Burnout and Digital Storytelling in Business and Economics Education in the Age of Artificial Intelligence: A Literature Review

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Abstract

Background: In business and economics education, digital storytelling has emerged as a multimodal pedagogical approach, while the growing presence of artificial intelligence has introduced new opportunities and risks related to overload, authorship, and responsible tool use. **Objectives:** This paper examines the relationship between digital storytelling and burnout-related issues in business and economics education, and seeks to position artificial intelligence as a contextual factor that may influence both the benefits and risks of this pedagogical approach. **Methods/Approach:** The paper is based on a literature review of studies identified in the Web of Science database. The selected studies were analysed thematically with a focus on digital storytelling, communication, engagement, and burnout-related challenges in higher education. **Results:** The reviewed literature indicates that digital storytelling is associated with improved communication skills, stronger motivation, greater learner engagement, and more meaningful participation in learning activities. **Conclusions:** The findings indicate that digital storytelling has relevant pedagogical potential in business and economics education, particularly in strengthening audience-oriented communication, narrative coherence, and active student participation. However, these benefits are not automatic, as their sustainability depends on structured implementation and on limiting the additional cognitive and technical demands associated with artificial intelligence-supported learning.

Keywords: burnout; digital storytelling; higher education; business education; economics education; artificial intelligence; student engagement; communication competence

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Introduction

The rapid digital transformation of higher education has significantly reshaped teaching and learning practices over the last decade, further accelerated by the COVID-19 pandemic. Institutions were required to adopt digital platforms regardless of their prior technological readiness, leading to the widespread integration of digital tools into instructional processes (Akour & Alenezi, 2022; Haleem et al., 2022; Yuliani & Hartanto, 2022). Within business and economics education, this shift has intensified the need for pedagogical approaches that not only deliver disciplinary content but also foster communication competence, digital literacy, and active student engagement.

Communication competence remains a central outcome of higher education, especially in business-related fields where graduates are expected to present ideas clearly, engage in professional dialogue, and translate complex analyses into accessible narratives (Hymes, 1972; Savignon, 2017). However, designing learning activities that effectively develop such competencies in digitally mediated environments remains challenging (Al-Amri, 2020). In this context, digital storytelling has emerged as a pedagogical method that integrates narrative construction with multimedia elements, including text, audio, images, and video, thereby enabling students to communicate knowledge in a structured and audience-oriented manner (Rahimi, 2019; Miller, 2019).

Existing emerging studies suggest that digital storytelling can enhance motivation, engagement, communication skills, and confidence, particularly when students actively create their own content (Aljaraideh, 2020; Hava, 2021; James et al., 2019; Yang et al., 2022). These effects are particularly relevant in business and economics education, where students are expected to develop the ability to present data-driven insights, construct persuasive arguments, and adapt communication to different stakeholders. At the same time, the multimodal and production-oriented nature of digital storytelling introduces additional cognitive and organisational demands, which may contribute to student strain if not appropriately managed.

Alongside these developments, the increasing use of artificial intelligence tools has introduced new dynamics into educational practice. Artificial intelligence can support ideation, language refinement, and technical production, but it may also yield generic outputs, reduce authorship awareness, and require additional verification and critical evaluation. As a result, students are required not only to learn content but also to manage digital tools, evaluate outputs, and maintain responsibility for the accuracy and coherence of their work. These conditions align with broader concerns related to workload, cognitive overload, and burnout in higher education.

Although burnout has been widely discussed in educational contexts, its relationship to specific pedagogical methods, such as digital storytelling, remains underexplored. This is particularly evident in business and economics education, where the focus has primarily been on performance outcomes rather than on the sustainability of learning processes. Digital storytelling, therefore, represents a relevant case for examining how pedagogical design may simultaneously support engagement and contribute to or mitigate student strain. In this study, burnout is not treated as a directly measured outcome, but as a conceptual lens through which workload, cognitive strain, and sustainability of learning processes are interpreted.

This paper addresses this gap by reviewing the literature on digital storytelling and examining its implications for burnout-related dynamics in business and economics education. Rather than assuming a direct causal relationship, the paper positions burnout as an analytical lens through which the benefits and limitations of digital storytelling can be more critically assessed, particularly in the context of artificial intelligence-supported learning environments.

Literature review

Digital storytelling in higher education

Digital storytelling has emerged as a pedagogical approach that combines narrative construction with multimedia elements such as text, audio, images, and video (Rahimi, 2019; Miller, 2019). Its educational relevance is grounded in the development of communicative competence, understood as the ability to use language appropriately in context and for specific purposes (Hymes, 1972; Savignon, 2017). In higher education, and particularly in business and economics programmes, this competence is directly linked to students' ability to present arguments, interpret data, and communicate insights to different audiences.

Empirical studies consistently report positive effects of digital storytelling on communication skills, including speaking, writing, and narrative structuring (Al-Amri, 2020; James et al., 2019; Yang et al., 2022). In addition, digital storytelling has been associated with increased motivation, engagement, and learner satisfaction (Aljaraideh, 2020; Hava, 2021). These outcomes are particularly relevant in business education, where students are expected to develop persuasive communication and audience-oriented reasoning.

Beyond skill development, digital storytelling supports active, experiential learning by positioning students as creators rather than passive recipients. It requires integrating content selection, interpretation, and presentation into a coherent narrative, aligning with contemporary pedagogical approaches focused on student-centred, multimodal learning environments (Jerez et al., 2021). As such, digital storytelling provides a structured format for practising communication tasks that closely resemble real-world business activities.

Artificial intelligence and storytelling in education

The rapid development of artificial intelligence, particularly large language models, has introduced new possibilities for storytelling-based learning. Artificial intelligence tools can support various stages of the storytelling process, including idea generation, language refinement, content structuring, and multimedia production. Recent studies suggest that integrating generative artificial intelligence into digital storytelling can enhance creative and critical thinking, as well as overall learning performance (Chiu & Hwang, 2026).

Similarly, research on AI-assisted narrative approaches indicates that storytelling supported by artificial intelligence can improve student engagement, clarity of explanation, and perceived relevance of learning materials (Hallal et al., 2026). Artificial intelligence can also enable personalised and adaptive storytelling experiences, adjusting content to different learners and contexts (Gousopoulos & Petrakos, 2026). These features align with broader trends in higher education towards personalised and technology-enhanced learning environments.

However, the literature also highlights important limitations and risks. Artificial intelligence-generated content may yield generic outputs, shallow understanding, and challenges with authorship and accuracy. As a result, several authors emphasise the need for careful instructional design and explicit guidelines for responsible use of artificial intelligence in educational settings (Yarnall et al., 2026). In this sense, artificial intelligence does not replace pedagogical design but rather increases its importance.

Overall, the integration of artificial intelligence into storytelling-based learning expands both the opportunities and the complexity of educational practice. While it

can enhance creativity and efficiency, it also introduces additional cognitive and evaluative demands for students.

Burnout, technostress, and cognitive load in digital learning

Parallel to the development of digital and AI-supported learning environments, a growing body of literature examines student workload, cognitive demands, and burnout-related challenges in higher education. Although burnout is not always explicitly measured, related constructs such as stress, cognitive overload, and mental fatigue are frequently discussed in the context of digital learning.

The shift towards technology-mediated education has increased the number of tasks students must manage simultaneously, including content processing, tool usage, and communication across digital platforms (Akour & Alenezi, 2022; Haleem et al., 2022). This can contribute to technostress and cognitive overload, particularly when learning activities are poorly structured or require unfamiliar technical skills.

From this perspective, digital storytelling represents a potentially ambivalent pedagogical approach. On the one hand, its emphasis on engagement, creativity, and meaningful communication may reduce disengagement and support more sustainable learning experiences. On the other hand, its multimodal and production-oriented nature can increase workload and complexity, especially when combined with artificial intelligence tools that require additional monitoring and validation.

Importantly, the existing literature rarely examines digital storytelling and burnout in a unified framework. Instead, these constructs are typically studied in isolation: digital storytelling research focuses on engagement and communication outcomes, while burnout research focuses on stress and workload in digital environments. This separation indicates a clear research gap.

Synthesis and research gap

The reviewed literature reveals three relatively distinct but related streams: digital storytelling as a pedagogical method, artificial intelligence as an emerging educational tool, and burnout-related challenges in digital learning environments. While each of these streams is well represented individually, their intersection remains limited and fragmented.

In particular, there is a lack of research examining how digital storytelling, especially when supported by artificial intelligence, affects student workload, cognitive demands, and burnout-related outcomes in business and economics education. Existing studies provide indirect evidence through constructs such as engagement, motivation, and cognitive load, but do not systematically address the sustainability of learning processes.

This gap justifies the need for a more integrated perspective that considers both the benefits and the potential risks of storytelling-based and AI-supported pedagogical approaches. The present study addresses this gap by analysing the literature through the lens of burnout and sustainable learning, thereby extending existing research beyond performance-oriented outcomes.

Methodology

This study applies a structured literature review based on a systematic search of the Web of Science Core Collection database. The search strategy was designed to capture research related to digital storytelling and burnout-related constructs, using combinations of keywords such as “digital storytelling”, “storytelling”, “burnout”, “technostress”, and “exhaustion”.

Given the limited number of studies simultaneously addressing all focal concepts, a broader search approach was adopted. The aim was not to identify only studies covering digital storytelling, artificial intelligence, and burnout within a single framework, but to capture relevant and adjacent research streams. This approach allows for a more comprehensive understanding of the field, which remains fragmented and underexplored.

The initial dataset consisted of 74 records. The screening process was conducted in two stages. First, titles and abstracts were reviewed to assess relevance to educational contexts. Second, full-text screening was applied to identify studies addressing at least one of the following dimensions: (1) digital storytelling in education, (2) artificial intelligence-supported learning, and (3) student engagement, cognitive load, or burnout-related challenges. Studies outside educational contexts or without conceptual relevance were excluded.

The selected studies were analysed using a thematic synthesis approach. The analysis was structured around three main streams: (1) digital storytelling and communication competence, (2) artificial intelligence in educational contexts, and (3) burnout, technostress, and cognitive load in digital learning environments. Rather than aiming for quantitative aggregation, the analysis focuses on identifying recurring patterns, relationships, and gaps across these streams.

This methodological approach enables the integration of fragmented literature and supports the identification of an underexplored intersection between digital storytelling, artificial intelligence, and burnout in business and economics education.

Results

Core learning outcomes of digital storytelling

The literature consistently demonstrates that digital storytelling contributes to the development of communication-related competencies in higher education. Across studies, the most frequently reported outcomes include improvements in narrative structuring, clarity of expression, and the ability to adapt communication to specific audiences (Al-Amri, 2020; James et al., 2019; Yang et al., 2022). These competencies are particularly relevant in business and economics education, where students are required to communicate complex concepts clearly and persuasively.

In addition to communication skills, digital storytelling is strongly associated with increased learner motivation and engagement. Students involved in storytelling-based tasks report higher levels of participation, interest, and satisfaction than those in more traditional instructional approaches (Aljaraideh, 2020; Hava, 2021). This is often linked to the active role students assume, as they are required to create and present their own content rather than passively receive information. Empirical findings further indicate that digital storytelling supports the development of digital literacy and oral communication skills, while also strengthening confidence in presenting ideas (Setiawan et al., 2023; Chaisriya et al., 2023).

A recurring finding across the literature is that the effectiveness of digital storytelling is not primarily driven by digital media but by the cognitive and communicative demands embedded in the task. Students are required to transform information into a coherent narrative, which involves selecting relevant content, prioritising key ideas, and establishing logical relationships between them (Rahimi, 2019). This process promotes higher-order cognitive engagement and supports a deeper understanding of the subject matter.

Furthermore, digital storytelling has been linked to more meaningful and contextualised learning. By embedding content within a narrative structure, students

are encouraged to connect theoretical knowledge with real-world applications and personal interpretations (Nguyen, 2011; Schrum et al., 2021). This contributes to a stronger sense of relevance and supports the development of applied communication skills. Collaborative storytelling activities additionally foster interaction, perspective-taking, and communication within groups, further enhancing learning outcomes (Rutta et al., 2020).

Finally, the literature consistently highlights that these positive outcomes depend on structured implementation. Clear task design, scaffolding through techniques such as storyboarding, and iterative feedback are identified as key conditions for successful application (Aljaraideh, 2020; Hava, 2021; Jerez et al., 2021). Without such support, students may experience difficulties in organising content and managing the demands of the task.

Artificial intelligence as an enabling and complicating factor

The reviewed literature indicates that integrating artificial intelligence into storytelling-based learning environments introduces both enabling and complicating effects. In educational contexts, artificial intelligence—particularly large language models—has been increasingly used to support content creation, idea generation, and language refinement. Empirical studies show that such tools can enhance students' creative output, support the development of ideas, and improve the overall quality of storytelling tasks (Chiu & Hwang, 2026). These tools are particularly useful in the early stages of the storytelling process, when students may struggle to structure narratives or generate relevant content.

In addition, artificial intelligence-supported storytelling has been associated with increased student engagement and perceived clarity of learning materials. Studies suggest that narrative-based approaches supported by AI can make complex or abstract content more accessible and easier to understand, thereby facilitating participation and comprehension (Hallal et al., 2026). Artificial intelligence can also support personalised learning by adapting narrative content to different audiences and learning needs, thereby further enhancing its pedagogical effectiveness (Gousopoulos & Petrakos, 2026).

At the same time, the literature highlights several limitations associated with the use of artificial intelligence in storytelling-based learning. A recurring issue is the tendency of AI-generated content to be overly generic or insufficiently grounded in specific contexts, requiring students to spend additional effort refining, verifying, and adapting the output. This shifts part of the cognitive load from content generation to evaluation and critical assessment (Yarnall et al., 2026). As a result, students are not only engaged in creating narratives but also in monitoring the quality and accuracy of AI-assisted outputs. This suggests that artificial intelligence increases operational efficiency while simultaneously maintaining, or even increasing, cognitive demands at the evaluative level.

Furthermore, the use of artificial intelligence introduces additional complexity to the task. Students must manage both the storytelling process and the effective use of digital tools, which may increase the number of steps required to complete assignments. This includes selecting appropriate prompts, interpreting generated responses, and ensuring alignment between the generated content and learning objectives. Such requirements can increase cognitive demands, particularly for students with limited prior experience in using AI tools.

The literature also raises concerns about authorship, originality, and responsible use. The integration of artificial intelligence into learning tasks raises questions about the extent to which students remain active creators versus passive users of generated

content. For this reason, several studies emphasise the importance of clear guidelines, transparency, and reflective practices in the use of AI in educational settings (Yarnall et al., 2026).

Burnout, technostress, and cognitive strain in digital learning

The reviewed literature indicates that digitally mediated learning environments are increasingly associated with elevated cognitive demands and stress-related challenges. Although burnout is not consistently measured as a primary outcome, related constructs such as technostress, cognitive overload, and mental fatigue are frequently discussed in the context of technology-enhanced education (Akour & Alenezi, 2022; Haleem et al., 2022). These challenges are particularly evident in settings where students must simultaneously manage content learning, digital tools, and performance expectations.

A recurring finding is that digital learning environments tend to increase task complexity. Students are often required to navigate multiple platforms, process large amounts of information, and engage in continuous communication, all within constrained timeframes. Such conditions can contribute to cognitive overload and reduced capacity for deep learning. In this context, stress does not arise from a single task but from the cumulative effect of multiple parallel demands.

Within this broader framework, storytelling-based tasks introduce additional layers of cognitive and organisational effort. While digital storytelling has been shown to enhance engagement and communication skills, it also requires students to manage multiple components, including content selection, narrative development, visual design, and technical production. Without adequate structure, these demands may exceed students' cognitive capacity, leading to increased strain.

The literature suggests that the key factor determining whether such tasks contribute to engagement or exhaustion is the level of instructional support. Clear task design, scaffolding, and staged feedback are consistently identified as mechanisms that reduce ambiguity and help students manage workload (Jerez et al., 2021; Aljaraideh, 2020). In contrast, poorly structured tasks with unclear expectations can lead to confusion, inefficiency, and increased stress.

In digitally intensive environments, these effects may be further amplified. The introduction of additional tools and technologies increases the number of decisions students must make and the effort required to coordinate different aspects of the task. This aligns with broader findings on technostress, which show that the perceived complexity and constant adaptation to new technologies contribute to psychological strain.

Importantly, the literature rarely examines burnout in direct connection with digital storytelling. Instead, burnout-related outcomes are typically studied in more general digital learning contexts, while storytelling research focuses on engagement and communication. This separation suggests that the relationship between storytelling-based pedagogies and student strain remains insufficiently explored.

Discussion and conclusion

Summary of findings and proposed conceptual model

This study examined the literature on digital storytelling, artificial intelligence, and burnout-related challenges in higher education, with a specific focus on business and economics education. The findings indicate that digital storytelling is consistently associated with improved communication competencies, higher levels of student engagement, and more active forms of learning. Its effectiveness is primarily linked to

the requirement to structure and communicate ideas through coherent narratives, rather than to the use of digital tools alone.

At the same time, the integration of artificial intelligence introduces both opportunities and additional complexity. Artificial intelligence tools can support idea generation, content development, and technical execution, thereby facilitating participation and enhancing creative output. However, the findings suggest that these tools do not reduce overall effort, but instead shift cognitive demands toward evaluation, verification, and refinement of generated content.

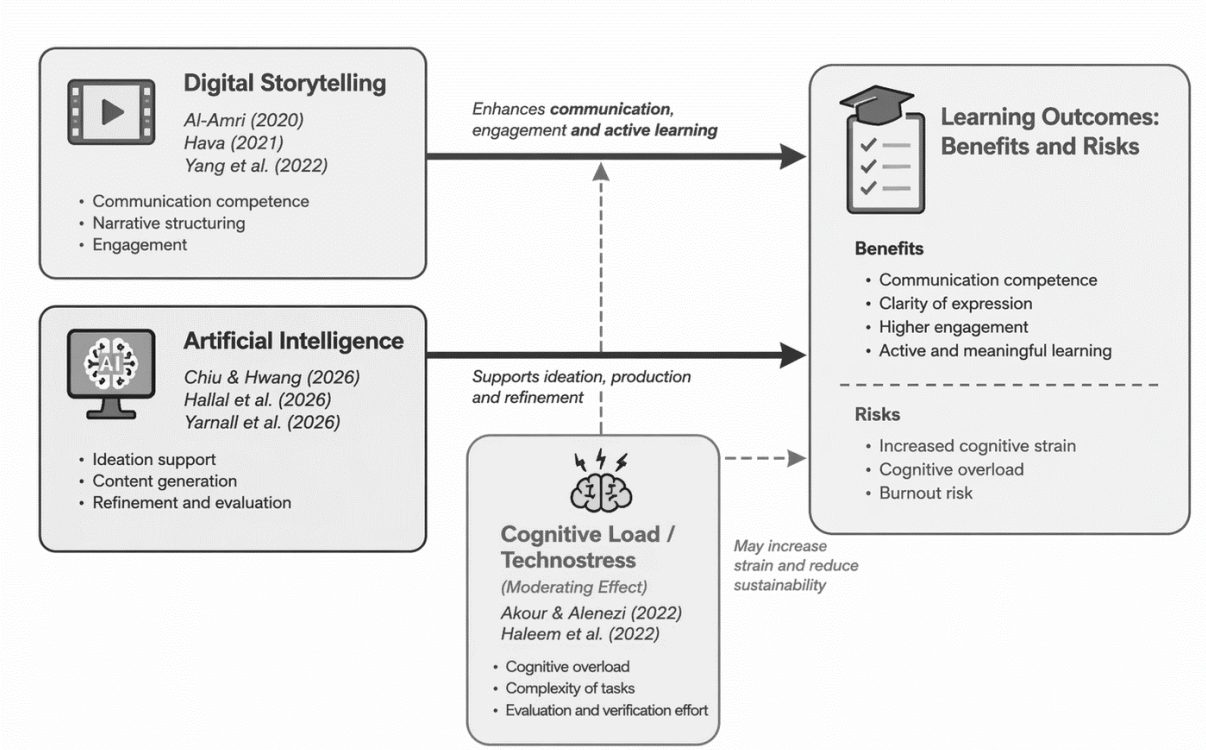
The analysis also highlights that digital and AI-supported learning environments are associated with increased cognitive load and potential strain. While burnout is rarely addressed directly in the context of digital storytelling, related constructs such as technostress and cognitive overload suggest that complex, multimodal tasks may increase mental effort, particularly when insufficiently structured.

The results reveal that the three examined domains, digital storytelling, artificial intelligence, and burnout-related challenges, remain largely disconnected in the existing literature. Their intersection is underexplored, indicating a need for more integrated research that considers both the benefits and the cognitive costs of storytelling-based and AI-supported learning approaches.

Based on the synthesis of the literature, a conceptual model, presented on Figure 1, is proposed that integrates digital storytelling, artificial intelligence, and cognitive load perspectives. The model illustrates how storytelling-based learning, supported by artificial intelligence, simultaneously enhances engagement and introduces additional cognitive demands. These interactive effects shape the overall learning experience, creating a tension between learning effectiveness and cognitive strain.

Figure 1

Conceptual model of digital storytelling, artificial intelligence, and cognitive load in higher education



Source: Authors' elaboration based on the reviewed literature

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The proposed model synthesises the key findings of the literature by integrating three core dimensions: digital storytelling as a pedagogical approach, artificial intelligence as a technological enabler, and cognitive load as a constraining factor. Digital storytelling contributes to the development of communication competence and engagement by requiring students to structure and present content in a narrative form. Artificial intelligence supports this process by facilitating idea generation, content refinement, and production efficiency.

However, both elements introduce additional cognitive demands. The need to evaluate AI-generated outputs, ensure accuracy, and integrate multimodal elements increases cognitive load and may contribute to technostress. As a result, the model highlights a central tension between enhanced learning outcomes and the risk of cognitive strain or burnout. This perspective suggests that the effectiveness of AI-supported storytelling depends on balancing engagement-driven benefits with cognitive-demand management.

Theoretical contributions

This study contributes to the literature by integrating three research streams that have largely developed independently: digital storytelling in education, artificial intelligence-supported learning, and burnout-related challenges in digital environments. While prior research has predominantly examined these areas in isolation, this study positions them within a common analytical framework, thereby extending existing knowledge toward a more comprehensive understanding of contemporary learning processes.

First, the study contributes by reframing digital storytelling as a cognitively demanding pedagogical approach rather than solely a motivational or engagement-oriented tool. Existing literature primarily emphasises its positive effects on communication and participation (Al-Amri, 2020; Hava, 2021). In contrast, this study highlights the underlying cognitive mechanisms, such as narrative structuring, information prioritisation, and audience adaptation, that align with principles of multimodal learning and deeper cognitive processing (Rahimi, 2019).

Second, the study advances the theoretical understanding of artificial intelligence in education by conceptualising its role not only as an enabling technology, but also as a factor that reshapes cognitive effort. While recent research has demonstrated that AI-supported storytelling can enhance creativity and learning outcomes (Chiu & Hwang, 2026; Hallal et al., 2026), this study's findings suggest that AI does not reduce overall cognitive demands. Instead, it redistributes effort toward evaluation, verification, and critical judgment, which aligns with emerging discussions on the need for responsible and reflective use of AI in educational settings (Yarnall et al., 2026).

Third, the study contributes by identifying the absence of an integrated framework linking storytelling-based pedagogies and burnout-related outcomes. Although burnout, technostress, and cognitive overload have been widely discussed in digital learning environments (Akour & Alenezi, 2022; Haleem et al., 2022), their relationship with specific pedagogical methods such as digital storytelling remains insufficiently explored. By highlighting this gap, the study opens a new line of inquiry focused on the sustainability of learning approaches in complex digital contexts.

Finally, the study offers a conceptual contribution by introducing the notion of a tension between engagement and cognitive strain in AI-supported storytelling environments. This perspective suggests that pedagogical innovations should not be evaluated solely on effectiveness, but also on their impact on student workload and well-being. In doing so, the study complements existing research on engagement and

performance with a process-oriented and sustainability-focused perspective on learning in the age of artificial intelligence.

Practical implications

The findings of this study have several practical implications for the design and implementation of teaching in business and economics education, particularly in digitally mediated and AI-supported environments.

First, digital storytelling should not be implemented as an unstructured creative task. The results clearly indicate that its effectiveness depends on a well-defined assignment design. Instructors should specify the narrative structure (e.g., problem–analysis–recommendation), clearly define the target audience, and set explicit expectations regarding the use of evidence. Structured scaffolding, such as storyboarding and intermediate milestones, is essential to ensure that students focus on communication quality rather than purely technical or aesthetic aspects.

Second, integrating artificial intelligence into storytelling tasks requires clear operational rules. Students should be guided on how to use AI tools for specific purposes (e.g., idea generation, language refinement), while maintaining responsibility for content accuracy and interpretation. Requiring a short disclosure of AI usage can support transparency and encourage reflective engagement rather than passive reliance on generated outputs.

Third, workload management emerges as a critical factor. Digital storytelling assignments combine multiple demands, conceptual, communicative, and technical, which can lead to cognitive overload if not properly calibrated. Instructors should therefore limit task scope (e.g., short formats, clearly bounded topics), avoid excessive technical requirements, and ensure alignment between task complexity and course level.

Fourth, assessment design should prioritise communication and reasoning over production quality. Evaluation criteria should focus on clarity of argument, coherence of narrative, and appropriate use of evidence, rather than on advanced technical execution. This reduces unnecessary pressure and ensures that learning objectives remain central.

Finally, digital storytelling can be effectively positioned as a simulation of real-world business communication tasks. When properly structured, it can serve as a training ground for activities such as pitching, reporting, and stakeholder communication. However, its successful implementation depends on balancing engagement with cognitive demands, particularly in environments where students are already exposed to multiple digital tools and learning requirements.

Limitations and future research directions

This study has several limitations that should be acknowledged.

First, the analysis is based on a single database (Web of Science Core Collection), which may limit the coverage of relevant studies. Although WoS ensures a high level of quality and indexing consistency, it may exclude recent or practice-oriented contributions that are indexed in other databases, such as Scopus or Google Scholar. In addition, the relatively small number of identified studies reflects both the specificity of the topic and the field's fragmentation.

Second, the study relies on a structured literature review and thematic synthesis rather than on empirical data. As such, the findings are interpretative and do not allow for causal conclusions. While this approach is appropriate for identifying patterns and research gaps, it does not provide direct evidence on the impact of digital storytelling or artificial intelligence on burnout-related outcomes.

Third, the search strategy required some conceptual broadening due to the limited number of studies that addressed all focal constructs simultaneously. As a result, the analysis integrates adjacent research streams rather than a tightly defined body of literature. Although this approach provides a more comprehensive perspective, it also introduces heterogeneity across the analysed studies.

Fourth, the focus on higher education, and particularly on business and economics education, further narrows the applicability of the findings. Some of the included studies originate from other disciplinary contexts, which may limit direct generalisation. Based on these limitations, several directions for future research can be identified.

Future studies should empirically examine the relationships among digital storytelling, artificial intelligence, and burnout-related outcomes. In particular, there is a need for quantitative and mixed-methods research that measures cognitive load, technostress, and student well-being in storytelling-based learning environments.

In addition, comparative research designs could explore differences between traditional assignments and storytelling-based tasks, as well as between AI-supported and non-AI-supported learning conditions. Such studies would provide more precise insights into the conditions under which these approaches enhance or hinder learning.

Further research should also investigate the role of instructional design variables, such as task structure, scaffolding, and assessment criteria, in moderating the relationship between engagement and cognitive strain. This would contribute to the development of more sustainable pedagogical models.

Finally, future research could expand the scope beyond higher education and examine how storytelling-based and AI-supported approaches function in different educational contexts and cultural settings. This would help to assess the generalisability of the findings and further develop the theoretical framework proposed in this study.

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