

Research Paper

Student Perception and Pedagogical Implications of Generative AI in Digital Storyboarding: A Case Study at NEUC

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Abstract: Generative artificial intelligence (Gen AI) is rapidly transforming educational practice, yet its impact on processes in creative disciplines remains underexplored. This mixed-methods case study investigates how 12 undergraduate design students engaged with Gen AI in digital storyboarding at New Era University College (NEUC). Findings reveal that while prompt formulation posed the most significant challenge (75% reporting a high challenge), students also reported an enhanced understanding of the workflow (75% perceiving significant benefits). Four dynamic themes were identified: AI as a creative collaborator, the complexity of prompt formulation, the efficiency-control paradox, and AI's role as cognitive scaffolding. We introduce the construct of translational cognitive load to describe the mental effort required to articulate creative intent into machine-interpretable prompts, alongside the emergence of creative-technical literacy as a core competency. Pedagogical implications include embedding structured prompt engineering curricula, developing an AI literacy framework and designing assessment models that evaluate both process and product. While limited in scope, this study provides foundational evidence for integrating AI into creative education in ways that preserve agency, foster reflective learning and align with evolving industry needs.

Keywords: Creative education, storyboarding, prompt engineering, AI literacy, generative artificial intelligence

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Introduction

Generative artificial intelligence (Gen AI) has emerged as a transformative technology in creative industries, significantly reshaping processes in visual storytelling and media production (Hwang & Wu, 2025; Sims, 2024). Current platforms, notably DALL·E 3 and Midjourney, as well as video production tools like Sora, VEO, Veed and Hailou, have advanced the creation of complex visual content, enabling rapid prototyping that was previously limited by technological constraints (Al-Sayegh, 2025). As a result, these technologies are promoting a shift toward human-AI collaborative processes, thereby blurring conventional boundaries between conception and execution (Fu et al., 2025).

As a foundational pre-visualisation practice, storyboarding is utilised as both a cognitive tool for narrative construction and a communication bridge between ideas and production execution (Walker et al., 2015). Based on Vygotsky's (1978) constructivist framework, storyboarding serves as an externalisation of internal creative processes, enabling the manipulation of abstract ideas through visual representation. However, the integration of AI fundamentally redefines this interaction. Specifically, AI shifts the cognitive load from the manual task execution to the conceptual articulation and rapid prompt engineering required for its use (Van Merriënboer & Sweller, 2005).

Integrating Gen AI into creative education poses complex pedagogical challenges that transcend basic tool training. Therefore, an effective AI integration demands careful consideration of its effects on learning objectives, creative processes and the assessment framework (Gierhart et al., 2024; Pavlik, 2025). While the professional adoption of AI has been rapid, a significant gap in systematic educational research persists. Current studies often examine the broad impact of AI on creative industries (Alfarsi et al., 2024), but rarely address the specific challenges that arise when students engage AI tools in structured learning environments, particularly in creative disciplines that require the development of both technical and creative skills.

The expanding significance of prompt engineering as a core skill further complicates the educational environment, requiring rapid re-evaluation of curricula, assessment methods and the basic definition of both digital literacy and human-AI collaboration. Effective interaction with AI systems requires an extensive understanding of how to translate creative intent into machine-interpretable instructions (Darmawan et al., 2024; Viswanathan, 2025). This emerging creative-technical literacy must be integrated into an educational framework without compromising the focus on fundamental creative competencies. Roe et al. (2025) argue that timely educational research is critical due to the accelerated growth of AI capabilities, noting that current tools represent a significant advancement over previously examined systems.

Based on Vygotsky's sociocultural theory, this study considers Gen AI technologies as complex scaffolding that assists learning when properly integrated, particularly within the zone of proximal development. Unlike conventional scaffolding, which is progressively eliminated, AI scaffolding demands the acquisition of new creative-technical literacies while perhaps disrupting core creative processes. Recent studies on human-AI collaboration support this viewpoint. Baltà-Salvador et al. (2025) observed that organised, blended procedures can empower students, but Fu et al. (2025) discovered that collaborative co-creation requires specific instructional frameworks. These findings indicate that AI technologies work best when they supplement, rather than replace, human abilities. As a result, effective integration must maintain creative ownership while leveraging technological advantages.

This study also uses the Cognitive Load Theory (Van Merriënboer & Sweller, 2005), which suggests that AI integration must carefully balance the intrinsic cognitive load (the inherent creative demands of a task) with the extraneous cognitive load (the effort required to operate the tool and formulate prompts). This balance explains why, depending on the implementation strategy, AI may both help and hinder learning (Mzwri & Turcsányi-Szabo, 2024). Despite the increased interest in AI-enhanced creative education, there is a significant lack of empirical research on students' interaction with AI-integration processes. Most existing studies focus on AI tools' capabilities in general rather than on the specific cognitive and pedagogical dynamics that emerge during hands-on creative tasks or projects (Bura, 2025).

This research gap is particularly significant in storyboarding education, as the learning objectives are multifaceted. They include narrative construction, visual communication, production planning and collaborative development. Given that AI technologies may have varying effects across these categories, a more in-depth examination of student experiences and pedagogical consequences is required. A recent study highlighted the importance of this effort. Korea Institute of Design Research Society and Choi (2024) emphasised the benefits of a collaborative-based creative process between AI and designers, while Longo and Albano (2025) advocated for hybrid frameworks that bridge the gap between creativity and technology. The emergence of critical AI literacy as an educational necessity highlights the urgent need for evidence-based pedagogical approaches in creative disciplines.

In light of these gaps, this study examines how undergraduate visual communication design students at New Era University College (NEUC) employ Gen AI for digital storyboarding in a formal educational setting. The NEUC curriculum, which blends conventional creative education with future technology, offers a unique opportunity to investigate AI adoption within an established academic framework. The significance of this study extends beyond its current setting. It represents an

expanding number of educational institutions aiming to introduce AI technology without sacrificing educational quality and creative integrity.

Based on the theoretical framework and identified gaps, this study addresses three (3) research questions:

- 1) What are the primary creative challenges and benefits students experience when using Gen AI in digital storyboarding and how do these experiences alter throughout phases of the workflow?
- 2) How do student perceptions of creative processes evolve with AI tool integration, particularly regarding creative ownership, collaboration and decision making?
- 3) What specific pedagogical implications emerge from integrating Gen AI into creative curricula, and how can frameworks be adapted to optimise learning outcomes while preserving creative development objectives?

Collectively, these questions aim to build the much-needed empirical knowledge of AI-enhanced creative education while also providing practical insights into curriculum development.

Literature Review

The Traditional Storyboarding Process

Storyboarding is a foundational process in media production, serving as a pre-visualisation tool that connects conceptual ideas to production execution (Walker et al., 2015). This crucial procedure enables creators to organise narrative flow, camera angles and scene-by-scene transitions. As a result, it aligns creative and technical teams, allowing potential difficulties to be identified and costly adjustments to be avoided later in the production cycle. According to Liu (2020), conventional approaches such as hand-drawn drawings and digital animatics are widely utilised in film, animation, and media courses to help students enhance their visual literacy and narrative skills.

Recent studies highlight a learning advantage of storyboarding in developing narrative thinking and collaborative planning. For example, Pani (2021) discovered that systematic and structured storyboarding activities significantly improved students' ability to visualise and articulate visual narratives in digital media courses. Similarly, Yusoff and Salim (2014) noted that digital storyboarding tools support iterative design and peer evaluation in classroom settings. These advantages extend beyond the educational setting. According to Fraser (2003), storyboards are powerful accelerators for collaborative improvement, allowing teams to align objectives, evaluate performance and distribute updates. Furthermore, storyboards provide a visual representation of data structure, organisation and content, establishing

a conceptual framework for complex projects where narrative messages delivered through visuals are more effective than verbal dictation alone (Chiu & Chu, 2019; Mislana et al., 2020).

However, as Saberi (2023a) highlighted, traditional storyboarding frameworks, particularly those based on classical narrative patterns, may be unsuitable for the intricacies of modern “non-linear” storytelling. The integration of advanced computer tools into storyboarding curriculum has increased the complexity and refinement of visual storytelling by allowing designers to modify characters and experiment with a larger range of camera angles (Madden et al., 2009). Building on this, researchers are now exploring more advanced methods, such as utilising literary storyboard languages to annotate complex cinematic storylines (Ronfard et al., 2015). While digital technologies have accelerated the evolution of storyboarding, allowing for more complex pre-visualisations with interactive elements and multiple plotlines, non-linear approaches are still underutilised in conventional animation curricula, which emphasis linear timelines (Chen, 2013; Saberi, 2023b).

The Rise of Generative AI

Gen AI platforms, such as OpenAI’s DALL-E 3, Midjourney, Canva AI, and Stability AI’s Stable Diffusion, have driven rapid evolution in creative workflows. By employing diffusion-based topologies and extensive training datasets, these platforms can generate visually diverse and semantically rich images from textual prompts. Within the creative industries, such technologies are increasingly applied to concept art, mood boards and pre-visualisation tasks. As Mazzone and Elgammal (2019) suggested, AI can serve as a co-collaborator, accelerating the ideation process and expanding aesthetic possibilities.

Recently, industrial applications have spotlighted AI’s transformational potential in a variety of creative disciplines. For instance, Davenport and Bean (2023) as well as Totlani (2023) highlighted the use of AI-generated graphics in preliminary design stages of advertising and film production, noting significant productivity improvements and rising ethical concerns. In the product design and fashion industries, Gen AI is enhancing creativity through powerful algorithms, enabling rapid generation of multiple design variants and concepts while modelling complex structural aspects (Adhikari et al., 2025; Balasubramanian & Periyaswamy, 2025).

Nevertheless, the use of Gen AI poses significantly contentious issues regarding authorship, originality and creative agency. As Agarwal et al. (2024) suggested, over-reliance on AI technologies may result in the homogenisation of visual styles and decreased critical engagement among new producers. These considerations underscore the critical necessity for careful integration techniques that protect human creative thinking while maximising the possibilities of modern technology.

AI in Education

In education today, artificial intelligence has grown significantly, with uses ranging from personalised learning systems to creative assistance tools. AI aids visual production, music composition and storytelling in the creative arts. Holmes et al. (2019) advocated for an augmentation-focused teaching approach that emphasises, rather than replaces, student innovation through integrated techniques.

The integration of AI into educational settings has shown substantial improvements across various domains (Lee, 2025). According to Omran Zailuddin et al. (2024), using AI can increase efficiency, widen creative outputs and promote cooperation. Specifically, increased personal abilities and work efficiency, known as “Performance Expectancy”, has been highlighted as a major driver in the adoption of AI (Wang et al., 2024). Wang et al. (2025) and Nguyen (2025) discovered that AI-assisted ideation enhanced student creativity and visual communication by enabling the rapid development of high-quality 2D concept graphics.

From a media education perspective, Gen AI may assist with numerous activities, such as scriptwriting, animation and visual storytelling. As stated by Mallik and Gangopadhyay (2023), AI-assisted tools in digital media classes reported better engagement and rapid prototyping when utilised by students. However, they also raised concerns about losing control of the creative development process. Similarly, Choi et al. (2024) and Gobert et al. (2024) found that while AI tools can successfully scaffold learning for less experienced students, they require rigorous instructional design to reduce their passive use. These findings highlight the complexities of incorporating AI into creative education, where technical advantages must be carefully balanced against pedagogical goals and the preservation of student individuality.

Research Gap: Empirical Understanding of Student-AI Interaction in Creative Tasks

Despite increasing interest in integrating AI into education, empirical studies of students’ experience with Gen AI in task-based creative contexts, such as digital storyboarding, remain notably limited. The majority of recent research addresses AI integration from a broader curricular or institutional perspective, leaving a significant gap in understanding how students engage with these technologies during hands-on creative projects. Echoing this, Holmes and Luckin (2016) as well as Nguyen (2025) have called for more detailed, qualitative studies into the influence of AI on learning processes within casual and design-based disciplines.

This gap in the literature is particularly significant given the rapid evolution of AI capabilities and their increasing integration into professional creative workflows. As Wang et al. (2025) emphasised, students require robust support to

develop the competitive and innovative capabilities necessary in a swiftly changing technological landscape (Hartanti et al., 2025). Consequently, understanding students' perspectives, challenges, and creative approaches to applying Gen AI is critical to developing effective pedagogical frameworks. Such frameworks are needed to prepare students for AI-integrated professional environments whilst upholding fundamental educational goals in creative disciplines.

This study addresses the identified gap by investigating how visual communication design students at NEUC engage with Generative AI for storyboarding. The empirical insight derived from these student experiences is intended to inform both theoretical understanding and practical pedagogical strategies in AI-enhanced creative education.

Methodology

Informed by the theoretical framework discussed earlier, this study employed a mixed-methods approach within a descriptive case study design. This methodology was selected to explore student interactions with Gen AI for digital storyboarding. This approach facilitated the collection of both quantitative data on student perspectives and qualitative insight into the underlying cognitive and creative processes. Ultimately, it provided a comprehensive understanding of the integration of AI into creative pedagogy.

Twelve undergraduate students from the Bachelor of Visual Communication Design programme at New Era University College were recruited via purposive sampling. All participants were in their fifth semester and enrolled in the CBVDM2114 Digital Video and Media Production module. The study was conducted over four weeks during face-to-face sessions in the second semester of the 2025/2026 academic year. All participants had previously completed at least one media production course, ensuring a consistent baseline of fundamental knowledge. Although several participants reported informal exposure to Gen AI technologies through social media or personal experimentation, none had prior formal training. Ethical approval was granted by the institutional review board, and rigorous informed consent procedures were employed to ensure voluntary participation.

The study utilised three contemporary platforms available at the time of research (June–July 2025): Veo 3 (version 3.2.1, March 2025 release) for image generation; Hailuo (beta release, updated March 2025) for video storyboard generation; and Milanote (version 3.8.0) for online visual organisation. The documentation of specific software versions is critical not only for academic rigour but also to ensure the replicability of the study. This approach acknowledges the continuous evolution of AI tool capabilities, a vital consideration for future comparative

research, and underscores the need for adaptive pedagogical strategies to help students navigate this rapid technological change.

To enhance the validity and depth of the findings, a triangulated data collection method was employed. This method comprised three components. First, a two-stage task-based evaluation was administered, requiring participants to develop a 3-4-minute narrative structure followed by a 30-second AI-assisted storyboard. This task was designed to replicate a typical pre-production workflow while maintaining control over procedural variables. Second, a validated questionnaire was utilised, containing Likert-scale items to measure perceived challenges and benefits at various workflow stages, along with open-ended questions exploring shifts in creative processes and perceptions of AI engagement. Third, systematic observations were conducted using structured field notes to document behavioural patterns, collaborative interactions and problem-solving strategies.

For the analysis of quantitative data, descriptive statistics were employed to determine the frequency and percentage distributions of the challenge and benefit ratings. The qualitative data from open-ended questionnaire responses and observation notes were subjected to Braun and Clarke's (2006) six-phase thematic analysis. This process facilitated the identification of recurrent themes and patterns concerning the relationship between cognitive challenge, perceived benefits and creative outcomes.

Findings

The mixed-method analysis revealed distinct patterns in student experiences across three key stages of the AI-enhanced storyboarding process. On the whole, the findings highlight both the opportunities and the significant challenges associated with integrating Gen AI into creative education.

The quantitative results indicate a clear hierarchical pattern in perceived difficulty across the project stages (Table 1). The initial storyline creation phase presented considerable challenges, with 50% of participants rating it as "highly difficult" and 33% as "moderately difficult". However, translating creative ideas into an effective AI prompt was identified as the most demanding phase; 75% of students rated this stage as "highly" or "extremely" challenging, while only 8% rated it as low-to-moderate. In stark contrast, when rating their overall learning, 75% of students reported "high" to "extreme" improvement in their understanding of the pre-production workflow due to AI assistance. This shows that Gen AI can serve as a robust cognitive support system, enhancing students' understanding of the pre-production process like never before.

Table 1. Student difficulty ratings across project stages (n=12)

Project Stage	Less than moderately difficult (%)	Moderately difficult (%)	Highly to very highly difficult (%)
Initial storyline creation	17	33	50
Translating ideas into AI prompts	8	17	75
Understanding the workflow	8	17	75

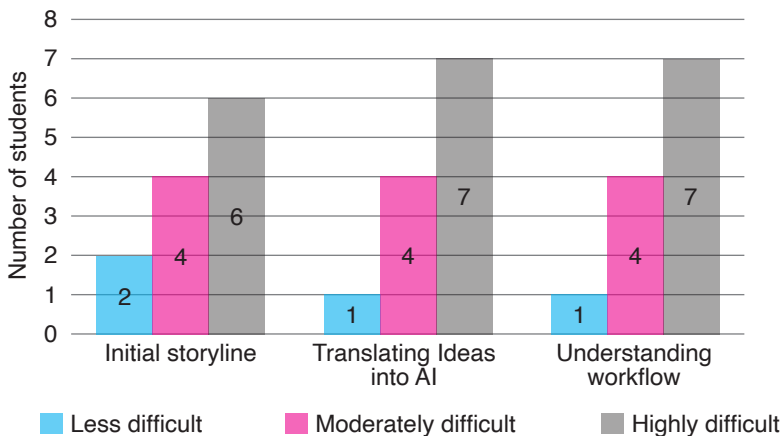


Figure 1. Student rating for key project stages

Thematic analysis of the open-ended response yielded four interrelated themes, which serve to explain the quantitative patterns previously highlighted.

Theme 1: AI as a Creative Collaborator

Participants predominantly perceived Gen AI as a co-creative partner rather than a mere tool. They frequently noted that AI’s capacity to generate “visually polished, professional-looking scenes” and “dynamic camera angles that enriched initial concepts”. As one participant articulated, “it is not replacing creativity, but rather accelerating and broadening exploration”. This collaborative perception aligns with the significant improvements in process knowledge reported previously, as AI assisted in translating abstract concepts into tangible visual representations.

Theme 2: Complexity of Prompt Engineering

Conversely, the most frequently cited challenge was translating creative intent into AI-interpretable commands. Participants understand that effective visualisation

demanded “*precise, structured descriptions covering narrative details, visual style and camera direction*”. Minor ambiguities or omissions in prompts routinely led to inconsistent outputs, with spatial relationships and character actions being particularly prone to misinterpretation. This finding directly contextualises why 75% of participants rated prompt formulation as highly challenging, as it represents the emergence of a novel creative-technical literacy.

Theme 3: Efficiency-Control Tension

Whilst participants acknowledged AI’s efficacy in overcoming logistical challenges such as “*location availability, weather and scheduling*”, they reported that this efficiency often came at the cost of creative control. They cited issues such as “*inconsistent character continuity and stylistic deviations*” that undermined the narrative’s cohesion. This tension highlights a broader challenge in educational contexts: balancing the affordance of technology with the development of deliberate creative intent.

Theme 4: Enhanced Workflow Understanding

Despite these technical challenges, AI nonetheless served as an effective form of cognitive scaffolding for the pre-production process. Participants reported that the AI-generated visualisations enabled them to grasp concepts such as “*shot composition, pacing and narrative flow*” more effectively than conventional methods. This scaffolding effect helps to explain why 75% of students reported significant gains in workflow knowledge. It indicates that the pedagogical value of AI integration extends beyond content generation to encompass a deeper facilitation of the learning process itself.

In summary, the synthesis of quantitative ratings with qualitative themes validates the mixed-methods approach used in this study. The significant challenge reported in prompt formulation (75%) directly correlates with the identified theme of technical complexity; however, the significantly felt improvements in workflow knowledge align with the idea of AI as cognitive scaffolding. These findings demonstrate that, while AI technologies have steep learning curves, particularly in prompt engineering, they offer enormous educational benefits when properly integrated into a creative curriculum.

Discussion

This study suggests that integrating Gen AI into creative workflows does not merely reduce cognitive load; rather, it redistributes it. The critical bottleneck shifts from the domain of creative execution towards the translational cognitive effort required to convert abstract ideas into effective, machine-interpretable prompts. The finding on prompt formulation presenting a significant challenge for 75% of participants

underscores the emergence of a new creative-technical literacy, positioning it as an essential competency for future creative professionals.

Implications for Policy and Curriculum Design

At the policy level, these findings underscore the need to establish clear AI literacy standards within creative education. Universities should integrate dedicated modules on prompt engineering and human-AI interaction into their design, media, and arts programmes. Such modules should be sequenced logically, beginning with foundational exposure and progressing to sophisticated project-based integration. Furthermore, embedding AI literacy criteria within accreditation and programme evaluation frameworks could better ensure that graduates meet current industry demands for effective human-AI collaboration.

From a curriculum design perspective, AI integration should be approached as a structured scaffolding tool to enhance students' metacognitive and reflective abilities, rather than merely as a means of improving production efficiency. Consequently, assessment rubrics must extend beyond the final creative product to evaluate process documentation, prompt-refinement strategies and the critical analysis of AI-generated outputs. This pedagogical approach promotes active student engagement with technology, fostering critical thinking over passive dependency.

Ethical Considerations in Creative AI Use

The integration of AI into creative education introduces ethical considerations that require deliberate pedagogical framing. Curricula must inform students that AI-generated content can inadvertently reproduce elements from its training data, raising complex issues of authorship and originality. Moreover, Gen AI algorithms may perpetuate cultural, gender and racial biases embedded within their datasets, potentially influencing creative outputs in problematic ways. The legal status of intellectual property (IP) for AI-generated works also remains ambiguous, necessitating clear institutional policies on usage, attribution and licensing in both academic and professional contexts.

By embedding these ethical discussions within the creative curriculum, universities can better equip graduates to navigate the technical, creative and ethical complexities of AI-augmented professional practice. Through a synthesis of institutional policy, informed curriculum design and dedicated ethical training, higher education can foster a new generation of responsible, critical and innovative creative practitioners.

Cognitive Load Restructuring in AI-Enhanced Creative Learning

The finding that 50% of participants rated storyline creation as highly challenging is consistent with existing research on the inherent difficulties of narrative construction

(Liu, 2020; Walker et al., 2015). However, our study reveals that AI does not simply reduce this cognitive load but fundamentally redistributes it. Whereas conventional storyboarding distributes cognitive effort across conceptualisation, visualisation and technical execution, the introduction of AI shifts the primary bottleneck towards what we term, “*translational cognitive load*”, the mental effort required to bridge human creative intent and machine interpretation.

This restructuring aligns with the principle of the Cognitive Load Theory, which posits a transformation of extraneous cognitive load (the effort of interface and process) into germane cognitive load (the effort dedicated to schema construction and learning) (Kirschner et al., 2006). The high difficulty rating (75%) for prompt formulation thus reflects a novel cognitive demand that the current pedagogical framework has yet to address fully. Conversely, the high rate of reported improvement in workflow knowledge (75%) confirms AI’s utility as a cognitive scaffold, supporting learners within their zone of proximal development by externalising complex processes.

Prompt Engineering as Creative-Technical Literacy

That 75% of participants identified prompt formulation as the most challenging aspect of the task signals the emergence of what we conceptualise as “*creative-technical literacy*”. This hybrid competency bridges artistic vision with computational communication. In contrast to traditional media literacies, which focus on consumption and production, this new literacy necessitates a meta-cognitive awareness of how AI systems interpret and generate content (Viswanathan, 2025).

The reported difficulties with spatial movements and character consistency reflect the current limitations of AI in maintaining a narrative coherence. Furthermore, these challenges underscore the need for explicit pedagogical frameworks designed to cultivate AI interaction skills (Korea Institute of Design Research Society & Choi, 2024). This finding transcends mere tool training, pointing towards fundamental shifts in how creative ideas are conceptualised and articulated. It thereby contributes to the broader discourse on critical AI literacy in education (Roe et al., 2025).

The Efficiency-Control Paradox

Analysis of student responses revealed what we term the “*efficiency control paradox*”: participants appreciated the AI’s capacity to overcome practical constraints but also experienced frustration due to diminished creative control. This term resonates with theoretical debates concerning automation versus augmentation in creative work (Longo & Albano, 2025). Our findings indicate that current AI tools primarily operate in an augmentative mode, which necessitates considerable human oversight.

The challenges students reported regarding character continuity highlight AI's current technical limitations in maintaining temporal and narrative consistency. However, as Hwang and Wu (2025) argue, such limitations can be reframed as valuable learning opportunities. They foster the development of critical evaluation and adaptive problem-solving skills, both of which are essential for professional practice. This reconceptualization transforms technological constraints into pedagogical assets that can improve outcomes in creative education.

AI as Cognitive Scaffolding for Process Understanding

The fact that 75% of students reported an enhanced understanding of creative workflows provides compelling evidence for AI's role as a cognitive scaffold in education. This scaffolding operates through "*process externalisation*", whereby the structured and detailed articulation required for prompts makes the internal aspects of creative decision-making visible. Consequently, students are compelled to consider elements that are often implicit, such as shot composition, lighting, character positioning, and narrative pacing.

The iterative process of refining prompts based on AI-generated outputs creates what Gierhart et al. (2024) mentioned as "*reflective loops*", which enhance metacognitive awareness. This process mirrors professional creative workflows, indicating that AI tools can serve as a "*professional practice simulator*" that offers authentic learning experiences. This interpretation is supported by the collaborative co-creation framework of Fu et al. (2025), which demonstrates that structured AI interaction can pedagogically replicate real-world production processes.

Theoretical Framework: Toward Comprehensive AI Integration

Informed by the constructivist learning and cognitive load theories, our findings support a framework centred on three core principles: translational literacy, reflective scaffolding and collaborative agency. First, translational literacy comprises the cognitive and communicative skills required to bridge human creative intent with AI interpretation. This extends beyond technical prompt engineering to include a critical understanding of AI capabilities, limitations and biases (Darmawan et al., 2024). Second, reflective scaffolding positions AI tools as mediating artefacts that externalise creative processes, thereby enabling metacognitive reflection. This concept draws on Vygotsky's zone of proximal development and adapts it for AI-mediated learning. Finally, collaborative agency pertains to the challenge of maintaining human creative ownership while leveraging AI capabilities, a practice that requires what Mzwri and Turcsányi-Szabo (2024) termed as "*agentic AI interaction*".

Pedagogical Implications

These findings point to four key instructional strategies. First, curricula for prompt engineering should be structured to progress from basic AI interaction to sophisticated creative-technical communication, incorporating theories of visual communication and narrative structure. Second, the integration of reflective practice should require students to document their process of refining prompts and analyse the relationship between their creative intentions and the AI’s outputs. Third, collaborative learning structures ought to be designed to enable peer support in developing AI interaction strategies, thereby maintaining the social dimensions of creative learning. Fourth, assessment frameworks must evaluate both process and product, recognising prompt engineering competency and critical evaluation skills as integral components alongside traditional creative outcomes.

Conclusion

This study demonstrates that Gen AI does not simply reduce the cognitive demands of creative education but also redistributes them, highlighting translational cognitive load as a central challenge. Students’ perceptions suggest that structured integration of AI can enhance workflow comprehension while introducing new literacies essential for creative industries. For educators and policymakers, the findings underscore the urgency of embedding AI literacy and prompt engineering in curricula, supported by assessment strategies that value process alongside outcomes. Though limited by sample size, this research contributes conceptual tools—translational cognitive load and creative-technical literacy, that can guide future multi-institutional and longitudinal studies on AI in education.

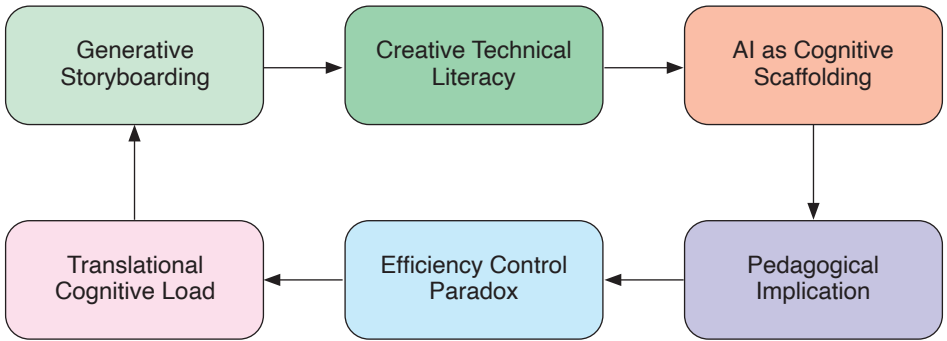


Figure 2. Gen AI in storyboarding conceptual framework

Recommendations For Future Research

While this study offers meaningful preliminary insights into the integration of AI, several limitations highlight the key directions for future research. First, the relatively small sample size ($n = 12$) and the focus on a single institutional context constrain the external validity and generalizability of the findings. Future research should therefore employ larger or more diverse samples across multiple institutions including cross-cultural and cross-national settings to enhance the robustness of conclusions.

Second, given the rapid and iterative evolution of AI technologies, particularly in generative AI tools, longitudinal research design is strongly recommended. Such studies would enable to track changes in student perceptions, usage pattern and learning curve behaviour. These approaches could also capture potential shifts from novelty-driven engagement to the more critical, reflective and strategic use of AI in creative processes.

Third, the need for comparative research across different creative disciplines, such as graphic design, fine arts and creative writing. Each discipline may present unique affordances and constraints in the adoption of AI, shaped by disciplinary norms, assessment practice and definitions of creativity.

Finally, further studies should shift beyond perception-based analyses and incorporate direct measurement of learning outcomes. The empirical assessment of student performance, creativity, critical thinking, and skill development is essential to substantiate the pedagogical claims with AI integration.

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