this research highlight 3 interconnected contributions to the field of AI-enhanced educational video production 1) the development of an AI-based conceptual model 2) expert validation of the AI-based conceptual model and 3) the synthesis of learner characteristics for creative confidence. First, the model development process integrated AI technologies such as NLP, computer vision, and machine learning into 4 intelligent production stages that reflect real-world educational media workflows. This structured mapping not only demonstrates operational feasibility but also ensures pedagogical alignment by grounding each stage in instructional goals. The clarity and modularity of the model make it adaptable to various educational contexts and media production capacities. Second, expert validation results affirmed the model's relevance, clarity, and completeness, while also identifying areas for refinement in feasibility, particularly concerning access to AI tools. Qualitative feedback revealed strong support for the model's innovation, instructional utility, and potential to foster learner creativity. Experts emphasized the model's applicability across disciplines and suggested its usefulness for educators with varying levels of technical expertise. Third, the synthesis of learner characteristics resulted in a comprehensive framework for creative confidence, consisting of 5 key domains: Intellectual, Creative Mindsets, Creative Action, Motivational Drivers, and Reflective Awareness. These traits were derived from recent literature and aligned with the model's pedagogical intent. The framework supports instructional design by making creative learning goals explicit and assessable through clearly defined behavioral indicators and rubrics. Together, these 3 findings position the model not just as a technological scaffold, but as a pedagogically meaningful innovation. While no pilot implementation has been conducted, the theoretical rigor, expert consensus, and alignment with learner development provide a strong foundation for future experimental application and broader scalability. Expert evaluation confirmed the model's relevance, clarity, feasibility, and completeness. One expert remarked, "The model demonstrates strong potential to guide educators in adopting AI creatively, especially in resource-limited settings." This illustrates how the model not only supports instructional alignment but also addresses real-world implementation challenges. Such feedback reinforces the model's practicality and pedagogical significance, especially in fostering creative confidence through structured AI-supported production processes.

VII. Conclusion

This research developed and validated an AI-based conceptual model for educational video production, emphasizing intelligent production stages and the promotion of learner creative confidence. The model integrates key AI technologies such as NLP, TTS, computer vision, and machine learning across 4 production stages: scriptwriting, visualization, voiceover generation, and video editing. Expert evaluations confirmed the model's clarity, relevance, feasibility, and its pedagogical value in fostering creativity. A key contribution of this research is the synthesis of learner characteristics linked to creative confidence, resulting in 5 domains: Intellectual, Creative Mindsets, Creative Action, Motivational Drivers, and Reflective Awareness. These were translated into a conceptual framework and an analytical approaches to support instructional design and assessment in AI-enhanced environments. Although classroom implementation was not conducted, the research offers a strong theoretical foundation and practical tools for educators. It shifts the focus of AI in education beyond automation toward creative learner development. Future work may explore implementation in varied contexts and refine tools for evaluating creative growth. Ultimately, the model provides both structure and inspiration for integrating AI with pedagogy empowering learners not only to consume media but to create, reflect, and innovate with confidence.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Naphatsanan Suwannawong served as the principal investigator, conceptualized the study, developed the AI-based model, synthesized learner characteristics, and led the manuscript writing. Phatchareephorn Bangkheow participated in data collection and organized expert validation procedures. Prachyanun Nilsook and Panita Wannapiroon provided academic supervision and critical guidance throughout the research design, model development, and expert validation phases. Siwaporn Linthaluek and Jidapha Yoorubsuk contributed to the design of the methodology, conducted the literature review, and supported data visualization. All authors reviewed and approved the final version of the manuscript.

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